
Systematic screening
for child abuse
at emergency departments
Eveline C.F.M. Louwers

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Systematic Screening for Child Abuse at Emergency Departments

Structurele screening op kindermishandeling op de spoedeisende hulp

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CHAPTER 1

General introduction

Child abuse is a serious problem and has serious consequences for the victim, his or her environment and for society itself. It has been estimated that one in every 30 Dutch children is exposed to child abuse.[1] While preventable morbidity and mortality of infectious diseases in childhood is enormously reduced over the past decades, unfortunately this has not been the case for the staggering statistics surrounding child abuse.[2] Child abuse includes all forms of physical and emotional maltreatment, sexual abuse and neglect that result in actual or potential harm to the child's health, development or dignity.[3] Child abuse was already addressed as a public health problem in the 19th century by a French forensic expert, Ambroise Tardieu (Born in Paris on March 10, 1818). He was the first physician to acknowledge the appearance of children being mistreated at the hands of their parents, and described the classical features of almost all forms of child abuse and neglect.[4-5] A century later, in 1962, American physicians wrote a landmark article about child abuse being a pediatric and public health problem, called "The battered child-syndrome".[4-7] This was the starting point for further recognition and awareness of child abuse. The increasing awareness of child abuse by health care professionals since 1962 is reflected in the enormous increase in articles published in the MEDLINE database. In 1963, 12 articles were categorized under the newly added keyword "child abuse" versus 914 in 2011.[7] In 1970 the Dutch Association Against Child Abuse was founded.

Child abuse

The definition of child abuse that is used in this thesis originates from the Dutch law: *"Any form of threatening or violent physical, mental or sexual interaction with a minor which is perpetrated actively or passively by parents or other persons on whom the minor is dependent and causes or will probably cause physical or mental injury and serious harm to the minor".*[8] We consider people under the age of 19 to be minors or children.

Four types of child abuse can be distinguished: physical abuse, sexual abuse, psychological abuse and neglect.[9] Physical abuse is the use of physical force or implements against a child that results in, or has the potential to result in, physical injury. This includes for example hitting, kicking, shaking or strangling.[9]
Sexual abuse is any completed or attempted sexual act, sexual contact, or non-contact sexual interaction with a child by a caregiver. Intentional touching directly or through clothes of genitalia, penetration genitally or digitally and exposure to sexual activity are all forms of sexual abuse.[9] Psychological abuse concerns intentional behavior that conveys to a child that he or she is worthless, unloved, unwanted or valued only in meeting another's needs. Psychological abuse is for example consequently blaming, intimidating or isolating the child. Witnessing domestic or intimate-partner violence is classified as exposure to psychological abuse.[9]
Neglect includes the failure to meet a child's basic physical, emotional, medical or educational needs, failure to provide adequate food or clothing, not seeking medical attention when needed, allowing a child to miss education and failure to ensure a child's safety.[9]

Prevalence

It is difficult to assess the magnitude of child abuse because most cases are hidden and not recognized by professionals or others.[10] The estimated incidence differs per country, varying from 17.1 per 1000 children in the USA[11] to 34 per 1000 children in the Netherlands.[1] Because of differing definitions and populations it is difficult to compare these data, however, the study design used in the American and the Dutch study was similar. The numbers in the Dutch NPM-2010 study are based on reports of professionals of any kind working with children and on the data of the Dutch Child Abuse Centres. Only 1.9% of the reporting professionals worked in hospitals, most of the professionals were from schools and daycares.[1] The estimated costs of child abuse and its consequences in the Netherlands are 965 million Euros per annum.[12]

People having concerns about a child potentially being abused contacted the Dutch Child Abuse Centre 65,993 times in 2011; this was the highest number of contacts ever in the Netherlands so far (figure 1). The Dutch Child Abuse Centre is the competent authority in the Netherlands that is responsible for taking care of cases of (potential) child abuse. Most people call the Child Abuse Centre with questions about how to deal with their concerns on the safety of one or more children they know. Nine percent of the reports to the Child Abuse Centre consider physical abuse. Sexual abuse is the least reported form of child abuse with 2%. Thirty-one percent of the reports concern psychological abuse of which two thirds relate to witnessing domestic violence, and neglect includes most reports (47%). In 19,254 cases (29% of all contacts) the call led the Child Abuse Centre to start an investigation into the occurrence of child abuse. In 9% of these 19,254 cases the child was referred through a hospital.[13]

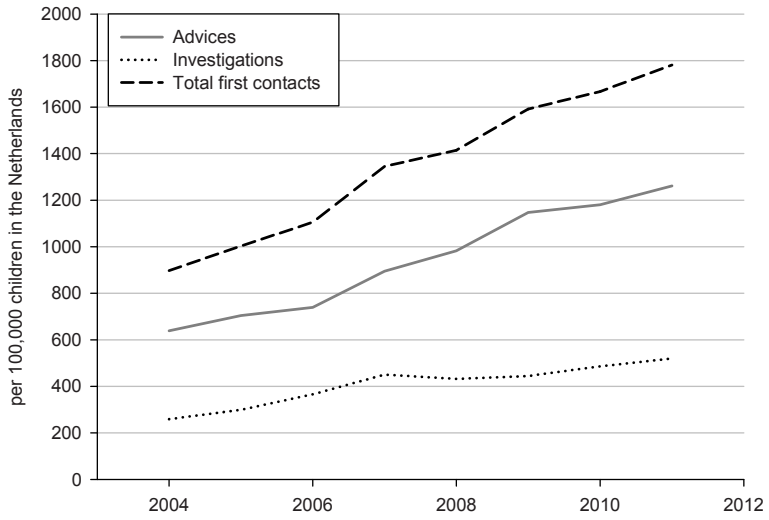

Figure 1
Number of first contacts with the Child Abuse Centre in the Netherlands[13]

Consequences of child abuse

The long term adverse effects of child abuse are numerous; former victims have increased health risks for alcoholism, smoking, drug abuse, sexually transmitted disease, severe obesity, depression, and suicide attempt.[9,14-19] Formerly abused children have a poor self-rated health[20], and an increased risk for adult diseases including ischemic heart disease, cancer, chronic lung disease, skeletal fractures, and liver disease.[9,15] Persons who have been maltreated chronically when they were young are more at risk for behavioral and emotional problems than those who were victims of transitory maltreatment. Early detection and intervention to improve the family situation is therefore crucial.[16,20-22]
Severe cases of child abuse can lead to the death of a child. Mortality due to child abuse is probably underreported in the Netherlands as well as in other countries; the estimates in the Netherlands vary from 17 to 40 children dying of child abuse each year.[23-24]

Screening

Screening can be defined as the systematic application of a test or inquiry, to identify individuals at sufficient risk of a disorder or abnormality to benefit from further investigation or direct preventive action. Screening calls attention to the likelihood of a condition before symptoms appear.[25-27] For an increasing number of conditions screening is being conducted, either in or out of the context of population based screening programs. Prenatal screening, the neonatal heel prick, cervical and breast cancer screening are just a few examples of screening programs offered to eligible groups in the Netherlands.[28] A screening program leads to major benefits for a small group of persons, but also to limited disadvantages for a group of persons. In a good screening program the benefits outweigh the disadvantages at the population level.[28]
Early detection of child abuse can potentially reduce the related short-term and long-term morbidity and mortality. When families are supported to bring the abuse to a stop, the quality of life of the children and families can improve. A potential disadvantage of screening for child abuse, however, is an increase of incorrect suspicions and accusations, which could be harmful for families and/or to patient-doctor relationships.[29]

Systematic screening for child abuse started around 1975 in Canada[30] with the introduction of a screening at a number of emergency departments[30-32] but it was not introduced on a large scale. In the late nineties the first attempts to systematically screen for child abuse were made in the Netherlands with the development of the SPUTOVAMO form by Compernolle.[33] The SPUTOVAMO form is an injury registration checklist and was introduced in the emergency department of the VU medical Centre in Amsterdam to detect child abuse in an early stage.[34] In the following years several screening tools based on the SPUTOVAMO form were developed and used in Dutch emergency departments. However, evidence is lacking if systematic screening for child abuse in emergency departments leads to an increased detection rate of potential child abuse, and if the detected cases of potential child abuse are justified or not. The validity of the screening questions to predict potential child abuse was never evaluated. Despite the lack of

evidence screening for child abuse at emergency departments has become mandatory in the Netherlands in 2009.[35]

Research questions

In this thesis we address the following research questions:

1. Which valid screening tools to detect child abuse at emergency departments have been described in literature?
2. What are facilitators and barriers for screening for child abuse at emergency departments in the Netherlands?
3. How frequent is systematic screening for child abuse applied at Dutch emergency departments, and to what extent is potential child abuse being detected?
4. What is the effect of systematic screening using the newly developed Escape screening tool on detection of child abuse at emergency departments?
5. What is the predictive value for suspected child abuse of the different screening questions in the Escape screening tool?
6. Are *suspicions* of child abuse detected by the Escape screening tool at emergency departments justified as child abuse in follow-up?

In the following chapters these research questions will be answered and discussed. In Chapter 8 we discuss implications of screening at the emergency department and future perspectives for improving detection of child abuse at emergency departments. Also we present conclusions and recommendations for practice. This thesis ends with a summary.

Outline of the Escape project

In 2007 we initiated the project 'Escape', an acronym for *"**S**creening for **c**hild **a**buse at **e**mergency departments, implementation of an optimal **p**rotocol"*. The goal of Escape was to develop an effective and feasible implementation protocol for screening for child abuse at emergency departments. We started with a literature review on relevant items for the screening tool (Chapter 2) and interviews with professionals to evaluate the facilitators and barriers for screening for child abuse at the hospital emergency departments (Chapter 3). Based on these data we modified an existing screening instrument and selected the best way of addressing barriers for screening of child abuse. We started with a baseline monitoring of the rates of screening and detection of suspected child abuse at emergency departments during a period of six months (Chapter 4). This was followed by the implementation of an adapted screening instrument and training of emergency department nurses in seven Dutch hospitals. These seven hospitals were located in the province of South Holland (The Netherlands) with together annually 200,000 emergency department visitors. We used an interrupted time-series design to detect changes in trends of screening and detection of child abuse over time, before and after the implementation of the screening instrument and the training for emergency department nurses. The effects of implementation in terms of screening rate and detection rate of suspected child abuse were moni-

tored for another 23 months (Chapter 5). We subsequently measured the predictive value of the screening questions of our instrument that we used to detect suspected child abuse (Chapter 6). Finally we selected one hospital for the follow-up of all children who had visited the emergency department during our study period. We combined hospital databases and a database of the Child Abuse Center to evaluate how well the screening was capable in detecting justified cases of child abuse (Chapter 7).

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CHAPTER 2

Screening for child abuse at emergency departments: a systematic review

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Arch Dis Child 2010;95:214-218

Abstract

Introduction – Child abuse is a serious problem worldwide and can be difficult to detect. Although children who experience the consequences of abuse will probably be treated at an emergency department, detection rates of child abuse at emergency departments remain low.
Objective – To identify effective interventions applied at emergency departments that significantly increase the detection rate of confirmed cases of child abuse.
Design – This review was carried out according to the Cochrane Handbook. Two reviewers individually searched Pubmed, The Cochrane Library, EMBASE, Web of Science, and CINAHL for papers that met the inclusion criteria.
Results – Fifteen papers describing interventions were selected and reviewed; four of these were finally included and assessed for quality. In these studies the intervention consisted of a checklist of indicators of risk for child abuse. After implementation, the rate of detected cases of suspected child abuse increased by 180% (weighted mean in three studies). The number of confirmed cases of child abuse, reported in two out of four studies, showed no significant increase.
Conclusions – Interventions at emergency departments to increase the detection rate of cases of confirmed child abuse are scarce in the literature. Past study numbers and methodology have been inadequate to show conclusive evidence on effectiveness.

Introduction

Child abuse is one of the most serious and devastating problems in childhood. The number of children that are abused has long been underestimated. According to estimations from the World Health Organization (WHO) in 2002 almost 31,000 children aged <15 years died worldwide as a result of homicide.[1] The incidence of child abuse in the USA is estimated at 23.1 per 1,000 children[2-3] and in the Netherlands at 30 per 1,000 children.[3] In this report child abuse refers to 'all forms of physical and emotional ill-treatment, sexual abuse, neglect, and exploitation that result in actual or potential harm to the child's health, development or dignity', as defined by the WHO.[4]

Early detection and intervention may help to halt child abuse and limit the damage to the development of the child.[5] Although child abuse can be difficult to detect, it is likely that children who experience the consequences of abuse will be treated at emergency departments (EDs). The incidence rates of child abuse at EDs have been reported to range from 2%[6-8] to as high as 10%.[9-13] However, the detection rate of child abuse at EDs in the Netherlands (assessed for 2001-2004) was only 0.1%.[14] If the medical staff (e.g. at EDs) would systematically be aware of the possibility of child abuse in each child they see, the detection rate might increase.

Introduction of a uniformly applicable protocol for screening for child abuse could be beneficial if such a screening is effective and if a simultaneous increase of incorrect suspicions of child abuse can be prevented. The aim of this review is to establish whether an effective intervention exists that is to be used at EDs and that significantly increased the detection rate of confirmed cases of child abuse.

Methods

The information for this review was obtained according to the Cochrane Handbook.[15] In February 2008 a search was made of PubMed, EMBASE, Web of Science, The Cochrane Library and CINAHL. No limitations were applied for languages or date of publication. To ensure that all critical papers were included, the journal 'Child Abuse and Neglect' was reviewed from 1977. The search was started in PubMed and used the medical subject heading terms "child abuse", "mass screening", and "emergency service, hospital" and eight other related keywords (battering, non-accidental injury, maltreatment, screening, intervention, emergencies, emergency treatment, emergency department), separately and in combination.

The following inclusion criteria were applied: (1) studies should be peer reviewed and focus on children; (2) the context should be an ED; and (3) an intervention to detect child abuse must have been used. Furthermore, studies aimed at specific patient groups (such as children with burns) were excluded, since results of these studies would not be generalisable to the ED setting. When titles and abstracts met the inclusion criteria, these were screened independently by two reviewers (EL, IK). The selected studies were rated on study design, the included age range, whether all presenting symptoms were included or only cases of trauma, and whether suspected cases of child abuse could be confirmed in the follow-up. Each paper was assessed for these four criteria; when a criterion was adequately met, one point was allocated. The reviewers

Table 1
Overview of articles included in this paper.

Article	Patients	Duration of study follow- up	Country	Aim of study	Type of research	Intervention implemented during study	Detection rate before and after intervention	Conclusion of study	Effective screening method according to reviewers*
Pless et al. Child Abuse Negl [13]	0-5 yrs Trauma n=4422	4.5 months	Canada	To test the hypothesis that a more systematic evaluation of all children with accidents would increase the number of patients referred to the CPT because of suspected maltreatment and thereby result in an increased number of subsequently confirmed cases	Prospective	Introduction of the Accident-SCAN, a checklist with 10 questions for assessing the risk of child abuse, filled in by nurses who received special training. In combination with findings of the physician at physical examination	Increase of confirmed cases of abuse and neglect 0.86% → 1.13% OR 1.32 95% CI 0.72-2.40	No significant increase of detection of abuse after introduction of the SCAN. Authors concluded that ED staff was already doing well or the SCAN was not sufficient	Not effective. Increase of confirmed cases of abuse was not significant
Sidebotham and Pearce BMJ [21]	0-18 yrs All presenting symptoms n=2345	Two audits of 2 months each	United Kingdom	To show whether procedures for identifying children thought to be at risk of abuse were being followed	Prospective	Education and training of ED staff, introducing feedback, and updating the checklist, consisting of five risk factors for child abuse	Increase of children with ≥2 indicators discussed with the on-call paediatric registrar 0.22% → 1.32% OR 6.0 95% CI 1.71-21.2	Procedures were being followed. Checklist heightens awareness of those children in whom there are features that might cause concern	Effectiveness not shown. A significant increase of suspected abuse, but number of confirmed cases were not reported
Benger and Pearce BMJ [9]	0-5 yrs Trauma n=2000	Two audits of 3 months each	United Kingdom	To improve child protection procedures by increasing the frequency with which intentional injury was adequately documented and considered by physicians. To increase the number of children referred for further assessment, thereby increasing the detection of child abuse	Prospective	Introduction of a flowchart, with four questions, in the patient's file for assessing child abuse and consulting the CPR	Increase of cases of suspected abuse referred to social services after 6 months. The outcome of referred children could not be determined 0.6% → 1.4% OR 2.33 95% CI 0.89-6.1	Inclusion of a flowchart increased awareness, consideration and documentation of suspected abuse	Effectiveness not shown. A non-significant increase of suspected abuse, and authors could not establish no. of confirmed cases
Bleeker et al. Ned. Tijdsch. Geneeskd. [14]	0-17 yrs Suspected cases of abuse at all departments n=220	40 months	The Netherlands	To describe characteristics of child abuse, establish directives in cases of suspected abuse and introduction of a checklist	Retrospective	Evaluation and analysis of collected information on child abuse, introduction of a checklist consisting of nine questions	After intervention 28 cases of confirmed abuse were detected at the ED	Increase of detected cases of confirmed abuse after introduction of a checklist at the ED and analysis by experts	Effectiveness not shown. No registration of situation before introduction of the intervention

* Effective screening method: due to the intervention, the rate of cases of confirmed child abuse increased significantly.
CPR, Child Protection Register; CPT, Child Protection Team; ED, Emergency Department; SCAN, Suspected Child Abuse and Neglect.

jointly reached a consensus on inclusion or exclusion criteria of the papers and on the allocation of points.
An intervention was considered effective if due to the intervention the rate of cases of confirmed child abuse increased significantly.

Results

The search in PubMed resulted in 328 titles; no new studies were found in the other databases. From these titles, 318 studies were excluded based on the title and/or the lack of an abstract. Based on titles and abstracts, 10 papers appeared to fulfil the inclusion criteria.[8-9,13,16-22] An additional three papers were added from the reference lists[23-25], and two Dutch papers known to the reviewers were also included.[14,26] Of the resulting 15 papers, the full articles were read by the two reviewers. Subsequently, 11 articles were excluded because they did not specifically meet the inclusion criteria, that is, one was not a peer-reviewed study[26], and in 10 studies the intervention was not applied in practice.[8,16-20,22-25]
Therefore, four studies were finally included in this review which together reported on 8987 children aged 0-18 years (table 1).[9,13-14,21]

Pless *et al* introduced the Montreal Children's Hospital Accident Scan for 4422 trauma patients aged ≤6 years presenting at EDs (table 2). This prospective study showed a non-significant increase of confirmed cases of abuse from initially 0.86% up to 1.13% after implementing the intervention. The authors reported 25 (70%) 'true positives' out of 36 children suspected of abuse after the intervention. Pless *et al* concluded that either implementation of the checklist was not sufficient to increase the detection rate of child abuse, or that the ED staff was already focused on detecting child abuse.[13]

Table 2
Items used in the checklists of the articles included in this review

Item of the checklist	Pless *et al*[13]	Sidebotham and Pearce[21]	Benger and Pearce[9]	Bleeker *et al*[14]
Findings examination conform history	X	X	X	X
Delay in seeking medical help	X	X	X	X
Inconsistent history	X	X	X	X
Child/parent behaviour and interaction appropriate	X		X	
Child/parent reported or showed evidence of abuse	X			
Skeletal survey required	X			
Other reason to suspect abuse	X			
Previously seen at ED		X		
Head injury or fracture in child <1yr		X		
Action of parents after injury appropriate				X
Perpetrator/witness accompanied child to ED				X

In the study of Sidebotham and Pearce, all 2345 children aged ≤18 years who attended the ED, were included. Triage by nurses of the children attending the ED included checking the child protection register and assessing five indicators of risk for child abuse (table 2). Two audits of 2 months each were carried out. After the first audit, training and feedback were given to the ED staff and the checklist was revised. During the second audit, a significant increase in suspected cases of abuse was seen (0.22% vs 1.32%, odds ratio (OR) 6.0), but whether these suspicions were confirmed in a later stage was not examined. The authors concluded that using a checklist will increase the awareness of child abuse in ED staff, but that child abuse cannot be identified solely through assessing five indicators of risk for child abuse.[21]

Benger and Pearce performed a prospective study with 2000 trauma patients aged ≤6 years presenting at the ED. There were two audits of 3 months each; after the first audit a flowchart was introduced for the patient files consisting of four questions (table 2). This flowchart was included in 71.7% of the patient files. After the introduction of the intervention, a much greater proportion of ED notes recorded consideration of intentional injury (71%) than in the first audit (1.6%), even in the notes without a flowchart. The increase in cases of suspected abuse was non-significant (0.6% vs 1.4%, OR 2.3). Due to local policies the authors were not allowed to assess whether these suspected cases of child abuse were confirmed at a later stage.[9]

In a Dutch study of Bleeker *et al*, a checklist (named SPUTOVAMO) was introduced (table 2). Numbers of detected cases before the intervention were not registered. After introduction of the intervention, child abuse was detected in 0.1% of all children presenting at the ED. Out of 220 suspected cases of abuse in the hospital (not only the ED), 58 (26%) cases of child abuse could be confirmed.[14]

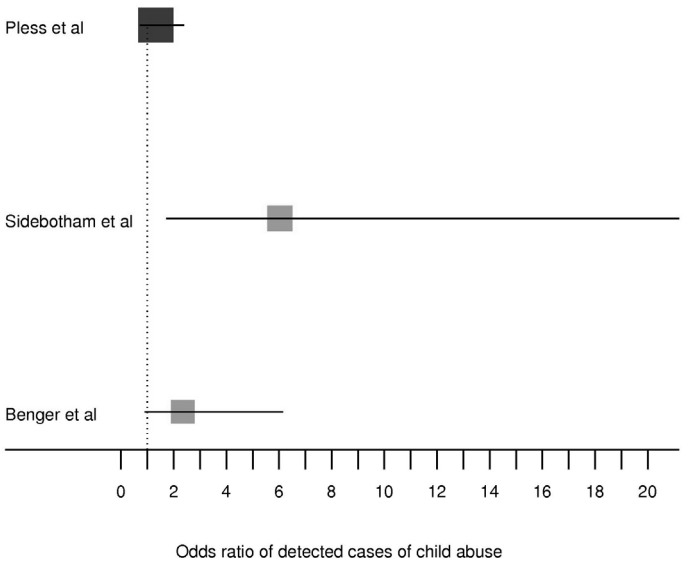

Figure 1
The trends in the detection rate of suspected or confirmed cases of child abuse per study

Table 3
Quality assessment of the included articles

Article	Detection rate was assessed before and after applying the intervention	Inclusion until minimally age 16 yrs	All presenting symptoms were included	Cases of suspected child abuse could be confirmed	Score
Pless *et al.* Child Abuse Negl[13]	1	0	0	1	2
Sidebotham and Pearce BMJ[21]	1	1	1	0	3
Benger and Pearce BMJ[9]	1	0	0	0	1
Bleeker *et al.* Ned. Tijdsch. Geneeskd.[14]	0	1	1	1	3

When the criterion was sufficiently met one point was ascribed.

In the three studies for which numbers of children were reported, the detection rate of suspected or confirmed cases of child abuse increased by 179.9% (weighted mean). Figure 1 shows the trends per study.[9,13,21] Although the study of Pless *et al* was the only one that provided follow-up confirmation of the suspected cases of abuse, the studies of Sidebotham *et al* and Bleeker *et al* satisfied most of the criteria in the quality assessment (table 3).

Discussion

In this review we found only four studies reporting an intervention to increase the detection rate of child abuse at EDs. In none of these studies could a significant increase in the detection of *confirmed* abuse in children be established after the introduction of an intervention at the ED. However, all studies reported an increase in the rate of *suspected* cases of abuse after the introduction of an intervention, as well as improved documentation of patient files, and a higher level of awareness of child abuse among ED staff, which are worthwhile effects of these interventions.[9,13-14,21]

One risk associated with the introduction of screening for child abuse is an increase in the rate of incorrect suspicions without an increase of confirmed cases, which can be harmful for families. In two of the four studies in this review, the authors reported the number of cases of confirmed abuse. In the study of Pless *et al,* 11 of the 36 cases (30%) were found to be true accidents after a full assessment[13], indicating child abuse had not occurred. Bleeker *et al* reported 58 (26%) confirmed cases out of 220 suspected cases; 120 suspected cases were refuted and in 42 cases no evidence was obtained.[14] The wide range between these studies may be related to the protocol used, or the population attending the ED; this stresses the importance of not accusing a possible perpetrator but rather to focus on the child's well being and conducting larger studies.

Screening for child abuse at EDs can also have positive side effects. When structured registration forms were used, documentation of the consideration of child abuse and documentation of risk

factors increased.[9,21,23-24,27-29] Improved documentation is beneficial not only for other medical staff involved, but also in the event of a judicial investigation. Another positive effect of using checklists was that it heightened awareness; for example, in the case that the checklist was mistakenly not added to the medical records, the ED staff would still consider the possibility of child abuse and be better able to report this.[9,21,27,30]

The studies by Flanagan *et al*[17] and Limbos and Berkowitz[17,24] showed that the standard indicators of child abuse were not always sought by physicians, suggesting the need for an aide-memoir[17,24] such as a checklist of indicators of risk for child abuse. In 1979, Hight *et al* developed a risk profile for children with burns to improve the recognition of child abuse.[31] After the introduction of Hight's profile, Clark *et al* reported an increase of suspected cases of child abuse in burned patients and a significant increase in effective referrals to social services.[29] Benger and McCabe also introduced a reminder checklist for burned patients after which they saw a significant increase in the documentation of the risk indicators of child abuse and an (non-significant) increase in the referral rate.[27] In addition, according to Clark *et al*[29] there are many barriers for physicians to report child abuse, including lack of information, fear of litigation, and fear of creating an adversarial role between the doctor and the family. The use of a checklist and a clear protocol can help to break down some psychological barriers against reporting abuse.[29]

However, recording risk factors alone may be insufficient: the education of ED staff is essential to support screening.[14,17-21,27-28] Van Haeringen *et al* emphasized the importance of educating physicians: child abuse should not be missed because of lack of knowledge, or because physicians are ignorant of child abuse.[32]

Table 2 shows the items included in the checklists of the studies in this review. One or more disconcerting items are considered as a reason to suspect child abuse and to consult the paediatrician. Three items were included in all checklists: (1) whether the findings on examination conformed with the history given by the child or parents; (2) whether there was a delay in seeking medical help; and (3) whether there was an inconsistent history. Clark studied the effect of a screening profile in children with burns; he found that items 1 and 3 were significantly associated with referral for child protective services. Item 2 was found not to be significantly related.[29] However, we recommend further study on the predictive value of each of the items separately in studies with larger case numbers.

Some studies reported that younger children are at greater risk of abuse than older ones[10-11,29], but as reported by others also school-age children are often victim of abuse.[14,17,24,31,33] Two studies in this review implemented screening only in preschool children[9,13], the other two did not make a selection for age.[14,21] The OR of the detection of child abuse through a checklist was much higher in the study of Sidebotham *et al* that screened all age groups, compared with the studies that screened children ≤6 years of age (table 1). The incidence of child abuse at EDs has been estimated as 2%[6-8] up to as high as 10%.[9-13] The incidence of 10% was based on estimations in older studies while the incidence of 2% was based on more recent assessments. However, even the more recent assessments remain an educated guess since child abuse cannot be measured in the same way as, for instance, obesity. There is a taboo associated with child abuse and often it cannot be seen from the outside. In this review, the incidence of suspected cases of child abuse after introduction of an intervention ranged from 0.1% to 2.3%. Although this number is

low, it still represents a large number of children and child abuse remains an important public health problem.

The number of studies in this review is very small. Although we retrieved a large number of publications using a sensitive search strategy according to the Cochrane Handbook[15], searched in five different databases, and did not exclude studies based on language, many studies did not fulfil the inclusion criteria. Two of the assessed papers were not identified through our search strategy; one was not present in the databases we searched[26], and the other did not correspond with the Mesh terms.[14] Nevertheless, because we were already aware of these two Dutch studies we were able to assess them. However, we acknowledge the possibility that other ('grey') publications describing screening for child abuse at EDs may have been published but were not found by us on this occasion. The weighted mean has to be considered as an indication of the effects of the studies, since we pooled three studies in which two different quantities (suspected cases vs confirmed cases) were used.

We conclude that interventions at EDs to increase the detection rate of cases of confirmed abuse could be effective, but currently there is no conclusive evidence to confirm this. Maybe the benefits are small and past study numbers and methodology have been inadequate to prove that benefit. To supply this evidence we recommend further research in large study populations including assessments of the detection rate of child abuse before and after the implementation of an intervention.

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CHAPTER 3

Facilitators and barriers to screening for child abuse in the emergency department

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Abstract

Background – To identify facilitators of, and barriers to, screening for child abuse in emergency departments (ED) through interviews with ED staff, members of the hospital Board, and related experts.

Methods – This qualitative study is based on semi-structured interviews with 27 professionals from seven Dutch hospitals (i.e. seven pediatricians, two surgeons, six ED nurses, six ED managers and six hospital Board members). The resulting list of facilitators/barriers was subsequently discussed with five experts in child abuse and one implementation expert. The results are ordered using the Child Abuse Framework of the Dutch Health Care Inspectorate that legally requires screening for child abuse.

Results – Lack of knowledge of child abuse, communication with parents in the case of suspected abuse, and lack of time for development of policy and cases are barriers for ED staff to screen for child abuse. For Board members, lack of means and time, and a high turnover of ED staff are impediments to improving their child abuse policy. Screening can be promoted by training ED staff to better recognize child abuse, improving communication skills, appointing an attendant specifically for child abuse, explicit support of the screening policy by management, and by national implementation of an approved protocol and validated screening instrument.

Conclusions – ED staff are motivated to work according to the Dutch Health Care Inspectorate requirements but experiences many barriers, particularly communication with parents of children suspected of being abused. Introduction of a national child abuse protocol can improve screening on child abuse at EDs.

Background

Early detection of child abuse is a priority of the Dutch Health Care Inspectorate; in the Netherlands, each year 107,200 children are victim of some type of child abuse.[1] Child abuse is an important public health problem: besides the serious consequences for each child and their environment, the estimated costs of child abuse in the Netherlands are 965 million euros per annum.[2-3]

The Dutch media frequently report the inadequate detection of child abuse in hospital emergency departments (EDs). Since January 2009 all EDs are legally required to fulfil the Inspectorate criteria, published in the report *'EDs do not adequately detect child abuse: a broken arm is too often an incident'* in 2008 (Table 1). This report includes a Child Abuse Framework with criteria such as screening each child visiting the ED for child abuse, and regular training for ED staff.[4] Perhaps related to these requirements, the total number of children reported by Dutch hospitals to the central Child Abuse Center increased from 677 (4%) in 2007 to 1,499 (8.3%) in 2010.[5-7]

Table 1
Child Abuse Framework of the Dutch Health Care Inspectorate October 2008: all criteria were required to be in place by January 2009

A. Policy

1. There is policy at the level of the Board of Directors to address child abuse; this policy is documented and funding for this policy is secured.
2. There is policy within the hospital for dealing with suspected child abuse in the ED. This policy is documented and compliance with policy is checked.

B. Child abuse team, special child abuse attendant, cooperation with Child Abuse Center

3. A child abuse team is in place. The purpose, duties and procedures of this team are documented. The team has representatives from the ED, a pediatrician, a child psychologist, a social worker and a surgeon; the team meets at least twice a year.
4. The hospital has a special child abuse attendant who has a job description, and was consulted at least 1-10 times in the first half of 2007. Functionality is ensured by provision of sufficient hours and budget.
5. Structured consultations take place with the Child Abuse Center; a pediatrician and an ED staff member is present at these consultations. The cooperation is evaluated for procedure and content.

C. Protocol for suspected child abuse

6. The hospital has a hospital-wide protocol, as well as a protocol in the ED for dealing with signs/suspicions of child abuse. The SPUTOVAMO* checklist and its manual are part of the ED protocol.

D. Professional development

7. The hospital has a training program for the detection of child abuse. This program is well structured and documented; 95-100% of the ED staff follow the program.

E. Registry and information

8. It is known how many children visited the ED. The SPUTOVAMO* checklist is used for all (100%) children. These numbers are recorded.
9. It is known how many children were suspected of child abuse based on the SPUTOVAMO* checklist; these numbers are recorded. A member of staff is available to perform and control these registrations.
10. For all children who visited the ED in the first half of 2007, it is known how many times the Child Abuse Center was consulted. These numbers are recorded, and for at least 50% of the children of suspected child abuse the Child Abuse Center was consulted.
11. For all children who visited the ED in the first half of 2007, it is known for how many a referral or report was made to the Child Abuse Center or to other types of aid; these numbers are recorded. Someone is available for implementation and management of this registration.

*SPUTOVAMO = Dutch injury registration checklist

In the present study, ED professionals in Dutch hospitals were interviewed about the quality of child abuse detection in EDs, with the aim to define facilitators/barriers to screening for child abuse, and to make recommendations to optimize the screening for child abuse at EDs.

Methods

As part of the study *'Screening for child abuse in EDs, implementation of an optimal protocol'* interviews were held with 27 professionals who were all related to at least one of the seven participating hospitals in the province of South-Holland, the Netherlands.[8] The hospitals included one university (urban) children's hospital, four urban teaching hospitals, and two rural peripheral hospitals. All participating hospitals had an emergency department where children of all ages were treated. Some of these emergency departments had been undertaken screening for child abuse prior to the staff being surveyed. This period ranged from several years to just one year. At their office, we interviewed members of four professions; nine senior physicians (seven pediatricians and two surgeons), six members of the hospital Board, six ED nurses and six ED managers. These professions were selected because of their direct involvement in the detection of child abuse in the ED or their responsibility concerning child abuse policy. From these 27 interviews, facilitators of and barriers to detection of child abuse were extracted.

In the second phase of the study, these facilitators/barriers were presented to five child abuse experts and one implementation expert for their advice on how to tackle the barriers. These child abuse experts were a pediatrician with expertise in prevention of child abuse, a forensic pediatrician, a child abuse hospital attendant, a forensic nurse specialist in the child abuse detection, and a senior child abuse researcher specialist in child abuse prevention.

All 33 interviews were semi-structured and focused on detection of child abuse in EDs, and related training and policy. All interviewees (except the implementation expert) were also asked for their opinion about ten propositions related to child abuse policy and detection, cooperation, and training. The SPUTOVAMO is a Dutch injury registration checklist developed to detect child abuse in an early stage.[9] All interviews were conducted by the same researcher (EL), all were audio-recorded, and fully transcribed for analysis by two researchers (EL, IK). In 11 interviews a second researcher was (IK or MA) present. Reasons for this were twofold: to train the first interviewer (EL) and to underline the importance of some of the interviews: these were the interviews with six members of the hospital Board, and with the implementation expert.

This study was approved by the Medical Ethical Committee of the Erasmus MC, University Medical Centre Rotterdam (MEC-2007-195). Participants were professionals and informed consent for participation was audio-recorded.

Results

The 33 interviews (conducted between June 2007 and January 2008) lasted on average 38 (range 22-76) minutes each.

First, the health professionals were asked if they ever suspected child abuse in the ED and what they found difficult about these situations. Four of the seven pediatricians found it difficult to

discuss suspected child abuse with the parents; this was mainly due to practical problems (e.g. limited time, lack of a suitable/quiet location) and personal barriers (e.g. fear of an unjustified suspicion). The two surgeons had a similar experience and also mentioned the problem of separating the child's medical treatment from the investigation of possible abuse. They considered medical treatment to be their prime responsibility and prefer to leave investigation of abuse to other professionals, e.g. the pediatrician or the Child Abuse Center (Table 2, proposition 2). Five ED nurses considered communication to be a limiting factor, e.g. when parents questioned the need for a head-to-toe examination when their child had a local injury only.

Child Abuse Framework

During the interviews, the following elements of the Inspectorates' Child Abuse Framework (Table 2) were mentioned.

A. Policy (propositions 1-3): Health professionals saw active support from the hospital Board as a positive factor, whereas the lack thereof was seen as a bottleneck. When the Board was supportive they arranged for example the appointment of a special child abuse attendant. The Board unanimously indicated that they were open to a more active policy on the detection of

Table 2
Propositions presented to the interviewees at the end of the interview

Propositions A. Policy	***Agree***	***Disagree***	***No opinion***
1. It is better to have an unjustified suspicion than to miss a case of child abuse (n=32)	30	2	0
2. Other specialties are pleased to let the pediatrician conduct the discussion with parents in the case of suspected child abuse (n=32)	25	1	6
3. Sometimes I do not report a suspicion of child abuse in order to avoid problems with the parents (n=26; not presented to members of the Board)	10	15	1
Propositions B. Child abuse team, special child abuse attendant, cooperation with Child Abuse Center	***Agree***	***Disagree***	***No opinion***
4. The Child Abuse Center is sufficiently accessible for reporting child abuse (n=26; not presented to members of the Board)	15	3	8
5. When it comes to child abuse, patient privacy is subordinate to the interests of consultations between health professionals (n=32)	23	6	3
Propositions C. Protocol for suspected child abuse	***Agree***	***Disagree***	***No opinion***
6. In our ED more than 90% of the child abuse cases are detected (n=32)	3	23	6
7. If no follow-up is organized, you might as well stop screening for child abuse (n=32)	16	16	0
8. Our ED staff is well informed about when/when not to fill out a screening instrument for child abuse (n=32)	16	9	7
Propositions D. Professional development	***Agree***	***Disagree***	***No opinion***
9. My medical training was sufficient to enable me to detect child abuse in practice (n=26; not presented to members of the Board)	3	20	3
10. Prejudice precludes proper detection of child abuse (n=32)	24	8	0

These answers are derived from 32 interviewees (i.e. excluding the implementation expert), or from 26 interviewees (i.e. excluding the implementation expert and the 6 Board members).

child abuse. However, one Board member remarked: *'It's difficult to find budgeting in these times of cutbacks' and another said: 'We can tackle all sorts of problems of our society but if there are no financial compensations, then we should really limit to our core business; treating real pathology.'*

B. Child abuse team, child abuse attendant, collaboration Child Abuse Center (propositions 4, 5): Three of the 7 hospitals had a child abuse team which focused on policy and/or cases. Organizing a team meeting was a bottleneck *'...because it's difficult to meet during working hours and people aren't so willing to meet after work'.* Five Board members found the appointment of a child abuse attendant useful, but '*…no money was available', or 'it belongs to the normal package of social work'.* One Board member was '*…not in favor of creating functions with special areas, as the primary person (ED nurse) would no longer feel responsible'.*

The health professionals were satisfied with the collaboration with the Child Abuse Center.

C. Protocol for suspected child abuse (propositions 6-8): All physicians stated that their hospital had a protocol for suspected child abuse. However, among the other interviewees, not all were aware of it or did not know where to find the protocol.

At the time of the interviews, screening for child abuse by completing a SPUTOVAMO form (or a checklist derived from SPUTOVAMO) was conducted in 5 of 7 participating hospitals; 2 hospitals did not screen for child abuse because of disagreement about its usefulness or about the profession that should complete the screening instrument. Irrespective of whether or not screening took place, the majority thought that child abuse is not always detected in the ED. ED managers agreed that screening belongs to the work of the ED. However, during busy hours ED nurses often disregard the checklist, even though it can be filled in relatively quickly.

D. Professional development (propositions 9, 10): In all hospitals the pediatricians provided some training on recognizing and dealing with child abuse, albeit sporadically and without a structured program. In one hospital, all staff had recently received intensive training in detecting child abuse. A fast turnover of ED staff (especially junior doctors) was an obstacle to organizing teaching and maintaining the level of knowledge. Two physicians found that lack of motivation among the ED staff was also an obstacle. Almost all nurses and physicians stated that more emphasis should be placed on detecting child abuse during their basic training.

Expert opinions

Also interviewed were five child abuse experts and in addition, we asked an implementation expert for advice on how to implement a screening protocol for child abuse at EDs.

A. Policy: To ensure funding for the policy to tackle child abuse, two experts advised to adjust the DBC code (Diagnostic/Treatment code in the Dutch medico-financial system) for child abuse *'…then hospitals will receive the money they need for this type of care'.*

B. Child abuse team, child abuse attendant, collaboration with the Child Abuse Center: The experts think that child abuse teams are necessary for good collaboration between the various disciplines. Two experts advised to evaluate the policy twice a year with the complete team; for specific cases they advised to review these only with the specific professionals involved. Four experts found it worthwhile to invest in and appoint an attendant specifically for child abuse, especially because psychosocial research and referral to child care entails considerable time and effort. A child abuse attendant can guarantee quality control, rapidity of treatment or referrals, and proper follow-up of patients.

C. Protocol for suspected child abuse: Introduction of a national protocol, with local modifications, was supported by the experts. This will ensure uniformity of the process and prevent each hospital having to develop its own protocol.

All experts found screening for child abuse at EDs worthwhile, and considered a head-to-toe examination an essential part of screening, because important signs of child abuse often can be found on the skin. This is not standard practice for all ED nurses, because they often have a problem with undressing a child completely when the child has only a local complaint or injury. Overall screening for child abuse can become more acceptable for ED nurses and parents if the hospital informs all parents about the routine screening process, e.g. via brochures, flyers, announcements, etc.

D. Professional development: The experts emphasised that for successful screening and early detection of child abuse, ED staff needs adequate training. This can be realized by including detection of child abuse in the medical training of physicians and nurses; in this way physicians will also learn to include child abuse in their differential diagnosis. Important topics during training are interviewing techniques/communication skills, and relating injuries with the history and developmental phase of the child.

Implementation expert

When implementing improvements in a workplace, it is important to proceed along appropriate steps. The following steps are based on the model of Grol *et al.*[10-11]

The first step is to define 'good care' based on the literature and/or expert opinions. Then, indicators are defined to measure the quality of good care, e.g. '*…during the triage ED nurses will screen for child abuse in more than 90% of the children*'. Subsequently, the current situation is investigated in the participating hospitals, i.e. do they meet the indicators of good care? If not, the barriers to this are explored by means of interviews or questionnaires. A decision is made as to which part of the implementation package is needed in each hospital, and implementation can then start. Finally, the effect can be measured by the indicators of good care.

The facilitators and barriers for screening of child abuse at emergency departments are summarized in table 3.

Table 3
Facilitators and barriers for screening of child abuse in emergency departments

Facilitators	Barriers
Support of the Hospital Board	Practical problems (e.g. limited time)
Presence of child abuse attendant	Personal barriers (e.g. fear of an unjustified suspicion)
Presence of child abuse team	Insufficient communication skills
Intensive training of ED staff	Fast turnover of ED staff
Financial support	

Discussion

Since January 2009 Dutch hospitals are legally required to fulfill the criteria of the Child Abuse Framework of the Dutch Health Care Inspectorate.[4] Most of the hospitals in the present study met most of these criteria. In general, this was promoted by a supportive Board, the presence of a child abuse attendant, a protocol for suspected child abuse or an appropriate screening instrument. However, many barriers to adequate detection of child abuse at EDs still exist. More time, money and effort of health professionals and management are needed to tackle these barriers. Previous studies have shown that screening for child abuse in emergency departments is effective to increase the detection of suspected child abuse, but a validated protocol or screening instrument is lacking.[8,12-15]
Health professionals are motivated to improve the detection of child abuse, but lack sufficient time to develop adequate policy and protocols, to register (suspicions of) child abuse, and to organize education and training. Moreover the ED's high patient flow with its great diversity in severity of symptoms, makes it hard for ED staff to calmly discuss a suspicion of child abuse with parents. The appointment of a dedicated child abuse attendant who can perform all these tasks could be a solution. Unfortunately, not all hospital directors, whose support is needed to create such a function, are convinced of this necessity. The Inspectorate sees the appointment of a child abuse attendant as a condition of delivering responsible care.[4] In addition to a child abuse attendant, a child abuse team will promote the signaling and detection of (suspected) child abuse.[16]
Implementation of a national screening protocol, including a screening instrument applicable for all children and an appropriate procedure for situations when child abuse is suspected, is required but not yet available.[14] Developments are ongoing and the validity of various screening instruments is currently being investigated.

None of the participating hospitals had a structured training program for the detection of child abuse or for the care of abused children. The design of such a program is impeded by the high turnover of (especially) junior doctors in EDs. Nevertheless, it is essential to develop such programs, because education is the basis for proper detection of child abuse. In addition, effective interviewing techniques can lower the threshold to discuss suspicions of abuse with parents.[4,14]
Management support is essential to realize structured training programs. In the Netherlands there are good opportunities for this, e.g. e-learning for ED nurses, and a two-day course for physicians are available.[17-18]
Detailed registration of the numbers and types of suspected child abuse cases in hospitals is important. This can be largely automated and integrated with the electronic patient file. Then, based on these data, the extent of the workload (part-time/full-time) for a child abuse attendant can be calculated, as well as other requirements, e.g. the need for consulting hours for suspected cases of child abuse.

A limitation to be mentioned for this study is that the interviews were conducted before the Health Care Inspectorate published its report, and some topics that were addressed in the report, such as registration and information were not addressed in our interviews.[4] Because we wanted

to compare perspectives from different disciplines we interviewed professionals of mixed background. A limitation of this approach is that we interviewed small numbers per discipline.
At the beginning of our study screening for child abuse had been ongoing in some of the participating emergency departments while others had not even started, which is also a limitation of this study.

Conclusions

In summary, the health professionals in the present study are motivated to adhere to the Child Abuse Framework of the Health Care Inspectorate, but experience many barriers. When child abuse is suspected, communication is often the main bottleneck. Management should create opportunities, such as adequate training and appointment of a child abuse attendant, to enable health professionals to better commit themselves to improved detection of child abuse. Simply acknowledging the problems and approving the policy is not sufficient. Implementation of a national protocol for suspected child abuse, including relevant training and a validated screening instrument, will go a long way to removing these barriers.

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CHAPTER 4

Detection of child abuse at emergency departments, a multi-centre study

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Abstract

Objective – This study examines the detection rates of suspected child abuse in the emergency departments of seven Dutch hospitals complying and not complying with screening guidelines for child abuse.

Design – Data on demographics, diagnosis and suspected child abuse were collected for all children aged ≤18 years who visited the emergency departments over a 6-month period. The completion of a checklist of warning signs of child abuse in at least 10% of the emergency department visits was considered to be compliance with screening guidelines.

Results – A total of 24 472 visits were analysed, 54% of which took place in an emergency department complying with screening guidelines. Child abuse was suspected in 52 children (0.2%). In 40 (77%) of these 52 cases, a checklist of warning signs had been completed compared with a completion rate of 19% in the total sample. In hospitals complying with screening guidelines for child abuse, the detection rate was higher (0.3%) than in those not complying (0.1%, $p < 0.001$).

Conclusion – During a 6-month period, emergency department staff suspected child abuse in 0.2% of all children visiting the emergency department of seven Dutch hospitals. The numbers of suspected abuse cases detected were low, but an increase is likely if uniform screening guidelines are widely implemented.

Introduction

Child abuse is a serious public health problem with high morbidity and mortality; worldwide, 155,000 deaths occur annually in children as a result of abuse or neglect.[1] Preventing recurrent abuse or recognising early abuse is difficult but essential if long-term effects are to be limited. Although victims of child abuse have higher emergency department use than the general paediatric population, child abuse unfortunately often remains unrecognised in the emergency department.[2-6]

Woodman *et al.*[4] found consistent evidence that physical abuse affects 1 in 11 children in the UK each year and estimated that about 1% of all injury-induced child visits to emergency departments are due to physical abuse. In the Netherlands, an estimated 107 200-160 000 children are victims of child abuse annually; however, hospital staff were responsible for only 6% of the 16 156 reports on child welfare in 2008.[7-9]

The overall impression is of suboptimal detection of child abuse in hospitals. Implementing a uniform screening protocol for child abuse in emergency departments could increase detection rates, leading to a decrease in the short- and long-term effects of child abuse.[2,10] Therefore, the aim of the current study is to assess the detection rates of child abuse in emergency departments in hospitals complying and not complying with uniform screening guidelines and examine the characteristics of cases of suspected abuse.

Methods

The province of South-Holland in the Netherlands has a population of 3.5 million people which is served by 22 hospitals. So that the cohort would be representative, data were collected from emergency departments in seven (a university children's hospital, three teaching hospitals and three rural hospitals) which together have approximately 200 000 emergency department visitors annually.

Detection of child abuse

All children aged 0-18 years who visited the emergency departments with a new complaint over a 6-month period were included. We checked all data on cases of suspected abuse, and considered it to be a case if emergency department staff noted their suspicion in the medical record. Children who were specifically referred to the hospital with a suspicion of child abuse were not included in the number of cases detected in the emergency department. The definition used for child abuse was any form of threatening or violent physical, mental or sexual interaction with a minor which is perpetrated actively or passively by parents or other persons on whom the is dependent and causes or will probably cause physical or mental injury and serious harm to the minor.[11]

All hospitals had a checklist of warning signs of child abuse available in the emergency department. These checklists were either used for all children visiting the emergency department, or, in one hospital, only for children with trauma, and were mostly completed by emergency de-

partment nurses. If one of the warning signs on the checklist was ticked, the emergency department nurse informed the treating specialist that the suspicion of child abuse was increased. The frequency of checklist use varied greatly. Compliance with screening guidelines for child abuse in the emergency department was considered to be use of the checklist in at least 10% of all emergency department visits by children. The numbers of suspected abuse cases detected in the emergency department were compared between hospitals complying and not complying with the screening guidelines.

This study was approved by the Medical Ethical Committee of the Erasmus MC, University Medical Centre Rotterdam.

Data collection and processing

Data were collected over 6 months in each hospital. In five of the seven hospitals this period covered August 2007 to January 2008. For logistical reasons, the collection period was November 2007 to April 2008 in one hospital and March 2008 to august 2008 in another. For all children data were collected on demographics, reason for the emergency department visit, the referrer, the treating specialist and the diagnosis at discharge. We used emergency department triage systems and (electronic) patient files, and if available, data from the screening checklist for child abuse. Based on all this information, we assessed whether or not emergency department staff suspected child abuse.

Table 1

Characteristics of all emergency department visitors aged ≤ 18 years over 6 months in seven Dutch hospitals classified as complying or not complying with screening policy

	Hospitals complying with screening policy	Hospitals not complying with screening policy	Total	p Value*
Emergency department visitors	13 109	11 363	24 472	
Age in years (range)	7.6 (0-18)	6.0 (0-18)	6.9 (0-18)	< 0.001
0-4	4799 (37%)	5747 (51%)	10 546 (43%)	
5-8	2233 (17%)	1938 (17%)	4171 (17%)	
9-12	2210 (17%)	1366 (12%)	3576 (15%)	
13-18	3829 (29%)	2157 (19%)	5986 (25%)	
Sex (male)	7353 (56%)	6401 (56%)	13 754 (56%)	0.58
Referrer				< 0.001
Self-referral	5505 (43%)	6937 (63%)	12 442 (52%)	
General practitioner	2921 (23%)	2622 (24%)	5543 (23%)	
Other	4469 (35%)	1383 (13%)	5852 (25%)	
Treating specialist				< 0.001
Surgeon	7616 (58%)	6924 (61%)	14 540 (60%)	
Paediatrician	4641 (36%)	3106 (28%)	7747 (32%)	
Other	833 (6%)	1257 (11%)	2090 (9%)	
Completed checklists	4726 (36%)	43 (0.4%)	4769 (20%)	< 0.001
Suspected child abuse cases in the emergency department	43 (0.3%)	9 (0.1%)	52 (0.2%)	< 0.001

* Continuous variable (age) calculated with Wilcoxon rank test; categorical variables calculated with the χ^2test.

Statistical analysis

The χ^2 test was used to compare baseline categorical variables between hospitals complying to and not complying with screening policy, between cases screened and not screened for child abuse, and between children with and without suspected abuse. The Wilcoxon rank test was used for the continuous variable age. Analyses were performed using the statistical package SPSS 15.0. Statistical significance was defined as $p < 0.05$.

Results

Emergency department visitors

During the 6-month study period, 24 472 children aged ≤ 18 years visited one of the seven emergency departments with a new complaint. Of these, 56% (13 754) were male, and more than 40% (10 546) were 4 years of age or younger. The majority (52%) visited the emergency department without being referred, and most (60%) had a surgical problem (e.g. a fracture).
Of all children, 54% visited an emergency department which complied with screening guidelines. The patients in these hospitals were older, less often self-referred, and more often treated by a paediatrician than those who visited hospitals not complying with screening guidelines (table 1).

Table 2
Characteristics of all emergency department visitors aged ≤ 18 years over 6 months in seven Dutch hospitals classified by cases screened or not screened

	Cases screened for child abuse	Cases not screened for child abuse	p Value*
Emergency department visitors	4769	19 167	
Age in years (range)	6.2 (0-18)	6.9 (0-18)	< 0.001
0-4	2052 (43%)	8352 (44%)	
5-8	976 (21%)	3112 (16%)	
9-12	901 (19%)	2593 (14%)	
13-18	838 (18%)	4937 (26%)	
Sex (male)	2690 (56%)	10 772 (56%)	0.85
Referrer			< 0.001
Self-referral	2105 (45%)	10 258 (54%)	
General practitioner	1390 (30%)	4044 (21%)	
Other	1274 (27%)	4865 (25%)	
Treating specialist			< 0.001
Surgeon	2800 (59%)	11 432 (60%)	
Paediatrician	1739 (37%)	5894 (31%)	
Other	227 (5%)	1753 (9%)	
Suspected child abuse cases in the emergency department	40 (0.8%)	12 (0.1%)	< 0.001

* Continuous variable (age) calculated with Wilcoxon rank test; categorical variables calculated with the χ^2 test.

Table 3
Diagnosis of suspected cases of child abuse in seven Dutch hospitals over 6 months

Type of abuse	Diagnosis	Children (n)
Physical abuse		37 (71%)
	Fractures/luxation	18
	Bruises/wounds/burns/contusion	15
	Inflicted traumatic brain injury/head injury	4
Neglect		13 (25%)
	Various diagnoses (intoxication, wounds, commotio cordis, infection)	
Sexual abuse		2 (4%)
	Genital wound	

Screening

Overall, the checklist was completed for 36% of emergency department visitors (ranging from 16% to 56%) in hospitals complying versus 0.4% in hospitals not complying with the guidelines. The rate of suspected child abuse was higher in hospitals complying versus hospitals not complying with screening guidelines (0.3% vs 0.1%, $p < 0.001$) (table 1).
The 4769 children who were screened for child abuse were significantly younger than those not screened ($p < 0.001$). Children screened for abuse were less often self-referrals and were more often treated by a paediatrician. Significantly more cases of suspected abuse arose in children screened than not screened for child abuse (0.8% vs 0.1%, $p < 0.001$) (table 2).

Cases of suspected child abuse

After excluding 23 children specifically referred with suspected abuse, a suspicion of child abuse arose in 0.2% (52) of all remaining emergency department visitors. Cases of suspected child abuse were on average 3.9 years old, and 33/52 were aged ≤ 4 years. In 40 of the 52 cases, a checklist of warning signs of abuse was completed. Most suspicions concerned physical abuse, with fractures being the most often reported diagnosis (table 3).

Discussion

During a 6-month study period, a suspicion of child abuse arose in 0.2% of children aged ≤ 18 years who visited the emergency departments of seven hospitals, and in 0.3% of children aged ≤ 4 years. The significantly higher detection rate in hospitals complying with screening guidelines for child abuse (0.3%) compared to those not complying (0.1%) shows the importance of increased situational awareness for improving detection of child abuse. Checklists were completed in 40 (77%) of the 52 cases of suspected abuse but in only 19% of the total population, although the use of checklists in suspected cases might have been intentional selection.
Implementation of a structured screening protocol, therefore increasing the situational awareness of child abuse, might result in a higher detection rate of suspected child abuse. A checklist of warning signs of child abuse could be part of such a protocol, but a validated checklist is currently not available.[12] If a checklist were used, it might result in more cases of suspected child abuse being identified and would be a first step in improving the detection rate of actual cases

of child abuse. The use of a checklist in every child visiting the emergency department would result in universal screening to identify a high risk group.[13] Unfortunately, an increase in the sensitivity of child abuse detection would lead to a decrease in specificity. Therefore, a protocol with clear guidelines on how to manage suspicions of child abuse is required. Where a case is suspected, it is very important that the physician informs the parents about his or her concerns without accusing anyone. Unfortunately, fear among physicians and other emergency department staff of making a false accusation can lead to failure to report cases of suspected abuse.

Screening for child abuse in the emergency department is not standard policy in most countries (eg, USA, Canada and the UK), but did become mandatory in the Netherlands in 2009.[14] Earlier studies on screening (each including from 2000-4422 patients) reported higher detection rates of suspected abuse (range 1.1-1.4%) than the 0.3% rate identified in the present study.[15-17]
We found that the detection rate of suspected child abuse was much higher when a checklist of warning signs of abuse was completed. Comparison of screened cases with those not screened showed that emergency department staff completed the checklists more often in children who were younger, were referred by a general practitioner or were treated for a paediatric complaint.

In the present study, children suspected of being abused were younger than the average child in the emergency department. The younger the child, the more vulnerable he or she is, the higher the risk that an injury requires medical attention, and the higher the chance that emergency department staff suspect abuse.[18] However, because child abuse can affect children of all ages, emergency department staff must be aware of the risk in all children visiting the emergency department to avoid missing cases of child abuse.[19]
Physical abuse is the most common type of child abuse detected in the emergency department,[6] as shown in the present study. Neglect and emotional and sexual abuse are more difficult to identify in an emergency department setting but also require attention. Overall, child abuse remains an under-reported problem. This can be attributed to, for example, inadequate knowledge and training of professionals regarding recognition of abuse injuries, unwillingness to report suspicions of abuse, and variations in what is considered to be abuse.[18]

Some limitations of the present study need to be addressed. First, we present cases of *suspected* abuse. Since abuse was not yet confirmed, this could have led to an overestimation of the detection rate of child abuse. Second, cases of suspected abuse might have been missed because only one of the hospitals systematically registered such cases. Finally, for optimal data comparison the same time period should have been used in all hospitals. However, due to logistical problems this was not possible in two of the participating centers.
The strengths of this study are the relatively long observational period, the large number of children, the inclusion of all patients (≤ 18 years old) who visited the emergency departments with a new complaint, and the fact that of the results are representative of various emergency department settings.

In summary, the detection rates of suspected child abuse in children who visited an emergency department were very low (0.2%). However, the detection rate of suspected abuse was higher in

hospitals where emergency department staff complied with screening guidelines than in hospitals with non-compliant emergency department staff. We recommend that hospitals encourage compliance with screening guidelines, implement strict policies to improve the detection rate of suspected child abuse in emergency departments, and use the results of these interventions to develop an optimal screening protocol for emergency departments. Further research is recommended on how to identify genuine cases of child abuse among the high risk group of suspected cases identified by screening.

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CHAPTER 5

Effects of systematic screening and detection of child abuse in emergency departments

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Abstract

Objective – Although systematic screening for child abuse of children presenting at emergency departments might increase the detection rate, studies to support this are scarce. This study investigates whether introducing screening, and training of emergency department nurses, increases the detection rate of child abuse.

Methods – In an intervention cohort study, children aged 0 to 18 years visiting the emergency departments of 7 hospitals between February 2008 and December 2009 were enrolled. We developed a screening checklist for child abuse (the "Escape Form") and training sessions for nurses; these were implemented using an interrupted time-series design. Cases of suspected child abuse were determined by an expert panel using predefined criteria. The effect of the interventions on the screening rate for child abuse was calculated by interrupted time-series analyses and by the odds ratios for detection of child abuse in screened children.

Results – A total of 104 028 children aged 18 years or younger were included. The screening rate increased from 20% in February 2008 to 67% in December 2009. Significant trend changes were observed after training the nurses and after the legal requirement of screening by the Dutch Health Care Inspectorate in 2009. The detection rate in children screened for child abuse was 5 times higher than that in children not screened (0.5% vs 0.1%, $P < .001$).

Conclusions – These results indicate that systematic screening for child abuse in emergency departments is effective in increasing the detection of suspected child abuse. Both a legal requirement and staff training are recommended to significantly increase the extent of screening.

Introduction

The prevalence of child abuse in the Netherlands in 2005 was estimated at 1 in 30 children.[1] However, early detection of child abuse at emergency departments in the Netherlands is low (0.2%) compared with, for example, the United Kingdom (1.4%-6.4%), Italy (2%), and the United States (10%).[2-7] Even allowing for the difficulty of comparing these data because of differing definitions and populations, the detection rate of child abuse at Dutch emergency departments is strikingly low. Starting in January 2009, the Dutch Health Care Inspectorate legally required all emergency departments to screen every child for child abuse and to regularly train their emergency department staff.[8]

To identify high-risk populations, checklists of warning signs for child abuse are used.[9] These checklists contain (on average) 6 to 9 questions, such as, "Was there a delay in seeking medical attention?" or "Do the findings of the physical examination confirm the history?". Emergency department nurses generally complete these checklists, and, if at least one of the warning signs is positive, the nurse informs the physician about the possible suspicion of child abuse. However, large studies to support the value of checklists in the detection of child abuse are scarce.[9-12]

To assess the effect of screening for child abuse, we conducted a prospective intervention cohort study at 7 emergency departments in the Netherlands. After a baseline monitoring of 6 months[7], our aim was to implement a new checklist for screening for child abuse in emergency departments and to implement training in interview techniques for emergency department nurses.[9] Also assessed was the effect of changes in national and local policy on the screening and detection of child abuse.

Methods

Study design and setting

The province of South Holland (the Netherlands) has a population of 3.5 million people served by 22 hospitals. For this study, data were collected from 7 of these hospitals with a total of about 200 000 emergency department visitors annually. All children aged 0 to 18 years visiting the emergency departments from February 2008 to December 2009 were included. Data were collected on demographics, reason for the emergency department visit, the referrer, the treating specialist, the diagnosis, and place of discharge. We used emergency department triage systems and (electronic) patient files and, if available, data from the checklists for child abuse. Data collection lasted on average 22 (range, 17-23) months.

This study was approved by the Medical Ethical Committee of the Erasmus MC, University Medical Centre Rotterdam (MEC-2007-195).

Interventions

Screening instrument

We developed a new checklist for screening for child abuse (ie, the "Escape Form"), based on a systematic literature review[9], earlier developed tools, interviews with professionals, and testing the feasibility of the proposed Escape form with emergency department nurses (Table 1). The

Table 1
"Escape Form": Checklist for Potential Child Abuse Used at Emergency Departments^

Is the history consistent?	Yes	No^
Was there unnecessary delay in seeking medical help?	Yes^	No
Does the onset of the injury fit with the developmental level of the child?	Yes/N.A.	No^
Is the behavior of the child/the carers and the interaction appropriate?	Yes	No^
Are the findings of the top-to-toe examination in accordance with the history?	Yes	No^
Are there any other signals that make you doubt the safety of the child or other family members? *If 'Yes' describe the signals in the box 'Other comments' below.	Yes*^	No
Other comments		

NA, not applicable.
^If one of these answers is selected, the risks of child abuse could be increased and additional action is recommended.

Escape Form is a checklist with 6 questions on warning signs for all types of child abuse, suitable for all children visiting an emergency department. This Escape Form was used in an interrupted time-series design at 2 emergency departments (hospitals A and B) and, after a process evaluation, in 2 other emergency departments (hospitals C and D). Emergency department nurses completed the Escape Form during the triage of the patients. If one of the warning signs was marked, the nurse informed the physician, who had the responsibility to evaluate the increased risk for child abuse and take action if necessary. All completed Escape Forms were collected in hospitals A, B, C and D, and all checklists (with similar content)[2] were used in hospitals E, F and G.

Training

For nurses, an important barrier to detecting and reporting child abuse is a low level of knowledge, vocational skills, and self-efficacy.[13-15] To help emergency department nurses feel more competent in their communication about possible child abuse, training was implemented comprising an interactive workshop in interview techniques in case of suspicion of child abuse. We planned to invite all emergency department nurses of hospitals A, B, C and D for the workshops, which they would attend during working hours.

Case definition

Child abuse teams are multidisciplinary teams that deal with child abuse policy and assist hospital staff when child abuse is suspected. In the 7 hospitals, data on all children with suspected abuse reported during the study period by emergency department staff to the child abuse teams were collected and recorded in a database (Microsoft Access 2003). Subsequently, in the cases presented, these children were scored by 4 professionals independently (a forensic pediatrician [A.B.], 2 social pediatricians [M.A., A.T.], and a physician [E.L.]), to assess suspected child abuse. They scored the cases on the basis of an overview composed of the clinical notes with the variables age, gender, signs at presentation at the emergency department, history and findings at the emergency department, conclusion of the screening instrument, and diagnosis (of the physician). If a professional marked one or more inclusion criteria, we defined that patient as a "potential case". If a professional marked 1 or more exclusion criteria we defined that patient as "no case"; if a child met both inclusion and exclusion criteria, the exclusion criteria took precedence. Cases were included for analysis if at least 2 professionals, including 1 of the exter-

nal professionals (A.B., A.T.), confirmed a child as a "potential case". The following definition was used for child abuse: "any form of threatening or violent physical, mental or sexual interaction with a minor which is perpetrated actively or passively by parents or other persons on whom the minor is dependent and causes or will probably cause physical or mental injury and serious harm to the minor".[16] Based on this definition we formulated the 8 inclusion criteria and 4 exclusion criteria a priori of the scoring (see Appendix).

Statistical analysis

The χ^2 test was used to compare categorical variables between children suspected and not suspected of abuse. The effect of interventions on the screening rate for child abuse was calculated by interrupted time-series analyses.[17] Interrupted time-series analysis models the impact of an intervention on the screening and detection rate by allowing a sudden change at the moment of introduction of the intervention, and by allowing for a difference in trend before and after the intervention. The intervention was timed at the start, midpoint or end of the month, which was the unit of time. In each hospital the odds ratios (ORs) were calculated for the detection of child abuse in screened children, and a pooled OR.

Statistical significance was defined as $P < .05$. The statistical packages SPSS 17.0 (SPSS Inc, Chicago, IL) and R 2.7.1 (R Development Core Team, Vienna, Austria) were used for the analysis.

Results

During the 23-month study period, a total of 104 028 emergency department visits in the 7 hospitals were included. The average age of the children was 7.2 years; 56% were male; 48% of the children presented at the emergency department without a referral; and 49% had a surgical problem. In total, 37 404 (36%) screening instruments were completed from the 104 028 emergency department visits (Table 2).

Screening rate

Overall, the screening rate for child abuse in the 7 emergency departments increased from 20% in February 2008 (hospitals A, B, D, F and G) to 67% in December 2009 (hospitals A, B, C, D, E, F and G). The screening rate in the intervention hospitals increased twice as much (ie, from 14% to 69%) as those in the control hospitals (ie, from 35% to 63%) (Fig 1).

The Escape Form was implemented in hospital A in July 2008, in hospital B in August 2008 and in hospital D in September 2009. In hospital C the existing checklist was adapted by using the Escape Form but was not completely replaced by it. Hospital B had a screening rate of < 3% before the introduction of the Escape Form; the screening rate increased to 34% in the first month of implementation. Hospitals A and D already screened for child abuse using different checklists; in these hospitals the screening rate showed no significant change at the moment of implementation of the Escape Form.

In hospitals A and C, training was implemented for emergency department nurses; 43 (95%) emergency department nurses participated up to March 2009.

Table 2
Characteristics of All Emergency Department Visitors Aged ≤ 18 y During the 23-mo Study Period in Seven Dutch Hospitals Classified by Cases of Suspected Child Abuse or Total Population

Characteristics	Cases Not Involving Suspected Child Abuse	Cases of Suspected Child Abuse	P*	Total Population
Emergency department visitors	103 785 (99.8%)	243 (0.2%)		104 028
Age, y				
0-4	41 952 (40%)	150 (62%)	< .001	42 102 (40%)
5-8	17 865 (17%)	37 (15%)		17 902 (17%)
9-12	17 220 (17%)	25 (10%)		17 245 (17%)
13-18	26 748 (26%)	31 (13%)		26 779 (26%)
Gender (male)	58 322 (56%)	123 (51%)	.080	58 445 (56%)
Referrer			< .001	
Self-referral	49 990 (48%)	102 (42%)		50 092 (48%)
General practitioner	31 751 (31%)	76 (31%)		31 827 (31%)
Other	17 985 (17%)	54 (22%)		18 039 (17%)
Unknown	4059 (4%)	11 (5%)		4 070 (4%)
Treating physician			< .001	
Surgeon	50 475 (49%)	151 (62%)		50 626 (49%)
Pediatrician	43 374 (42%)	75 (31%)		43 449 (42%)
Other	9 493 (9%)	17 (7%)		9 510 (9%)
Unknown	443 (0.4%)	0		443 (0.4%)
After emergency department visit referred to			< .001	
Home	42 728 (41%)	61 (25%)		42 789 (41%)
Outpatient department	23 158 (22%)	76 (31%)		23 234 (22%)
Hospital admission	14 674 (14%)	55 (23%)		14 729 (14%)
Other	13 527 (13%)	29 (12%)		13 556 (13%)
Unknown	9 698 (9%)	22 (9%)		9 720 (9%)
Completed checklists (screen rate)	37 221 (36%)	183 (75%)	< .001	37 404 (36%)

*Categorical variables calculated with the χ^2 test.

Interrupted time-series analysis shows a direct significant increase in the screening rate after training and, subsequently, an increasing trend from March 2009 on. In hospital B, 22 (55%) emergency department nurses were able to attend the training but without a direct significant effect on the screening rate.

In the middle of our study period (February 2008 to December 2009) the Dutch Health Care Inspectorate legally required screening for child abuse in all emergency departments. After this change, the screening rate increased sharply, in addition to the already increasing screening rate. Also, after this change in national policy, the increase in the screening rate persisted.
Interrupted time-series analyses of the individual hospitals showed the best positive effect of training of nurses on the screening rate in hospital A (ie, from 29% to 65%). The screening rate in hospital B showed the best increase after the implementation of screening (ie, from 3% to 34%). In hospital C, the screening rate had been increasing since screening became legally required,

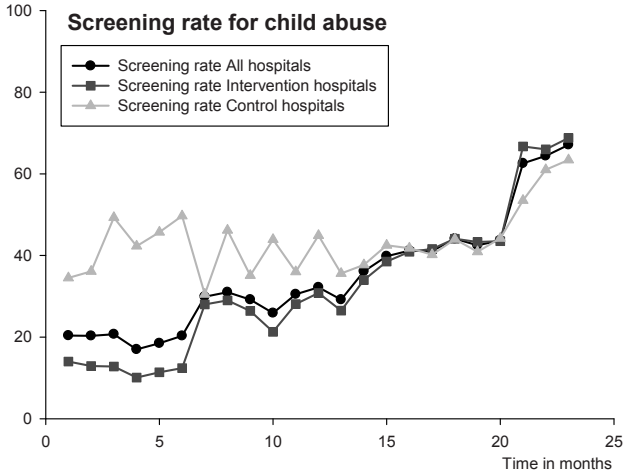

Figure 1
Plot of the average screening rate for child abuse in 7 Dutch emergency departments from February 2008 to December 2009.

and the training for emergency department nurses had an additional positive effect on this trend. Implementation of the Escape Form in hospital D after legal requirement of screening did not have a significant effect on the screening rate. In the control hospitals E and G, there was a positive effect on the screening rate after screening became legally required, but this was not seen in control hospital F.

Detection rate

Between February 2008 and December 2009, of the total 104 028 children, 306 (0.2%) were reported to the child abuse teams of 1 of the 7 hospitals. Of these, 63 children were not considered to be a case of abuse by the four professionals (A.B., A.T., M.A., E.L.): 12 children due to alcohol intoxication, 4 due to a suicide attempt, and 29 due to injuries caused by strangers or peers, and in 18 cases there was insufficient information to make a judgement. In 50% of the scored cases, all 4 professionals agreed on classification as a case or as no case. The agreement rate for 3 or more professionals was 70.6%. The 243 (0.2%) cases that were considered suspected of abuse, and thus included for the analysis, were significantly younger than the total pediatric emergency department population (4.7 vs 7.2 years; $P < .001$). The cases of suspected child abuse were less often self-referrals, were more often surgical problems, and were more often hospitalized. The most reported diagnoses of the cases were fractures (19%), burns (8%), and minor head injury (8%). Cases of suspected child abuse were more often screened by emergency department staff than children in the total pediatric emergency department population (75% vs 36%, $P < .001$) (Table 2).

Pooled ORs for detection of suspected child abuse in children screened in the 7 hospitals was 4.88 (95% confidence intervals 3.58-6.68) (Fig 2). In other words, the detection rate of suspected child abuse was significantly higher in children who were screened for child abuse than in those not screened for child abuse (0.5% vs 0.1%, $P < .001$).

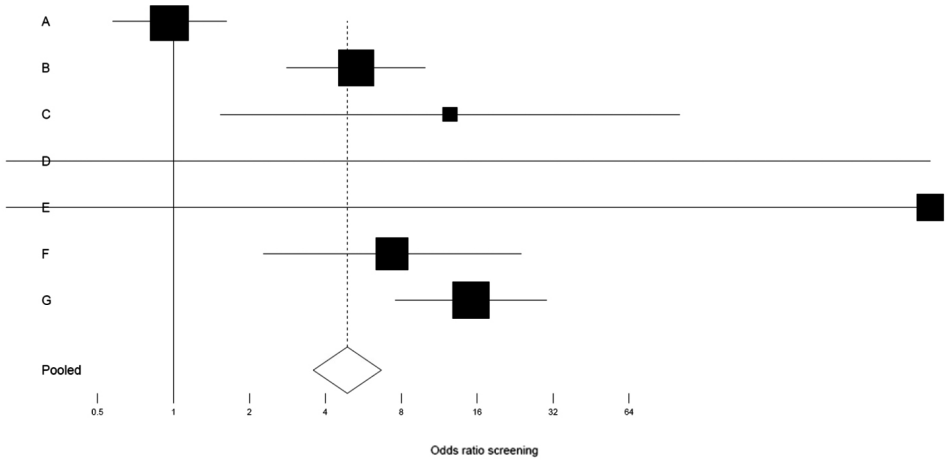

Figure 2
Forest plot: ORs for detection of suspected child abuse in children screened in the 7 Dutch hospitals and pooled ORs. Squares are proportional to the number of cases with confidence intervals as horizontal solid lines, pooled OR is represented by the centre line of the diamond and confidence intervals as the lateral tips of the diamond, and the solid vertical line indicates no effect.

Discussion

Screening for child abuse in Dutch emergency departments proved to be effective in detecting suspected child abuse. Training of emergency department nurses and making screening a legal requirement were appropriate interventions for optimizing the screening rate for child abuse in emergency departments. During a period of 23 months, the detection rate of suspected child abuse in 7 emergency departments was 0.2% of all 104 028 children aged 18 years or younger. The detection rate was significantly higher in children screened for child abuse than in those not screened for child abuse (0.5% vs 0.1%, $P < .001$).

The screening rate for child abuse increased during the study period, probably as a result of various interventions. The difference in the detection rate of screened children (0.5%, N = 183) and of nonscreened children (0.1%, N = 60), and the pooled ORs of 4.9 for detection of suspected child abuse in screened children, supports the importance of screening for child abuse. An abnormal OR of 0.96 in the university children's hospital A may be explained by the historical presence of a high awareness for child abuse. In some hospitals, the age limit for screening was not 18 but 16 years; however, analyses using 16 years as the age limit had no significant effect on the results.

A limitation of the study is that the hospitals were not randomized to the intervention and the control arm. However, randomization was impossible for both logistical and ethical reasons. For instance, if all staff had recently been trained in screening for child abuse, training them in the context of the present study was logistically not possible. Also, for example, if a hospital wanted to introduce screening for child abuse as soon as possible, we considered it unethical to ask them to postpone this because of our plans for implementation. In all 7 hospitals, we performed

baseline monitoring during a 6-month period to measure all the differences in the screening and detection rates of child abuse.[7] This showed that differences in the screening rates between the intervention and control hospitals at the start of the implementation study are clearly visible (Fig 1). However, this does not alter the results of the interventions.

In many countries screening for child abuse in emergency departments is not common practice. We believe this is the first prospective intervention cohort study describing the effects of interventions on the screening and detection rate of suspected child abuse. Of the literature reviews on screening tests for child abuse in emergency departments, all conclude (but do not prove) that screening is useful to improve the detection of child abuse.[9-12,18] Our study supports these reviews in the effectiveness of screening for suspected child abuse in increasing the detection rate of child abuse in emergency departments. More convincing evidence for the effectiveness of screening might be provided by a randomised controlled trial; however, such a study is not legally feasible in the Netherlands.

Despite many studies documenting the need for training in recognizing and handling child abuse, few studies have specifically tested a specific type of training for emergency department staff. There is some evidence that certain types of child protection training (didactive, interactive, and computer assisted) may have a positive influence on professional knowledge, attitudes, and behavior in relation to child abuse detection and knowledge.[18] Specifically for emergency departments, 1 study showed no improvement in documentation of cases of possible physical child abuse after three 1-hour didactic sessions and a reminder checklist in the patients' chart.[19] Another study showed that e-learning improved the performance and self-efficacy of emergency department nurses in the detection of child abuse.[15]

In the middle of our study period (ie, January 2009), the Dutch Health Care Inspectorate legally required screening for child abuse at emergency departments; all hospitals received details on the requirements they had to meet.[8] All hospitals have to submit an annual report on the screening and detection rate for child abuse to the Health Care Inspectorate, who annually visit a number of hospitals to monitor compliance with screening. Introduction of the legal requirement of screening had an overall positive effect on the screening rate for child abuse in the currentt study, as well as significant differences at the hospital level.

Screening for child abuse in the emergency department should be embedded in the routine structure of all hospitals and (on a practical level) supported by electronic systems and (on a rational level) supported by policymakers and emergency department managers. Nevertheless, additional ways to increase the awareness of child abuse at emergency departments are needed since the detection rate of 0.2% remains very low. Compared with other countries, there may be a different threshold being applied, or there are still false-negative cases in the cohort. For optimal effect, the screening instrument could be made a required part of the electronic patient file, thereby obliging emergency department staff to complete the form before they can close the patient's chart. This measure was implemented in hospital B and probably explains the considerable increase in the screening rate that occurred in the last three months of our study period.

Various barriers were experienced when implementing screening and training for child abuse. Because the emergency department is a busy environment, it was difficult to achieve a 100% screening rate, due to lack of time, lack of awareness, and, possibly, to lack of motivation. Successful implementation of an intervention in healthcare is seldom easy because of the numerous factors influencing such an implementation.[20-21]

Limitations of this study include the possibility of an overestimation of "actual" cases of child abuse, since we presented cases of suspected child abuse. Also, we do not know the number of false-negative cases of child abuse in the children not suspected of abuse. We cannot exclude the possibility that screening tools were being applied inconsistently. However, considering the numbers of completed checklists (37 404) and detected cases of potential abuse (243), we believe that, most of the time, the screening tools were applied independently of concerns of the nurse.

The prospective study focused on implementation of the screening instrument and on training. However, during the study period there were many changes in national (eg, screening became a legal requirement) and local policy for child abuse, and child abuse was a "hot item" in the media. Therefore, it was impossible to unravel all of these known and unknown influences on emergency department staff and their screening behaviour.

The strengths of this study are the implementation of the Escape Form, a relatively long study period of 23 months, a large number (104 028) of children, inclusion of all consecutive patients (≤ 18 years old) who visited the emergency departments, and the fact that the results are representative for various emergency department settings thus enhancing the generalizability of our findings.

Conclusions

Systematic screening for child abuse in emergency departments is effective in increasing the detection of suspected child abuse. Training emergency department staff and requiring screening legally at emergency departments increase the extent of screening. Future studies should focus on the validation of a screening instrument for child abuse in emergency departments.

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The authors thank the emergency department staff of the following hospitals for their much-appreciated cooperation: Erasmus MC-Sophia Children's Hospital, IJsselland Hospital, Albert Schweitzer Hospital, Rivas Zorggroep Beatrix Hospital, Reinier de Graaf Gasthuis, St. Franciscus Gasthuis, and HagaZiekenhuis Juliana Children's Hospital.

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Appendix

Inclusion and Exclusion Criteria for Study Cases.

Inclusion Criteria
1. Injury caused by a person the child is dependent on
2. Injury resulting from neglect by caregivers
3. Psychological harm resulting from actions of the person the child is dependent on
4. Psychological harm resulting from failure of the person the child is dependent on
5. Withheld from medical care
6. Child was witness of domestic violence
7. Child was witness of sexual acts
8. Child was victim of sexual acts
Exclusion Criteria
1. Suspicion of abuse reported before emergency department visit
2. Alcohol intoxication
3. Suicide attempt
4. Injury caused by stranger or peers

CHAPTER 6

Accuracy of a screening instrument to identify potential child abuse in emergency departments

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Abstract

Objectives – Although screening for child abuse at emergency departments (EDs) increases the detection rate of potential child abuse, an accurate instrument is lacking. This study was designed to measure the accuracy of a screening instrument for detection of potential child abuse used in EDs.

Methods – In a prospective cohort study at three Dutch EDs, a 6–item screening instrument for child abuse ('Escape') was completed for each child visiting the ED. The data from the completed Escape instruments were used to calculate sensitivity, specificity, and the positive/negative predictive value per item. The clinical notes and conclusions of the screen instruments of all potentially abused children reported to the hospital's Child Abuse Teams were collected and reviewed by an expert panel. A logistic regression model was used to evaluate the predictors of potential abuse.

Results – Completed Escape instruments were available for 18,275 ED visits. Forty-four of the 420 children with a positive screening result and 11 of the 17,855 children with a negative result were identified as potentially abused. Sensitivity of the Escape instrument was 0.80 and specificity was 0.98. Univariate logistic regression showed that potentially abused children were significantly more likely to have had an aberrant answer to at least one of the items: OR 189.8 (95% CI 97.3-370.4).

Conclusions – Most of the children at high risk for child abuse were detected through screening. The Escape instrument is a useful tool for ED staff to support the identification of those at high risk for child abuse.

Introduction

Early intervention in childhood abuse is important to prevent or reduce long-term adverse effects.[1-4] Although screening for child abuse at emergency departments is known to increase the detection rate of potential child abuse, an accurate screening instrument for use in the emergency department setting is still lacking.[5-6] Since emergency departments have a high turnover of patients and staff work under considerable pressure and time constraints, a short and reliable screening instrument is needed that can be completed quickly. A team of pediatricians and screening experts developed an instrument to screen for child abuse in emergency departments, to identify high-risk children. The design was based on a systematic literature review[5], earlier screening instruments[7-10], interviews with professionals, and pre-testing of the concept with emergency department nurses, (Figure 1). This screening instrument (called 'Escape') is a 6-item checklist addressing risk factors for child abuse, which may be predictive for child abuse in any child. The instrument is to be used irrespective of the patient's reason for their visit; it is not an injury evaluation checklist. The present study was designed to measure the accuracy of this newly developed screening instrument for child abuse in emergency departments using expert panels. The possibility to minimize the burden of completing the instrument whilst maintaining sensitivity and specificity was also examined.

1. Is the history consistent?	Yes	No
2. Was seeking medical help unnecessarily delayed?	Yes	No
3. Does the onset of the injury fit with the developmental level of the child?	Yes/N.A.	No
4. Is the behavior of the child, his or her carers and their interaction appropriate?	Yes	No
5. Are findings of the head-to-toe examination in accordance with the history?	Yes	No
6. Are there any other signals that make you doubt the safety of the child or other family members? *If 'Yes' describe the signals in the box 'Other comments' below.	Yes*	No
Other comments		

Figure 1
'Escape instrument': the screening instrument for child abuse used at the emergency departments. One (or more) ticked answers in the dark boxes indicate the possibility of an increased risk of child abuse and further action is recommended.

Methods

Intervention

The Escape instrument was implemented in three Dutch hospitals[11], where it was to be used in each child aged ≤ 18 years who visited the emergency department. Emergency department nurses completed the Escape instrument during the triage of the patient. If one or more items of the instrument were aberrant the screening result was considered positive. The nurse was instructed to inform the physician at the emergency department of the result of the screening. The physician had the final responsibility to evaluate the increased risk of child abuse. When child abuse was obvious or the physician remained concerned about the safety of the child, after taking the history and examining the child, he or she referred the child to the Child Abuse Team of the hospital for further care (irrespective of the screening result). Data of all instruments com-

pleted between July 2008 and December 2009 (18 months) were used to measure the accuracy of this screening instrument for child abuse in emergency departments.
The study was approved by the Medical Ethical Committee of the Erasmus MC (MEC-2007-195).

Case definition

The aim was to ensure that data of all cases of potential child abuse were collected from each emergency department, and to establish into what extent cases were uniformly defined across the participating departments. In doing so, we first contacted the Child Abuse Teams of the three hospitals and collected data of all potentially abused children who had been reported by the emergency department staff during the study period. Subsequently, to establish whether or not these were potential cases of child abuse, the data were independently evaluated by an expert panel consisting of a forensic pediatrician, two pediatricians (with extensive experience in child abuse) and a physician. They classified the cases on the basis of an overview composed of the clinical notes with the variables of age, gender, signs at presentation at the emergency department, history and findings at the emergency department, conclusion of the screening instrument, and diagnosis (of the physician). For this study, 8 inclusion criteria and 4 exclusion criteria were formulated (see Appendix) based on the following definition for child abuse *'Any form of threatening or violent physical, mental or sexual interaction with a minor which is perpetrated actively or passively by parents or other persons on whom the minor is dependent and causes or will probably cause physical or mental injury and serious harm to the minor'.*[12] For an individual patient, if a professional indicated one or more of the inclusion criteria to be present, that patient was classified as a 'potential case'. If a professional indicated one or more of the exclusion criteria to be present, that patient was classified as 'no case'. When both inclusion and exclusion criteria were indicated, that patient was classified as 'no case'. For the analyses we considered patients as 'potential cases' if at least two or more professionals classified them as such: see [11] for complete details. Since the aim was to measure the accuracy of screening, we excluded children who were known to have been abused at the moment they visited the emergency department.

Statistical analysis

Chi-squared tests were used to compare categorical variables of children who classified as 'potential cases of child abuse' versus those who were not. To validate the Escape instrument, its sensitivity, specificity, and positive/negative predictive values were calculated. Both univariate and multivariate regression analyses were used to determine the predictive value of each single item. To examine the possibility of limiting the number of items in the instrument the least sensitive items were removed and the sensitivity and specificity analyses were performed again. Statistical significance was defined as $p < 0.05$. The SPSS version 17.0 was used for analysis.

Results

During the 18-month study period the three emergency departments were visited by a total of 38,136 children aged ≤ 18 years. These children were on average 5.5 years old, 57% were male, 52% presented without being referred, 58% were treated by a pediatrician and 32% had a surgical problem. Using an age threshold of 16 instead of 18 years resulted in similar results.

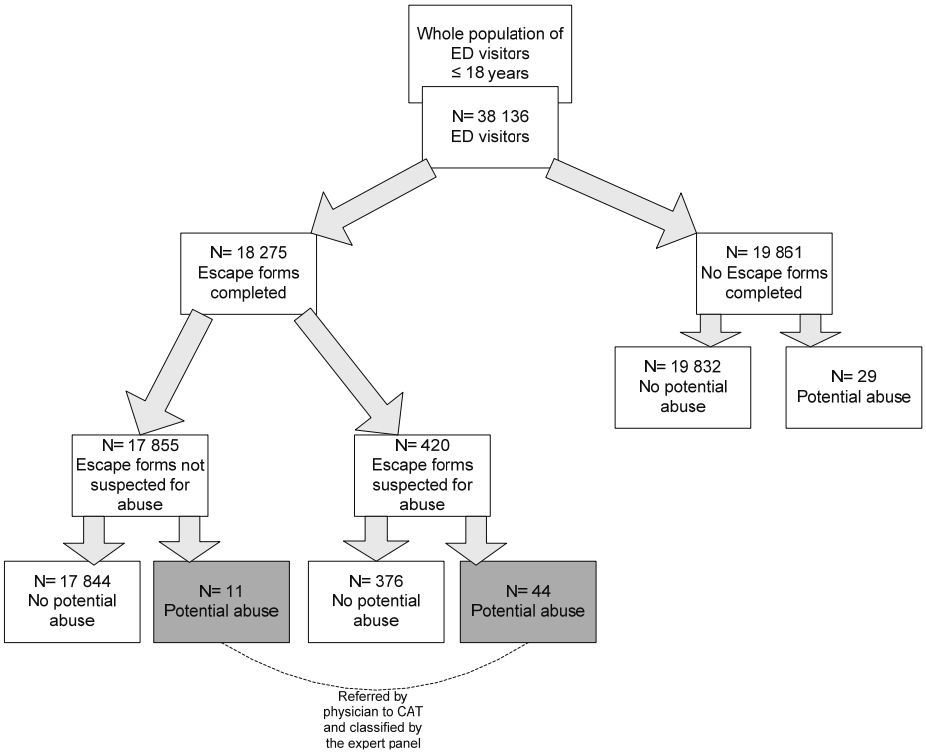

Figure 2
Flow diagram of screening for child abuse in the three emergency departments.

In 18,275 (48%) of these children the Escape instrument was completed (Fig. 2). Overall, 2.3% (420 of 18,275) of the instruments were positive. The responsible physician in the emergency department referred 89 (of 18,275) screened patients (positive and negative) to the Child Abuse Teams. Subsequently, of these 89 patients the expert panel classified 55 (56%) of them as cases of potential abuse. Of these 55 cases, in 44 (80%) of them the completed instruments were positive (Table 1). In 19,861 of the emergency department visits (52%) no Escape instruments were completed (Table 1).

Although the emergency department nurses were urged to complete the Escape instrument, it was not a mandatory part of the electronic patient file, and therefore unfortunately not always completed.

Table 2 presents the sensitivity, specificity, and positive/negative predictive values of (items of) the Escape instrument. The highest sensitivity of a single item was 0.59 (30/51) and the lowest was 0.12 (6/52); the specificity for each single item was 0.99. Sensitivity of the Escape instrument (≥ 1 item positive) was 0.80 (44/55) and specificity was 0.98 (17,844/18,220). Table 2 also presents positive and negative predictive values. The positive likelihood ratio of the Escape instrument was 40 and the negative likelihood ratio was 0.20.

Table 1

Characteristics of all emergency department (ED) visitors (aged ≤ 18 years) in three Dutch hospitals classified as whether or not screened for child abuse with the Escape instrument and whether or not potentially abused.

Characteristics	Children screened for child abuse with Escape instrument			Children not screened for child abuse with Escape instrument		
	Potential child abuse n = 55	No potential child abuse n = 18 220	p-value*	Potential child abuse n = 29	No potential child abuse n = 19 832	p-value*
Age						
0-4 years	44 (80%)	9 991 (55%)	0.002	18 (62%)	9 741 (49%)	0.08
5-8 years	4 (7%)	3 533 (19%)		6 (21%)	3 451 (17%)	
9-12 years	2 (4%)	2 612(14%)		5 (17%)	2 903 (15%)	
13-18 years	5 (9%)	2 084 (11%)		0	3 737 (19%)	
Sex (male)	24 (44%)	10 298 (57%)	0.054	11 (38%)	11 378 (57%)	0.03
Referrer			< 0.001			0.22
Self-referral	31 (56%)	9 532 (52%)		16 (55%)	10 147 (51%)	
Ambulance	12 (22%)	1 060 (6%)		5 (17%)	1 188 (6%)	
General practitioner	7 (13%)	4 013 (22%)		4 (14%)	4 522 (23%)	
Other	3 (6%)	3 166 (17%)		3 (10%)	3 461 (17%)	
Missing	2 (4%)	449 (3%)		1 (3%)	514 (3%)	
Treating specialist			< 0.001			0.15
Surgeon	28 (51%)	5 771 (32%)		16 (55%)	6 539 (33%)	
Pediatrician	19 (35%)	10 934 (60%)		11 (38%)	11 069 (56%)	
Other	8 (14%)	1 353 (7%)		2 (7%)	2 162 (11%)	
Missing	0	162 (1%)		0	62 (0.3%)	
Destination after ED visit			< 0.001			0.001
Home without control	16 (29%)	9 749 (54%)		8 (28%)	9 396 (47%)	
Hospital admission	16 (29%)	2 520 (14%)		5 (17%)	3 151 (16%)	
Outpatient clinic	12 (22%)	2 678 (15%)		6 (21%)	3 157 (16%)	
Other	7 (13%)	1 847 (10%)		8 (28%)	1 380 (7%)	
Missing	4 (7%)	985 (5%)		1 (3%)	1 371 (7%)	
General practitioner	0	441 (2%)		1 (3%)	1 377 (7%)	
Screening positive (≥1 item positive)	44 (80%)	376 (2%)	< 0.001	0	0	NA
Number of positive items			< 0.001			NA
≥ 2	22 (40%)	86 (0.5%)		0	0	
≥ 4	6 (11%)	19 (0.1%)		0	0	

*Calculated with the Chi-square test. NA = Not applicable

Table 2
Univariate comparisons of predictor variables in the Escape instrument for child abuse in emergency departments between cases of suspected child abuse and the total pediatric population, and sensitivity, specificity, positive and negative predictive value.

Items	Aberrant answer	No. of aberrant answers in total population n=18 275	No. of aberrant answers among cases of suspected abuse n=55	Missings	Odds ratio (95% CI)	p-value	Sensitivity (95% CI)	Specificity (95% CI)#	Positive predictive value (95% CI)	Negative predictive value (95% CI)^
1. Is the history consistent?	No	83 (0.5%)	9 (16%)	53	50.0 (23.6-106.2)	< 0.001	0.17 (0.09-0.30)	0.99	0.11 (0.05-0.20)	0.99
2. Was seeking medical help unnecessarily delayed?	Yes	141 (0.8%)	6 (11%)	130	17.4 (7.3-41.3)	< 0.001	0.12 (0.05-0.24)	0.99	0.04 (0.02-0.09)	0.99
3. Does the onset of the injury fit with the developmental level of the child?	No	81 (0.4%)	17 (31%)	1 136*	137.0 (72.7-258.5)	< 0.001	0.34 (0.22-0.49)	0.99	0.21 (0.13-0.32)	0.99
4. Is the behavior of the child, his or her carers and their interaction appropriate?	No	85 (0.5%)	11 (20%)	152	65.3 (32.3-131.9)	< 0.001	0.21 (0.12-0.35)	0.99	0.13 (0.07-0.22)	0.99
5. Are findings of the head-to-toe examination in accordance with the history?	No	54 (0.3%)	9 (16%)	109	82.1 (37.9-178.2)	< 0.001	0.17 (0.09-0.30)	0.99	0.17 (0.08-0.30)	0.99
6. Are there other signals that make you doubt the safety of the child or other family members?	Yes	170 (0.9%)	30 (55%)	152	182.9 (102.3-327.4)	< 0.001	0.59 (0.44-0.72)	0.99	0.18 (0.12-0.24)	0.99
≥ 1 question positive		420 (2.3%)	44 (80%)	0	189.8 (97.3-370.4)	< 0.001	0.80 (0.67-0.89)	0.98	0.10 (0.08-0.14)	0.99

* Nurses skipped this question in case of a trauma when the option 'not applicable' was not yet available.
# Maximum range of 95% CI 0.98-0.99.
^ Maximum range of 95% CI 0.997-0.999.

When item 2 (with the lowest sensitivity) was excluded, the sensitivity of the instrument decreased from 0.80 to 0.73. However, when excluding items 1, 4 or 5, the sensitivity decreased to 0.78, thus resulting in one missed case per excluded item. If items 1, 4 and 5 had been excluded, the sensitivity would decrease to 0.75, the specificity would remain at 0.98, and 3 cases would have been missed.

Due to the extremely high correlations between the predictors, multivariate analysis of the six items of the Escape instrument added no new information about the validity of the instrument.

Discussion

The Escape instrument proved to be useful to support emergency department staff in identifying the group of children at high risk of potential child abuse. Using univariate logistic regression to measure the accuracy of the instrument it was found that cases of potential child abuse were significantly more likely to have had an aberrant answer on at least one of the items (and thus to be screen-positive) compared with the total population.
While the sensitivity and positive predictive value of each single item were moderate, sensitivity for the complete Escape instrument was 0.80, indicating that not all potential cases of child abuse were detected when using a positive Escape instrument. However, specificity and the negative predictive value of each item were high, indicating that child abuse was not likely when the Escape instrument was negative. 3% of the Dutch children are yearly victim of any type of child abuse.[13] In the present cohort, in only 0.3% of the screened emergency department visitors potential abuse was detected, and in 0.1% of the children not screened for abuse; in both situations a very low percentage.

Emergency departments are generally very busy with a broad diversity of patients and staff is working under considerable pressure and time constraints. To increase adherence to the screening protocol it is advisable to minimize the time and effort it takes to conduct screening. Therefore the number of items of the screening instrument should be limited as possible without decreasing its reliability. Including item 1, 4 or 5 resulted in each detecting one additional case. Item 5 concerns the head-to-toe examination of the patient that is completed by the nurse during the triage process to detect signs of child abuse. The sensitivity of this item was unexpectedly low. This could be related to two possible mechanisms; the head-to-toe examination was not properly completed in all cases whereas the staff reported they did so; or the examination did result in only minimal additional sensitivity. In the latter case this might imply that conducting the head-to-toe examination is not worth the effort. When considering the balance between the time/effort made by the staff to motivate the patients and/or their carers to undergo the head-to-toe examination versus the limited contribution to the detection rate, exclusion of this item from the Escape instrument seems feasible. On the other hand, because no cases of child abuse should be missed inclusion of this item might be better. Further study on the effectiveness of the head-to-toe examination is warranted.

Eleven cases of potential child abuse were identified by emergency department staff, while the corresponding Escape instruments were negative. This shows that mere implementation of the instrument is insufficient to achieve the best effect of screening.[11] These false negative cases of potential abuse also show that emergency department nurses need to be trained in recognizing the risk factors/signals for child abuse and in communicating with the parents/child when they suspect child abuse. Physicians may also need training in how best to recognize, handle and communicate on potential child abuse.
Identifying the risk of potential child abuse and the need for an effective intervention to reduce this risk are inextricably linked.[14] If a physician is concerned about the safety of a child, the hospital is responsible to provide the facilities necessary for further research, therapy and follow-up of that child. The hospital can consult Child Protective Services, who have the facilities to examine potential child abuse and the expertise to refer the child to adequate care and to ensure that the child develops in a safe environment.

One limitation of this study is the fact that the rate of confirmed child abuse was unavailable and that using data of potential cases could result in an overestimation of the rate of true cases of child abuse. Follow-up of the potential cases is recommended to confirm the accuracy of the Escape instrument. Strengths of the study are the multicenter setting, the large number of completed Escape instruments, and the number of potential cases identified.

Conclusions

In this study, the majority of children at high risk for child abuse were identified by screening at emergency departments. The Escape instrument is useful for emergency department staff to identify the group of children at high risk for potential child abuse.

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Appendix

Inclusion and exclusion criteria for the cases of this study

Inclusion Criteria
1. Injury caused by a person on whom the child is dependent
2. Injury resulting from neglect by caregivers
3. Psychological harm may have resulted from actions of the person on whom the child is dependent
4. Psychological harm may have resulted from failure of the person on whom the child is dependent
5. Withheld from medical care
6. Child witnessed domestic violence
7. Child witnessed sexual acts
8. Child was victim of sexual acts
Exclusion Criteria
1. Suspicion of abuse was known prior to emergency department visit
2. Alcohol intoxication
3. Suicide attempt
4. Injury caused by stranger or by peers

CHAPTER 7

Follow-up for child abuse of children visiting the emergency department

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Abstract

Objective – Systematic screening for child abuse of all children visiting emergency departments (ED) can be helpful to detect child abuse. The aims of this study were to investigate whether suspicions of child abuse detected by screening in the ED were justified and whether later reported child abuse had been missed at the ED.

Methods – A database containing data of all 13 376 children ≤ 18 years who visited the ED of a Dutch urban children's hospital from February 2008 until December 2009 was matched with the local database of the Child Abuse Centre (CAC).

Results – Forty-seven children were reported to the CAC within 3 months after their ED visit. Nineteen reports were related to the ED visit; in 95% of these the CAC concluded that the reports were justified. 28 children had not been reported to the CAC by the study hospital but by other professionals. In 6 of these cases the CAC concluded that violence had been used against these children, which retrospectively could have been detected at the ED.

Conclusions – We conclude that suspicions of child abuse detected by screening at the ED were justified in a majority of cases. Despite screening policies, child abuse is still being missed. We recommend increasing the screening rate, organizing training for ED staff on a regular basis, and structuring feedback between the CAC and the ED.

Introduction

To reduce long-term effects of child abuse, early detection and intervention is important.[1] Systematic screening for child abuse in emergency departments (EDs) is helpful to detect child abuse.[2] Abused children visit EDs more often than the general pediatric population.[3] However, recognising child abuse at an ED is a challenge.[4]
When potential child abuse is detected in Dutch EDs children are reported to the Child Abuse Team (CAT) of the hospital and/or to the local Child Abuse Centre (CAC).[5] The CAC is the designated authority that is responsible for taking care of cases of (potential) child abuse. It investigates potential cases, refers parents and children to adequate support if necessary, or refers children to the Child Care and Protection Board. Professionals as well as citizens can report potential child abuse to the CAC, but there is no mandatory reporting in the Netherlands.[5]

The aims of this study were 1) to investigate whether suspicions of child abuse detected by screening at the ED were justified; 2) to assess retrospectively if reported child abuse at the CAC may have been missed at the ED.

Methods

The intervention

At Dutch EDs screening for child abuse is mandatory. In the study hospital the screening instrument is to be completed by the ED nurse during the triage of the patient. Subsequently the physician takes a full history and conducts a physical examination of the child. When concerns about the safety of the child remain, it is the physician's responsibility to report the child to the CAT or the CAC. When the CAC receives a report of potential child abuse they initiate an investigation and conduct interviews with the child itself, his or her parents, the school, the general practitioner, and other relevant contacts of the child. Based on this information conclusions are drawn about the safety of the child. When the CAC concludes that there are no concerns it closes the report. If the CAC has concerns about the safety of the child and the family is willing to improve their situation, the CAC refers the family for professional support, and monitors whether the situation of the child improves. When there are severe concerns about the safety of the child the CAC refers the case to the Child Care and Protection Board that can request the court to impose a so-called child protection measure, for example, placing the child in a foster home.

Were suspected cases justified?

To asses aim 1, whether the assessment of suspicions of child abuse detected by screening in the ED were justified; we checked whether children who visited the ED had been reported at the CAC within 3 months after their ED visit. A database containing data of all children (n = 13,376) who visited the ED of a Dutch urban children's hospital between February 2008 and December 2009 was matched with the database of the local CAC. For logistical reasons the merge was carried out in two steps. The first merge was performed with the variables date of birth, gender and zip code. In the selection of potential hits a second match was performed using the variables

initial, surname and house number to strengthen the match. We then investigated whether the CAC report was related to the ED visit. From the CAC database we collected the categorized variables 'reason of CAC report', 'diagnosis at CAC', and 'reporting authority'.
We classified cases by having been screened or not, by the screening result (positive or negative), and whether the child had been reported to the CAC by the study hospital or by other professionals.

Potentially missed cases?

To assess retrospectively if child abuse that had been reported to the CAC may have been missed at the ED we used the same database as described above. We checked per case whether or not the child had been reported to the CAC by the study hospital following his or her ED visit.
To calculate the sensitivity of screening for child abuse at the ED we defined a case as: "A child that visited the ED, was reported to the CAC within three months following the ED visit, and where the CAC concluded after their research that the report was justified." A test was considered positive when the Escape screening form was positive.

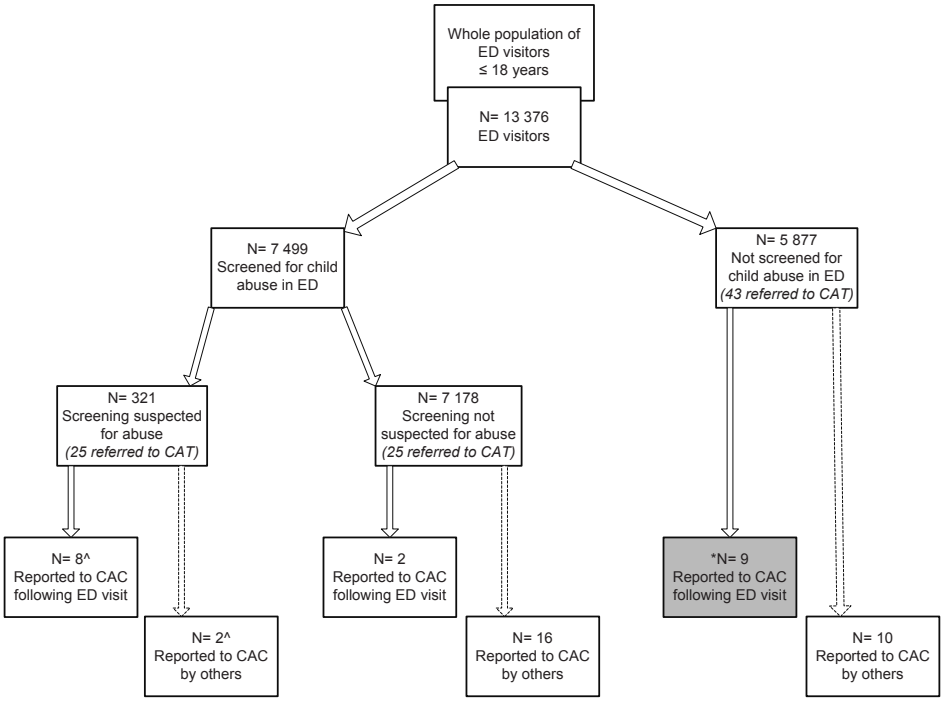

Figure 1
Flow diagram of children visiting the ED and being reported within 3 months at the CAC.
^ 1 of the cases was not confirmed as child abuse by the CAC
* 4 out of 9 presented at ED with abuse and were directly reported to the CAC without screening.
ED = emergency department; CAT = Child abuse team; CAC = Child Abuse Centre

The statistical package SPSS 20 was used for the analysis.
This study was approved by the Medical Ethical Committee of the Erasmus MC, University Medical Centre Rotterdam (MEC-2007-195).

Results

In total 47 children of the 13,376 ED visitors were reported to the CAC within 3 months after their ED visit (figure 1). These 47 children were on average 5.2 years of age, 55% were male, 49% were self referrals, 55% had been treated at the ED by a pediatrican and 23% of the children were admitted to the hospital after their ED visit (table 1).

Were suspected cases justified?

There were 19 children reported to the CAC by the study hospital following the ED visit, in one of these 19 cases the CAC concluded at the end of their investigation that there were no more concerns about the safety of the child. 28 children were not reported to the CAC by the study hospital, but by other professionals. Below we will describe these results in more detail, subdivided in children who were 1) screened positive; 2) screened negative; and 3) not screened for child abuse.

Table 1
Characteristics of children reported to CAC within 3 months after visiting the ED, categorized by screening for child abuse.

Characteristics	Screened for child abuse		Not screened for child abuse N = 19
	Screening positive for child abuse N = 10	Screening negative for child abuse N = 18	
Age (yrs)	8.7	3.7	4.8
0-4	4 (40%)	12 (67%)	13 (68%)
5-8	1 (10%)	3 (17%)	2 (11%)
9-12	1 (10%)	2 (11%)	3 (16%)
13-18	4 (40%)	1 (6%)	1 (5%)
Sex (male)	4 (40%)	10 (56%)	12 (63%)
Referrer			
Ambulance	4 (40%)	2 (11%)	2 (11%)
General practitioner	3 (30%)	2 (11%)	5 (26%)
Self-referral	2 (20%)	12 (67%)	9 (47%)
Other	1 (10%)	2 (11%)	3 (16%)
Treating specialist			
Pediatrician	5 (50%)	10 (56%)	11 (58%)
Surgeon	4 (40%)	7 (39%)	7 (37%)
Other	1 (10%)	1 (6%)	1 (5%)
Destination after ED visit			
Hospital admission	5 (50%)	1 (6%)	5 (26%)
Outpatient clinic	4 (40%)	4 (22%)	4 (21%)
Other	1 (10%)	2 (11%)	3 (16%)
Home	0	11 (61%)	7 (37%)

Table 2
Characteristics of children reported at the CAC within three months after an ED visit.

Case #	Age (years)	Gender	Reason for ED visit	Diagnosis at ED	Reason of CAC report	Diagnosis at CAC
Screening positive for child abuse						
1	1-4	Male	Wet bandage	Bandage change after hand surgery	Other deregulation	Other deregulation
2*	5-8	Female	Burn leg	Burn leg	Unknown	Use of violence
3*	1-4	Female	Fall from stairs yesterday, painful neck, lot of bruises	Multiple trauma, skull fracture	Use of violence	Use of violence
4*	9-12	Female	Car accident	Observation after car accident	Alcohol addiction parent	Use of violence
5*	1-4	Male	Suspected sexual abuse	Sexual abuse, bruises and 2 anal fissures	Other deregulation	Other deregulation
6*	13-18	Male	Deodorant bottle lit, exploded in hands, burns	Burns hands	Other deregulation	Other deregulation
7	13-18	Female	Alcohol intoxication	Alcohol or drugs intoxication?	Psychic problems child	Other deregulation
8	1-4	Male	Swelling on head without trauma	Skull fracture	Other deregulation	No problems at end of research
9	13-18	Female	Alcohol intoxication	Alcohol intoxication	Psychic problems child	Use of violence
10	13-18	Female	Swallowed 150 tablets of Rivotril. Drowsy.	Suicide attempt	Severe individual parental problem	No problems at end of research
Screening negative for child abuse						
11*	1-4	Female	Blue eye, blood out of mouth	Haematoma eye and thick lip, probably after trauma	Other deregulation	Use of violence
12	<1	Male	Failure to thrive, sees yellow	Yellow baby, social problems	Severe individual parental problem	Multi problem family
13	<1	Male	Otitis in cardiomyopathy patient, looks gray	Viral upper tract infection	Use of violence	Use of violence
14	<1	Female	Fall out of stroller, neck pushed back	Abrasion right forehead	Use of violence	Use of violence
15	<1	Male	Fever, crying	Rhinitis	Use of violence	Use of violence
16	1-4	Female	Fever	Iron deficiency anaemia	Use of violence	Use of violence
17	5-8	Female	Sore throat	Lymph node pathology	Pedagogic inability	Multi problem family
18	13-18	Female	Cut on thumb	Cut on thumb	Use of violence	Severe individual parental problem
19	<1	Male	Mother thinks child has stomach ache	Enteritis and rhinitis	Severe individual parental problem	Divorce problems
20*	<1	Male	Hit the water in a car (no submersion)	Haematoma occiput and contracture neck	Multi problem family	Other deregulation
21	5-8	Male	Painfull swolen belly	Nephrotic syndrome	Severe individual parental problem	Other deregulation
22	1-4	Female	Finger between door	Contusion finger	Use of violence	Multi problem family
23	<1	Female	Got cookie from brother	No pathology	Multi problem family	Problems parental relation
24	<1	Male	Smoke inhalation	Minimal carbon monoxide poisoning	Multi problem family	Other deregulation
25	5-8	Male	Painful right hand	Contusion hand	Multi problem family	Problems parental relation

26	<1	Male	Hernia inguinales both sides?	Hernia inguinalis both sides	Use of violence	Severe individual parental problem
27	9-12	Female	Painful back after fall	Unknown	Pedagogic inability	Pedagogic inability
28	9-12	Male	Yellow fluid out of ear after diving	Perforated eardrum	Unknown	Drug addiction parent
Not screened for child abuse						
29*	<1	Female	Stridor, not responding	Suspected seizure	Other deregulation	Other deregulation
30*	1-4	Female	Sewer cleaner drinking	Lesions and oedema digestive tract	Multiproblem family	Multi problem family
31*	1-4	Male	Soft tissue swelling scalp	Commotio cerebri	Refugee problems	Use of violence
32*	1-4	Male	Femur fracture	Distal femur fracture	Severe individual parental problem	Multi problem family
33*	<1	Male	Fall on head	Commotio cerebri	Unknown	Other deregulation
34*	9-12	Male	Stabbed with knife by sister	Cut in left arm	Use of violence	Pedagogic inability
35*	9-12	Male	Abuse	Abuse	Use of violence	Other deregulation
36*	1-4	Female	Sexual abuse	Sexual abuse	Multi problem family	Other deregulation
37*	<1	Female	Beaten on the head	Abrasions in face, potential commotion cerebri	Addiction parent	Severe individual parental problem
38	1-4	Male	Bleeding after circumcision	Little bleeding after circumcision	Use of violence	Use of violence
39	1-4	Male	Fever, dyspnoic	Viral infection	Multi problem family	Multi problem family
40*	1-4	Female	Blow on head	Blow to head by father	Use of violence	Multi problem family
41	5-8	Male	Fever, sore throat	Viral infection	Pedagogic inability	Multi problem family
42	1-4	Male	Swelling right cheek	Parotitis	Use of violence	Problems parental relation
43	5-8	Male	Painful thumb	Mild finger contusion	Use of violence	Multi problem family
44	1-4	Female	Fever and coughing	Upper tract infection	Other deregulation	Other deregulation
45	13-18	Female	Stomach ache after vomiting blood	Vomiting blood	Multi problem family	Unknown
46	9-12	Male	Got possibly chlorinated water on skin	Splash accident with diluted chlorine	Multi problem family	Unknown
47	1-4	Male	Fall against bedside, cut right eye	Skin wound right eye	Multi problem family	Multi problem family

^Dark colored boxes were reported to the CAC following the ED visit

* Referred by ED staff to Child abuse team of the study hospital

Screened positive for child abuse

7499 out of 13,376 ED visitors (56%) were screened for child abuse in the ED; in 321 of 7499 (4.3%) cases the screening test was positive (figure 1). These children were then evaluated by the ED physician, who referred 25 of 321 (7.8%) children to the CAT of the hospital, and eight (2.5%) to the CAC (table 2, case 1-8). The CAC referred seven of these eight cases to professional support or to the Child Care and Protection Board, indicating that the CAC supported the concerns about the safety of the child. In the remaining case (table 2, case 8) the CAC concluded at the end of their investigation that there were no more concerns about the safety of the child.

Two positively screened cases had not been reported to the CAC by the hospital, but by other professionals (table 2, case 9 and 10). One of these cases presented at the ED accompanied by a social worker, indicating that professional support was already enabled. This was the reason for the ED staff not to report the patient to the CAC.

Screened negative for child abuse

Of 7178 negative screened children, 18 (0.25%) were reported to the CAC within 3 months following their ED visit. In two of those cases the hospital had reported the child to the CAC despite the negative screening result. The other 16 cases were reported to the CAC by other professionals. In 4 of these 16 cases the CAC concluded after their investigation that violence had been used against these children (table 2, case 13-16). Three of these 4 children had presented at the ED with infectious symptoms while one presented with a trauma. In the other 12 cases the CAC concluded parental problems in at least 9 of them.

Despite the negative screening one of the 16 cases was reported to the Child abuse team of the hospital that invited the family for a consultation (table 2, case 20).

Not screened for child abuse

Of 5877 children who had not been screened for child abuse, 19 (0.32%) were reported to the CAC within 3 months following the ED visit. Nine of these 19 CAC reports were referred by the study hospital. Four of these nine children presented at the ED because they were victims of abuse (table 2, case 34-37). They were all directly reported to the CAT of the hospital, and subsequently to the CAC. ED staff may have concluded that screening was not of any added value.

The other ten children had not been reported to the CAC by the study hospital, but by other professionals. In one of these cases ED staff had been worried about the safety of the child and reported it to the CAT of the hospital (table 2, case 40). In another child of these ten, who had visited the ED because of a complication of surgery, the CAC concluded that violence had been used against the child (table 2, case 38).

Potentially missed cases

We analysed if child abuse reported to the CAC may have been missed at the ED, and how these potentially missed cases related with the results of screening for child abuse. Within 3 months of an ED visit 80% (8 of 10) of the CAC reports who were screened positive at the ED were referred by the study hospital, 11% (2 of 18) of the screened negatives, and 33% (5 of 15) of the children not screened for child abuse were referred by the study hospital (figure 1).

We assessed how the results of screening for child abuse at the ED related to the CAC reports. From the children screened positive for child abuse at the ED 2.5% (8 of 321) were reported to

the CAC by the study hospital. This was 0.03% (2 of 7178) for the screened negatives and 0.09% (5 of 5877) for the children not screened for child abuse.
We found a sensitivity for screening for child abuse at EDs of 0.31 (8 out of 26). The number needed to screen to detect one potential case of child abuse at the ED is 846 (1/ (28/7499-15/5877)).

Discussion

Between February 2008 and December 2009 47 of 13,376 children (0.35%) were reported to the CAC within 3 months following their ED visit. We conclude that in 19 children reports to the CAC were made by the study hospital following the ED visit. In one of these 19 cases the CAC concluded that there were no concerns on the safety of the child, in the other 18 cases concerns about potential abuse were considered justified. Twenty-eight children visited the ED and were reported to the CAC by other professionals than the study hospital. We conclude that child abuse may have potentially been missed at the ED in six of them; the CAC concluded that violence had been used against these six children.
We conclude that suspicions of child abuse detected by screening and reported to the CAC are generally justified. Since the consequences of unjustified suspicions of child abuse can be very harmful for the child and their family[6], we want to underline the importance of good communication in a case of suspected child abuse. This entails emphasizing the concerns about the child and not accusing the parents of abuse.

Whether child abuse has been missed in children who were screened in the ED, is not easy to answer retrospectively. Still, we can draw a number of conclusions. Firstly, probably some cases should have raised the awareness of the ED staff. Secondly, higher screening rates would probably have resulted in higher rates of cases reported to the CAC. Thirdly, children who were reported by other professionals than the ED staff within 3 months after their ED visit had often presented themselves with an internal medical problem (for example fever or abdominal pain) at the ED. Presumably ED staff is less aware of potential child abuse in patients with internal problems than in trauma patients, because the main focus is on physical abuse in the ED.[7] Neglect and emotional abuse are thus even more difficult to detect in an ED setting than physical abuse. Further research is recommended to examine whether extension of the screening instrument with an item targeting psychosocial problems will increase the detection of children who are exposed to this.

The number of reported children to the CAC in the screened positive group, i.e. 8 out of 321, appears to be small. However, all positive screening forms were checked by the hospital social worker and about 8% of the screened positives were referred to the CAT of the hospital. Also, in the screened positives group only two children had been reported to the CAC by others, and one of the two presented at the ED with a social worker and was therefore probably not reported to the CAC by the hospital. So it seems that, compared to the other groups, not many cases of child abuse have been missed in the screened positive group.

In the screened negatives, 16 out of 18 children were reported to the CAC by others and had not been reported by the study hospital. In 7 cases the CAC observed a parental problem; it is difficult to conclude if this could have been detected during the respective ED visits. Taking a social history at the ED might have prevented that these cases were missed. However, one might wonder if an ED visit is the best time and place to take a social history. Settings like the general practitioners office or mother and child clinics are perhaps better suited for an extensive social history. In four out of 16 cases the CAC concluded that violence had been used against the child; the ED visit may have been a good opportunity to detect this abuse. Three of these 4 children presented at the ED with an internal problem, which probably made it difficult to detect child abuse.[2]
In the non screened group, reports to the CAC were related to the ED visit in 9 out of 19 children, in four of these nine cases the abuse was already known when the children presented at the ED. The ten children who were not screened at the ED and had been reported to the CAC by others had presented at the ED with more common symptoms, except a child who presented at the ED with a complication of surgery and in whom the CAC concluded that violence had been used against her/him.

The ED visits were an opportunity to detect child abuse in children, but unfortunately not all cases reported to the CAC were detected. To improve the detection of child abuse in EDs the screening rate should increase, and preferably to 100%.[2,8] To optimize the screening effect, ED staff needs training to recognize child abuse and to act adequately in case of a suspicion.[2,9,10] This training needs to be organized on a regular basis, because there is a high transfer of staff in the ED.[11] The CAT of the hospital could supervise the screening and training at the ED.[12] Feedback from the CAC to the ED about reported cases as well as missed cases could be very informative[10]; however, this can be complicated in the context of privacy of the patients.

The sensitivity of screening for confirmed cases of child abuse at EDs is low with 0.31 (8 out of 26). However, this is under the assumption that all 18 children were truly missed cases of child abuse at the moment they presented at the ED. If we focus whether the child abuse was already present at the moment of presentation at the ED, the total number of cases would decrease probably. For example cases 13, 15-17, 19, 21, 26 and 28 were common, not suspected for abuse, ED presentations. The sensitivity for screening would than increase to 0.39. Currently the number of false positives is low, maybe the threshold to refer a child to the CAC can be reduced somewhat.
Some limitations of the present study need to be addressed. The database of the ED was matched only with the local CAC; we probably missed a few cases that have been reported to other CACs. Only categorized data was available from the CAC and therefore we were not able to draw conclusions in detail about every individual case.

Conclusions

In summary, we conclude that suspicions of child abuse detected by screening at the ED were justified in a majority of cases and that despite screening child abuse is still being missed at EDs.

To minimize this, we think the screening rate should increase, training for ED staff needs to be organized on a regular basis, and feedback from the CAC to the ED could be helpful.

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CHAPTER 8

General discussion

This thesis focused on the implementation of systematic screening for child abuse at emergency departments and its effect on the detection rate of suspected child abuse. We describe this process in the context of the research questions that were posed in the introduction.

Answers to the research questions

1. Which valid screening tools to detect child abuse at emergency departments have been described in literature?

The literature review presented in chapter 2 showed that the number of studies was too limited to answer this research question.[1] Only four studies reported the use of a screening tool which proved to increase the detection of suspected child abuse at emergency departments.[2-5] These tools consisted of checklists, in which, overall, 11 different screening items were used, none of which had been validated. Three items were included in all four screening tools: 1; whether the findings on examination confirmed with the history given by the child or parents; 2; whether there was a delay in seeking medical help; and 3; whether there was an inconsistent history (for example, the child tells a different story than the parent). We developed the Escape instrument *("**S**creening for **c**hild **a**buse at **e**mergency departments, implementation of an optimal **p**rotocol")* based on this systematic literature review, and also on interviews with professionals. The feasibility of the proposed Escape instrument was tested by emergency department nurses. We included the three items mentioned before in the Escape instrument and added three other items to screen for child abuse at emergency departments. 4; Whether the onset of the injury fits with the developmental level of the child, 5; whether the behavior of the child/the carers and their interaction was appropriate, and 6; whether there were any other signals that doubt the safety of the child or other family members. The SPUTOVAMO form is an injury registration checklist often used in Dutch emergency departments, the questions in this checklist differ with the Escape instrument except for item 1 and 2. In appendix A the complete instrument is described in English and Dutch.

2. What are facilitators and barriers for screening for child abuse at emergency departments in the Netherlands?

This question was answered through interviews with professionals involved in screening for child abuse at emergency departments, presented in chapter 3.[6] Barriers for screening for child abuse at emergency departments mentioned in the interviews were practical problems like lack of time to develop adequate policy and protocols, to register (suspicions of) child abuse, and to organize education and training. Personal barriers were also named like fear of an unjustified suspicion of abuse and insufficient communication skills. A fast transfer of emergency department staff is a barrier for the arrangement of a structured training program. Also facilitators of screening for child abuse at emergency departments were identified. A supportive hospital board, the presence of a child abuse attendant and a child abuse team, thorough training for emergency department staff and financial support were all thought to contribute to improved rates of screening and detection of child abuse at emergency departments.

3. How frequent is systematic screening for child abuse applied at Dutch emergency departments, and to what extent is potential child abuse being detected?

In 2007 and 2008 we monitored baseline rates of screening and detection of child abuse at emergency departments in seven Dutch hospitals, presented in chapter 4.[7] We found that overall only 20% of the emergency department visitors up to 18 years were screened for child abuse. A suspicion of child abuse arose in 0.2% of children aged up to 18 years and in 0.3% of the subgroup of children aged up to 4 years. In those hospitals where emergency department staff complied with screening guidelines for child abuse, the detection rate of suspected child abuse was significantly higher than in the non-complying hospitals; 0.3% versus 0.1% ($p<0.001$).

4. What is the effect of systematic screening on the detection of child abuse at emergency departments?

In an intervention (cohort) study we explored the effects of systematic screening (chapter 5).[8] We included all 104 028 children aged 18 years or younger who visited the emergency departments of seven Dutch hospitals in a period of 23 months. Screening tools and training sessions for emergency department nurses were implemented by using an interrupted time series design. The average screening rate in the seven emergency departments increased from 20% at baseline to 67% after 23 months. Training of emergency department nurses and making screening a legal requirement were appropriate interventions for optimizing the screening rate. The detection rate for suspected child abuse in children screened for abuse was 5 times higher than in children not screened. These results indicate that systematic screening for child abuse at emergency departments is effective in increasing the detection rate of suspected child abuse. In the Netherlands yearly 400.000 children and adolescents visit the emergency department. Given this number of emergency department visitors we expect that the implementation of screening increases the number of suspected cases of child abuse from 400 to 2000 cases per year.[9] The screening rate further improved when completing the screening instrument was made mandatory. This was observed in one hospital where the electronic patient file could not be closed if the screening tool was not completed.

5. What is the predictive value for suspected child abuse of the different screening questions in the Escape screening tool?

In chapter 6 we measured the accuracy of the Escape instrument: it proved to be useful to support emergency department staff in identifying the group at high risk of suspected child abuse at the emergency department. The sensitivity of each single item was lower (range 0.12-0.59) than the overall sensitivity of the entire Escape instrument of 0.80. The specificity of the Escape instrument was 0.98, the positive predictive value 0.10 and the negative predictive value 0.99. The sensitivity of the head-to-toe examination was unexpectedly low, 0.17. We expected that the head-to-toe examination would have had a relevant contribution to the detection of suspected child abuse. Depending on the priorities made, the Escape instrument could be shortened. When the question on the head-to-toe examination will be removed, maybe the screening rate will increase because the emergency department nurses are more motivated to complete the Escape instrument. Despite the lower sensitivity of the Escape instrument in that case, the number of detected cases of suspected child abuse might increase because of the

higher screening rate. We now conclude that the Escape instrument should not be shortened to maximize the sensitivity.
The Escape instrument is the first validated screening tool for child abuse at emergency departments presented in literature. The international screening tools in literature were not validated[2-3], neither was the SPUTOVAMO[4], and the validation of the CHAIN-ER (Utrecht) is still in progress.[10]

6. Are suspicions of child abuse as detected by screening at emergency departments justified?

To answer this question we followed all emergency department visitors younger than 18 years of one of the study hospitals, see chapter 7. To assess if reports to the Child Abuse Centre were related to screening and/or the detection of suspected abuse in the emergency department, we checked whether children who visited the emergency department had been reported at the local Child Abuse Centre within 3 months following their visit. In 23 months 13 376 children visited the emergency department. Of these, 0.35% (47) were reported to the Child Abuse Centre within 3 months after visiting the emergency department. In 19 children reports to the Child Abuse Centre were related to their emergency department visit, and reported by hospital staff. Twenty-eight children were reported to the Child Abuse Centre by other professionals than the study hospital. The Child Abuse Centre concluded that violence had been used against six of these 28 children; the emergency department staff diagnosed in three of these six children a non-trauma related problem (for example infection), in one child an alcohol intoxication and in the last one a complication of surgery, which suggests the possibility of further improvements in the screening tool.
We conclude that suspicions of child abuse detected by screening at the emergency department were justified.

Limitations of the study

In the Escape project we used a prospective cohort intervention study to assess the effectiveness for screening for child abuse at emergency departments on the number of suspected cases of child abuse. And an interrupted time series design to evaluate the implementation of the interventions. We considered these the best available methods to answer our research questions. The optimal way of testing the effectiveness of screening would have been a randomized controlled trial. Ethically this was undesirable since it would have required asking some hospitals to refrain from screening and training they had already introduced.
A limitation in this study was the lack of a gold standard for child abuse. We designed comparable to other studies the best available reference standard[10], using an expertise panel who individually judged all cases of suspected child abuse based on data available from the ED visit. Definitions of child abuse are very broad and differ internationally. This can be a problem for comparing results of different studies.

Another limitation in this study is the timing of the validation of the Escape instrument, which has been done after the intervention study. Optimally the Escape instrument was validated before implementing it. This was not possible because of practical reasons. The large numbers

needed for validating the instrument and assessing the effectiveness of screening, and the long time of follow-up were not available during this project. Therefore we first empirically validated the Escape instrument when implementing it and closely followed the effects, and second we validated the Escape instrument in detail by calculating the sensitivity, specificity, and positive/negative predictive values. We conclude this provides sufficient evidence that using the Escape instrument to screen uniformally for child abuse at emergency departments is effective to detect potential child abuse.

Future prospects

We distinguish three main areas of future prospects arising from this thesis.

Training of emergency department staff

In this thesis we conclude that screening is effective to increase the detection rate of suspected child abuse.[8] These cases of suspected child abuse has been shown to be justified in the final chapter. We endorse the implementation of systematic screening for child abuse by emergency department nurses at every emergency department. Therefore we support the legal requirement of screening for child abuse at emergency departments of the Dutch Health Care Inspectorate.[11] In the Escape project we also observed that some coercion is sometimes necessary to achieve adherence to the screening program, since not every hospital was convinced that screening belonged to their tasks.

We implemented training especially focused on the communication with the patient and the family when a suspicion of child abuse arises. We did so because communication in such cases was often mentioned by nurses and physicians as a barrier for screening for child abuse. Many studies documented the need for training in recognizing and handling child abuse, but few studies have specifically tested a specific type of training for emergency staff.[8,12-14] In chapter 7 we described that cases of child abuse are being missed because they were not recognized as a case of child abuse at the emergency department. To improve the results of screening we therefore recommend to implement training in communication and also in recognizing child abuse for emergency department nurses along with the implementation of screening.[8] This training should be repeated on a regular basis.

Screening for child abuse in other settings

The setting of the emergency department is well suited to conduct screening for child abuse. Children who are victim of child abuse are visiting the emergency department more often than non-abused-children.[14] Also the moment that the patient is presenting at the emergency department is a window of opportunity or golden hour of opportunity; the patient and the family are more approachable for help or advice by others at such a moment of crisis than at a later time. This moment is therefore crucial to perhaps be able to interrupt the child abuse and to create a safe place for the child to grow up.[15-16]

Whether screening for child abuse using the Escape instrument is also effective in other settings as emergency departments, needs further research. The instrument is developed for the acute medical setting; in similar settings the use of the Escape instrument could be applicable. In the

Netherlands this could be for example the out of office general practices ("huisartsenposten"), for acute care by general practitioners. Like at emergency departments, child abuse is frequently being unrecognized at out of office general practices.[17]
Screening for child abuse using the Escape instrument is less likely to be effective in other pediatric settings without acute patient presentations, like mother and child clinics or general practitioner offices. Because the patients are not presenting for acute medical problems. However, screening using another instrument could be effective to increase the detection of child abuse in these settings. This screening instrument should be more focused on neglect and psychological abuse, the types of child abuse with the highest prevalence.

Remaining research questions

For the Escape project we collected an extensive set of data; datasets from the electronic patient files and emergency department triage systems of seven Dutch emergency departments were collected for 29 months consecutively. Additionally follow-up data of all visitors up to 18 years of one hospital was collected at the Child Abuse Centre. This dataset has already provided answers to a number of important questions, and potentially it may provide the answers to additional, as yet unanswered questions, such as: Which symptoms at presentation at the emergency department can predict the probability of child abuse? Which physicians (pediatrician, surgeon, neurologist, etc) come in contact with which types of abuse? What is the association between children (and their parents) being referred to the emergency department versus being self-referrals on the one hand, and the compliance rate of emergency department staff regarding screening and detection of potential child abuse on the other hand?
An important research topic is the outcome of children screened positive at the ED. A large national follow-up study is needed to answer that question. What is the effectiveness of screening for child abuse at emergency departments on reducing the long term adverse effects?
The CHAIN-ER study conducted in Utrecht or the study on the SPUTOVAMO in Amsterdam could possibly provide some answers to these questions soon.[10,18]

At the end of this Escape project we conclude that screening for child abuse at emergency departments using the Escape instrument is effective in increasing the detection of child abuse. We advice the Escape instrument use at all emergency departments for a better detection of child abuse. This thesis will be widely spread amongst professionals working in the pediatric and/or emergency field.

Hopefully these efforts will result in increasing the early detection of child abuse, to bring the abuse to a halt in these children, and limit the (long-term) adverse effects for these children being victim of child abuse.

Conclusions

- Systematic screening for child abuse in emergency departments is effective in increasing the detection rate of suspected child abuse.
- To optimize the implementation of screening for child abuse it should be combined with training of emergency department nurses prior to its implementation.
- A significant proportion (95%) of suspicions of child abuse detected by screening at the emergency department in this study is justified.
- The Escape instrument is an accurate screening tool to screen for child abuse at emergency departments, i.e. sensitivity of 80% and specificity of 98%.
- Uniform screening for child abuse at emergency departments is more effective than case finding or screening in selected groups of children.
- According to emergency department staff screening for child abuse at emergency departments is facilitated by a supportive hospital board, the presence of a child abuse attendant and child abuse team, intensive training for emergency department staff and financial support.
- The introduction of the legal requirement of screening for child abuse at emergency departments is an effective intervention to increase the screening rate for child abuse.
- There are still cases of child abuse being missed at emergency departments screening for child abuse (shown in the follow-up at one emergency department).

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Appendix A

Escape instrument – The screening instrument for child abuse used at the emergency departments. One (or more) ticked answers in the dark boxes indicate the possibility of an increased risk of child abuse and further action is recommended.

▪ Is the history consistent?	yes	no
▪ Was seeking medical help unnecessarily delayed?	yes	no
▪ Does the onset of the injury fit with the developmental level of the child?	yes / n.a.	no
▪ Is the behavior of the child, his or her carers and their interaction appropriate?	yes	no
▪ Are findings of the head-to-toe examination in accordance with the history?	yes	no
▪ Are there other signals that make you doubt the safety of the child or other family members? * If Yes describe the signals in the box 'Other comments' below.	yes*	no

Other comments:

Conclusion:

Doubt about the safety of the child; if ***one or more*** answers ***inside the arrow*** have been ticked, please confer with the treating physician.

Escape instrument in English

▪ Is de anamnese consistent?	ja	nee
▪ Is er onnodig vertraagd medische hulp gezocht?	ja	nee
▪ Past het ontstaan van het *letsel* bij het ontwikkelingsniveau van het kind?	ja / n.v.t.	nee
▪ Zijn het gedrag van het kind / de verzorgers en de interactie tussen hen passend?	ja	nee
▪ Komen de bevindingen bij top-teen onderzoek overeen met de anamnese?	ja	nee
▪ Zijn er overige signalen waardoor u twijfelt aan de veiligheid van het kind of overige familieleden? ***** Indien ja: beschrijf de signalen onder 'Overige opmerkingen' in het vak hieronder.	ja*****	nee

Overige opmerkingen:

Conclusie:

Twijfel over de veiligheid van het kind; indien u ***één of meer*** antwoorden hebt omcirkeld ***in de pijl,*** overleg dan met de behandelend arts.

Escape instrument in Dutch

CHAPTER 9

Summary
Samenvatting

Summary

Early detection of child abuse can potentially reduce the related short-term and long-term morbidity and mortality. When families are supported to bring the abuse to a stop, the quality of life of the children and families can improve **(Chapter 1)**. In 2007 we initiated the project 'Escape', an acronym for *"**S**creening for **c**hild abuse at **e**mergency departments, implementation of an optimal **p**rotocol"*. The goal of Escape was to develop an effective and feasible implementation protocol for screening for child abuse at emergency departments. We started a literature review on valid screening tools to detect child abuse at emergency departments **(Chapter 2)**. Only four studies reported the use of a screening tool, which proved to increase the detection of suspected child abuse at emergency departments. Based on this systematic literature review, and also on interviews with professionals we developed the Escape instrument, a screening instrument consisting of six questions.

To get to know the facilitators and barriers for screening for child abuse at emergency departments we interviewed professionals involved in screening for child abuse at emergency departments of seven hospitals **(Chapter 3)**. Barriers for screening mentioned in the interviews were practical problems like lack of time to develop adequate policy and protocols, to register (suspicions of) child abuse, and to organize education and training, and personal barriers like fear of an unjustified suspicion of abuse and insufficient communication skills. Also facilitators of screening for child abuse at emergency departments were identified; a supportive hospital board, the presence of a child abuse attendant and a child abuse team, thorough training for emergency department staff and financial support.

We started a baseline monitoring of the rates of screening and detection of suspected child abuse at Dutch emergency departments during a period of six months **(Chapter 4)**. We found that overall only 20% of the emergency department visitors up to 18 years were screened for child abuse. A suspicion of child abuse arose in 0.2% of children aged up to 18 years and in 0.3% of the subgroup of children aged up to 4 years. In those hospitals where emergency department staff complied with screening guidelines for child abuse, the detection rate of suspected child abuse was significantly higher than in the non-complying hospitals; 0.3% versus 0.1% ($p<0.001$).

The baseline monitoring was followed by the implementation of the Escape instrument and training of emergency department nurses in seven Dutch hospitals **(Chapter 5)**. These seven hospitals were located in the province of South Holland (The Netherlands). Overall, their emergency departments are annually visited by 200 000 patients. We used an interrupted time-series design to detect changes in trends of screening and detection of child abuse over time, before and after the implementation of the screening instrument and the training for emergency department nurses. We included all 104 028 children aged 18 years or younger who visited the emergency departments of the seven hospitals during a period of 23 months. The average screening rate in the emergency departments increased from 20% at baseline to 67% after 23 months. Training of emergency department nurses was an appropriate intervention for optimizing the screening rate. During the study period, from January the 1st 2009, screening became a

legal requirement, and this turned out to result in optimizing the screening rate. Despite of the implementation of the screening instrument and of the interventions the screening rate was not 100% at the end of the study period but 67%. The detection rate for suspected child abuse in children screened for abuse was 5 times higher than in children not screened. These results indicate that systematic screening for child abuse at emergency departments is effective in increasing the detection rate of suspected child abuse.

We subsequently measured the predictive value of the screening questions of the Escape instrument **(Chapter 6)**. The sensitivity of each single item was lower (range 0.12-0.59) than the overall sensitivity of the entire Escape instrument of 0.80. The specificity of the Escape instrument was 0.98, the positive predictive value 0.10 and the negative predictive value 0.99. The Escape instrument proved to be useful to support emergency department staff in identifying the group at high risk of suspected child abuse at the emergency department.

Finally we selected one hospital for the follow-up of all children who had visited the emergency department during our study period. We combined hospital databases and a database of the Child Abuse Center to evaluate how well the screening was capable in detecting justified cases of child abuse **(Chapter 7)**. In 23 months 13 376 children visited the emergency department. Of these, 0.35% (47) were reported to the Child Abuse Centre within 3 months after visiting the emergency department. Twenty-eight children were reported to the Child Abuse Centre by other professionals than the study hospital. The Child Abuse Centre concluded that violence had been used against six of these 28 children; the emergency department staff diagnosed in three of these six children a non-trauma related problem (for example infection), in one child an alcohol intoxication and in the last one a complication of surgery. The fact that these cases of child abuse had not been detected at the emergency department suggests the possibility of further improvements in the screening tool. In 18 out of 19 (95%) children reports to the Child Abuse Centre were related to their emergency department visit and justified.

At the end of the Escape project we can conclude that systematic screening for child abuse in emergency departments is effective in increasing the detection rate of suspected child abuse if combined with training of emergency department nurses prior to its implementation, legal requirement of screening, and a clear screening tool **(Chapter 8)**.

Samenvatting

Vroege opsporing van kindermishandeling kan mogelijk de korte en lange termijn morbiditeit en mortaliteit als gevolg van kindermishandeling verminderen. De kwaliteit van leven van de kinderen en hun families verbetert wanneer de families worden ondersteund in het laten stoppen van het geweld **(Hoofdstuk 1)**. In 2007 zijn we gestart met het Escape project, Escape is een acroniem voor *"**S**creening for **c**hild **a**buse at **e**mergency departments, implementation of an optimal **p**rotocol"*. Het doel van Escape was het ontwikkelen van een effectief en werkbaar implementatie protocol voor screening op kindermishandeling op de spoedeisende hulp. We begonnen met een literatuur onderzoek naar valide screening instrumenten om kindermishandeling

te detecteren op de spoedeisende hulp afdelingen **(Hoofdstuk 2)**. Slechts vier studies rapporteerden het gebruik van een screening instrument. Uit hun resultaten bleek dat screening de signalering van vermoedens van kindermishandeling op de spoedeisende hulp deed stijgen. Gebaseerd op dit systematische literatuuronderzoek en op interviews met professionals hebben we het Escape instrument ontwikkeld, een screening instrument bestaande uit zes vragen.

Om vast te stellen welke bevorderende en belemmerende factoren voor screening op kindermishandeling op de spoedeisende hulp een rol speelden, hebben we professionals geïnterviewd die betrokken waren bij screening op kindermishandeling op de spoedeisende hulp **(Hoofdstuk 3)**. Belemmerende factoren voor screening die naar voren kwamen uit de interviews waren praktische problemen zoals te weinig tijd om goed beleid en goede protocollen te ontwikkelen, om (vermoedens van) kindermishandeling te registreren en om voorlichting en onderwijs te organiseren. Persoonlijke belemmeringen zoals angst voor een onterecht vermoeden en ontoereikende communicatieve vaardigheden werden ook genoemd. Genoemde bevorderende factoren voor screening op kindermishandeling op de spoedeisende hulp waren een ondersteunend ziekenhuis bestuur, de aanwezigheid van een aandachtsfunctionaris en een team kindermishandeling, intensieve training voor het personeel van de spoedeisende hulp en financiële ondersteuning.

We begonnen met een nulmeting van zes maanden van de screening en detectie rates van vermoedens van kindermishandeling op zeven spoedeisende hulp afdelingen **(Hoofdstuk 4)**. We vonden dat er in totaal slechts 20% van de spoedeisende hulp bezoekers tot 18 jaar werden gescreend op kindermishandeling. Bij 0,2% van de kinderen tot en met 18 jaar ontstond er een vermoeden van kindermishandeling. In de groep tot en met 4 jaar was dit 0,3%. In de ziekenhuizen waar het spoedeisende hulp personeel zich goed hield aan de screening richtlijnen voor kindermishandeling was de detectie rate van vermoedens van kindermishandeling significant hoger dan in de ziekenhuizen waar deze richtlijnen niet goed werden nageleefd, 0,3% versus 0,1% ($p<0,001$).

Na de nulmeting startten we met de implementatie van het Escape instrument en de training van spoedeisende hulp verpleegkundigen in zeven ziekenhuizen **(Hoofdstuk 5)**. Deze zeven ziekenhuizen bevinden zich in Zuid-Holland en hebben samen jaarlijks zo'n 200.000 spoedeisende hulp bezoekers. We gebruikten een interrupted time-series design om veranderingen in de screening en detectie trends van kindermishandeling over de tijd waar te nemen, voor én na de implementatie van het Escape instrument en voor en na de training van de spoedeisende hulp verpleegkundigen. We includeerden alle 104.028 kinderen tot en met 18 jaar die deze zeven spoedeisende hulp afdelingen bezochten gedurende een periode van 23 maanden. Het gemiddelde percentage gescreende kinderen steeg van 20% bij de start tot 67% na 23 maanden. Training van spoedeisende hulp verpleegkundigen bleek een goede interventie om het percentage gescreende kinderen te doen toenemen. Tijdens de studie periode, vanaf 1 januari 2009, werd screening op kindermishandeling op de spoedeisende hulp verplicht gesteld door de Inspectie voor de gezondheidszorg, dit resulteerde in een positief effect op het screening percentage. Ondanks de implementatie van het screenings instrument en de interventies was het screening percentage geen 100% aan het eind van de studie periode maar 67%. Het per-

centage detectie van vermoedens van kindermishandeling was vijf keer hoger bij gescreende kinderen dan bij kinderen die niet waren gescreend op kindermishandeling. Deze resultaten laten zien dat structurele screening op kindermishandeling op de spoedeisende hulp effectief is om de detectie van vermoedens van kindermishandeling te doen stijgen.

Vervolgens hebben we de voorspellende waarde per screening vraag in het Escape instrument gemeten **(Hoofdstuk 6)**. De sensitiviteit van de individuele vragen was lager (range 0,12-0,59) dan de sensitiviteit van het gehele Escape instrument van 0,80. De specificiteit was 0,98, de positief voorspellende waarde 0,10 en de negatief voorspellende waarde 0,99. We concluderen dat het Escape instrument nuttig is gebleken om spoedeisende hulp personeel te ondersteunen in het identificeren van de groep kinderen met een hoog risico op (vermoedens van) kindermishandeling.

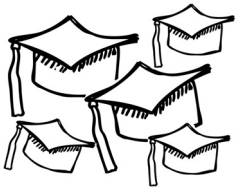
Ten slotte hebben we één ziekenhuis geselecteerd voor de follow-up van alle kinderen die de spoedeisende hulp hadden bezocht in onze studie periode. We hebben de database van het ziekenhuis gecombineerd met de database van het plaatselijke Advies en Meldpunt Kindermishandeling om te evalueren hoe goed de screening in staat was om terechte vermoedens van kindermishandeling te detecteren **(Hoofdstuk 7)**. In 23 maanden bezochten 13.376 kinderen de spoedeisende hulp van dit ziekenhuis. Hiervan werden 47 kinderen (0,35%) gemeld bij het Advies en Meldpunt Kindermishandeling binnen drie maanden na het bezoek aan de spoedeisende hulp. Achtentwintig kinderen werden gemeld bij het Advies en Meldpunt Kindermishandeling door andere professionals dan die van het ziekenhuis. De conclusie van het Advies en Meldpunt Kindermishandeling was bij zes van deze 28 kinderen dat er geweld tegen ze was gebruikt. Het personeel van de spoedeisende hulp diagnosticeerde bij drie van deze zes kinderen een niet trauma gerelateerd probleem (bijvoorbeeld een infectie), bij één kind een alcohol intoxicatie en bij de laatste een complicatie van een operatie. Het feit dat deze zaken van kindermishandeling niet op de spoedeisende hulp zijn herkend suggereert dat verbeteringen van het Escape instrument nog mogelijk zijn. Bij 18 van de 19 (95%) meldingen door het ziekenhuis aan het Advies en Meldpunt Kindermishandeling was het vermoeden terecht.

Aan het einde van het Escape project kunnen we concluderen dat structurele screening op kindermishandeling op de spoedeisende hulp effectief is om de detectie rate van vermoedens van kindermishandeling te doen stijgen. Om de implementatie van screening op kindermishandeling te optimaliseren zou training van de spoedeisende hulp verpleegkundigen vooraf moeten gaan aan de implementatie en zou screening wettelijk verplicht moeten worden **(Hoofdstuk 8)**.

CHAPTER 10

Dankwoord
Curriculum vitae
PhD portfolio


Bedankt!

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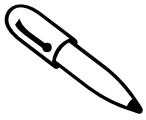

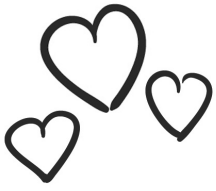

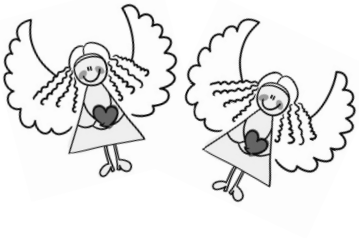

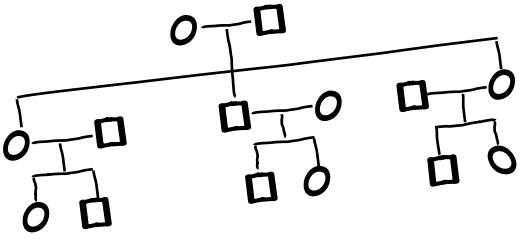


Elsje

Curriculum vitae

Eveline (Eefje) Louwers was born on the 28th of October 1978 in Hout-Blerick, The Netherlands. After finishing secondary school at the Thomascollege in Venlo in 1997, she started studying Medicine at the Erasmus MC in Rotterdam. In her study years she worked in a team of students at the child and adolescent psychiatric clinic of the Erasmus MC Sophia Children's hospital. She graduated from medical school in 2005, after finishing her last internship in Tanzania. She then started to work as a pediatric resident at the Ikazia hospital in Rotterdam for one year and continued in 2006 in the Erasmus MC Sophia Children's hospital. In 2007 she started working on this thesis as a PhD student at the department of Public Health and the department of Pediatrics under supervision of professor Harry de Koning and professor Henriëtte Moll. She continued to work as a pediatric resident at the emergency department of the Erasmus MC Sophia Children's hospital and later as child abuse consultant. During this PhD period she obtained her Master of Science degree in Clinical Epidemiology at the Netherlands Institute for Health Sciences in 2010. In 2011 Eveline started her residency to become a general practitioner at the Leiden University Medical Center. She lives together with Marc van den Berg and their son Joep and daughter Pien.

Eveline (Eefje) Louwers is geboren op 28 oktober 1978 in Hout-Blerick in Limburg. Na het afronden in 1997 van haar middelbare school het Thomascollege in Venlo, begon ze met de studie geneeskunde aan het Erasmus MC in Rotterdam. In haar studententijd werkte ze in het studententeam van de kinder- en jeugdpsychiatrische kliniek van het Erasmus MC Sophia kinderziekenhuis. Na het afronden van haar laatste co-schap in Tanzania behaalde ze haar artsendiploma in 2005. Hierna startte ze als arts-assistent kindergeneeskunde in het Ikazia ziekenhuis en vervolgens in 2006 in het Erasmus MC Sophia kinderziekenhuis. In 2007 begon ze met haar promotieonderzoek op de afdelingen Maatschappelijke Gezondheidszorg en Algemene Kindergeneeskunde onder leiding van professor Harry de Koning en professor Henriëtte Moll. Ze bleef werken als arts-assistent kindergeneeskunde op de spoedeisende hulp van het Erasmus MC Sophia kinderziekenhuis en later in het team kindermishandeling. Tijdens haar promotie onderzoek behaalde ze in 2010 haar Master in Science in de Klinische Epidemiologie aan het Netherlands Institute for Health Sciences. In 2011 is Eveline begonnen met de huisartsenopleiding aan het Leids Universitair Medisch Centrum. Ze woont samen met Marc van den Berg en hun zoon Joep en dochter Pien.

PhD portfolio

Summary of PhD training and teaching activities

Name PhD student: Eveline C.F.M. Louwers Erasmus MC Department: Public Health and Pediatrics Research School: Nihes	PhD period: May 2007- June 2013 Promotors: H.J. de Koning and H.A. Moll Supervisor: I.J. Korfage

1. PhD training	**Year**	**Workload (Hours/ECTS)**
Research skills		
Master of Clinical Epidemiology, Netherlands Institute for Health Sciences (NIHES), Rotterdam	2008-2010	70 ECTS
General academic skills		
Biomedical English Writing and Communication	2008	112 hours
Research Integrity	2008	56 hours
In-depth courses		
Werkgroep Onderwijs Kindermishandeling voor Kinderartsen	2010	20 hours
Presentations		
Presentations at Erasmus MC	2008-2010	56 hours
International conferences	2010-2011	100 hours
National conferences	2008-2012	64 hours
Conferences		
Dag voor de jonge onderzoeker, Nederlandse Vereniging voor Kindergeneeskunde	2007-2010	40 hours
Nederlandse Vereniging voor Kindergeneeskunde congres	2007-2010	40 hours
International conference on child and family maltreatment	2008,2011	100 hours
Kennis beter delen	2008	20 hours
Kindermishandeling aanpakken is weerstanden overwinnen	2008	10 hours
European Academy of Pediatric Societies	2010	20 hours
European Conference on Child Abuse and Neglect	2012	10 hours
Landelijke Organisatie van Aspirant Huisartsen conference	2012	10 hours
Seminars and workshops		
Weekly seminars department of Public Health	2007-2011	100 hours
2. Teaching activities		
Lecturing		
Education Child Abuse 3rd year medical students	2007-2008	40 hours
Emergency Department Havenziekenhuis	2009	4 hours
Lecture Child Abuse, minor Public Health	2009-2010	8 hours
Supervising Master's theses		
Supervising medical students for research period	2007-2011	84 weeks

Child abuse is a serious problem and has serious consequences for the victim, his or her environment and for society itself. It has been estimated that one in every 30 Dutch children is exposed to child abuse. Early detection of child abuse can potentially reduce the related short-term and long-term morbidity and mortality. In this thesis the results of the Escape project are presented. The goal of Escape was to develop an effective and feasible implementation protocol for screening for child abuse at emergency departments.