Health and social care-associated harm amongst vulnerable children in primary care: mixed methods analysis of national safety reports

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ABSTRACT

Purpose Patient safety failures are recognised as a global threat to public health, yet remain a leading cause of death internationally. Vulnerable children are inversely more in need of high-quality primary health and social-care but little is known about the quality of care received. Using national patient safety data, this study aimed to characterise primary care–related safety incidents among vulnerable children.

Methods This was a cross-sectional mixed methods study of a national database of patient safety incident reports occurring in primary care settings. Free-text incident reports were coded to describe incident types, contributory factors, harm severity and incident outcomes. Subsequent thematic analyses of a purposive sample of reports was undertaken to understand factors underpinning problem areas.

Results Of 1183 reports identified, 572 (48%) described harm to vulnerable children. Sociodemographic analysis showed that included children had child protection-related (517, 44%); social (353, 30%); psychological (189, 16%) or physical (124, 11%) vulnerabilities. Priority safety issues included: poor recognition of need and subsequent provision of adequate care; insufficient provider access to accurate information about vulnerable children, and delayed referrals between providers.

Conclusion This is the first national study using incident report data to explore unsafe care amongst vulnerable children. Several system failures affecting vulnerable children are highlighted, many of which pose internationally recognised challenges to providers aiming to deliver safe care to this at-risk cohort. We encourage healthcare organisations globally to build on our findings and explore the safety and reliability of their healthcare systems, in order to sustainably mitigate harm to vulnerable children.

INTRODUCTION

Almost two decades unsafe care has been recognised as a global threat to public health, yet healthcare–associated harms remain a leading cause of death internationally.1 2 Children are particularly at risk of poor quality care and subsequent healthcare harm: a US study highlights that only 47% of children receive high-quality primary care; and in the UK 26% of child deaths have identifiable care failures.3 4 Vulnerable patients such as those with disabilities, safeguarding concerns or those receiving social care, are at an even greater risk of unsafe healthcare, by virtue of their physical, psychological, social or child protection needs.5 6–7 Rates of placement in out-of-home care have increased internationally over the last two decades.8 Each year, as many as 16% of children are physically abused, up to 10% experience penetrative sexual abuse and 10% are neglected or psychologically abused.9 Almost a third of UK children either live in poverty, with disability, are on the child protection register or under the care of local authorities; all of which are widely accepted as markers of vulnerability.10–11 These vulnerable children are inversely more in need of high-quality health and social care, to counteract the lifelong deleterious impacts of adverse childhood experiences.6 12 13 Despite growing populations of vulnerable children...
globally, there have been no studies of the burden of unsafe care amongst this cohort.14 15

Interrogation of incident report data can yield important learning.26–18 Systematic identification of reported incident patterns and their contributory factors can highlight system issues amenable to redress—which can form the basis of targeted improvement efforts to effectively improve safety.19 We therefore aim to explore the safety of primary care provided to vulnerable children in the UK by interrogating national patient safety data.

METHOD
Study design
This cross-sectional study used established mixed methods to analyse patient safety incident reports submitted to a national database. The mixed methods process involved three phases: coding reports, exploratory data analysis and thematic analysis.

Data source
The UK’s National Health Service (NHS) is overseen by NHS England and NHS Improvement. Data for this study were extracted from the National Reporting and Learning System (NRLS)—a national database of patient safety incident reports from NHS organisations in England and Wales. Patient safety incidents relating to vulnerable children seen in primary care were extracted from the NRLS. The NRLS was established in 2003 and remains one of the largest national repositories of such data in the world. A patient safety incident is defined as: ‘Any unexpected or unintended incident[s] that could have, or did, lead to harm to one or more patients receiving NHS-funded care’.20 Each report captures structured categorical information such as patient age, incident location, date of occurrence and severity from the NRLS report was used. This coding approach contributed to the occurrence of another incident. Multiple codes for incident type, contributory factor and incident outcome were applied to each report where possible to deconstruct free-text narratives of reports and capture what happened, perceived contributory factors, outcomes and harm severity.21

Where free-text narratives provided insufficient information to categorise harm severity, the original reporter-allocated harm severity was used. This coding approach permitted modelling of the steps preceding and leading to the incident which resulted in harm to the patient (figure 1).24

Reports were coded by one of the authors, and for methodological rigour a random sample 20% of reports were independently double coded by another author for every 500 reports coded. If disagreements arose they were arbitrated at weekly meetings with the research team trained in root cause analysis and human factors.26

Definition of vulnerability
Our definition of vulnerability was informed by the literature (see online supplementary appendix 1) and included ‘children under the age of 18 years, who are more susceptible to welfare loss above the socially accepted norm if faced with adversity, without provision of additional support services’ This includes children who are as socially, psychologically or physically vulnerable, or vulnerable due to child protection risks. These categories are not mutually exclusive.

Study population
The free-text from the ‘IN07—Description of what happened’ category of 27 000 reports exclusively from primary care settings was searched using a list of key terms to identify reports involving vulnerable children (online supplementary appendix 2). Reports were reviewed by one of the authors and included if involved children under 18 years of age, occurred in primary care and involved a child defined as vulnerable as above. Reports of patients beyond the allocated age group, without free-text description or incidents occurring during inpatient care but were reported in primary care were excluded.

Coding reports
A classification system (a series of related coding frameworks), aligned with the WHO International Classification for Patient Safety, and previously developed by the Patient Safety (PISA) Research Group at Cardiff University was used.16 21 Codes were applied systematically to reflect the chronology of the described incident (figure 1). To model the sequence of events culminating and contributing to an incident, we adhered to the framework of the Recursive Model of Incident Analysis.24 Primary incidents included those proximal (chronologically) to the patient outcome, whereas contributory incidents included those that contributed to the occurrence of another incident. Multiple codes for incident type, contributory factor and incident outcome were applied to each report where possible to deconstruct free-text narratives of reports and capture what happened, perceived contributory factors, outcomes and harm severity.21

Where free-text narratives provided insufficient information to categorise harm severity, the original reporter-allocated harm severity from the NRLS report was used. This coding approach permitted modelling of the steps preceding and leading to the incident which resulted in harm to the patient (figure 1).24

Exploratory data analysis
We used exploratory data analysis to describe and summarise data in order to inform hypotheses about the most frequent and harmful reported incidents, contributory factors and outcomes.

Thematic analysis
We identified priority areas for improvement based on exploring a purposive sample of the most frequently harmful incidents
and those reported as causing severe harm or death. Two of the authors (AO and AC-S) independently re-read the reports and re-examined groups of similar incidents to understand the underlying contextual issues. From this process, causal themes and subthemes of safety failures were identified within clusters of codes. These could not have been captured in the initial phase of coding. The potential interventions to improve unsafe situations were generated by reflecting on the nature of the factors, and the underpinning structures and processes, influencing them. Our theory for improvement—which is grounded in the data—is illustrated in a driver diagram (figure 2).27

RESULTS

The search strategy identified 2015 reports, of which 1183 met the inclusion criteria. Of the 1183 vulnerable children whose care was the subject of a patient safety incident report, about half were reported to have suffered some degree of harm (n=572, 48% of reports).

Children who were the subject of child protection concerns (n=517, 90%) were most frequently reported as experiencing harm from unsafe care. Additional vulnerable children experiencing substandard care included orphans, migrants and looked-after children (n=353, 62%), children with poor mental health or learning difficulties (n=189, 16%) and children with physical disabilities (n=124, 11%) (table 1). As table 2 shows, there were three broad themes underpinning the healthcare harm experienced by these children: failure to recognise care needs and intervene appropriately (n=642, 54%); information transfer and documentation failures (295 reports, 25%) and referral failures between health and social care services (218 reports, 19%).

Poor recognition of vulnerable children’s health and social care needs, and subsequent failure to meet these needs and provide adequate care was a commonly described issue (n=642, 54%). Many of these children were described as suffering subsequent harm including 80 cases of moderate or severe harm, and 236 cases of low harm. Failure to identify the needs of vulnerable children frequently stemmed from delays conducting essential health assessments such as the annual Looked-after Child review, a mandatory assessment required for all children living in social care (n=128). Consequently, the needs of vulnerable children including their safeguarding needs went unassessed, undetected and unmet (n=162). For example, children with complex specialist care needs such as tracheostomy care or wheelchair access were sometimes unable to access these resources (n=30) (box 1, example 1). A range of contributory factors underpinned these failures: children had difficulty accessing the appropriate service (n=48), parents and carers had poor knowledge about which services they should access or how to access them (n=49) and this was compounded by language barriers for non-English speakers (n=76). Staff also had varying knowledge of the local processes around accessing additional care (example 2). This resulted in children suffering long delays waiting for appropriate assessment and treatment (n=53).

Poor information transfer between services (n=29, 25%), especially about child protection risk was a commonly reported issue. This resulted in harm to children including nine cases of moderate/severe harm and 106 cases of low harm. Failures included transfer of incorrect patient information, such as children’s status on the child protection register (n=67) (example 3), and incomplete transfer of essential information such as child

![Figure 2](http://adc.bmj.com/)
Table 2  Harm associated with different safety failures

<table>
<thead>
<tr>
<th>Area of safety failure: broad themes within incident reports</th>
<th>Specific safety failures within incident reports: subthemes</th>
<th>No harm (% of subtheme)</th>
<th>Harm (% of subtheme)</th>
<th>Moderate or severe (% of subtheme)</th>
<th>Total, n (% of total reports)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Failures to recognise care needs and intervene appropriately</td>
<td>Inadequate planning of health or social interventions</td>
<td>126 (68)</td>
<td>51 (27)</td>
<td>10 (5)</td>
<td>187 (16)</td>
</tr>
<tr>
<td></td>
<td>Failure or delayed recognition of children in need</td>
<td>87 (53)</td>
<td>47 (29)</td>
<td>28 (18)</td>
<td>162 (14)</td>
</tr>
<tr>
<td></td>
<td>Incidents completing standard assessments or investigations</td>
<td>45 (35)</td>
<td>65 (51)</td>
<td>18 (14)</td>
<td>128 (11)</td>
</tr>
<tr>
<td></td>
<td>Treatment and medication-related incidents</td>
<td>23 (27)</td>
<td>45 (53)</td>
<td>18 (20)</td>
<td>86 (7)</td>
</tr>
<tr>
<td></td>
<td>Difficulty accessing or engaging with healthcare providers</td>
<td>32 (65)</td>
<td>11 (23)</td>
<td>6 (12)</td>
<td>49 (4)</td>
</tr>
<tr>
<td></td>
<td>Inadequate provision of essential equipment</td>
<td>13 (43)</td>
<td>17 (56)</td>
<td>0</td>
<td>30 (3)</td>
</tr>
<tr>
<td>Information transfer and documentation failures</td>
<td>Medical documentation incidents</td>
<td>74 (67)</td>
<td>36 (32)</td>
<td>1 (2)</td>
<td>111 (9)</td>
</tr>
<tr>
<td></td>
<td>Information sharing incidents</td>
<td>64 (67)</td>
<td>29 (31)</td>
<td>2 (2)</td>
<td>95 (8)</td>
</tr>
<tr>
<td></td>
<td>Poor management of patient healthcare appointments</td>
<td>35 (73)</td>
<td>12 (25)</td>
<td>(2)</td>
<td>48 (4)</td>
</tr>
<tr>
<td></td>
<td>Communication incidents (face to face)</td>
<td>7 (17)</td>
<td>29 (71)</td>
<td>5 (12)</td>
<td>41 (4)</td>
</tr>
<tr>
<td>Referral failures between health and social care services</td>
<td>Delayed or incomplete referral of patients between services</td>
<td>71 (42)</td>
<td>78 (46)</td>
<td>20 (12)</td>
<td>169 (14)</td>
</tr>
<tr>
<td></td>
<td>Breaches of confidentiality</td>
<td>19 (39)</td>
<td>29 (59)</td>
<td>1 (2)</td>
<td>49 (4)</td>
</tr>
<tr>
<td>Other</td>
<td>Unprofessional conduct of healthcare providers</td>
<td>15 (54)</td>
<td>13 (46)</td>
<td>0 (0)</td>
<td>28 (2)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>611 (52)</td>
<td>462 (39)</td>
<td>110 (9)</td>
<td>1183 (100)</td>
</tr>
</tbody>
</table>

**DISCUSSION**

This study is the largest analysis of patient safety incidents reports describing the nature and burden of unsafe primary care for vulnerable children. Our findings point to major areas of systemic weakness in the care provided. This puts children—who are already subject to the harmful impact of childhood adversity—at risk of further health and social care-associated harm.

The comprehensive and detailed methods for analysing incident reports have also been applied to secondary care incident reports, as well as other studies in primary care. The quality and utility of safety incident reporting systems are heavily dependent on reporting staff, and under-reporting is a well-acknowledged issue with the NRLS. Additionally, included reports were directly affected by the sensitivity and specificity of our free-text searches. This study is therefore hypothesis generating and inductive in nature, requiring confirmation with further studies. However, the concurrent mixed methods approach better enables prioritisation, understanding and exploration of issues identified by frontline staff and offers important insights which can be interpreted alongside additional complementary data sources, to inform and target improvement efforts.

All children are by nature vulnerable, but from our study population, it is clear that pronounced reported health and social care-associated harm relates to those with child protective service involvement. Case reviews of child deaths highlight that early recognition of needs and safeguarding intervention can dramatically improve outcomes for vulnerable children by removing them from harmful and violent home environments and providing extra support in the home. Terrell et al highlight similar challenges with the provision of timely health assessments for looked-after children in the USA, as a result of issues...
coordinating care, incomplete and delayed referrals for assessment, documentation issues and appointment availability.\textsuperscript{11} Our study is consistent with previous studies of health and social care provision for children and repeated criticisms of regulators and external reviews that failures occur because of inadequate information sharing between services. In the UK, The Health and Social Care Act\textsuperscript{12} resulted in better integration of information for adult users of health services, but not children, despite clear evidence from reviews of severe harm and death that this is a serious weakness.\textsuperscript{10 33} Vulnerable children, by virtue of their greater needs are involved with multiple services. The complexity of their care
coordination is greater. Our findings highlight the difficulty of interactions between hospital and community teams. Children often faced worse health outcomes because of poor quality referrals. They could even be said to be victims of the 'inverse care law', because although they are more in need of safe care, they are also less likely to receive it. Although patient safety incidents affecting children may seldom be fatal, in our study almost half were reported as causing some level of harm. There are calls to give these events in childhood as much importance as is given to other major public health issues with lifelong sequelae.

From our analysis, exploring causation of patient safety incidents and the resulting harm, we used improvement science methods and tools to identify a set of strategic actions to strengthen the care for this group of vulnerable children. These are shown (primary drivers) in the driver diagram (figure 2). Recognising health and social care needs earlier, with better transfer of information across care and institutional boundaries, and improved efficiency of referrals, could reduce the risks of further harm to these vulnerable children. The secondary drivers denoted in the driver diagram exemplify specific actionable recommendations that could help bring about the necessary improvements detailed in the primary drivers.

Our findings support calls for shared and contemporaneous databases containing health and social care records to mitigate harms from out-of-date and inadequate care plans that leave children in vulnerable situations. Referrals of at-risk children to the necessary services could be improved through the use of patient referral checklists or where systems allow electronically generated and transmitted referrals containing agreed data items. Training staff to identify signs of abuse or neglect and clarifying guidelines for assessing and managing at-risk children alongside safeguard alerts and safety checklists will all allow earlier recognition and thus intervention for children that are currently going undetected. These represent higher-level recommendations that address healthcare systems rather than relying on humans who are more susceptible to error. While these changes take longer to implement, in the short-term practitioners can use interventions such as screening tools or clinical decision support tools to test in practice until reliable system changes can be achieved.

CONCLUSION
This study highlights health system failures affecting a vulnerable paediatric population, in addition to the numerous challenges facing providers attempting to deliver safe care—many of which are echoed around the globe. Through the application of improvement science methods to our data, we have identified systemic priority areas for action to mitigate health and social care-associated harm amongst vulnerable children. We encourage healthcare organisations globally to explore the priority safety issues highlighted in this study in the context of their own patient safety data, to empirically inform their own quality improvement efforts to improve the safety of care provided to vulnerable children.

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