



Care of Children and Young People Presenting to Hospital with a Decreased Conscious Level

Decreased Conscious Level (DeCon) Multi-site Audit
2010-2011 Report

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**National Reye's Syndrome
Foundation UK**

Care of Children and Young People Presenting to Hospital With a Decreased Conscious Level


Decreased Conscious Level (DeCon) Multi-site Audit 2010-2011 Report

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Explanatory notes

The symbol  is used in this report to indicate the availability of additional online data found on the DeCon website www.rcpch.ac.uk/decon. This includes supplementary information in the form of more detailed tables and graphs in addition to the information contained in this report.

Throughout this document 'child' refers to infant, child or young person unless otherwise stated.

Some total percentages in this report may not sum to 100% due to rounding to 1 decimal place.

Acknowledgements

The DeCon Project Board would like to thank the following individuals and organizations for the contribution of their time, effort and support to the project during its duration:

- The National Reye's Syndrome Foundation UK for funding this project;
- The clinical and non-clinical staff involved in data collection (Appendix A);
- The clinical staff involved in piloting of the audit tools and methodology;
- The stakeholders who provided their support to the project.

The Decreased Conscious Level Multi-site Audit Project Board comprises the following members:

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Mr Jason Gray	Paediatric Consultant Nurse, RCN representative
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Stakeholder organisations

- Association of Paediatric Emergency Medicine
- British Association of General Paediatricians
- British Inherited Metabolic Disease Group
- British Paediatric Neurology Association
- Children Living with Inherited Metabolic Diseases
- National Reye's Syndrome Foundation UK
- Paediatric Intensive Care Society
- Royal College of Nursing
- Royal College of Radiologists
- The Encephalitis Society
- The Meningitis Trust
- The Society of British Neurological Surgeons

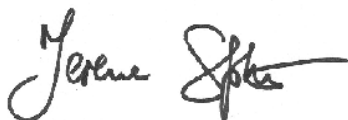
Foreword

Decreased conscious level is a presenting feature of many conditions which affect children attending hospital. The extent of the altered state of consciousness varies ranging from confusion and agitation to coma. These children may be at grave risk of severe morbidity or even death if not managed in a timely and appropriate fashion.

In 2004, Dr Richard Bowker in conjunction with the Paediatric Accident and Emergency Research Group based at Nottingham University Hospital with funding from the National Reye's Syndrome Foundation embarked on an ambitious project to develop a guideline to breach the gaps in the care and management of children and young people presenting to hospital with a decreased conscious level. This guideline, *The Management of A Child with a Decreased Conscious Level* was subsequently endorsed by the Royal College of Paediatrics and Child Health in 2005 (Bowker RP, Stephenson T, Baumer JH. Evidenced-based guideline for the management of decreased conscious level. Archives of Disease in Childhood. Education and Practice Ed. 91, ep115 - ep122, 2006).

Six years on, this guideline is still as relevant now as it was then. It is with this in mind that the Decreased Conscious Level Multi-site audit project was commenced in 2010, again funded by the National Reye's Syndrome Foundation. This report examines some of the key recommendations of the guideline and provides an insight into the current position of the management of these children in hospital settings across the UK pointing to areas of good practice but also deficiencies in care. This report's findings have immeasurable importance for the enhancement of the quality of care these children receive from all health professionals when they first present to hospital.

Finally, I would like to pay tribute to the very hard work of Stephanie Smith and Carla Long in bringing this report to fruition.



Terence Stephenson
President, Royal College of Paediatrics and Child Health

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Executive Summary

The epidemiology surrounding decreased conscious level in children and young people is unclear because there is a dearth of data on the numbers who present to hospital with this condition. Health Episodes Statistics data on head injury in children and young people less than 15 years of age in England in 2009-2010 suggests the prevalence of decreased conscious level due to traumatic causes could be in the region of at least 381 children per 100000. A population study in the North of England reports an estimate of 30 children per 100000 for 0-16 year olds presenting to hospital with decreased consciousness with encephalitis and meningitis accounting for just over one third of these cases (Wong et al., 2001).

The Decreased Conscious Level in Children and Young People (DeCon) Multi-site Audit evaluated some of the recommendations in the guideline *The Management of a Child with a Decreased Conscious Level*. This project comprised three components:

- A descriptive survey of the participating NHS trusts relating to their available facilities, resources and services;
- A clinical audit of specific recommended criteria and standards;
- A descriptive survey of clinicians examining the barriers and facilitators which impact on their use and compliance with the guideline's recommendations.

The primary aims of the audit are:

- To assess whether children with a decreased conscious level are receiving appropriate care according to selected recommendations within the guideline; and
- To identify how the guideline is currently being implemented in different settings and determine any barriers to change.

Organisational features of the participating trusts

There were 54 National Health Service (NHS) trusts participating in the audit comprising 66 hospitals. 53 of the 54 (98.1%) trusts returned data for the Service Description Questionnaire.

41.5% (22/53) participating trusts reported that the guideline is not being used in their trusts, while a slightly higher number (31/53, 58.5%) reported using the guideline in some form either as a stand-alone guideline or incorporated within another guideline used in their trust.

Over half of the participating NHS trusts (30/53, 56.6%) reported that in a typical week, the most senior grade of paediatrician resident on-site all night at their trust is either a consultant or a doctor of ST4 to ST8 grade or equivalent.

81.1% (43/53) trusts have access to paediatric anaesthetic skills or expertise on-site in a typical week, although data was not collected on whether this expertise was at consultant level. The trusts were more likely to report having either a general anaesthetist with paediatric interests (40/53, 75.5%) or general anaesthetist (28/53, 52.8%) as compared to a paediatric anaesthetic specialist such as a paediatric anaesthetist (14/53, 26.4%) or a paediatric intensivist (9/53, 17.0%).

79.2% (42/53) trusts have a paediatric nurse with Advanced or European Paediatric Life Support or equivalent training present on shift in a typical week with 21/53 (39.6%) reporting this availability on a 24/7 (24 hours per day, 7 days per week) basis and 21/53 (39.6%) indicating availability but not on a 24/7 basis.

60.4% (32/53) trusts possess an on-site paediatric emergency department or an area in their emergency department solely dedicated to the care of paediatric patients.

11.8% (6/53) trusts possess a dedicated paediatric intensive care unit on-site, while a significant percentage reported having a short-stay or assessment unit solely dedicated to the care of paediatric patients (37/53, 69.8%).

Clinical Audit Methodology

Participating units were asked to prospectively identify any consecutive cases of children less than 18 years who presented to hospital with a decreased conscious level between the period 1 November 2010 to 30 September 2011 and enter their clinical details into an online questionnaire. Trusts reported difficulties in adhering to a strict prospective case identification methodology. All trusts involved in the audit employed either a wholly retrospective approach or a combined approach using both prospective and retrospective case identification.

There were several limitations of the audit which included:

- Under-estimation and poor data capture in some categories of children and young people such as neonates, those over 16 years old or those presenting with a decreased conscious level secondary to alcohol intoxication;
- Contamination of the methodology due to failure to adhere to a strict prospective approach;
- The risk that setting standards based on documentation overlooks care in cases where documentation is inadequate;
- Possible inconsistency in the trusts' data capture due to the wide variation in case ascertainment among the trusts;
- Inadequate mechanisms for the detection of these patients in some trusts leading to small numbers of cases in comparison to other trusts with similar numbers of Accident and Emergency attendances;

- Possible reduced generalizability and representativeness of the audit's findings due to limited participation in Wales, Northern Ireland and Scotland.

The audit measured criteria within 8 main areas in the management and care of children and young people presenting to hospital with a decreased conscious level:

1. Features of the clinical history
2. Observations
3. Use of the physiological scoring systems: Glasgow Coma Scale and AVPU (alert, voice, pain and unresponsive) Scale
4. Recommended frequency of GCS measurements
5. Recommended core investigations and tests
6. Working diagnosis within 4 hours of presentation
7. Management plan within 4 hours of presentation
8. Parent or guardian involvement during initial resuscitation and management

There were exceptions to the standards and not every standard related to all children with a decreased conscious level; indeed some standards were only relevant to specific groups based on age and working diagnosis.

The DeCon Project Board set the thresholds for performance on the audit criteria focusing on the measurement of selected areas of basic care in the management of children with a decreased conscious level. A 90% performance target (optimal level) rather than a 100% target (ideal level) was set for the majority of audit standards, with a few exceptions such as the standards related to the recommended investigations for metabolic and infective cases, along with parental or guardian involvement.

A traffic light system consisting of green (90-100%), amber (75-89%) and red (<75%) is employed to illustrate visually how trusts in the audit performed for the specific standards.

Audit sample

For the data collection period 1 November 2010 to 30 September 2011 for the clinical audit questionnaire, there were 1135 cases submitted via the online tool. These data were submitted by 51 of the 54 (94.4%) participating trusts.

The audit sample comprised any child or young person less than 18 years, who presented to the participating trusts with a decreased conscious level. A decreased conscious level was defined as a Glasgow Coma Score (GCS) of 14 or less or an assessment of a response to voice, pain, or unresponsiveness on the AVPU scale.

If children and young people possessed any of the following features they were excluded from the audit: a previously diagnosed condition such as epilepsy or diabetes, a previously diagnosed metabolic condition, a ventriculo-peritoneal shunt, a GCS less than 15 on a day-to-day basis or a decreased conscious level from the moment of birth onwards.

1146 cases were submitted via the online tool, of which 1135 met the audit's inclusion criteria. 11 cases were deemed ineligible for the following reasons:

- 1 case where the AVPU assessment was Alert and the GCS was 15;
- 5 cases where the AVPU assessments were Alert and there were no GCS scores; and
- 5 cases where the GCS scores were 15 and there were no AVPU assessments.

Of the 1135 cases, the total number of cases entered into the online data collection tool by the trusts ranged from 1 to 73, with a mean of 22 cases and a median of 15 cases. 7 trusts submitted less than 5 cases and 21 trusts more than 20 cases.

The majority of the audit sample presented to a mixed emergency department (701/1135, 61.8%). The remainder presented either to a paediatric emergency department (407/1135, 35.9%) or paediatric assessment unit (25/1135, 2.2%).

45.2% (513/1135) of the audit cases were female and 55.8% (622/1135) were male. A higher percentage of female children (170/513, 33.1%) presented with decreased conscious level secondary to alcohol intoxication as compared to male children (142/622, 22.8%), whereas a significantly higher proportion of male children (121/622, 19.5%) presented with a decreased conscious level secondary to traumatic causes as compared to female patients (56/513, 10.9%) ($P < 0.005$).

The audit cases had a mean age of 8.3 years (standard deviation = 6.3 years) and a median age of 8 years. Children less than 5 years presenting to hospital with a decreased conscious level were more likely to present with febrile seizures (107/462, 23.2%) and infective causes (147/462, 31.8%), whereas children between 5 and 11 years were more likely to present with infective causes (44/169, 26.0%) and traumatic causes (47/169, 27.8%) and those 12 years and over, overwhelmingly with alcohol intoxication (309/504, 61.3%) and traumatic causes (75/504, 14.9%) ($P < 0.005$).

On presentation to hospital, 94.9% (1077/1135) of the audit sample had a differential working diagnosis. The most common working diagnoses among the audit sample were alcohol intoxication (312/1077, 29.0%), infective causes (217/1077, 20.2%) and traumatic causes (177/1077, 16.4%).

62.1% (705/1135) of the children presenting to hospital with a decreased conscious level were either reviewed by a consultant or a ST4 to ST8 (Specialty trainee year 4 to 8) doctor in paediatrics or emergency medicine. Children under five years who presented to hospital with a decreased conscious level were more likely to be reviewed by a consultant (199/462, 43.1%) as compared with those children between 5 to 11 years (64/169, 37.9%) and those 12 years and over (98/504, 19.4%) ($P < 0.005$).

There were 16 deaths (1.4%) among the audit sample. However, the majority of children were discharged from the emergency department or paediatric assessment unit (470/1135, 41.4%) or transferred for observation and treatment either to a general or specialist ward in the hospital (480/1135, 42.3%). 9.9% (112/1135) of the audit sample were transferred to paediatric intensive care units and 4.1% (46/1135) to other NHS hospitals. Data related to the outcome of the cases in this audit should be treated with caution because the number of deaths may be under-estimated since participating trusts were only required to indicate the child's outcome in relation to the current episode of care.

Question 1: Features of the clinical history

In the majority of trusts, there was a failure to meet the performance targets for either all or some of the recommended clinical history features which should be elicited from children and young people who present to hospital with a decreased conscious level. Very few trusts met the performance targets for the documentation of the presence or absence of the following clinical history features: vomiting (4/51, 7.8%), fever (4/51, 7.8%), convulsions (4/51, 7.8%), alternating periods of consciousness (11/51, 21.6%), trauma (2/51, 3.9%), ingestion of medication or recreational drugs (2/51, 3.9%) and length of symptoms (23/51, 45.1%). However, many of the trusts meeting the performance targets for these standards had less than 5 cases.

There were three other features of this audit sample which form the basis of a good examination by any admitting doctor of a child and young person on presentation to hospital. These include checking for signs of shock, the presence or absence of a non-blanching rash, and the pupil size and response. These examinations were documented as being undertaken to the following extent in the audit cases for all trusts combined:

- Signs of shock = 51.7% (587/1135)
- Presence or absence of a non-blanching rash = 36.1% (410/1135)
- Pupil size and response = 73.2% (831/1135)

Question 2: Observations

Generally trusts performed well for the documentation of heart rate (50/51, 98.0%) and oxygen saturation (46/51, 90.2%), and to a lesser degree for respiratory rate (38/51, 74.5%). However, the documentation of blood pressure (11/51, 21.6%) and temperature (31/51, 60.8%) of the child or young person presenting to hospital with a decreased conscious level was of a poorer standard across the participating trusts.

Question 3: Physiological scoring system used

47/51 (92.2%) trusts met the performance target that at least 90% of children and young people presenting to hospital with a decreased conscious level should have either a GCS (adult or modified) or AVPU assessment performed and documented in their clinical record as a means of assessing the extent of their conscious level.

3.2% (36/1135) of the total audit sample did not have either GCS or AVPU used to assess their level of consciousness, although trusts still identified these cases as meeting the audit criteria based on their documented clinical history. Trusts reported qualitatively that some of the reasons for the lack of documentation were due to missing clinical records, missing observation charts and the quick recovery of patients after presentation which made these assessments unnecessary.

In children who had their GCS done, the severity of decreased conscious level was categorised as follows:

- Severe: GCS ≤ 8 = 22.5% (203/903)
- Moderate: GCS 9-12 = 24.5% (221/903)
- Mild: GCS 13-15 = 53.0% (479/903)

Children under five years (434/462, 93.9%) were less likely to have documentation of the use of either GCS or AVPU to assess their level of consciousness on presentation as compared with those five years and over (665/673, 98.8%) ($P < 0.005$).

Question 4: Recommended frequency of GCS observations

49 of the 51 trusts had eligible cases of children who had their GCS done on presentation, accounting for 903 cases. 1/49 (2.0%) met the standard that 90% of children and young people presenting to hospital with a decreased conscious level who had their GCS done should have the recommended frequency of GCS measurements performed and recorded in their clinical records.

The failure of the majority of trusts to achieve this standard may be due to a range of reasons such as:

- Misinterpretation of this question;
- The lack of sensitivity in this question to adequately detect this standard;
- A genuine failure of clinicians in the participating trusts to comply with this recommendation in the guideline; and
- The specificity of the recommendation which means that trusts which do not employ the guideline may show low compliance in this area.

Question 5: Investigations and tests

14/51 (27.5%) trusts participating in the audit met the standard that a child or young person presenting to hospital with a decreased conscious level should have their capillary blood glucose done within 15 minutes of presentation.

There were no performance targets set for the other recommended core investigations which relate specifically to metabolic or infective cases. Indeed, only 21/51 trusts possessed eligible metabolic cases with a total of 35 cases, and 46/51 trusts possessed eligible infective cases totalling 217 cases.

There were insufficient metabolic cases in this sample to provide useful interpretation of the data on whether these cases met the standards for the core investigations and tests recommended in the guideline on a trust by trust basis. However, even in this small group, children presenting to hospital with a decreased conscious level secondary to a metabolic cause fail to have adequate documentation that the recommended core investigations were taken. A similar picture was seen among the infective cases with low levels of documentation of dipstick urinalysis (64/217, 29.1%) and to a much lesser degree blood cultures (171/217, 78.8%).

Question 6: Working diagnosis within 4 hours of presentation

40/51 (78.4%) trusts met the standard that 90% of children and young people who present to hospital with a decreased conscious level should have their working diagnosis documented in their clinical record within 4 hours of presentation to hospital. Children under five years (428/462, 92.6%) were less likely to have documentation of the working diagnosis within 4 hours of presentation as compared with those 5 years and over (649/673, 96.4%) (P = 0.004).

Question 7: Management plan within 4 hours of presentation

All 51 trusts which provided clinical audit data met the standard that 90% of children and young people who present to hospital with a decreased conscious level should have a management plan documented in their clinical record within 4 hours of presentation to hospital.

Question 8: Parental/Guardian involvement

There were no performance targets set for the standards related to parental or guardian involvement and communication during the initial management and resuscitation of the child or young person presenting to hospital with a decreased conscious level comprising the following areas:

- Allowing the parent or guardian to stay with their child;
- Informing the parent or guardian of their child's possible diagnosis and treatments; and
- Informing the parent or guardian of their child's possible prognosis.

There were low levels of documentation of information-sharing and communication with parents' or guardians with 46.9% (426/1135) being informed of their child's diagnosis and 35.2% (426/1135) of their child's possible prognosis.

Key Recommendations

For health professionals

1. All health professionals should take a comprehensive clinical history in children and young people presenting to hospital with a decreased conscious level irrespective of the differential diagnosis.
2. The clinical history documentation should include information on both the presence of a feature and its absence.
3. If health professionals are unable to obtain an adequate clinical history the reasons for this should be documented in the child's clinical record.
4. On arrival to hospital, all children and young people with a decreased conscious level should receive measurement of the complete set of observations including heart rate, respiratory rate, oxygen saturation, blood pressure and temperature.
5. All health professionals caring for and reviewing these children and young people should be responsible for ensuring that the complete set of observations are performed.
6. On arrival to hospital, all children and young people with a decreased conscious level should have either an AVPU or GCS (adult or modified) undertaken and the measurement documented.
7. If a child's decreased conscious level persists, this child should have their GCS measured and documented every 15 minutes if $GCS \leq 12$ and every 60 minutes if $GCS > 12$ in accordance with the guideline, until there is an improvement in condition.
8. If a child requires regular evaluation of their conscious level, GCS measurements should be commenced in addition to or instead of AVPU.
9. Capillary blood glucose should be undertaken in all children presenting to hospital with a decreased conscious level irrespective of the differential diagnosis.
10. All children presenting to hospital with decreased conscious level secondary to a metabolic, infective or unknown cause should receive appropriate and early investigation in accordance with the guideline.
11. All health professionals should document in the child's clinical record not only the clinical care given but also any discussions undertaken with parents, as well as children and young people.
12. All health professionals should inform parents or guardians of their child's possible diagnoses and prognosis and document this in the clinical record.

For trusts

13. Health professionals should receive regular training to reinforce good record keeping skills and this should be part of all trusts' compulsory training programme.
14. Observations charts should be incorporated into the emergency department notes whether written or electronic to encourage staff to measure and document the observations of all paediatric patients presenting with an acute illness of which decreased conscious level may be a feature.
15. Trusts who participated in the audit who failed to meet a minimum target of 75% for the standards in at least one of the four key areas should consider repeating a limited audit in these areas, six months after the dissemination of the audit's findings:
 - Clinical history features of vomiting before or at presentation, fever before or at presentation, convulsions before or at presentation, alternating periods of consciousness and length of symptoms;
 - Use of AVPU or GCS to assess the child's conscious level;
 - Observations of heart rate, respiratory rate, blood pressure and temperature on presentation to hospital;
 - Capillary blood glucose taken within 15 minutes of presentation.

General

16. The guideline should be updated and following one year of the revised guideline being in place, management of the child with a decreased conscious level should be re-audited. The audit should include England, Wales, Northern Ireland and Scotland.
17. All health professionals managing the emergency presentation of children and young people should be made aware of the guideline's existence and the audit's findings by engaging with the College of Emergency Medicine, the Royal College of Nursing and other pertinent Royal Colleges.
18. All front-line staff both in paediatric departments but also in emergency departments should be made aware of the guideline and the audit's findings by using a multi-faceted dissemination approach.

Summary of the audit standards with defined performance targets: 1135 eligible cases				
Audit standards: Information documented	Cases meeting the standard	% Cases meeting the standard	Median percent (95% Confidence Interval)	Trusts meeting the 90 - 100% performance target level
vomiting before or at presentation	660	58.2%	57.6% (50.0%, 64.4%)	4
fever before or at presentation	495	43.6%	45.9% (38.5%, 53.3%)	4
convulsions before or at presentation	484	42.6%	44.7% (40.0%, 50.0%)	4
alternating periods of consciousness	644	56.7%	60.0% (50.0%, 73.3%)	11
trauma	441	38.9%	30.8% (26.7%, 40.0%)	2
ingestion of medication/recreational drugs	391	34.5%	28.6% (20.0%, 37.3%)	2
length of symptoms	895	78.9%	82.6% (79.4%, 93.1%)	23
heart rate on presentation	1119	98.6%	100.0% (100.0%, 100.0%)	50
respiratory rate on presentation	1039	91.5%	97.3% (92.3%, 100.0%)	38
oxygen saturation on presentation	1081	95.2%	100.0% (95.9%, 100.0%)	46
blood pressure on presentation	872	76.8%	77.0% (75.0%, 83.3%)	11
temperature on presentation	1002	88.3%	92.3% (86.9%, 100.0%)	31
GCS or AVPU used to assess conscious level	1099	96.8%	100.0% (100.0%, 100.0%)	47
capillary blood glucose taken within 15 minutes of presentation	866	76.3%	83.3% (76.9%, 85.7%)	14
working diagnosis within 4 hours of presentation	1077	94.9%	98.3% (95.2%, 100.0%)	40
management plan within 4 hours of presentation	1112	98.0%	100.0% (100.0%, 100.0%)	51

1. Background

The Decreased Conscious Level in Children and Young People (DeCon) Multi-site Audit evaluated the recommendations in the guideline *The Management of a Child with a Decreased Conscious Level*. This guideline was produced by the Paediatric Accident and Emergency Research Group led by Dr Richard Bowker and endorsed by the Royal College of Paediatrics and Child Health (RCPCH) in 2005. The original guideline and this current project have both been funded by the National Reye's Syndrome Foundation UK. This non-profit organization's interest in the management of children with a decreased conscious level arose as a consequence of their advocacy for research and greater awareness of the devastating impact of Reye's syndrome for which a significant presenting feature is that of coma.

This project comprised three components:

- A descriptive survey of the participating NHS trusts relating to their available facilities, resources and services (Appendix B);
- A clinical audit of specific recommended criteria and standards from *The Management of a Child with a Decreased Conscious Level* guideline for eligible cases of children and young people less than 18 years of age who present to hospital with a decreased conscious level (Appendix C);
- A descriptive survey of clinicians' use of *The Management of a Child with a Decreased Conscious Level* guideline examining the barriers and facilitators which impact on their use and compliance with the recommendations in the guideline, and general strategies to facilitate the promotion of guideline use and dissemination (Appendices D and E).

Decreased conscious level in children is a multi-factorial condition for which the underlying cause may be traumatic injury such as head injury; non-traumatic conditions for instance infection, metabolic conditions, the accidental or deliberate ingestion of poisons, medication or recreational drugs, or unknown cause. These conditions may lead to a decreased conscious level in any child at any age and can have a catastrophic effect potentially leading to death or severe morbidity.

The numbers of children and young people who present to hospital with a reduced conscious level is difficult to quantify due to the scarcity of epidemiological data in this area. In 2009-2010, Health Episodes Statistics data report that in children less than 15 years of age in England there were 35541 admissions to hospital with head injury (Health Episode Statistics, 2010). Many children with head injury may also present with altered consciousness of varying degrees, so potentially the prevalence of decreased conscious level due to traumatic causes could be in the region of at least 381 children per 100000. Indeed, this figure may be an underestimate because ICD-10 codes have been criticized for failing to capture the full extent of head injury cases presenting to hospital, particularly in those under 15 years of age (Deb, 1999).

Head injury has a significant impact on the wellbeing of children and young people resulting in death or disability which can severely affect both their individual standard

of living and that of their families. A prospective study of the outcome for young people who present to hospital with severe head injury found that not only was there a high risk of death on initial presentation but it persisted even up to 7 years, particularly when there was a disability as a consequence of the head injury (McMillan & Teasdale, 2007).

There is a dearth of data on the numbers of children presenting to hospital as a consequence of decreased conscious level secondary to non-traumatic causes. Nevertheless, a population study in the North of England reports an estimate of 30 children per 100000 for 0-16 year olds presenting to hospital with decreased consciousness lasting more than 6 hours due to non-traumatic causes (Wong et al., 2001). Encephalitis and meningitis accounted for just over one third of these cases.

2. Aims

The primary aims of the audit are:

- To assess whether children with a decreased conscious level are receiving appropriate care according to selected recommendations within the guideline;
- To identify how the guideline is currently being implemented in different settings and determine any barriers to change.

The secondary aims of the audit are:

- To use the audit's findings to develop a programme which may significantly improve the quality of the care provided to children with a decreased conscious level on a national basis;
- To employ the audit's findings to support the development of a viable and cost-effective guideline implementation programme which can be adapted for other College-endorsed guidelines.

3. Organizational features of the NHS trusts

There were 54 National Health Service (NHS) trusts participating in the audit comprising 66 hospitals. 53 of the 54 (98.1%) trusts returned data for the Service Description questionnaire. Data on the following organizational features of the participating trusts were collected:

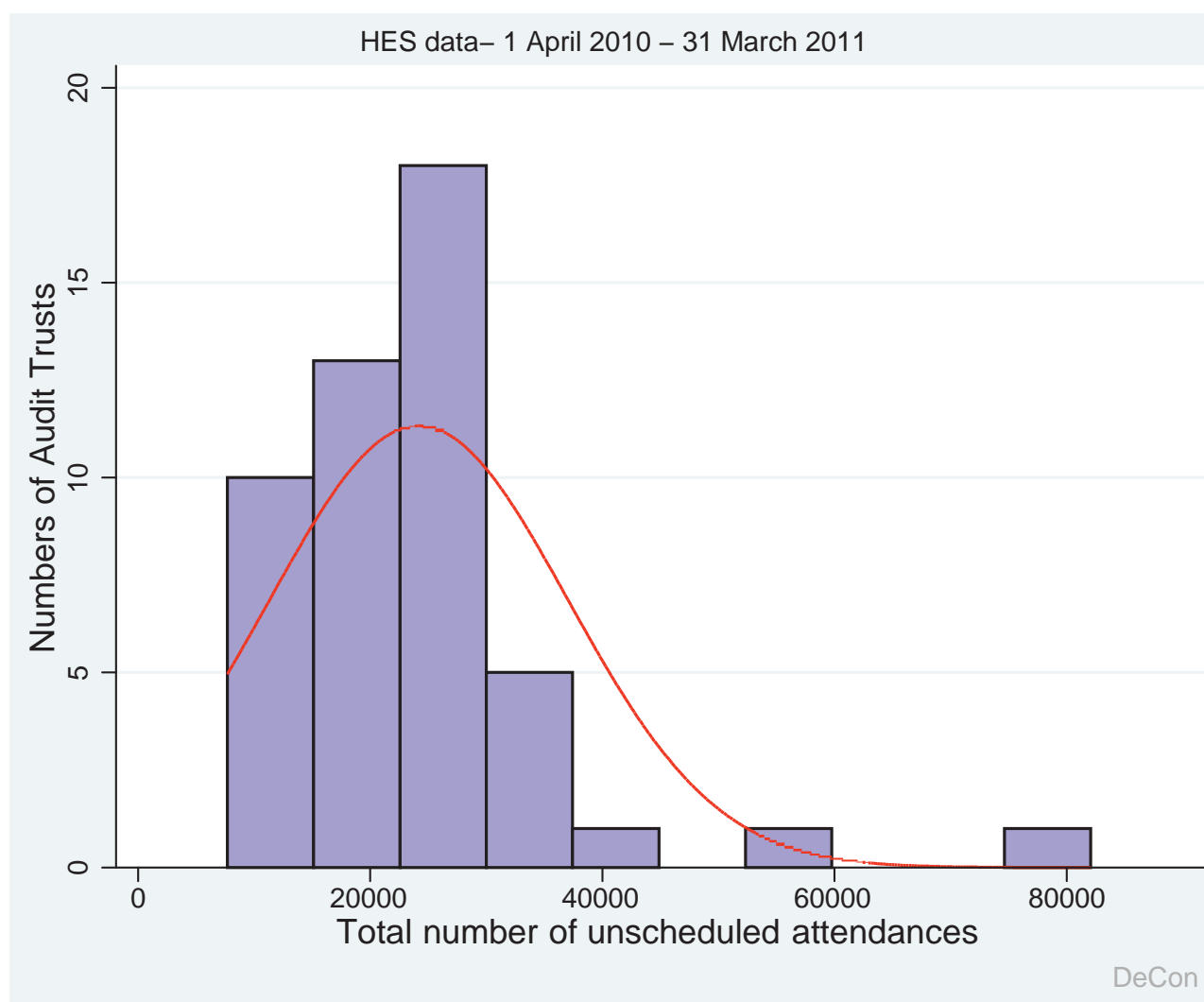
- The maximum age of children for whom the paediatric specialities of the participating trust provides care;
- The use of *The Management of a Child with a Decreased Conscious Level* guideline by the participating trust;
- The grade of the most senior paediatrician resident on-site at night;
- The presence of a nurse with advanced paediatric life support (APLS) or equivalent training;
- The level of access to paediatric anaesthetic skill or expertise;
- The availability of a paediatric emergency department, paediatric intensive care unit and paediatric assessment unit;
- Access to a laboratory able to process plasma ammonia;
- Access to computed tomography (CT) scanning facilities.

Trust-specific data were obtained from the NHS Information Centre on Health Episodes Statistics (HES) related to Accident and Emergency (A & E) attendances. This information was available for 50 of the 54 (92.6%) participating trusts in the audit. For the period April 2010 to March 2011, the mean number of total attendances to A & E departments of children less than 18 years for the trusts participating in the audit was 30565 (standard deviation = 19445) with a median number of attendances of 26985 and a range of 6480 to 109710.

In 49 of the 50 trusts for which HES data on A & E attendances were available, this data differentiated between planned and unplanned (unscheduled) attendances. The mean number of unscheduled attendances to Accident and Emergency in children less than 18 years for the trusts participating in the audit was 24187 (standard deviation= 12841) with a median number of unscheduled attendances of 23762 and a range of 7684 to 82074. (Figure 1)

- 59.2% (29/49) had < 25000 unplanned attendances
- 36.7% (18/49) had 25000-49999 unplanned attendances
- 4.1% (2/49) had \geq 50000 unplanned attendances

Figure 1: Unscheduled attendances of children and young people < 18 years of age to Accident and Emergency departments in the participating NHS trusts



3.1 Maximum age of children who receive care at the participating trusts

The mean maximum age of children seen at the 53/54 participating trusts which provided data is 17.4 years (standard deviation 1.2 years) with a median maximum age of 18 years. The majority of trusts (32/53, 60.4%) had a maximum age at which children received care of 18 years, while 12 (22.6%) had a maximum age of 16 years (Table 1).

Table 1: Maximum age of children and young people receiving care at the participating trusts

Maximum age in years	Number	Percent
13	1	1.9%
15	2	3.8%
16	12	22.6%
17	2	3.8%
18	32	60.4%
19	4	7.6%
Total*	53	100.0%

*Total percentage does not sum to 100% due to rounding to 1 decimal place.

3.2 Use of the Decreased Conscious Level guideline in the participating trusts

41.5% (22/53) participating trusts reported that the guideline is not being used in their trusts, while a slightly higher proportion indicated some degree of usage of the guideline (31/53, 58.5%).

- Guideline not used = 41.5% (22/53)
- Guideline incorporated within another guideline = 20.8% (11/53)
- Guideline used as a stand-alone guideline = 18.9% (10/53)
- Other use of the guideline = 18.9% (10/53)

In trusts which do not employ the guideline, the majority indicated that they used diagnosis-specific guidelines instead of one over-arching guideline for the management of children presenting to hospital with a decreased conscious level. The danger of the former approach is that it may lead to inconsistent and fragmented care for these children across the United Kingdom.

3.3 The most senior grade of paediatrician resident on-site all night

Over half of the participating NHS trusts (56.6%, 30/53) reported that in a typical week, the most senior grade of paediatrician resident on-site all night at their trust is either a consultant or a doctor of ST4 to ST8 grade or equivalent.

- Consultant = 5.7% (3/53)
- Associate specialist = 3.8% (2/53)
- Clinical fellow = 3.8% (2/53)

- ST1 - ST3 or equivalent = 3.8% (2/53)
- ST4 - ST8 or equivalent = 50.9% (27/53)
- Staff grade = 5.7% (3/53)
- Differing grades of paediatricians = 26.4% (14/53)

3.4 The presence of a Paediatric Nurse with APLS, EPLS or equivalent on shift

79.2% (42/53) trusts have a paediatric nurse with Advanced or European Paediatric Life Support or equivalent training present on shift in a typical week.

- No = 5.7% (3/53)
- Yes- 24/7 = 39.6% (21/53)
- Yes- but not 24/7 = 39.6% (21/53)
- Availability differs across the hospitals in the participating trust = 9.4% (5/53)
- Uncertain = 5.7% (3/53)

3.5 Access to Paediatric Anaesthetic skills or expertise on-site

81.1% (43/53) trusts have access to paediatric anaesthetic skills or expertise on-site in a typical week, although data was not collected on whether this expertise was at consultant level.

- No = 3.8% (2/53)
- Yes- 24/7 = 50.9% (27/53)
- Yes- but not 24/7 = 30.2% (16/53)
- Access differs across the hospitals in the participating trust = 11.3% (6/53)
- Uncertain = 3.8% (2/53)

The trusts were more likely to report having either a general anaesthetist with paediatric interests (40/53, 75.5%) or general anaesthetist (28/53, 52.8%) as compared to a paediatric anaesthetic specialist such as a paediatric anaesthetist (14/53, 26.4%) or a paediatric intensivist (9/53, 17.0%). The situation regarding anaesthetic expertise in paediatric settings is not a clear cut one because often in some hospitals anaesthetists may be able to do elective paediatric work but not emergency work.

3.6 On-site Paediatric Emergency Department

60.4% (32/53) trusts possess an on-site paediatric emergency department or an area in their emergency department solely dedicated to the care of paediatric patients, with 23 trusts (43.4%) having this availability on a 24/7 basis, while 9 trusts (17.0%) possess this facility but not on a 24/7 basis.

- No = 26.4% (14/53)
- Yes- 24/7 = 43.4% (23/53)
- Yes- but not 24/7 = 17.0% (9/53)
- Availability differs across the hospitals in the participating trust = 13.2% (7/53)

3.7 On-site Paediatric Intensive Care Unit

11.3% (6/53) trusts possess a dedicated paediatric intensive care unit on-site.

- No = 86.8% (46/53)
- Yes = 11.3% (6/53)
- Availability differs across the hospitals in the participating trust = 1.9% (1/53)

3.8 On-site Short stay or assessment unit solely for paediatric patients

69.8% (37/53) trusts report a paediatric assessment unit on-site, with 21 trusts (39.6%) reporting this availability on a 24/7 basis, while 16 trusts (30.2%) report possessing this facility but not on a 24/7 basis.

- No = 20.8% (11/53)
- Yes- 24/7 = 39.6% (21/53)
- Yes- but not 24/7 = 30.2% (16/53)
- Availability differs across the hospitals in the participating trust = 9.4% (5/53)

3.9 Laboratory able to process plasma ammonia available

92.5% (49/53) trusts have access to a laboratory which is able to process plasma ammonia, with 48 trusts (90.6%) reporting this availability on a 24/7 basis, while 1 trust (1.9%) reports possessing this facility but not on a 24/7 basis.

- No = 3.8% (2/53)
- Yes- 24/7 = 90.6% (48/53)
- Yes- but not 24/7 = 1.9% (1/53)
- Availability differs across the hospitals in the participating trust = 3.8% (2/53)

3.10 Computerised tomography (CT) scanning available on-site

98.1% (52/53) trusts possess CT scanning facilities on-site, with 51 trusts (96.2%) reporting this availability on a 24/7 basis, while 1 trust (1.9%) reports possessing this facility but not on a 24/7 basis.

4. Clinical Audit

4.1 Audit questions: Criteria and standards

The audit measured 8 main areas in the management of the care of children presenting to hospital with a decreased conscious level based on the recommendations in the guideline.

1. Features of the clinical history
2. Observations
3. Use of the physiological scoring systems: GCS and AVPU
4. Recommended frequency of GCS measurements
5. Recommended core investigations and tests
6. Working diagnosis within 4 hours of presentation
7. Management plan within 4 hours of presentation
8. Parent or guardian involvement

Positive evidence of the standards being achieved was taken as any documented evidence, whether in the form of electronic or written documentation, family tree drawings, plotted observations in observation charts or other charts, specimen pathology forms and any other reports by any member of the health care team in the patient's clinical record at presentation to hospital and during the course of the episode of care.

There were exceptions to the standards and not every standard related to all of the children with a decreased conscious level; indeed some standards were only relevant to specific groups of children. The DeCon Project Board set the thresholds for performance on the audit criteria which focused on the measurement of elements of basic care in the management of children with a decreased conscious level. A 90% target performance (optimal level) rather than a 100% target (ideal level) was set for the majority of audit standards with a few exceptions where no targets were set. The aim was to achieve attainable yet realistic targets for measuring the performance of the trusts in the provision of care to these children.

A traffic light system consisting of green, amber and red is employed to indicate and provide a visual means of highlighting how trusts in the audit performed for the specific standards (Table 2).

Table 2: Performance targets

Performance targets	Range (Percentage)	Colour
Ideal performance target 100%	90-100%	Green
Optimum performance target 90%	75-89%	Amber
Minimum performance target 75%	<75%	Red

4.2 Audit Sample

The audit sample comprised any child or young person less than 18 years, who presented to the participating trusts with a decreased conscious level. A decreased conscious level was defined as a Glasgow Coma Score (GCS) of 14 or less or response only to voice, pain, or unresponsive on the AVPU assessment scale.

If children and young people possessed any of the following features they were excluded from the audit:

1. A previously diagnosed condition which is known to be the cause of the decreased conscious level for instance epilepsy, diabetes, a previously diagnosed metabolic condition or a ventriculo-peritoneal shunt;
2. A Glasgow Coma Score (GCS) value of less than 15 on a day-to-day basis;
3. A decreased conscious level from the moment of birth onwards in preterm and full term infants;
4. Transfers from another hospital;
5. Any child who presents to hospital with a normal GCS (15) or AVPU assessment of Alert whose condition then deteriorates while in hospital.

There were exceptions to the exclusion criteria and children falling into the following categories were also included in the audit:

- A child with a decreased conscious level from the moment of birth onwards whose condition resolves but who has a subsequent presentation with a decreased conscious level.
- A child who presents to hospital with a decreased conscious level due to epilepsy, where this is the first onset and there is no previously established diagnosis.
- A diabetic child who presents to hospital with a decreased conscious level, which is not due to this condition.
- Several other categories of children were also included such as cases presenting to hospital with a decreased conscious level secondary to alcohol intoxication, head injury or trauma and febrile seizures.

4.3 Methodology

Data collection during this audit focused on episodes of care. During the course of this audit, a child could have several episodes of presentation to hospital with a decreased conscious level, and where the audit criteria was met then each episode was included in the audit.

Data were collected on all initial and subsequent admissions to the areas of the emergency department or paediatric assessment unit, providing children had not been transferred either from another ward in the hospital or from another hospital within the same episode of care.

4.3.1 What the RCPCH asked the participating trusts to do for data collection

Participating trusts were asked to prospectively identify any consecutive cases of children less than 18 years who presented to hospital with a decreased conscious level between the period of the 1st November 2010 to 30th September 2011.

Audit leads were responsible for checking whether the patient met the audit's inclusion criteria and did not possess any of the exclusion criteria, and for entering clinical details on eligible patients into an online clinical audit data collection tool. A paper-based proforma was also provided to trusts to aid their data collection.

The duplication of episodes of care was avoided by the audit leads entering the patient's NHS or hospital number, the date of birth and the date of presentation into the online tool. These three parameters were validated in the system against previous entries and if they were already present then the user was prevented from entering the case.

The patient identifiable data were encrypted by the system and a unique identifying number (UIN) was generated. This meant that data on the patient was anonymised at the point of data submission. The use of de-identified data in this audit meant that National Information Governance Board approval was not required for this audit and patient confidentiality was maintained.

Audit leads were also required to keep a record comprising the patient's name, NHS or hospital number, date of birth, gender, date of presentation, time of presentation and the unique identification number (generated by the online tool) at the local level. This information was recorded in an audit logbook provided by the RCPCH and used to identify and validate the cases during the evaluation of data quality and data cleaning phases of the audit.

4.3.2 How participating trusts collected the data

Trusts reported difficulties in adhering to a strict prospective case identification methodology due to staffing pressures as well as staff forgetting to record cases, particularly if they occurred infrequently. Indeed, all of the trusts involved employed either a wholly retrospective or a combined approach using both prospective and retrospective case identification.

There was a wide variation in their methods of case ascertainment. Some trusts identified their cases retrospectively through use of their emergency departments' computer systems. Others employed the audit logbook and required their staff to record the eligible patients' details whenever they presented or identified cases by means of the checking of emergency department patient admission cards or case notes.

Additionally, the actual commencement of the trusts' data collection also varied ranging from 1 November 2010 to 1 March 2011 because some of the participating trusts were unable to commence data collection or failed to do so from the 1 November 2010 and others joined the audit after this time period. However, the majority of trusts commenced data collection either on 1 November 2010 or 1 December 2010, and trusts commencing data collection at a later date collected data for the earlier period retrospectively.

4.4 Limitations

There were several limitations of this audit.

- Contamination of the methodology whereby most trusts adopted a mixed methodological approach (retrospective and prospective) or a retrospective approach to identify their cases rather than a strictly prospective approach may be a potential source of bias.
- Possible inconsistency in the trusts' data capture due to the wide variation in case ascertainment. Although to some extent this is an inevitable consequence of different working practices among the trusts it may lead to selection bias.
- Inadequate mechanisms for the detection of these patients in some trusts leading to reduced numbers of cases as compared with trusts with equivalent numbers of Accident and Emergency attendances. This may mean that the data obtained from these trusts fails to provide a true picture of both the epidemiology or the management of children with a decreased conscious level at the local level.
- Under-estimation of two categories of children: neonates and adolescents between 16-18 years because data for the audit was not collected from either neonatal units or adult settings. Additionally, the participating trusts differ in terms of the maximum age for which they provide care to paediatric patients, hence lessening the capture of those over 16 years in the audit.
- Children and young people who present to hospital with a decreased conscious level as a consequence of a minor head injury or alcohol intoxication may be under-ascertained as they are often discharged directly from the emergency department and therefore may be missed. This may present a false picture of the extent and severity of decreased conscious level in these groups.
- Another area of selection bias is the differing commencement dates for participating trusts within the audit. This possible confounding factor was accounted for by checking the audit standards for different time frames to ensure that the differing time period was not having a significant impact on the audit findings. The main issue that this creates is that of reduced numbers of cases and therefore percentages derived from small denominators (audit samples).
- Difficulty in assessing the care and management of patients where documentation is a proxy for the delivery of that care in those children with inadequate documentation in their clinical records.
- The trusts providing data in this audit self-selected to participate. This may mean that these trusts irrespective of whether they report that they employ the guideline or not may differ in terms of their approach to the management of children presenting with decreased consciousness from non-participating trusts, which has implications for the audit's representativeness and generalizability.

4.5 Data returns, quality and analysis

4.5.1 Data returns

There were 1146 cases submitted via the online tool for the clinical audit questionnaire of which 1135 were eligible. The total number of cases entered into the online data collection tool by the trusts ranged from 1 to 73 with a mean of 22 cases and a median of 15 cases. 51 of the 54 (94.4%) participating trusts provided clinical audit data. These trusts submitted the following number of cases:

- < 5 cases = 7 trusts
- 5-10 cases = 8 trusts
- 11-20 cases = 15 trusts
- > 20 cases = 21 trusts

4.5.2 Data quality

There was automated checking for missing data, inconsistencies, inaccuracies, outliers and any other discrepancies in the data entry. Each participating trust was sent a Data Quality Report highlighting their data quality queries. Audit leads of the participating trusts were asked to provide clarifications or corrections for the data as applicable. Once these were received, the relevant corrections were made in the online tool and a record of the errors and the date of any changes logged.

There were 11 cases for which there were queries regarding their eligibility for inclusion in the audit:

- 1 case where the AVPU assessment was Alert and the GCS was 15;
- 5 cases where the AVPU assessments were Alert and there were no GCS scores;
- 5 cases where the GCS scores were 15 and there were no AVPU assessments.

1135 cases met the audit's inclusion criteria and are the focus of this report.

4.5.3 Data analysis

The cleaned data were analysed using the following software:

- StatTransfer employed to convert the datasets from Excel format to STATA format.
- STATA 11.2 used to undertake all aspects of data management and analysis.

Throughout this document, descriptive data analyses will be used to report the audit standards. The main summary statistics and graphs used include the percentage of the cases meeting the audit standard, the median percent and its related 95% confidence intervals and horizontal bar charts:

- Percentage of the sample meeting the audit standard = $(\text{Number of children presenting to hospital with a decreased conscious level who meet the audit standard for each participating trust} \div \text{Total number of children presenting to hospital with a decreased conscious level to each participating trust}) \times 100$.
- The median percent is the middle value of the percentages of children meeting the specific audit standard for all the trusts, in other words the 50th percentile and its 95% confidence interval is used to indicate the reliability of the median percent. This latter value can be interpreted as the 95% probability that the median percent lies within the bounds of this interval.
- Horizontal bar charts are graphical plots employed to illustrate the performance of the participating trusts. This is a graph where the horizontal axis is the percentage meeting the standard and the vertical axis comprises the trusts. Each bar on this graph represents a trust in the audit and the length of the horizontal bars represents the percentage who met the audit standard for the respective trust. If this percentage is zero, a bar is not shown on the graph.

5. Features of the eligible cases

5.1 Gender and Age of the Cases

45.2% (513/1135) of the audit cases were female and 54.8% (622/1135) were male.

The audit sample had a mean age of 8.3 years (standard deviation = 6.3 years). Their median age was 8 years with the 25th quartile equal to 2 years and the 75th quartile equal to 14 years.

Cases of decreased conscious level tended to be skewed towards those children over 5 years of age in this audit sample. Children in the age category of more than 13 years but less than 18 years were more likely to present to hospital with a decreased conscious level than any other category in this sample. (Figure 2)

Age categories (adapted from Goldstein et al. 2005)

- Neonate: 0.0 to 0.1 year (1 month) = 2.6% (29/1135)
- Infant: 0.2 to 1.0 year = 20.7% (235/1135)
- Pre-school: 1.1 to 5.0 years = 17.4% (198/1135)
- School children: 5.1 to 13.0 years = 22.9% (260/1135)
- Adolescent and young person: 13.1 to 17.9 years = 36.4% (413/1135)

Figure 2: Age distribution of the eligible cases



5.2 Place of presentation

The majority of the audit sample either presented to a mixed emergency department (701/1135, 61.8%) or a paediatric emergency department (35.9%, 407/1135).

- Mixed Emergency Department = 61.8% (701/1135)
- Paediatric Emergency Department = 35.9% (407/1135)
- Paediatric Assessment Unit = 2.2% (25/1135)
- Place of presentation unknown = 0.2% (2/1135)

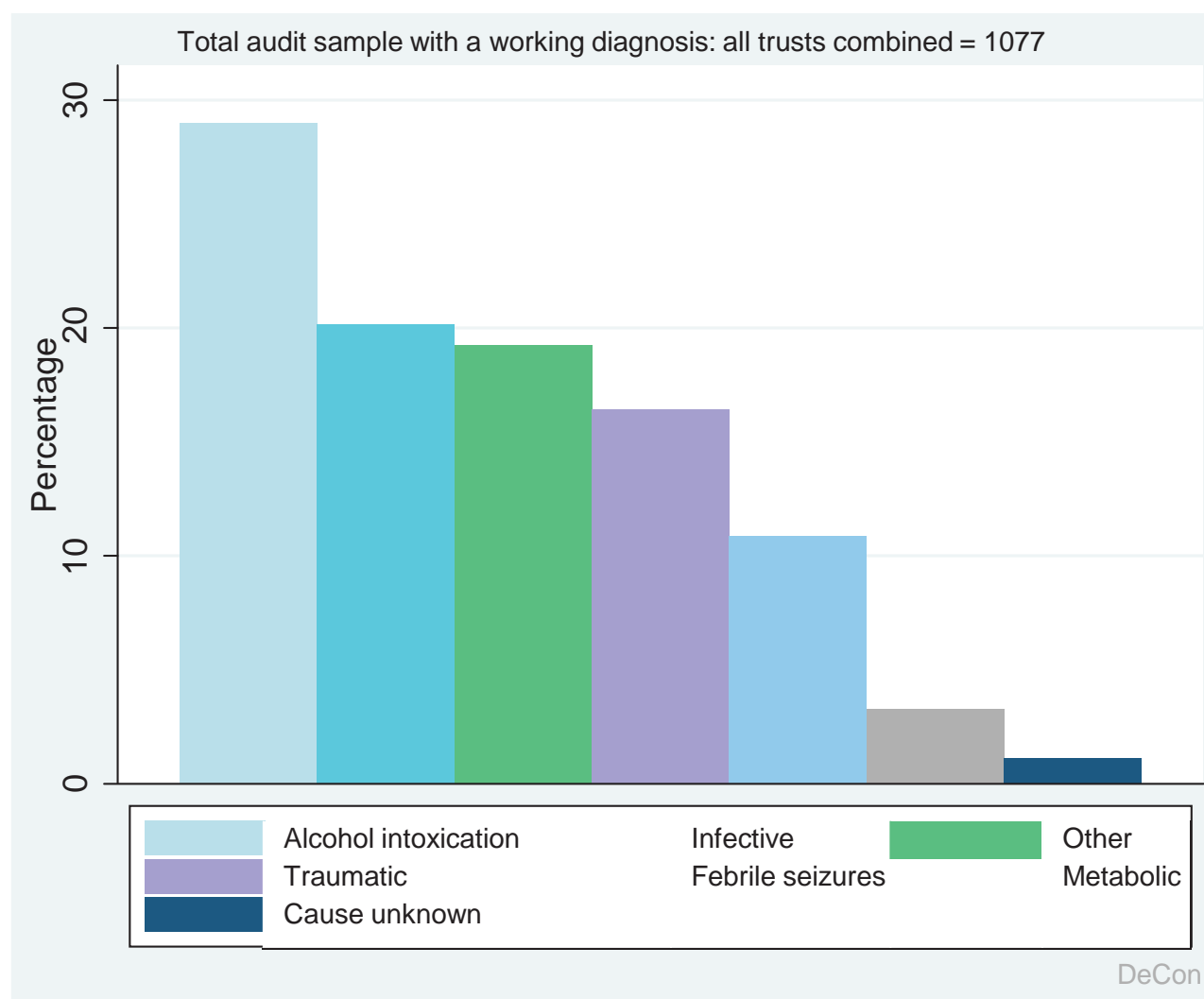
5.3 Working diagnosis at presentation to hospital

On presentation to hospital, 94.9% (1077/1,135) of the audit sample had a working diagnosis. The most common working diagnoses among the audit sample were alcohol intoxication (29.0%), infective causes (20.2%) and trauma (16.4%). (Figure 3)

- Alcohol intoxication = 29.0% (312/1077)
- Infective causes = 20.2% (217/1077)
- Traumatic causes = 16.4% (177/1077)
- Febrile seizures = 10.9% (117/1077)
- Metabolic causes = 3.3% (35/1077)
- Other causes = 19.2% (207/1077)
- Cause unknown = 1.1% (12/1077)

The other causes included for example asthma, prolonged convulsions, post convulsive state, intracranial haemorrhage and cardio-respiratory arrest.

Figure 3: Working diagnosis at presentation to hospital in children with a decreased conscious level



A higher percentage of female children (170/513, 33.1%) presented with a decreased conscious level secondary to alcohol intoxication compared to male children (142/622, 22.8%), whereas, a significantly higher proportion of male children (121/622, 19.5%) were likely to present with a decreased conscious level secondary to traumatic causes than female patients (56/513, 10.9%) (P <0.005).

Children less than 5 years presenting to hospital with a decreased conscious level were more likely to present with febrile seizures (107/462, 23.2%) and infective causes (147/462, 31.8%), whereas, children between 5 and 11 years were more likely to present with infective causes (44/169, 26.0%) and traumatic causes (47/169, 27.8%) and those 12 years and over, overwhelmingly with alcohol intoxication (309/504, 61.3%) and traumatic causes (75/504, 14.9%) (P <0.005).

5.4 The grade of the most senior clinician reviewing the child

62.1% (705/1135) of the children presenting to hospital with a decreased conscious level were either reviewed by a consultant or a ST4 to ST8 (Specialty trainee year 4 to 8) doctor in paediatrics or emergency medicine.

The grade of the most senior clinician who reviewed the children who presented to hospital with a decreased conscious level was as follows:

- Consultant = 31.8% (361/1135)
- Associate specialist = 2.7% (31/1135)
- Clinical fellow = 2.0% (23/1135)
- Staff Grade = 7.2% (82/1135)
- ST4-ST8 or equivalent = 30.3% (344/1135)
- ST1-ST3 or equivalent = 15.3% (174/1135)
- F1 or F2 = 3.0% (34/1135)
- Nurse = 1.2% (14/1135)
- Uncertain = 6.3% (72/1135)

Children under five years who presented to hospital with a decreased conscious level were more likely to be reviewed by a consultant (199/462, 43.1%) as compared with those children between 5 to 11 years (64/169, 37.9%) and those 12 years and over (98/504, 19.4%)(P <0.005).

5.5 Outcome of the children and young people

There were 16 deaths (1.4%) among the cases. The majority of children were discharged from the emergency department or paediatric assessment unit (41.4%) or transferred for observation or treatment either to a general or specialist ward in the hospital (42.3%).

The children in the audit sample had the following outcome:

- Died = 1.4% (16/1135)
- Discharged from hospital = 41.4% (470/1135)
- Transferred to the ward (general or specialist) = 42.3% (480/1135)
- Transferred to Paediatric Intensive Care Unit = 9.9% (112/1135)
- Transferred to another NHS hospital = 4.1% (46/1135)
- Self-discharged = 1.0% (11/1135)

Data related to the outcome of the cases in this audit should be treated with caution because the number of deaths may be under-estimated since participating trusts were only required to indicate the child's outcome in relation to the current episode of care.

Another issue is that of the possible confusion in the use of terminology for discharge and transfer used by emergency departments. It is the norm in most emergency departments to refer to the transfer to another area in the hospital or another hospital or discharge from hospital as a discharge. However, for the purposes of this audit if a child was moved to another area or hospital and required treatment or observation this was defined as a transfer and discharge from hospital referred to as a discharge only if this took place from the area of initial presentation such as the emergency department or the paediatric assessment unit.

6. Clinical Audit Results

6.1: Question 1: Features of the clinical history (Table 3)

Audit question:

At presentation to hospital, was the presence or absence of the recommended clinical history features documented in the child's clinical record?

All cases:

- Vomiting before or at presentation
- Fever before or at presentation
- Convulsions before or at presentation
- Alternating periods of consciousness
- Trauma
- Ingestion of medication or recreational drugs
- Length of symptoms

Children less than 5 years:

- Presence of any medication in the child's home
- Any previous infant deaths in the family

Children 5 years or more:

- Headache before or at presentation

Source of standards:

The Management of a Child with a Decreased Conscious Level guideline and the DeCon Project Board Team

Table 3: Clinical History Features: Audit standards and Performance targets

Audit standards	Total audit sample	Cases meeting the standard	% Cases meeting the standard	Median percent (95% Confidence Interval)	Trusts meeting the 90 - 100% performance target level
vomiting before or at presentation	1135	660	58.2%	57.6% (50.0%, 64.4%)	4
fever before or at presentation	1135	495	43.6%	45.9% (38.5%, 53.3%)	4
convulsions before or at presentation	1135	484	42.6%	44.7% (40.0%, 50.0%)	4
alternating periods of consciousness	1135	644	56.7%	60.0% (50.0%, 73.3%)	11
trauma	1135	441	38.9%	30.8% (26.7%, 40.0%)	2
ingestion of medication/recreational drugs	1135	391	34.5%	28.6% (20.0%, 37.3%)	2
length of symptoms	1135	895	78.9%	82.6% (79.4%, 93.1%)	23
Children < 5 years (49 trusts possess eligible cases)					
medication present in the child's home	462	37	8.0%	0.0% (0.0%, 4.8%)	2
family history of infant deaths	462	28	6.1%	0.0% (0.0%, 0.0%)	0
Children ≥ 5 years (48 trusts possess eligible cases)					
headache before or at presentation	673	172	25.6%	27.6% (16.7%, 33.3%)	3

6.1.1 Vomiting before or at presentation (Figure 4)

Standard:

All children presenting to hospital with a decreased conscious level should have a clinical history elicited of the absence or presence of vomiting before or at presentation and this information documented in their clinical record.

Performance target: At least 90% of children meet the standard.

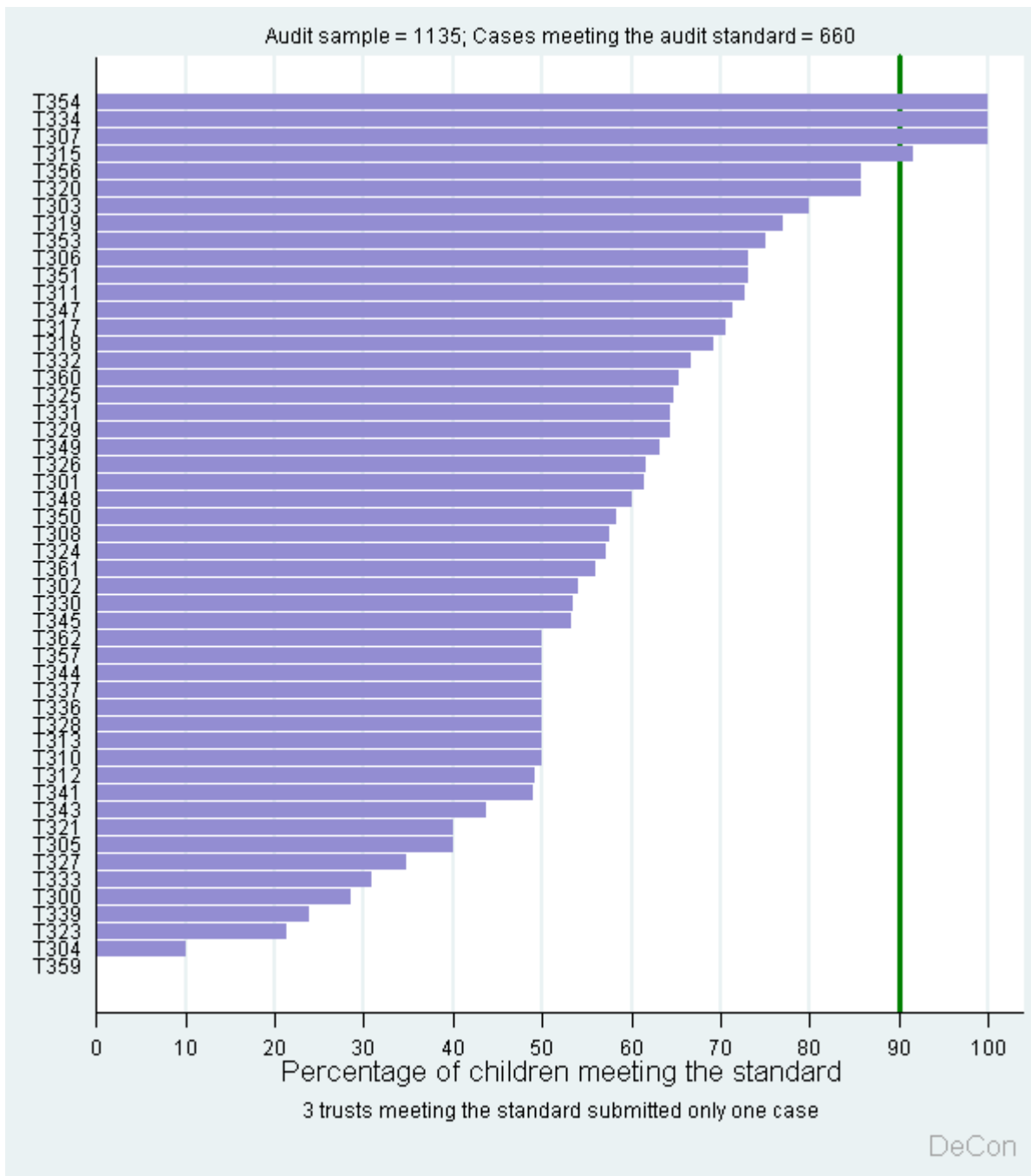
Results:

- Cases meeting the audit standard = 660/1135 (58.2%)
- Performance target range 90% to 100%: This was met by 4/51 (7.8%) trusts. Three of these trusts submitted only 1 eligible case, therefore this may not be a true reflection of their actual performance for this standard because of the small sample size.
- 75% - 89% range: 5 trusts

Children presenting with a decreased conscious level secondary to alcohol intoxication (199/312, 63.8%) or traumatic causes (113/177, 63.8%) were more likely to have documentation of the absence or presence of vomiting as compared to non-traumatic causes (310/576, 53.8%) or unknown cause (7/12, 58.3%) (P = 0.023).

There were no statistically significant differences in the documentation of the absence or presence of vomiting as part of the clinical history by the child's age, place of presentation or the grade of the most senior clinician reviewing the child.

Figure 4: Question 1: Features of the clinical history- Documentation of the presence or absence of vomiting before or at presentation



6.1.2: Fever before or at presentation (Figure 5)

Standard:

All children presenting to hospital with a decreased conscious level should have a clinical history elicited of the absence or presence of fever before or at presentation and this information documented in their clinical record.

Performance target: At least 90% of children meet the standard.

Results:

- Cases meeting the audit standard = 495/1135 (43.6%)
- Performance target range 90% to 100%: This was met by 4/51 (7.8%) trusts. Three of these trusts submitted fewer than 3 eligible cases, therefore this may not offer a true picture of their actual performance for this standard because of the small sample sizes.
- 75% - 89% range: 5 trusts

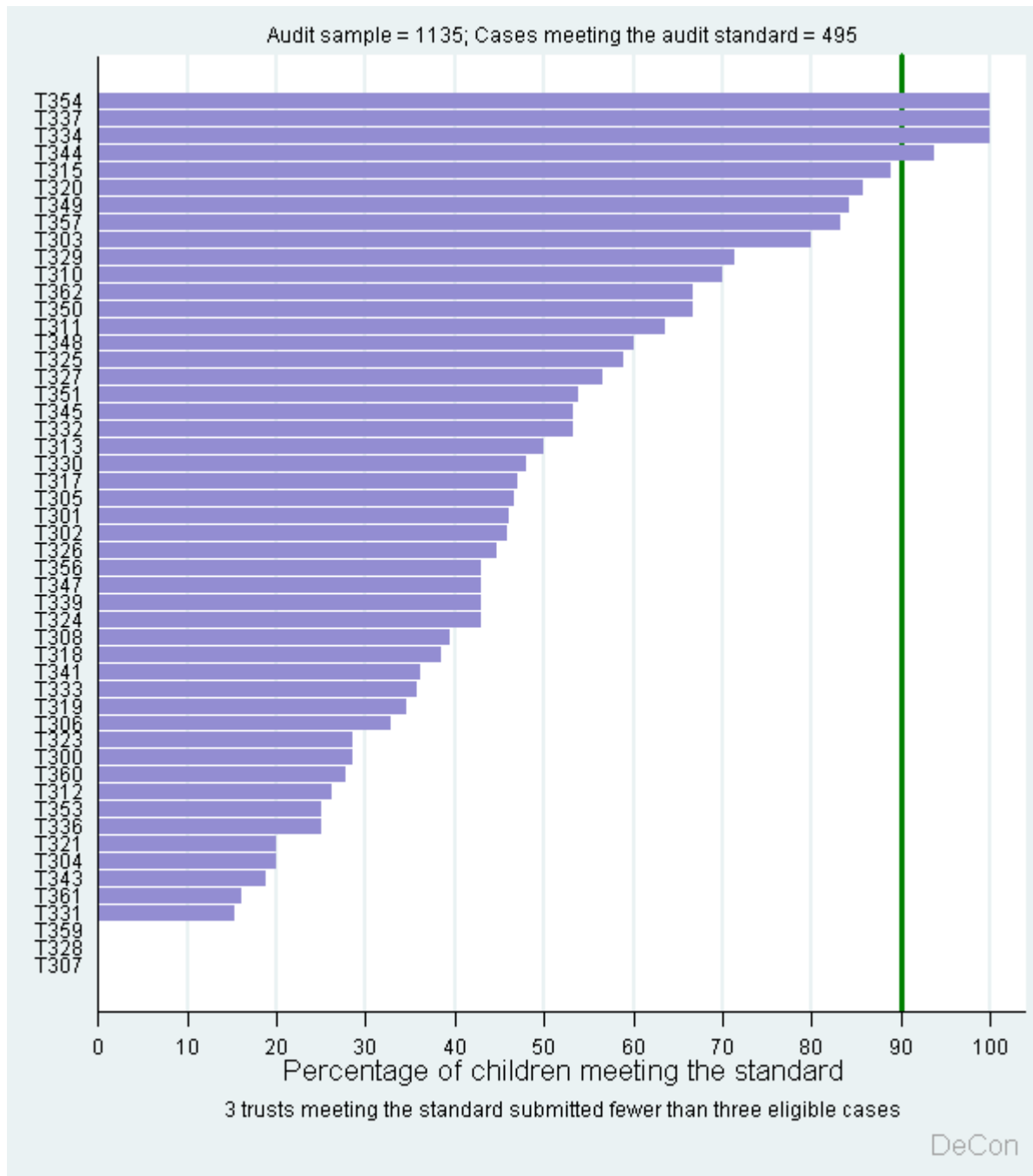
Children under 5 years (319/462, 69.1%) were more likely to have documentation of the absence or presence of fever as part of the clinical history as compared with those 5 years and over (176/673, 26.2%) ($P < 0.005$).

Children presenting with a decreased conscious level secondary to non-traumatic causes (399/576, 69.3%) were more likely to have documentation of the absence or presence of fever as compared to alcohol intoxication (36/312, 11.5%), traumatic causes (30/177, 17.0%) or unknown cause (7/12, 58.3%) ($P < 0.005$).

Children reviewed by a consultant (196/361, 54.3%) were more likely to have higher levels of documentation of the absence or presence of fever as compared with those reviewed by less senior staff such as a doctor of ST4 to ST8 grade or equivalent (220/480, 45.8%) a doctor of ST3 grade or lower (57/208, 27.4%) or a nurse (3/14, 21.4%) ($P < 0.005$).

There was no statistically significant difference in documentation of fever by the place of presentation.

Figure 5: Question 1: Features of the clinical history- Documentation of the presence or absence of fever before or at presentation



6.1.3 Convulsions before or at presentation (Figure 6)

Standard:

All children presenting to hospital with a decreased conscious level should have a clinical history elicited of the absence or presence of convulsions before or at presentation and this information documented in their clinical record.

Performance target: At least 90% of children meet the standard.

Results: 

- Cases meeting the audit standard = 484/1135 (42.6%)
- Performance target range 90% to 100%: This was met by 4/51 (7.8%) trusts. Three of these trusts submitted fewer than 3 eligible cases which may not be a true reflection of their actual performance because of their small sample sizes.
- 75% - 89% range: 2 trusts

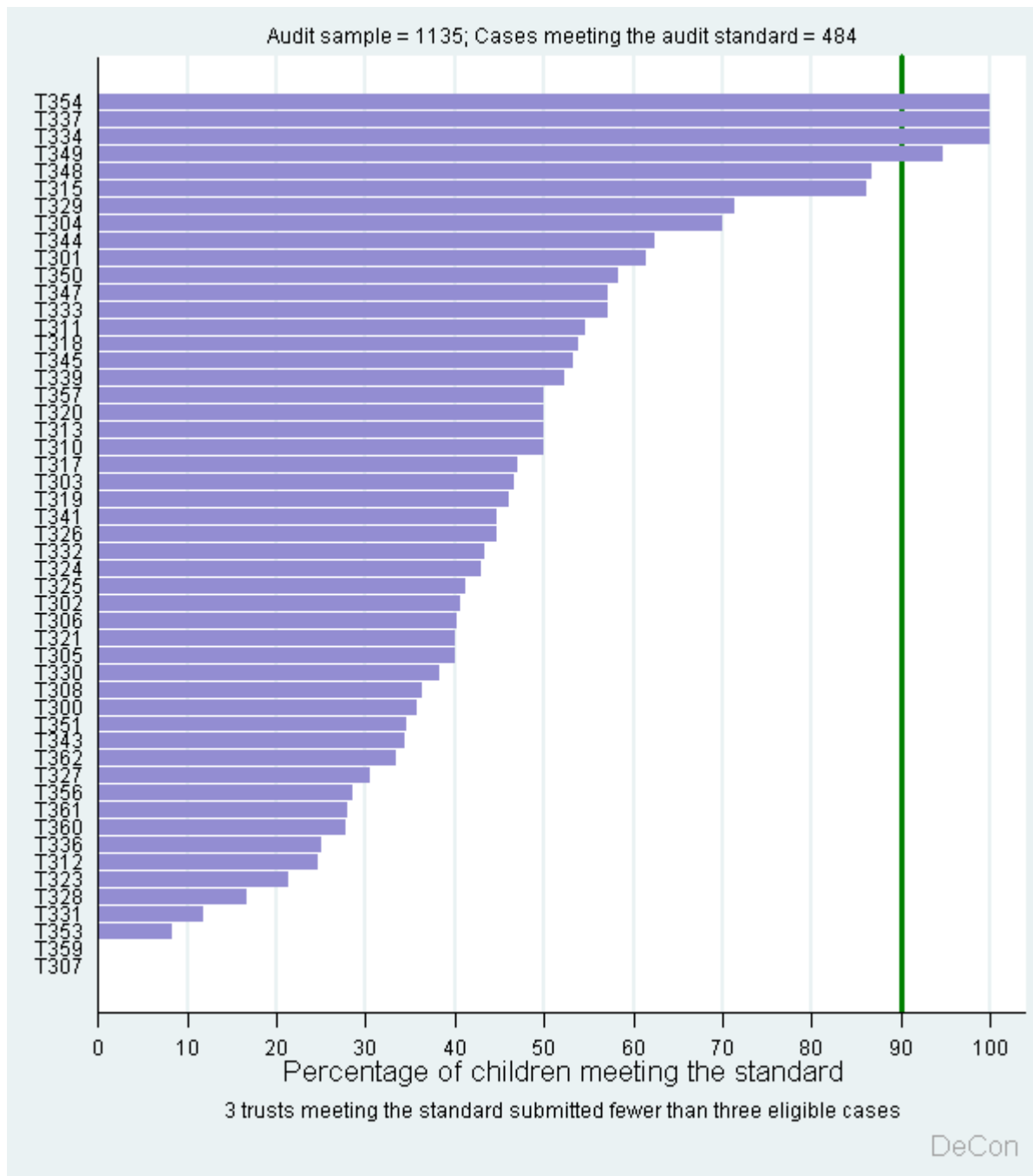
Children under 5 years (291/462, 63.0%) were more likely to have documentation of the absence or presence of convulsions as part of the clinical history as compared with those 5 years and over (193/673, 28.7%) ($P < 0.005$).

Children presenting with a decreased conscious level secondary to non-traumatic causes (367/576, 63.7%) or unknown cause (7/12, 58.3%) were more likely to have documentation of the absence or presence of convulsions as compared with alcohol intoxication (29/312, 9.3%) or traumatic causes (50/177, 28.3%) ($P < 0.005$).

Children reviewed by a consultant (182/361, 50.4%) or a doctor of ST4 to ST8 grade or equivalent (233/480, 48.5%) were more likely to have higher levels of documentation of the absence or presence of convulsions as compared with those reviewed by less senior staff such as a doctor of ST3 grade or lower (45/208, 21.6%) or a nurse (4/14, 28.6%) ($P < 0.005$).

There was no statistically significant difference in the documentation of the absence or presence of convulsions by the place of presentation.

Figure 6: Question 1: Features of the clinical history- Documentation of the presence or absence of convulsions before or at presentation



6.1.4 Alternating periods of consciousness (Figure 7)

Standard:

All children presenting to hospital with a decreased conscious level should have a clinical history elicited of the absence or presence of alternating periods of consciousness and this information documented in their clinical record.

Performance target: At least 90% of children meet the standard.

Results:

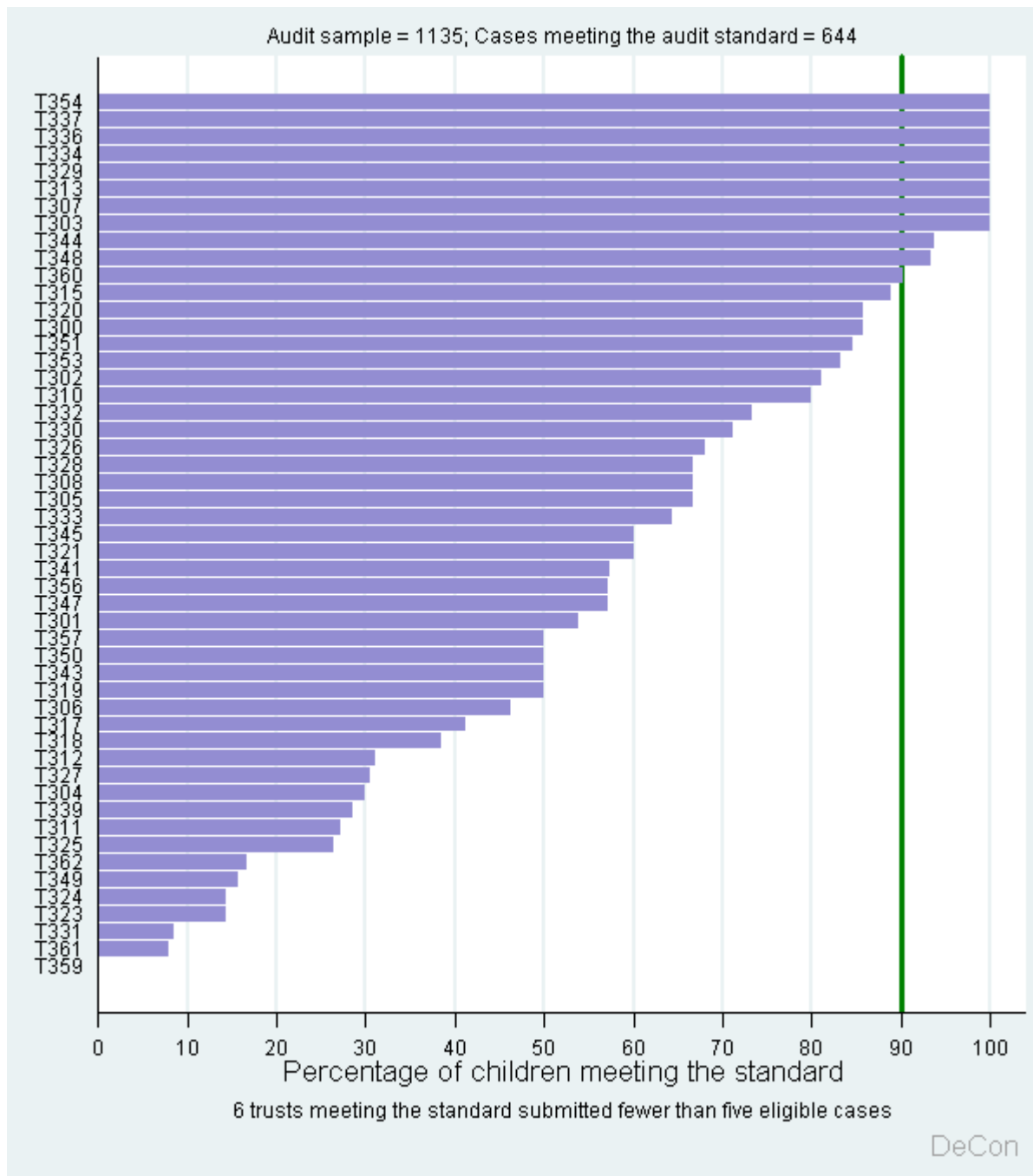
- Cases meeting the audit standard = 644/1135 (56.7%)
- Performance target range 90% to 100%: This was met by 11/51 (21.6%) trusts. Six of these trusts submitted fewer than 5 eligible cases.
- 75% - 89% range: 7 trusts

Despite the small numbers, children presenting with a decreased conscious level secondary to unknown cause (9/12, 75.0%) were more likely to have documentation of the absence or presence of alternating periods of consciousness as compared with alcohol intoxication (157/312, 50.3%), non-traumatic causes (344/576, 59.7%) or traumatic causes (104/177, 58.8%) ($P = 0.043$).

Children reviewed by a consultant (235/361, 65.1%) or a nurse (9/14, 64.3%) were more likely to have documentation of the absence or presence of alternating periods of consciousness as compared with those reviewed by a doctor of ST4 to ST8 grade or equivalent (246/480, 51.3%) or a doctor of ST3 grade or lower (116/208, 55.8%) ($P = 0.002$).

There were no statistically significant differences in documentation of the absence or presence of alternating periods of consciousness by the child's age or place of presentation.

Figure 7: Question 1: Features of the clinical history- Documentation of the presence or absence of alternating periods of consciousness



6.1.5 Trauma (Figure 8)

Standard:

All children presenting to hospital with a decreased conscious level should have a clinical history elicited of the absence or presence of trauma and this information documented in their clinical record.

Performance target: At least 90% of children meet the standard.

Results:

- Cases meeting the audit standard = 441/1135 (38.9%)
- Performance target range 90% to 100%: This was met by 2/51 (3.9%) trusts. Both trusts submitted fewer than 3 eligible cases which may not offer a genuine picture of their actual performance for this standard because of the small sample sizes.
- 75% - 89% range: 0 trusts

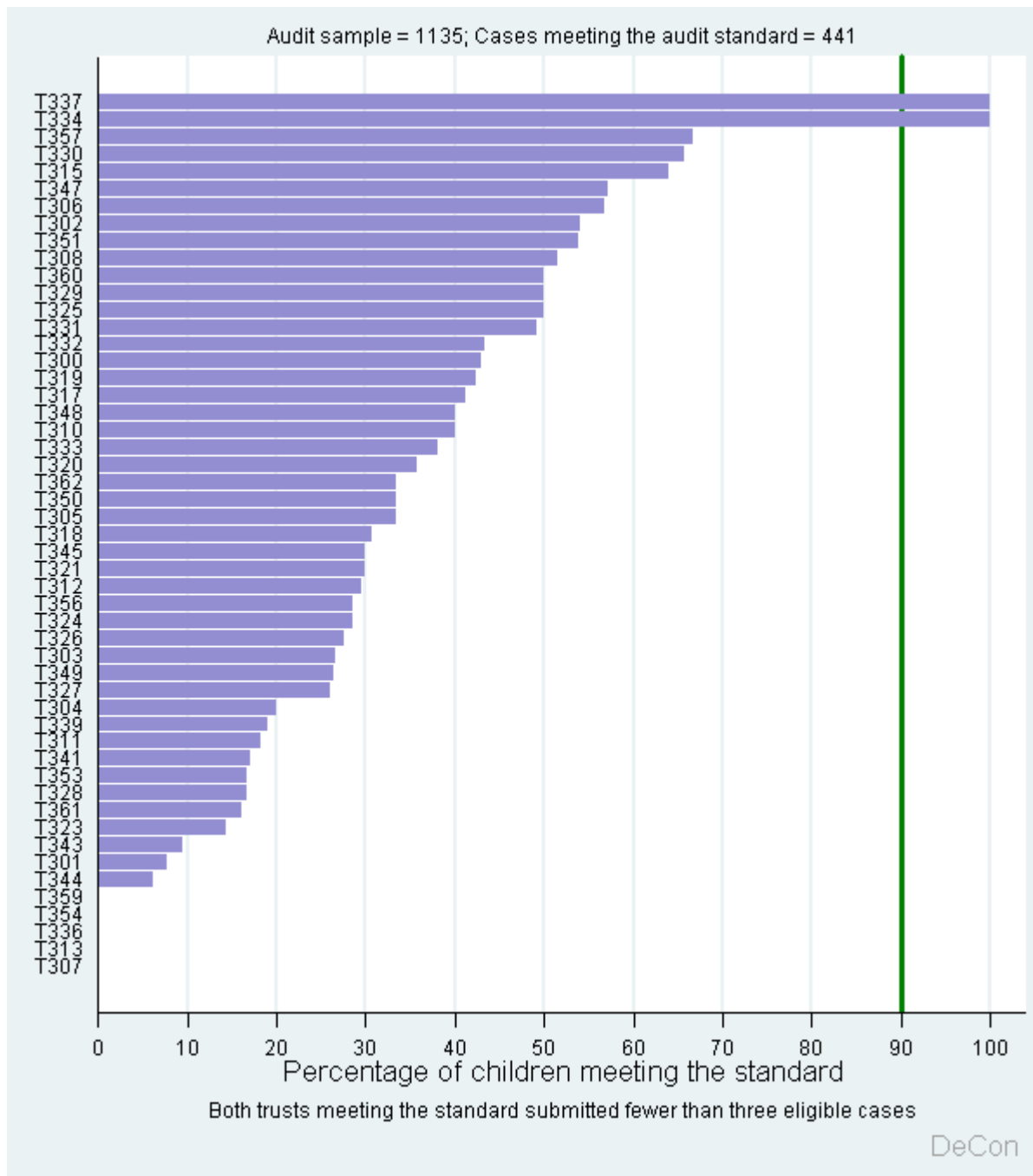
Children under 5 years (117/462, 25.3%) were less likely to have documentation of the absence or presence of trauma as part of the clinical history as compared with those 5 years and over (324/673, 48.1%) ($P < 0.005$).

Children presenting with a decreased conscious level secondary to traumatic causes (172/177, 97.2%) as might be expected were more likely to have documentation of the absence or presence of trauma as compared to alcohol intoxication (155/312, 49.7%), unknown cause (5/12, 41.7%) or non-traumatic causes (95/576, 16.5%) ($P < 0.005$).

Children reviewed by a doctor of ST3 grade or lower (99/208, 47.6%) were more likely to have documentation of the absence or presence of trauma as compared with those reviewed by a consultant (140/361, 38.8%), a doctor of ST4 to ST8 grade or equivalent (168/480, 35.0%) or nurse (4/14, 28.6%) ($P = 0.032$).

Children who presented to mixed emergency departments (297/701, 42.4%) were more likely to have documentation of the absence or presence of trauma than those children presenting to paediatric emergency departments (139/407, 34.2%) or paediatric assessment units (5/25, 20.0%) ($P = 0.006$).

Figure 8: Question 1: Features of the clinical history- Documentation of the presence or absence of trauma



6.1.6 Ingestion of medication or recreational drugs (Figure 9)

Standard:

All children presenting to hospital with a decreased conscious level should have a clinical history elicited as to whether or not they had ingested medication or recreational drugs and this information documented in their clinical record.

Performance target: At least 90% of children meet the standard.

Results:

- Cases meeting the audit standard = 391/1135 (34.5%)
- Performance target range 90% to 100%: This was met by 2/51 (3.9%) trusts. Both trusts submitted fewer than 3 eligible cases.
- 75% - 89% range: 0 trusts

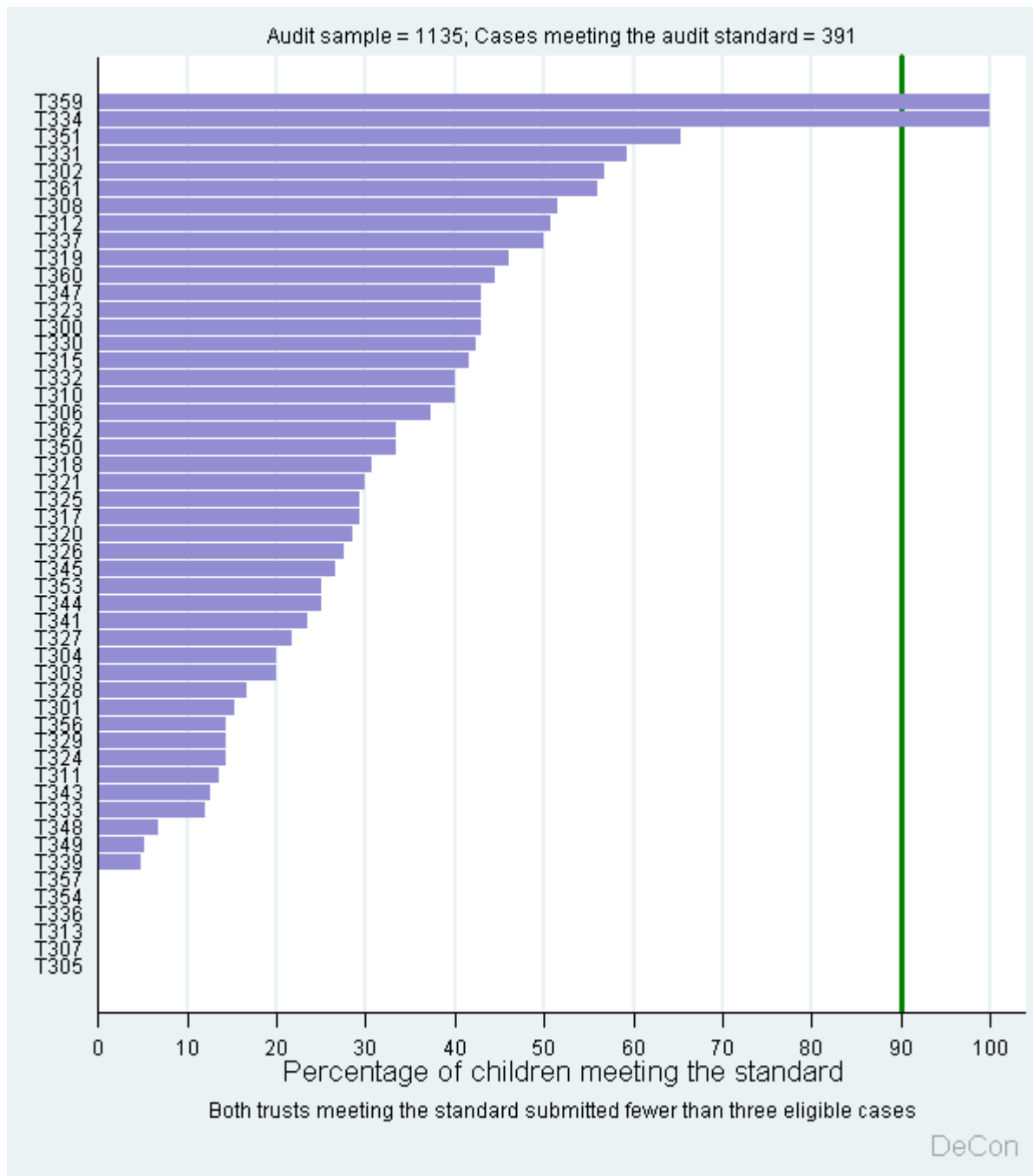
Children under 5 years (40/462, 8.7%) were less likely to have documentation of whether or not medication or recreational drugs were ingested as part of their clinical history as compared with those 5 years and over (351/673, 52.2%) ($P < 0.005$).

Children presenting with decreased conscious level secondary to alcohol intoxication (262/312, 84.0%) as might be expected were more likely to have documentation as compared with unknown cause (3/12, 25.0%), non-traumatic causes (101/576, 17.5%) and traumatic causes (20/177, 11.3%) ($P < 0.005$).

Despite the small numbers in some categories, children reviewed by a nurse (8/14, 57.1%) or a doctor of ST3 grade or lower (111/208, 53.4%) were more likely to have documentation as compared with those reviewed by a consultant (77/361, 21.3%) or a doctor of ST4 to ST8 grade or equivalent (167/480, 34.8%) ($P < 0.005$).

There was no statistically significant difference in documentation of whether or not medication or recreational drugs were ingested by the place of presentation.

Figure 9: Question 1: Features of the clinical history- Documentation of the presence or absence of ingestion of medication or recreational drugs



6.1.7 Length of symptoms (Figure 10)

Standard:

All children presenting to hospital with a decreased conscious level should have the length of symptoms elicited as a part of the clinical history and this information documented in their clinical record.

Performance target: At least 90% of children should meet the standard.

Results:

- Cases meeting the audit standard = 895/1135 (78.9%)
- Performance target range 90% to 100%: This was met by 23/51 (45.1%) trusts. Five of these trusts submitted fewer than 5 eligible cases.
- 75% - 89% range: 13 trusts

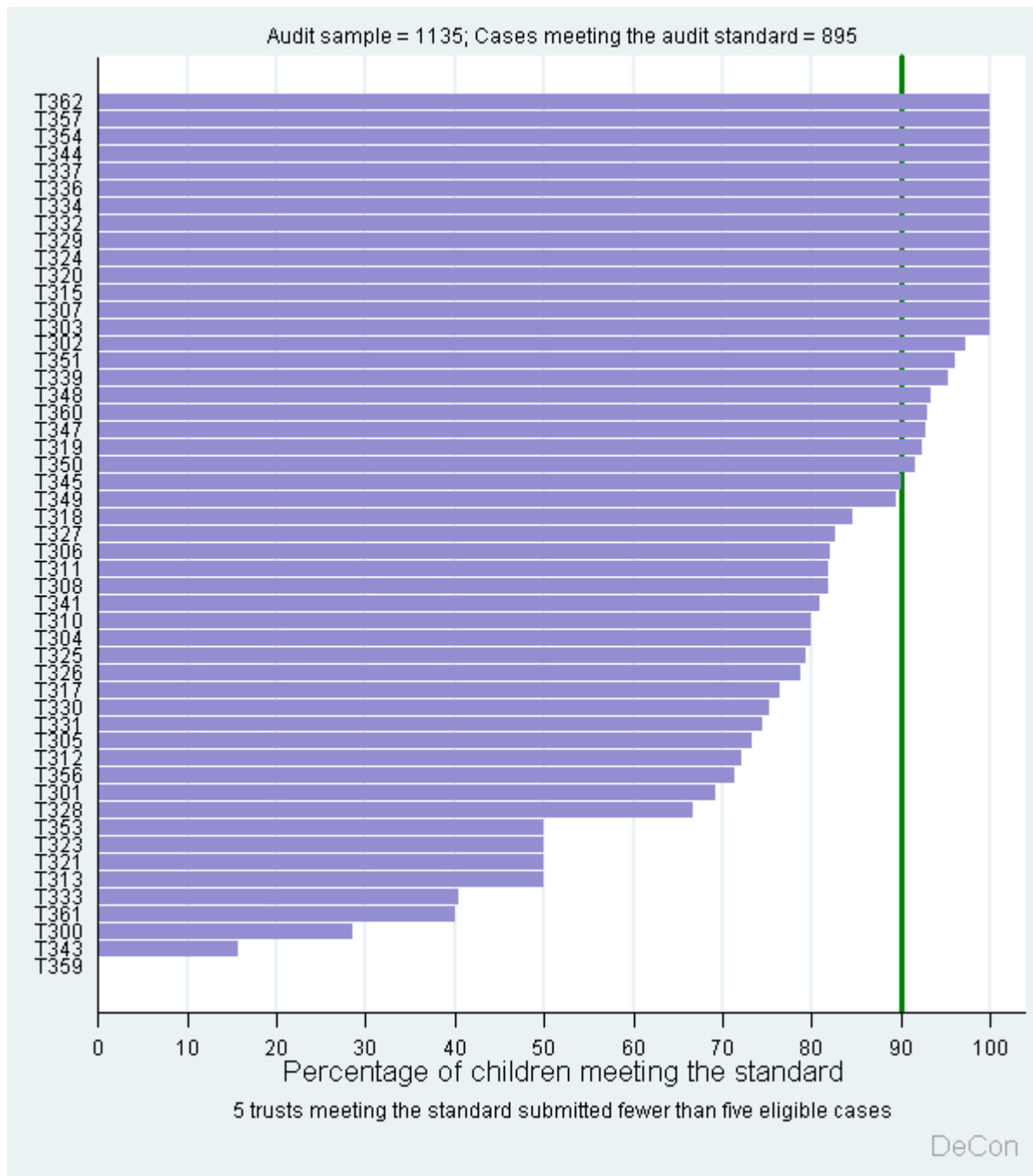
Children under five years (402/462, 87.0%) were more likely to have documentation of the length of symptoms as part of the clinical history as compared with those five years and over (493/673, 73.3%) ($P < 0.005$).

Although the number is small, children presenting with a decreased conscious level secondary to unknown cause (12/12, 100.0%) or non-traumatic causes (508/576, 88.2%) were more likely to have documentation of the length of symptoms as part of the clinical history as compared with alcohol intoxication (201/312, 64.4%) or traumatic causes (136/177, 76.8%) ($P < 0.005$).

Children reviewed by a consultant (304/361, 84.2%) or a doctor of ST4 to ST8 grade or equivalent (387/480, 80.6%) were more likely to have documentation of the length of symptoms as compared with those reviewed by less senior staff such as a doctor of ST3 grade or lower (150/208, 72.1%) or a nurse (8/14, 57.1%) ($P < 0.005$).

There was no statistically significant difference in documentation of the length of symptoms by the place of presentation.

Figure 10: Question 1: Features of the clinical history- Documentation of the length of symptoms



6.1.8 Presence of medication in the child's home (Children under 5 years)

Standard:

All children under five presenting to hospital with a decreased conscious level should have the presence of any medications in their home elicited as a part of the clinical history and this information documented in their clinical record.

Performance target: At least 90% of children under five years of age meet the standard.

Results:

- Cases meeting the audit standard = 37/462 (8.0%)
- 49 of the 51 trusts possessed eligible cases of children under five years.
- Performance target range 90% to 100%: This was met by 2/49 (4.1%) trusts. One of these trusts submitted only 1 eligible case.
- 75% - 89% range: 0 trusts

6.1.9 Family history of previous infant deaths (Children under 5 years)

Standard:

All children under five presenting to hospital with a decreased conscious level should have the absence or presence of a family history of previous infant deaths elicited as a part of the clinical history and this information documented in their clinical record.

Performance target: At least 90% of children under five years of age meet the standard.

Results:

- Cases meeting the audit standard = 28/462 (6.1%)
- 49 of the 51 trusts possessed eligible cases of children under five years.
- Performance target range 90% to 100%: The standard was met by 0/49 trusts.
- 75% - 89% range: 0 trusts

6.1.10 Headache before or at presentation (Children 5 years and over) (Figure 11)

Standard:

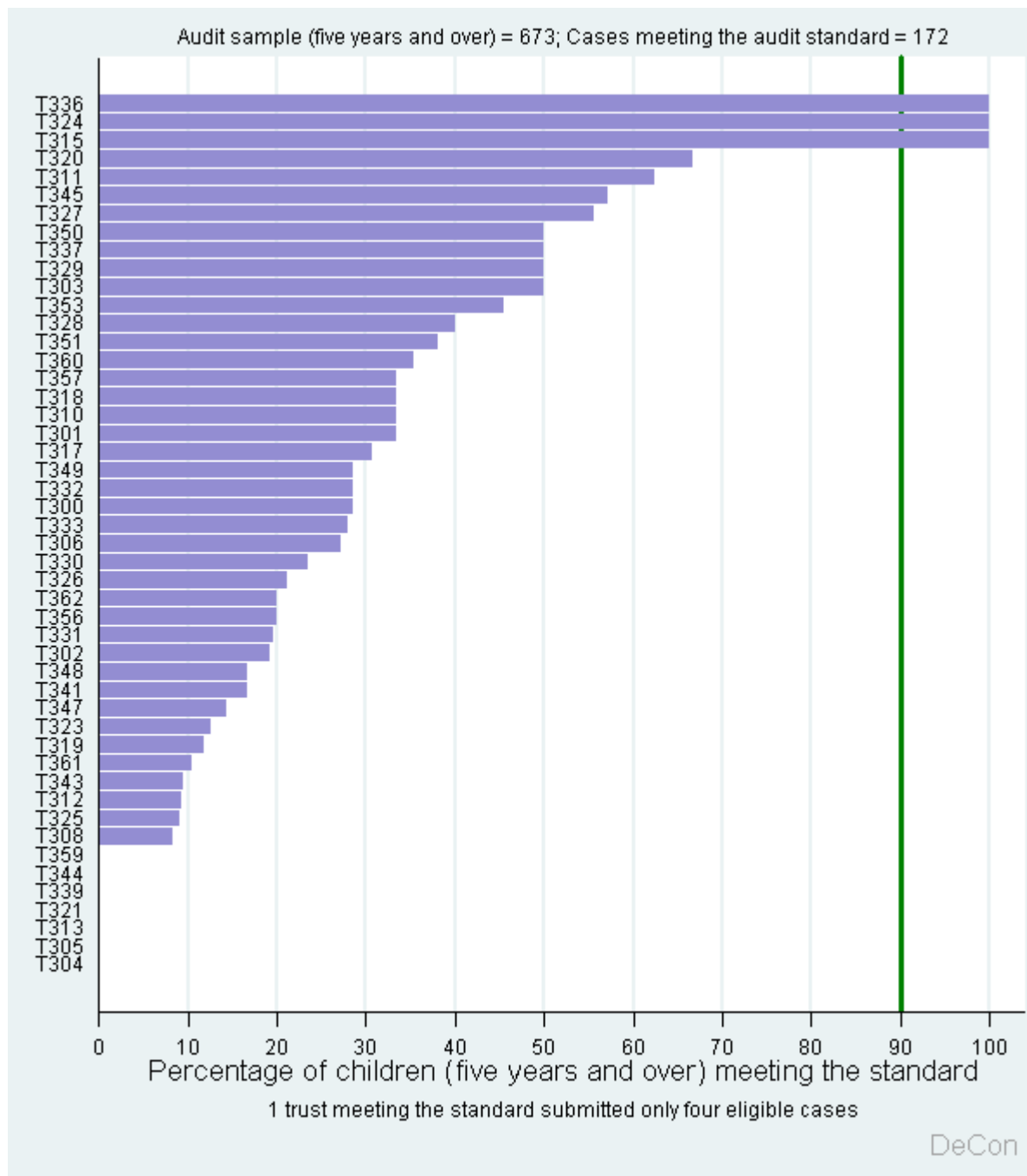
All children five years and over presenting to hospital with a decreased conscious level should have the absence or presence of headache before or at presentation elicited as a part of the clinical history and this information documented in their clinical record.

Performance target: At least 90% of children five years and over meet the standard.

Results: 

- Cases meeting the audit standard = 172/673 (25.6%)
- 48 of the 51 trusts possessed eligible cases of children 5 years and over of age.
- Performance target range 90% to 100%: This was met by 3/48 (6.3%) trusts. One of these trusts submitted only 4 eligible cases.
- 75% - 89% range: 0 trusts

Figure 11: Question 1: Features of the clinical history- Documentation of the presence or absence of headache before or at presentation in children 5 years and over



Comments: Question 1

There were three other features of this audit sample which although not part of the audit standards form the basis of a good examination by any admitting doctor of a child on presentation to hospital. These include checking for signs of shock, the presence or absence of a non-blanching rash, and the pupil size and response. These examinations were documented as being undertaken to the following extent in the audit cases for all trusts combined:

- Signs of shock = 51.7% (587/1135)
- Presence or absence of a non-blanching rash = 36.1% (410/1135)
- Pupil size and response = 73.2% (831/1135)

Poor documentation of the clinical features might relate to how practitioners interpret what the evidence should be. Often clinicians record information on the presence of a clinical history feature but overlook documentation on its absence. Some of the audit leads provided qualitative information on the cases indicating possible reasons for failure to take a full clinical history ranged from “the patient was intoxicated and unaccompanied” to “the patient left before there was a review by a doctor”.

However, there was significant inconsistency in the documentation of clinical history features across all the participating trusts. Although it is difficult to make any definitive statements because the audit samples for some trusts were small, it would appear that clinicians are failing to take an adequate history in these children and young people or at the very least to document this history in the patients' clinical records.

Clinical history taking is a key element of clinical decision making and forms the basis for accurate diagnosis allowing appropriate direction of the examination and investigations leading to pertinent and timely treatment of children presenting to hospital with a decreased conscious level. Inadequate record keeping in these patients may have legal implications, particularly as these children have a high risk of both mortality and morbidity.

Two areas of particular concern are the poor documentation of the history of alternating periods of consciousness and the length of the symptoms. Over three-quarters of the trusts failed to meet the performance target for documentation of alternating periods of consciousness and half of the trusts for documentation of the length of symptoms as a part of the clinical history. The latter is a particularly important clinical history feature as a progressive onset of symptoms may be suggestive of a metabolic, infective or toxic cause (Avner, 2006).

6.2 Question 2: Observations (Table 4)

Audit question:

Were the recommended observations documented in the child or young person’s clinical record at their presentation to hospital?

All cases:

- Heart rate
- Respiratory rate
- Oxygen saturation
- Blood pressure
- Temperature

Source of the standards:

The Management of a Child with a Decreased Conscious Level guideline

Table 4: Observations at presentation to hospital: Audit standards and Performance targets

Audit standards	Total audit sample	Cases meeting the standard	% Cases meeting the audit standard	Median percent (95% Confidence Interval)	Trusts meeting the 90 - 100% performance target level
heart rate	1135	1119	98.6%	100.0% (100.0%, 100.0%)	50
respiratory rate	1135	1039	91.5%	97.3% (92.3%, 100.0%)	38
oxygen saturation	1135	1081	95.2%	100.0% (95.9%, 100.0%)	46
blood pressure	1135	872	76.8%	77.0% (75.0%, 83.3%)	11
temperature	1135	1002	88.3%	92.3% (86.9%, 100.0%)	31

6.2.1 Heart rate (Figure 12)

Standard:

All children presenting to hospital with a decreased conscious level should have their heart rate measured and documented in their clinical records on presentation.

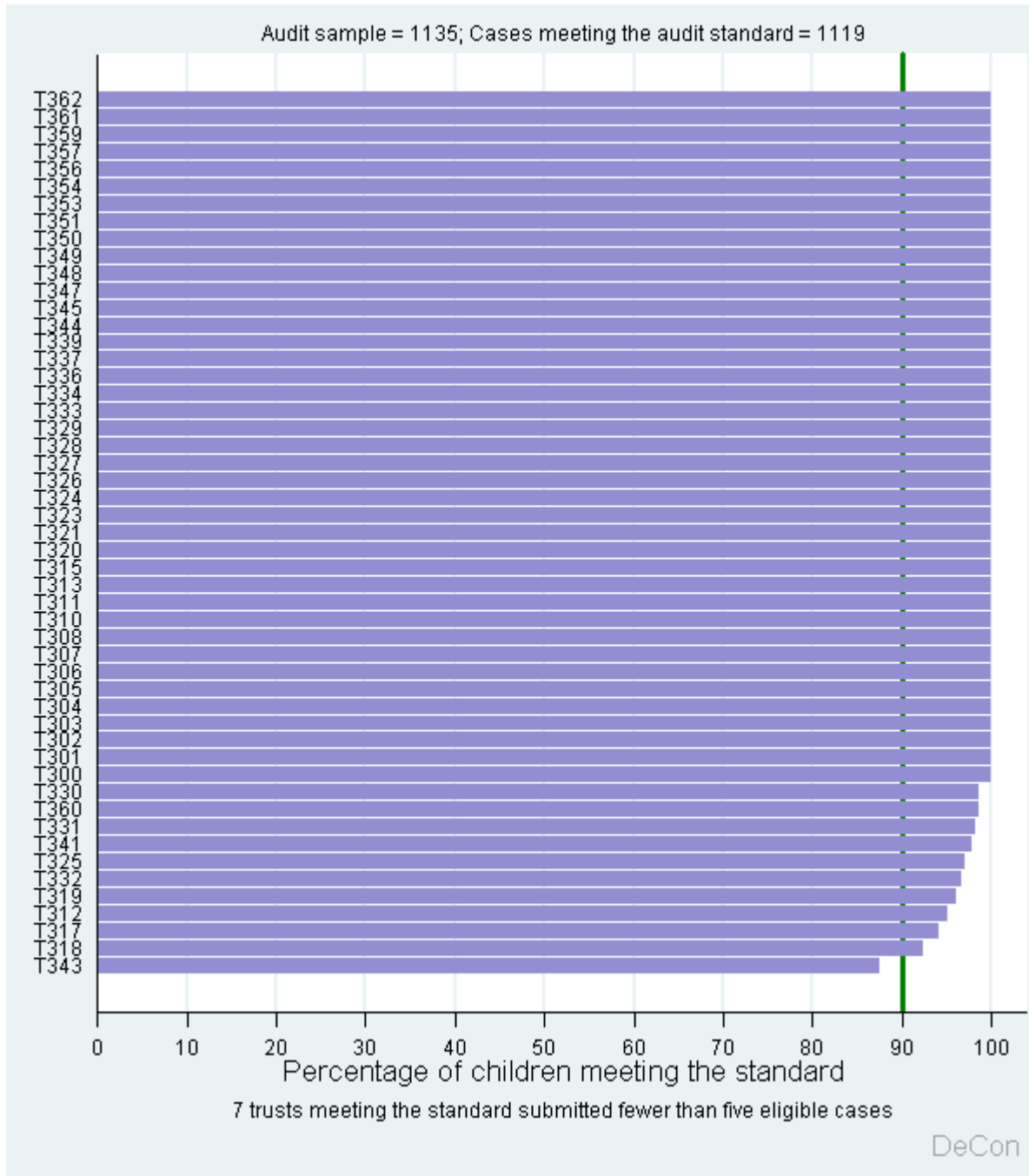
Performance target: At least 90% of children meet the standard.

Results:

- Cases meeting the audit standard = 1119/1135 (98.6%)
- Performance target range 90% to 100%: This was met by 50/51 (98.0%) trusts. Seven of these trusts submitted fewer than 5 eligible cases.
- 75% - 89% range: 1 trust

There were no statistically significant differences in the documentation of the heart rate in children presenting to hospital with a decreased conscious level by the child's age, working diagnosis, the grade of the most senior clinician reviewing the child or the place of presentation.

Figure 12: Question 2: Observations- Heart rate on presentation to hospital documented



6.2.2 Respiratory rate (Figure 13)

Standard:

All children presenting to hospital with a decreased conscious level should have their respiratory rate measured and documented in their clinical records on presentation.

Performance target: At least 90% of children meet the standard.

Results:

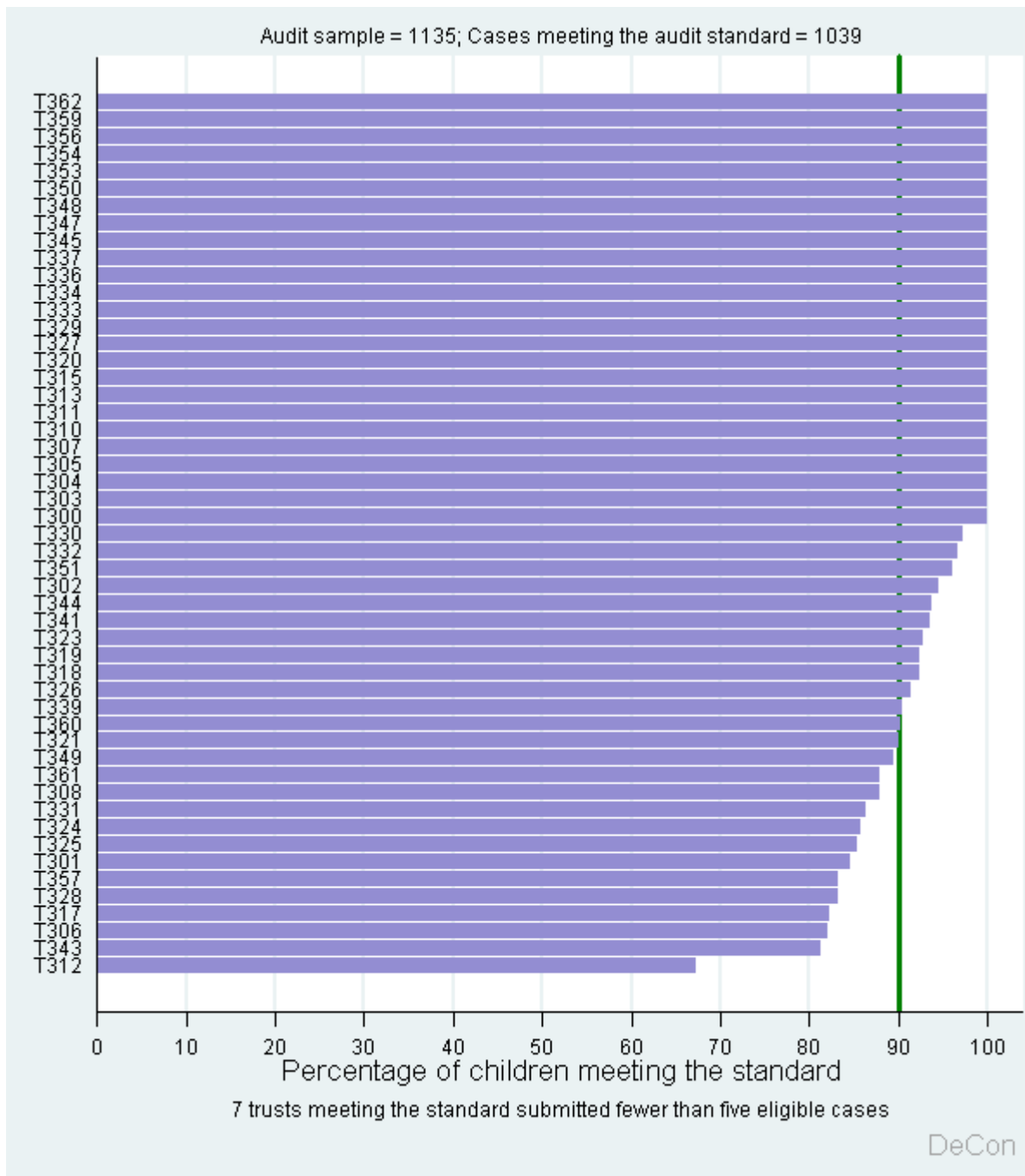
- Cases meeting the audit standard = 1039/1135 (91.5%)
- Performance target range 90% to 100%: The standard was met by 38/51 (74.5%) trusts. Seven of these trusts submitted fewer than 5 eligible cases.
- 75% - 89% range: 12 trusts

Children presenting with a decreased conscious level secondary to non-traumatic causes (545/576, 94.6%) or unknown cause (12/12, 100.0%) were more likely to have documentation of their respiratory rate as compared with those children presenting with alcohol intoxication (282/312, 90.4%) or traumatic causes (152/177, 85.9%) ($P < 0.005$).

Children who presented to mixed emergency departments (655/701, 93.4%) or paediatric assessment units (23/25, 92.0%) were more likely to have documentation of their respiratory rate than those children presenting to paediatric emergency departments (361/407, 88.7%) ($P = 0.022$).

There were no statistically significant differences in the documentation of the respiratory rate by the child's age or the grade of the most senior clinician reviewing the child.

Figure 13: Question 2: Observations- Respiratory rate on presentation to hospital documented



6.2.3 Oxygen saturation (Figure 14)

Standard:

All children and young people presenting to hospital with a decreased conscious level should have their oxygen saturation measured and documented in their clinical records on presentation.

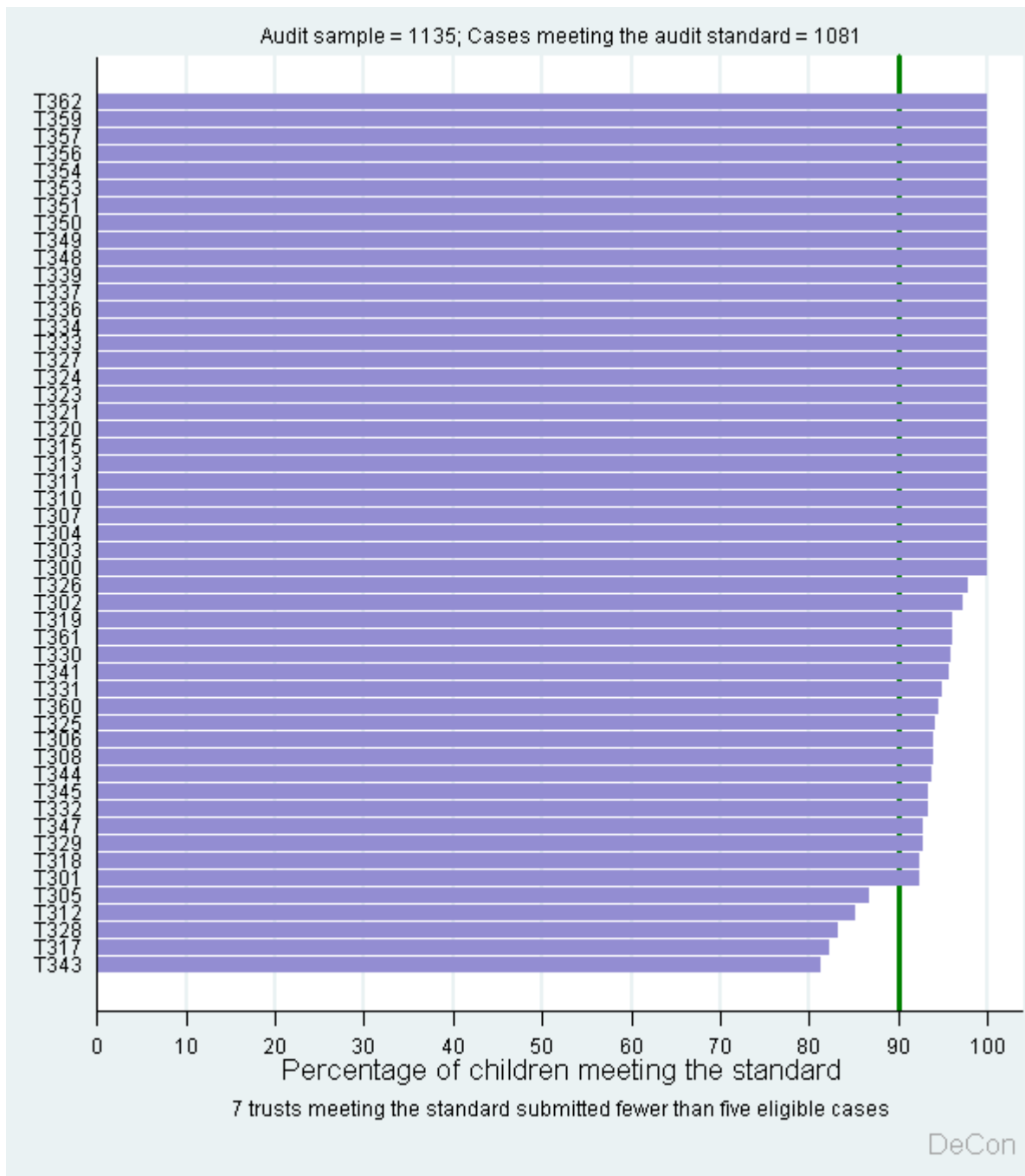
Performance target: At least 90% of children meet the standard.

Results: 

- Cases meeting the audit standard = 1081/1135 (95.2%)
- Performance target range 90% to 100%: This was met by 46/51 (90.2%) trusts. Seven of these trusts submitted fewer than 5 eligible cases.
- 75% - 89% range: 5 trusts

There were no statistically significant differences in the documentation of the oxygen saturation by the child's age, the working diagnosis, the grade of the most senior clinician reviewing the child or the place of presentation.

Figure 14: Question 2: Observations- Oxygen saturation on presentation to hospital documented



6.2.4 Blood pressure (Figure 15)

Standard:

All children presenting to hospital with a decreased conscious level should have their blood pressure measured and documented in their clinical records on presentation.

Performance target: At least 90% of children meet the standard.

Results:

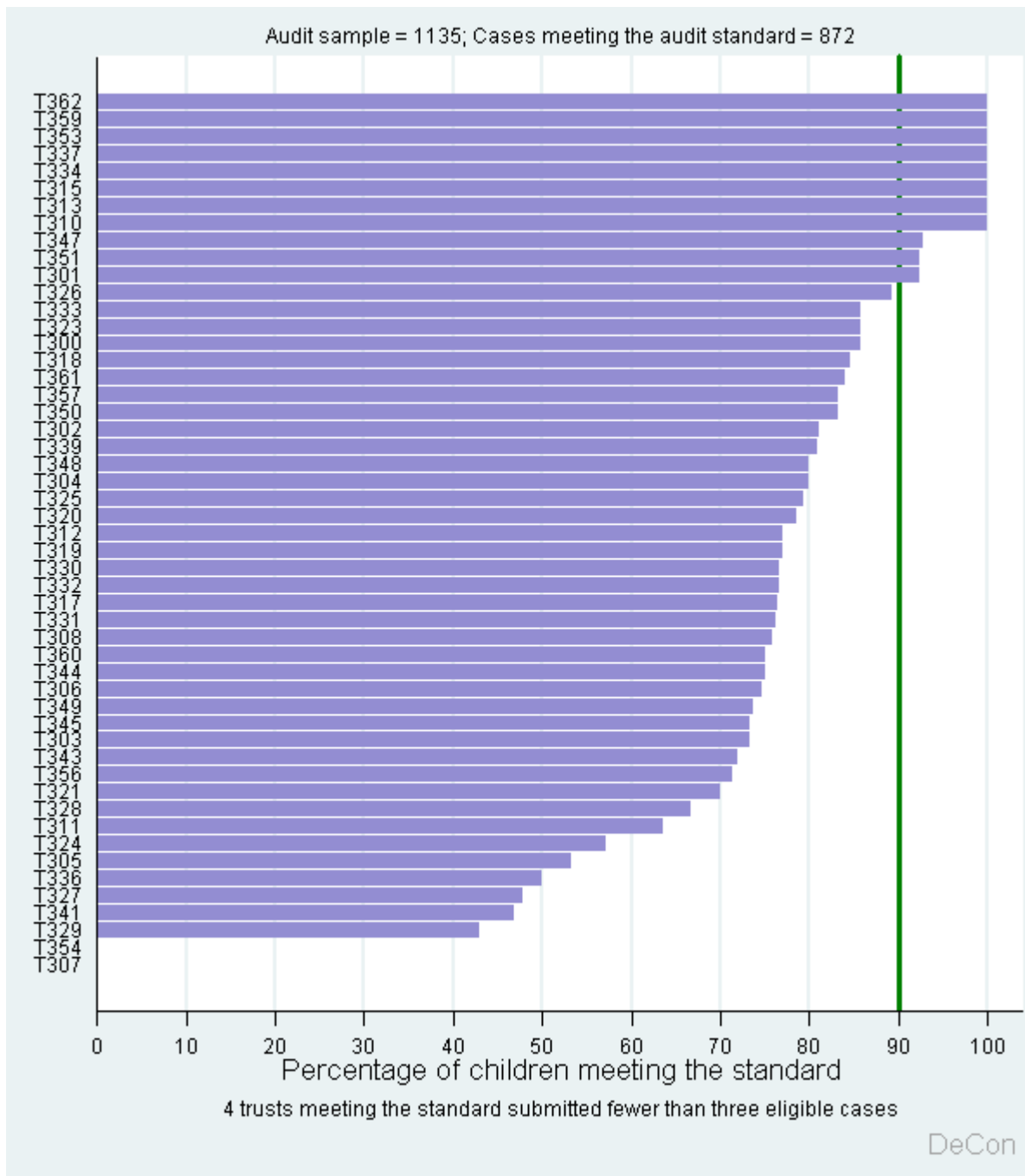
- Cases meeting the audit standard = 872/1135 (76.8%)
- Performance target range 90% to 100%: The standard was met by 11/51 (21.6%) trusts. Four of these trusts submitted fewer than 3 eligible cases.
- 75% - 89% range: 23 trusts

Children under five years (264/462, 57.1%) were less likely to have documentation of blood pressure on presentation as compared with those five years and over (608/673, 90.3%) ($P < 0.005$).

Children presenting with a decreased conscious level secondary to alcohol intoxication (298/312, 95.5%) were more likely to have documentation of blood pressure as compared with those children presenting with unknown cause (9/12, 75.0%), non-traumatic causes (389/576, 67.5%) or traumatic causes (140/177, 79.1%) ($P < 0.005$).

There were no statistically significant differences in the documentation of blood pressure by the grade of clinician reviewing the child or the place of presentation.

Figure 15: Question 2: Observations- Blood pressure on presentation to hospital documented



6.2.5 Temperature (Figure 16)

Standard:

All children and young people presenting to hospital with a decreased conscious level should have their temperature measured and documented in their clinical records on presentation.

Performance target: At least 90% of children meet the standard.

Results:

- Cases meeting the audit standard = 1002/1135 (88.3%)
- Performance target range 90% to 100%: The standard was met by 31/51 (60.8%) trusts. Seven of these trusts submitted fewer than 5 eligible cases.
- 75% - 89% range: 19 trusts

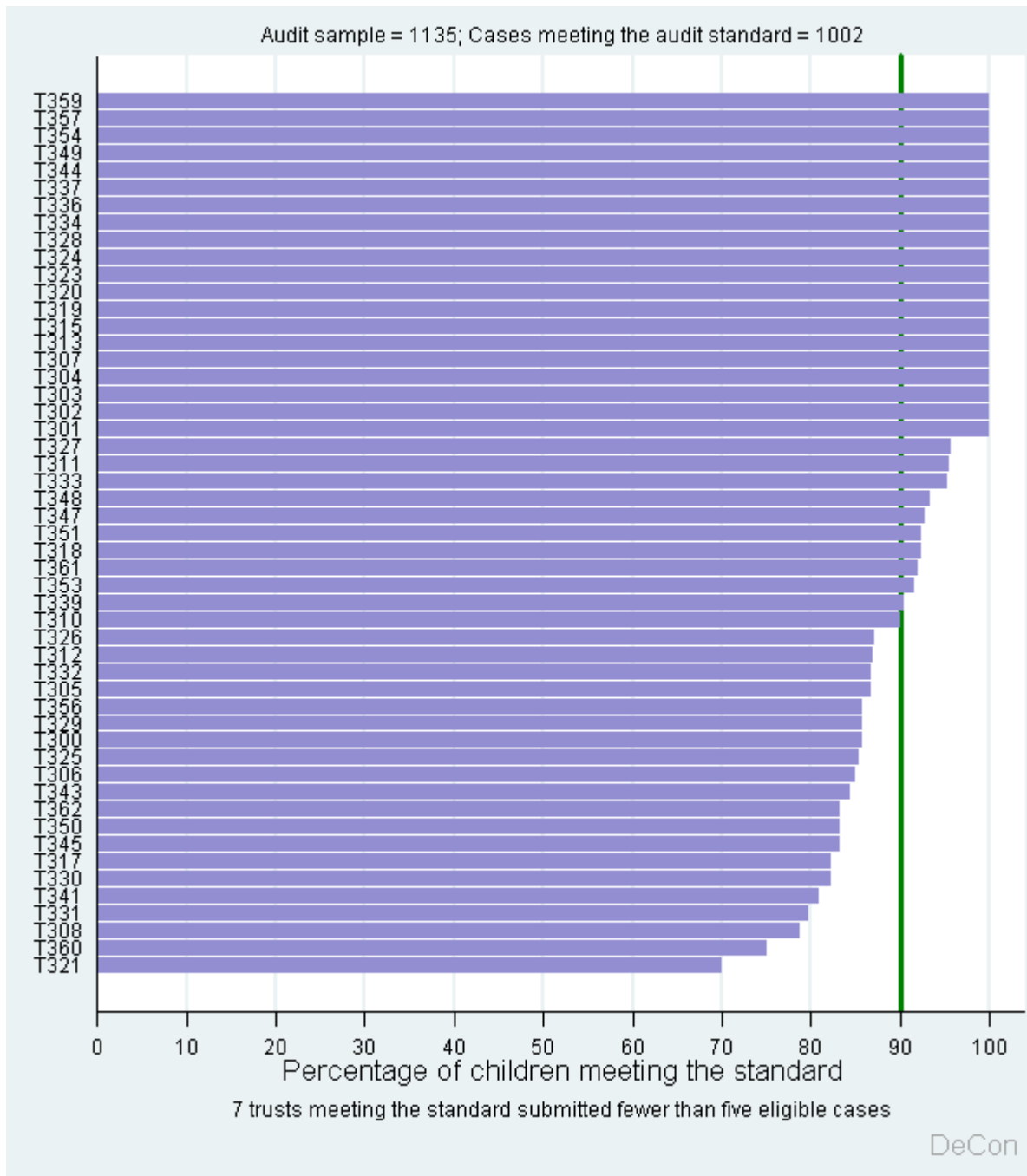
Children under five years (428/462, 92.6%) were more likely to have documentation of their temperature on presentation as compared with those five years and over (574/673, 85.3%) ($P < 0.005$).

Children presenting with a decreased conscious level secondary to non-traumatic causes (549/576, 95.3%) were more likely to have documentation of their temperature as compared with those children presenting with alcohol intoxication (277/312, 88.8%), unknown cause (10/12, 83.3%) or traumatic causes (119/177, 67.2%) ($P < 0.005$).

Children reviewed by a consultant (319/361, 88.4%) or a doctor of ST4 to ST8 grade or equivalent (439/480, 91.5%) were more likely to have documentation of their temperature as compared with those reviewed by less senior staff such as a doctor of ST3 grade or lower (170/208, 81.7%) or a nurse (11/14, 78.6%) ($P = 0.006$).

There was no statistically significant difference in documentation of temperature by the place of presentation.

Figure 16: Question 2: Observations- Temperature on presentation to hospital documented



Comments: Question 2

The majority of participating trusts met the performance targets for the documentation of heart rate, respiratory rate and oxygen saturation. However, a significant number of the trusts participating in the audit failed to meet the performance targets for the documentation of blood pressure and temperature.

The documentation of observations by staff in the emergency department setting is an area prone to poor practice. Acock et al. (2002) examining the documentation of observations in patients in the emergency department noted that these patients were likely to have inadequate observations measured both at presentation and during the course of their admission. Furthermore, one observational study of the routine monitoring of paediatric patients found that there was enormous discrepancy in the nature, frequency and documentation of the vital signs of these patients and there was significant widespread failure to document basic observations (Oliver et al. 2007).

This poor level of documentation of observations especially blood pressure and temperature in the audit cases may perhaps be explained by a range of factors such as:

- increased workload combined with limited staffing in the emergency department settings;
- difficulty involved in measuring these observations;
- lack of adequate support and experience;
- lack of the relevant skills and knowledge;
- suitability and pertinence of some observations for different patients; and
- lack of clarity among some staff as to what vital signs to measure, in what circumstances and how frequently they should be performed.

Although nursing staff are responsible for the measurement of vital signs in these patients in most settings, it is not solely the responsibility of nurses but also of doctors to ensure adequate measurement and documentation of observations. Indeed, doctors may play a significant role in reminding nurses to measure vital signs if the full set of observations is not complete when they review these children.

6.3 Question 3: GCS or AVPU used to assess conscious level (Figure 17)

Audit question:

Were the GCS (adult or modified) or the AVPU assessment scale used to evaluate the extent of the child's conscious level on their presentation to hospital and documented in the clinical record?

Standard:

All children and young people presenting to hospital with a decreased conscious level should have either a GCS or AVPU assessment performed and documented in order to assess the extent of their conscious level. This standard is closely connected to the audit's inclusion criteria.

Source of the standard:

The Management of a Child with a Decreased Conscious Level guideline

Performance target: At least 90% of children meet the standard.

Results: 

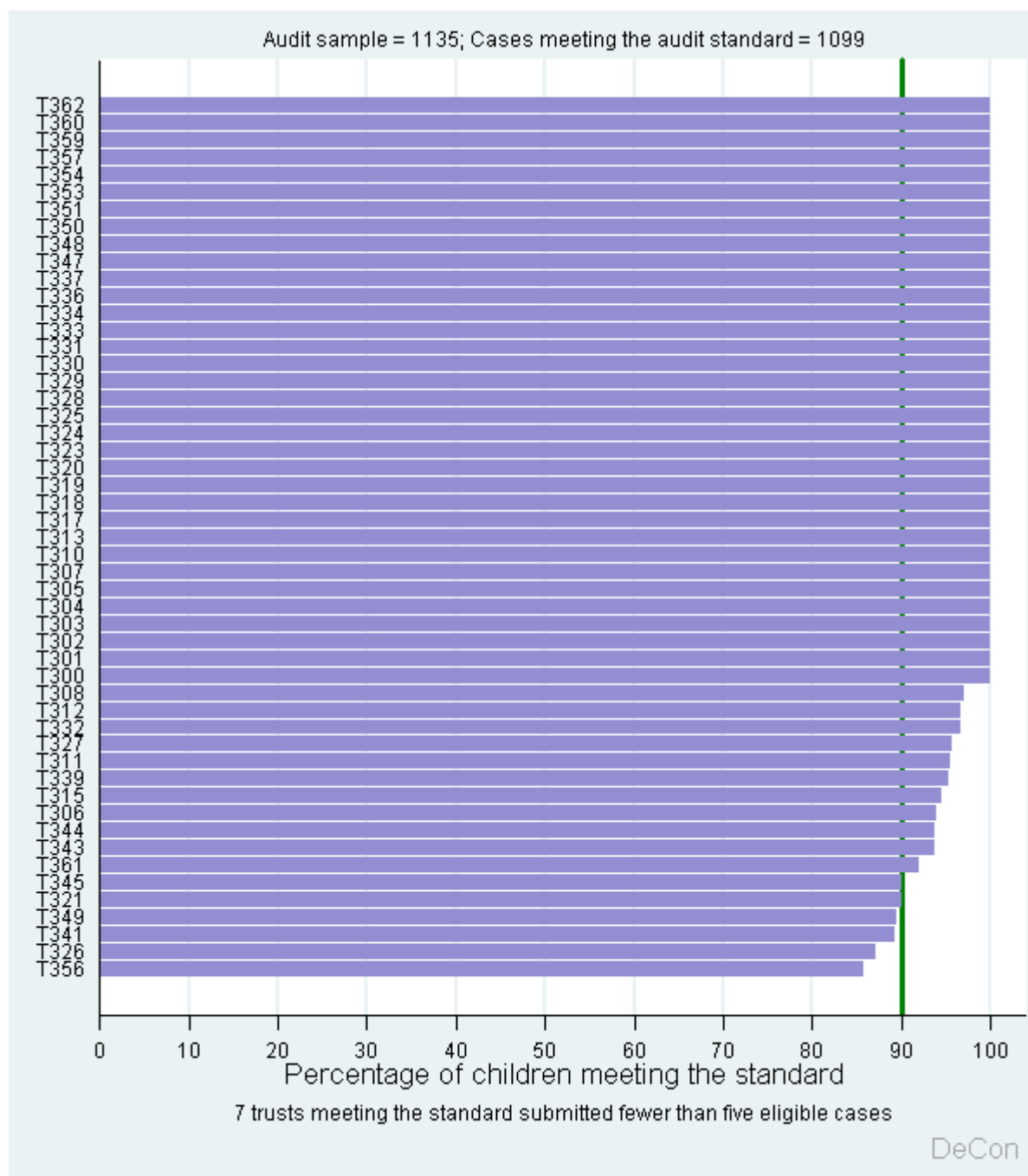
- Cases meeting the audit standard = 1099/1135 (96.8%)
- Performance target range 90% to 100%: The standard was met by 47/51 (92.2%) trusts.
- 75% - 89% range: 4 trusts
- Median percent (95% Confidence Interval) = 100.0% (100.0%, 100.0%)

Children under five years (434/462, 93.9%) were less likely to have documentation of the use of either GCS or AVPU to assess their level of consciousness on presentation as compared with those five years and over (665/673, 98.8%) ($P < 0.005$).

Children who presented with a decreased conscious level secondary to alcohol intoxication (312/312, 100.0%), unknown cause (12/12, 100.0%) or traumatic causes (176/177, 99.4%) were more likely to have documentation of the use of GCS or AVPU to assess their level of consciousness on presentation as compared with those children who presented with non-traumatic causes (549/546, 95.3%) ($P < 0.005$).

There were no statistically significant differences in documentation of the use of either GCS or AVPU to assess the level of consciousness at presentation by the grade of clinician reviewing the child or the place of presentation.

Figure 17: Question 3: GCS or AVPU assessment used and documented



Comments: Question 3

3.2% (36/1135) of the total audit sample did not have either GCS or AVPU used to assess their level of consciousness, although trusts still identified these cases as meeting the audit criteria based on a strong clinical history documented in their clinical records. Trusts reported qualitatively that some of the reasons for lack of documentation on these children were due to missing clinical records, missing observation charts and the quick recovery of patients after presentation which made these assessments unnecessary.

Of the 1099 cases reported to have had a physiological scoring system used to assess their decreased conscious level, the following assessments were employed:

- AVPU only = 17.8% (196/1099)
- GCS only = 60.4% (664/1099)
- Both AVPU and GCS = 21.8% (239/1099)

Of the 903/1135 eligible cases who had either GCS or both AVPU and GCS undertaken to assess their conscious level on presentation to hospital, the mean GCS score on presentation was 11 and the median 13. The mean lowest GCS measurement recorded during the course of these children's presentation was 11 and the median was 12. 22.5% (203/903) cases had a GCS of 8 or less at presentation (Table 5).

Table 5: GCS grades by the severity of decreased conscious level in children who had either GCS or both AVPU and GCS undertaken

GCS grades for decreased conscious level	Eligible Cases (Total = 903)
Severe: ≤ 8	203 (22.5%)
Moderate: 9-12	221 (24.5%)
Mild: 13-15	479 (53.0%)

15.6% (177/1135) of the audit sample were intubated. The reasons for intubation where clinicians could indicate several reasons for a child were as follows:

- Airway obstruction when the airway is unsupported = 16.9% (30/177)
- Airway compromised by vomiting = 6.2% (11/177)
- Respiratory rate inadequate for oxygenation or ventilation = 33.3% (59/177)
- Oxygen saturation less than 92% despite oxygen therapy = 10.2% (18/177)
- Signs of shock despite fluid resuscitation = 11.3% (20/177)
- Child looks exhausted = 6.2% (11/177)
- Glasgow Coma Score 8 or less = 52.0% (92/177)

- Glasgow Coma Score deteriorating = 13.0% (23/177)
- Signs of raised intracranial pressure = 7.3% (13/177)
- Other = 39.5% (70/177)

Of the other reasons for intubation the most common were that the child or young person was in cardiac arrest, experiencing intermittent apnoea or required intubation to undertake CT scanning.

Both the Glasgow Coma Scale (adult or modified) and the simpler AVPU scale have great applicability in the evaluation of the level of consciousness in paediatric patients. Indeed, the GCS is generally recognised as a valid and reliable tool for the assessment of a decreased conscious level in children and young people. However, it has been suggested that it may sometimes be applied in an incorrect and piecemeal fashion by clinicians (Teasdale and Murray, 2000). Therefore, it is imperative that all health professionals using the Glasgow Coma Scale to assess patients should have adequate training in its interpretation and in the conversion of the patient's clinical condition to the numerical Glasgow Coma Score, along with information on the use of the most appropriate version depending on the child's age (Palmer and Knight, 2006).

It should also be recognised that although the AVPU scale can have value in the evaluation of the child with a decreased conscious level on initial presentation to hospital, it does not replace the use of the Glasgow Coma Scale in assessing the acutely unwell child (McNarry and Goldhill, 2004).

6.4 Question 4: Recommended frequency of GCS measurements (Figure 18)

Audit question:

Were GCS measurements performed within the recommended frequency such that they were recorded in the clinical records every 15 minutes if less than or equal to 12 or every hour if greater than 12 at presentation to hospital in children who had GCS performed?

Standard:

All children and young people presenting to hospital with a decreased conscious level who had their GCS measured should have the recommended frequency of GCS measurements performed and recorded in their clinical records.

Source of the standard:

The Management of a Child with a Decreased Conscious Level guideline and Decreased Conscious Level Project Board Team

Performance target: At least 90% of children who had their GCS measured meet the standard.

Results:

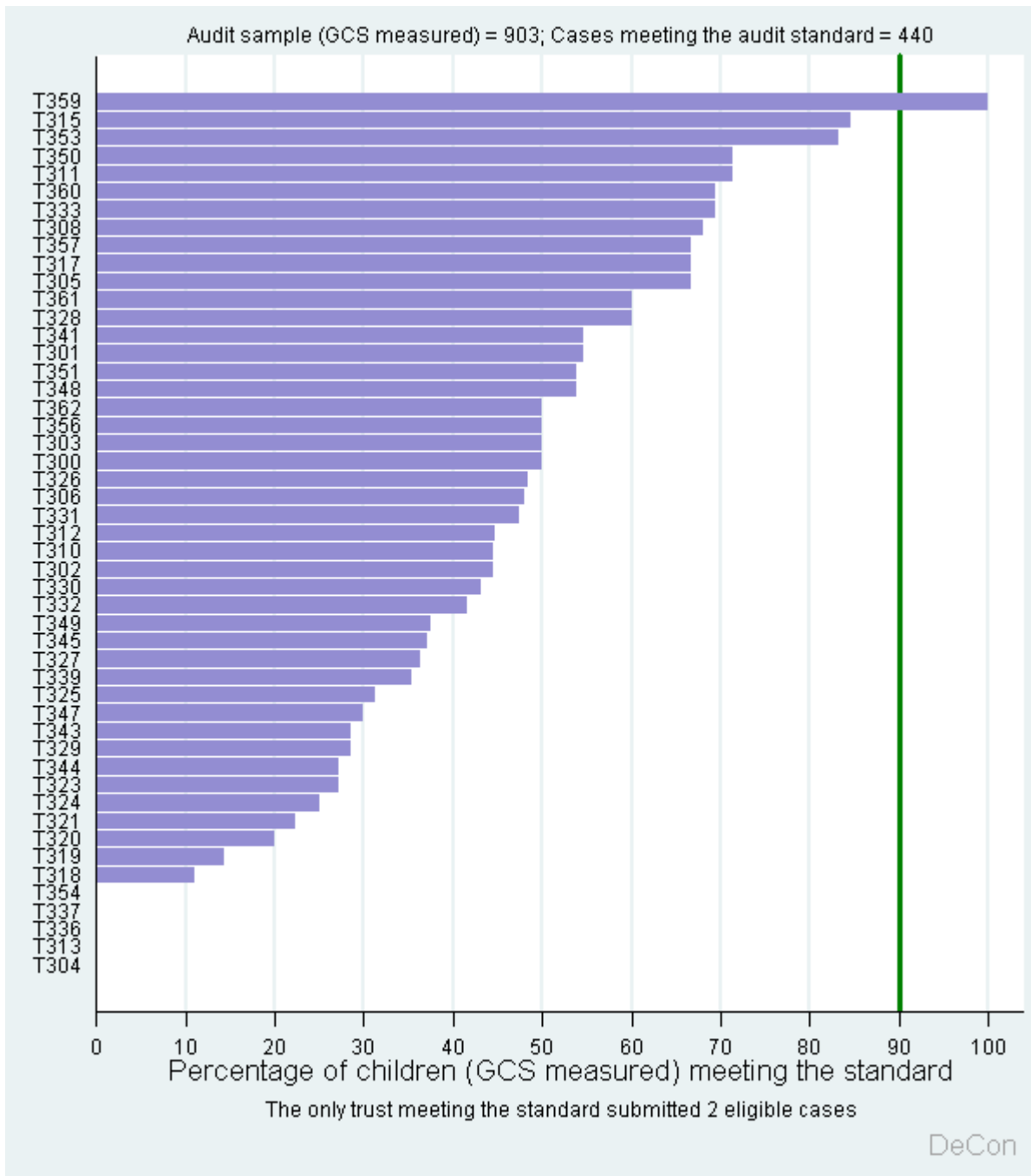
- Cases meeting the audit standard = 440/903 (48.7%)
- 49 of the 51 trusts providing clinical audit data possessed eligible cases of children who had their GCS measured on presentation for a total of 903 cases.
- Performance target range 90% to 100%: The standard was met by 1/49 (2.0%) trust.
- 75% - 89% range: 2 trusts
- Median percent (95% Confidence Interval) = 44.6% (36.4%, 50.0%)

Children presenting with decreased conscious level secondary to traumatic causes (117/167, 70.1%) were more likely to have documentation of the GCS measurements within the recommended frequency if GCS was performed as compared with those children presenting with alcohol intoxication (115/286, 40.2%), unknown cause (4/10, 40.0%) or non-traumatic causes (191/407, 46.9%) ($P < 0.005$).

Children who presented to paediatric emergency departments (170/311, 54.7%) were more likely to have documentation of the GCS measurements within the recommended frequency if GCS was performed than those children presenting to paediatric assessment units (5/17, 29.4%) or mixed emergency departments (264/573, 46.1%) ($P = 0.036$).

There were no statistically significant differences in documentation of the GCS measurements within the recommended frequency in children who have their GCS performed by the child's age or the grade of the clinician reviewing the child.

Figure 18: Question 4: GCS measurements taken and documented at the recommended frequency in children who had GCS performed



Comments: Question 4

The majority of trusts failed to meet the standard that 90% of children and young people presenting to hospital with a decreased conscious level who had their GCS measured should have the recommended frequency of GCS measurements performed and recorded in their clinical records. This may be for a range of reasons including:

- The misinterpretation of this question by clinicians providing the audit data;
- The lack of sensitivity in this question to adequately detect this standard;
- A genuine failure of clinicians in the participating trusts to comply with this recommendation in the guideline;
- The specificity of the recommendation which means that trusts which do not employ the guideline may fail to comply with this standard.

Although many of the trusts failed to meet the recommended standard for monitoring of GCS measurements, they reported a wide range of intervals for the measurement of GCS among the children:

- 15 minutes = 18.4% (166/903)
- 30 minutes = 17.6% (159/903)
- 60 minutes (1 hour) = 22.2% (200/903)
- 90 minutes = 2.2% (20/903)
- 120 minutes (2 hours) = 3.8% (34/903)
- Other time intervals = 19.6% (177/903)
- Uncertain of GCS measurements' frequency = 16.3% (147/903)

Regular monitoring of GCS measurements in children presenting to hospital with a decreased conscious level may be a useful tool in the detection of the deteriorating condition of these children.

6.5 Question 5: Recommended core investigations (Table 6)

Audit question:

Were the following recommended core investigations conducted within at least 1 hour of presentation to hospital?

All cases

- Capillary blood glucose

Metabolic cases: 21 Trusts possessed eligible cases with a total of 35 metabolic cases.

- Blood gases
- Liver function tests
- Full blood count and film
- Laboratory blood glucose
- Urea and electrolytes
- Plasma ammonia
- Saved plasma
- Saved serum
- Saved urine

Infective cases: 46 Trusts possessed eligible cases for a total of 217 infective cases.

- Dipstick urinalysis
- Blood culture

Source of the standard:

The Management of a Child with a Decreased Conscious Level guideline

Performance target: No performance targets were set for investigations pertinent to either infective or metabolic cases.

Table 6: Recommended core investigations: Audit standards and Performance targets

Audit standards	Total audit sample	Cases meeting the standard	% Cases meeting the audit standard	Median percent (95% Confidence Interval)	Trusts meeting the 90 - 100% performance target level
capillary blood glucose taken within 15 minutes of presentation	1135	866	76.3%	83.3% (76.9%, 85.7%)	14
Metabolic cases (21 trusts possess eligible cases)					
blood gases taken and sent within 1 hour of presentation	35	31	88.6%	100.0% (100.0%, 100.0%)	...
laboratory blood glucose taken and sent within 1 hour of presentation	35	25	71.4%	100.0% (0.0% 100.0%)	...
urea & electrolytes taken and sent within 1 hour of presentation	35	31	88.6%	100.0% (100.0%, 100.0%)	...
liver function test taken and sent within 1 hour of presentation	35	25	71.4%	100.0% (50.0%, 100.0%)	...
plasma ammonia taken and sent within 1 hour of presentation	35	5	14.3%	0.0% (0.0%, 0.0%)	...
full blood count and film taken and sent within 1 hour of presentation	35	29	82.9%	100.0% (100.0%, 100.0%)	...
saved plasma for later analysis taken within 1 hour of presentation	35	1	2.9%	0.0% (0.0%, 0.0%)	...
saved serum for later analysis taken within 1 hour of presentation	35	2	5.7%	0.0% (0.0%, 0.0%)	...
saved urine for later analysis taken within 1 hour of presentation	35	1	2.9%	0.0% (0.0%, 0.0%)	...
Infective cases (46 trusts possess eligible cases)					
dipstick urine done within 1 hour of presentation	217	64	29.5%	25.0% (14.3%, 33.3%)	...
blood cultures taken and sent within 1 hour of presentation	217	171	78.8%	100.0% (80.0%, 100.0%)	...

6.5.1 Capillary blood glucose within 15 minutes of presentation (Figure 19)

Standard:

All children and young people presenting to hospital with a decreased conscious level should have their capillary blood glucose taken within 15 minutes of presentation.

Performance target: At least 90% of children should meet the standard.

Results:

- Cases meeting the audit standard = 866/1135 (76.3%)
- Performance target range 90% to 100%: The standard was met by 14/51 (27.5%) trusts.
- 75% - 89% range: 23 trusts

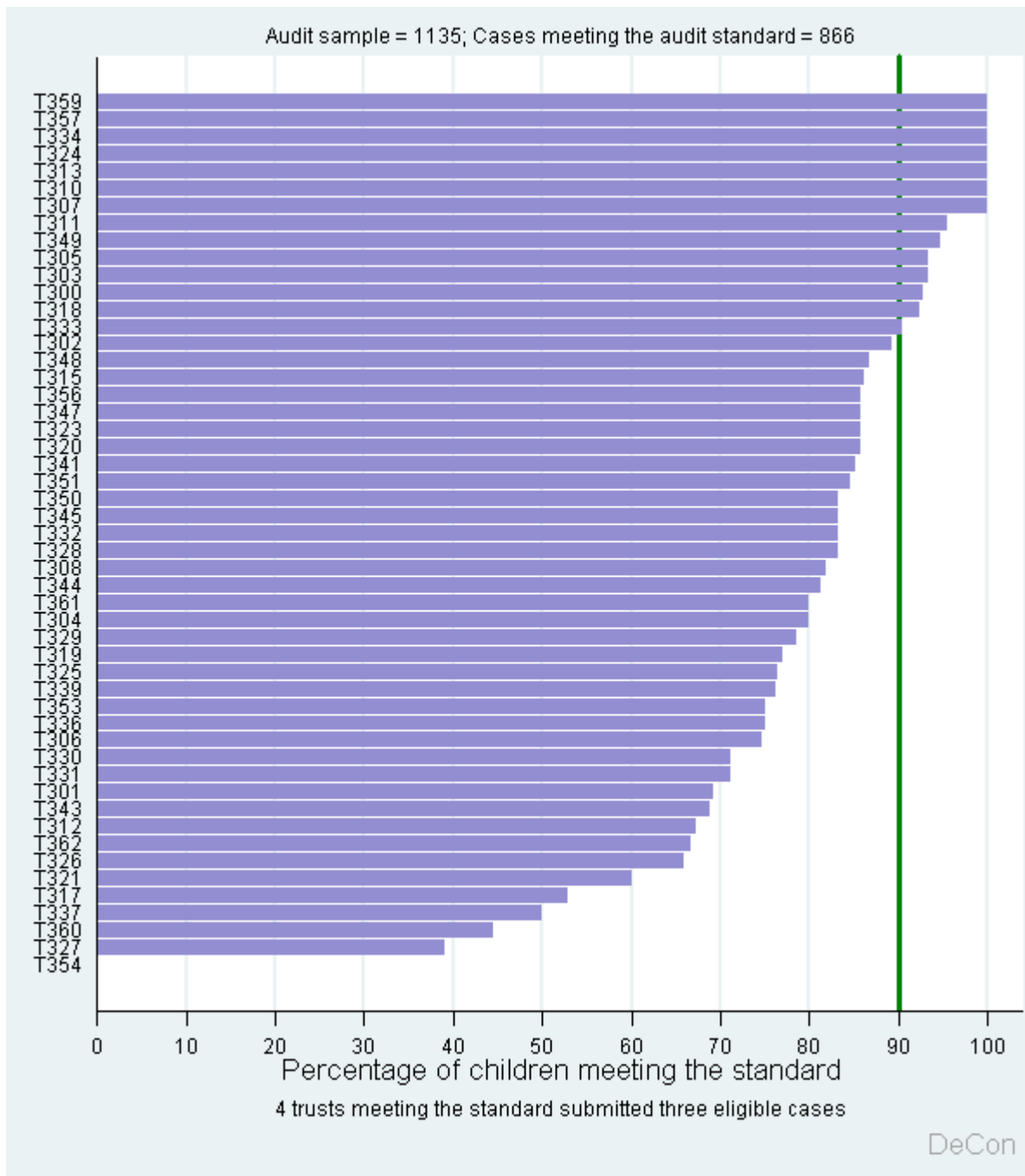
Children under five years (373/462, 80.7%) were more likely to have documentation of capillary blood glucose taken within 15 minutes of presentation as compared with those 5 years and over (493/673, 73.3%) ($P = 0.004$).

Children who presented with a decreased conscious level secondary to non-traumatic causes (489/576, 84.9%) or unknown cause (10/12, 83.3%) were more likely to have documentation of capillary blood glucose taken within 15 minutes of presentation as compared with those children presenting with alcohol intoxication (239/312, 76.6%) or traumatic causes (82/177, 46.3%) ($P < 0.005$).

Children reviewed by a consultant (316/361, 87.5%) were more likely to have documentation of capillary blood glucose taken within 15 minutes of presentation as compared with those reviewed by less senior staff such as a doctor of ST4 to ST8 grade or equivalent (373/480, 77.7%), a doctor of ST1 to ST3 grade or lower (122/208, 58.7%) or a nurse (8/14, 57.1%) ($P < 0.005$).

There was no statistically significant difference in the documentation of capillary blood glucose taken within 15 minutes of presentation by the place of presentation.

Figure 19: Question 5: Investigations- Capillary blood glucose taken with 15 minutes of presentation to hospital



Comments: Question 5

There is a great deal of inconsistency in the investigations undertaken in children and young people presenting to hospital. This may in part be due to differing practices in the various trusts.

In a significant number of trusts, clinicians are failing to document whether children and young people presenting with a decreased conscious level have a capillary blood glucose taken within 15 minutes of their presentation. This is particularly pronounced among junior staff and may point to a lack of knowledge and awareness of the value of this investigation in this group of children but also the narrow time frame for undertaking this test.

There were insufficient metabolic cases in this sample to provide useful interpretation of the data on whether these cases meet the standards for the core investigations and tests recommended in the guideline on a trust by trust basis.

However, even with this small group it is noted that for the most part children presenting to hospital with a decreased conscious level secondary to a metabolic cause fail to have adequate documentation that the recommended core investigations were taken. A similar picture is seen among the infective cases with low levels of documentation of dipstick urinalysis (64/217, 29.5%) and to a much lesser degree blood cultures (171/217, 78.8%). A possible explanation for this finding may be the difficulties involved in obtaining urine and blood specimens from younger children particularly as this age group is most likely to present with a decreased conscious level secondary to an infective cause.

Although it is not always necessary to undertake these investigations in all patients presenting to hospital with a decreased conscious level it is essential that those with a metabolic cause or where the cause is unknown should receive thorough investigation of their condition.

6.6 Question 6: Working diagnosis (Figure 20)

Audit question:

Did the patient have a working diagnosis (documented in the clinical record) within 4 hours of presentation to hospital?

Standard:

All children who present to hospital with a decreased conscious level should have their working diagnosis documented in their clinical record within 4 hours of presentation.

Source of the standard:

The Decreased Conscious Level Project Board Team

Performance target: At least 90% of children meet the standard.

Results:

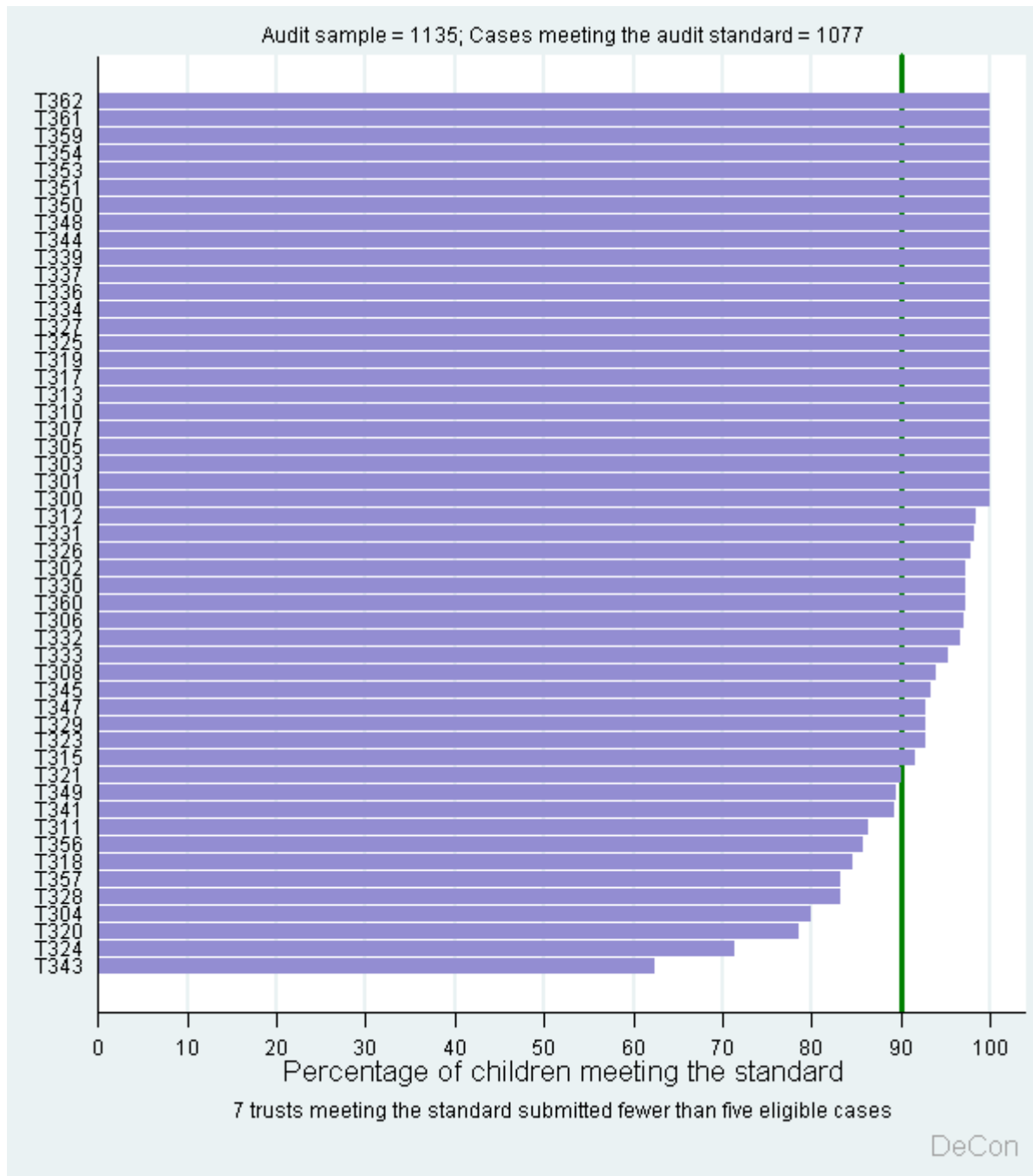
- Cases meeting the audit standard = 1077/1135 (94.9%)
- Performance target range 90% to 100%: The standard was met by 40/51 (78.4%) trusts.
- 75% - 89% range: 9 trusts
- Median percent (95% Confidence Interval) = 98.3% (95.2%, 100.0%)

Children under five years (428/462, 92.6%) were less likely to have documentation of the working diagnosis within 4 hours of presentation as compared with those 5 years and over (649/673, 96.4%) ($P = 0.004$).

In patients who were reviewed by a doctor, children reviewed by a consultant (333/361, 92.2%) were less likely to have documentation of their working diagnosis within 4 hours of presentation as compared with those reviewed by less senior staff such as a doctor of ST4 to ST8 grade or equivalent (462/480, 96.3%) or a doctor of ST1 to ST3 grade or lower (200/208, 96.2%) ($P = 0.022$).

Children presenting to paediatric emergency departments (395/407, 97.1%) or paediatric assessment units (24/25, 96.0%) were slightly more likely to have documentation of their working diagnosis within 4 hours of presentation as compared with those children presenting to mixed emergency departments (657/701, 93.7%) ($P = 0.049$).

Figure 20: Question 6: Working diagnosis within 4 hours of presentation to hospital



6.7 Question 7: Management plan (Figure 21)

Audit question:

Did the patient have a management plan in place (documented in the clinical record) within 4 hours of presentation?


Standard:

All children who present to hospital with a decreased conscious level should have a management plan documented in their clinical record within 4 hours of presentation.

Source of the standard:

The Decreased Conscious Level Project Board Team

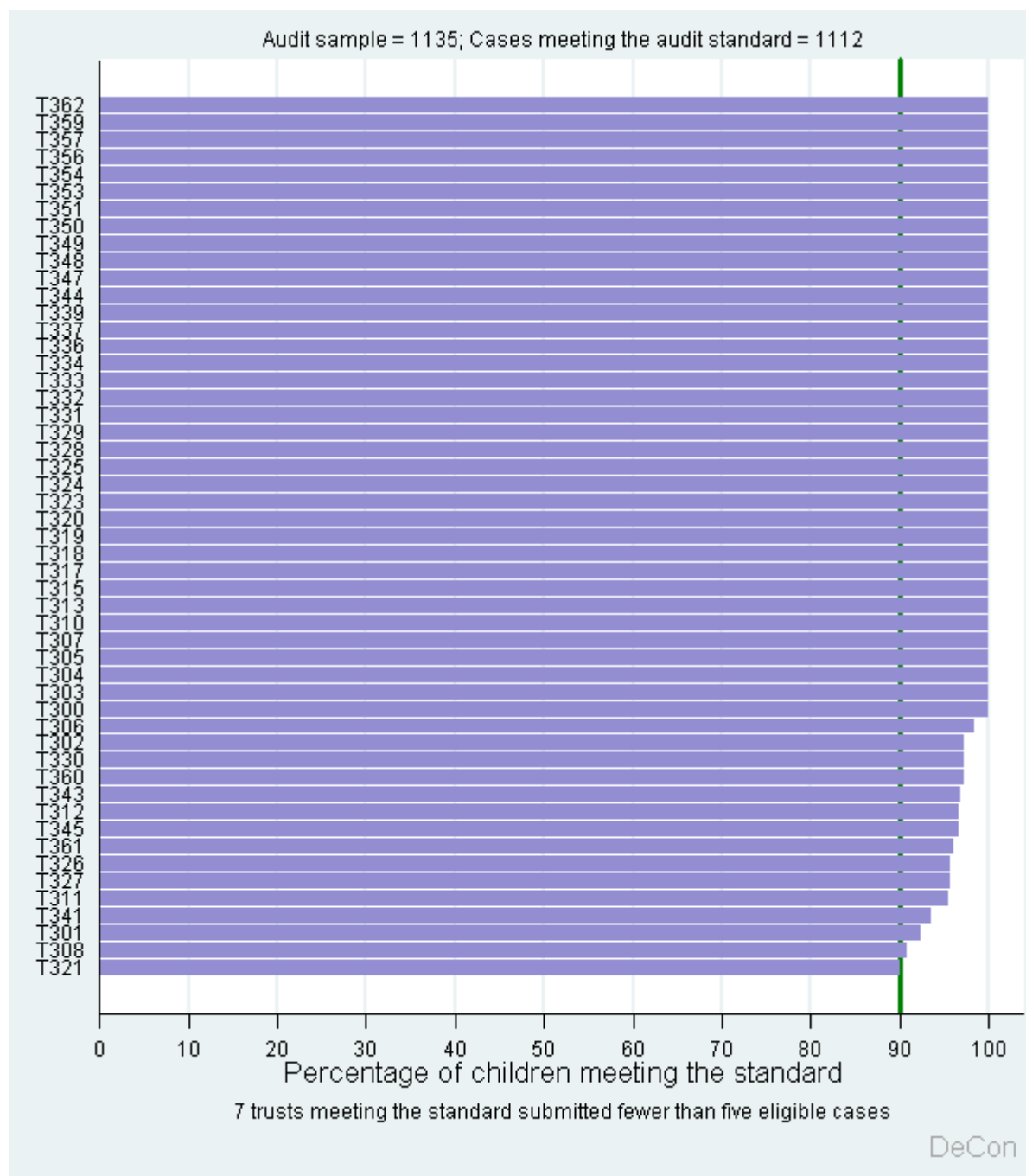
Performance target: At least 90% of children meet the standard.

Results: 

- Cases meeting the audit standard = 1112/1135 (98.0%)
- Performance target range 90% to 100%: The standard was met by all 51 participating trusts.
- Median percent (95% Confidence Interval) = 100.0% (100.0%, 100.0%)

There were no statistically significant differences in the documentation of the management plan within 4 hours of presentation by the child's age, working diagnosis, the grade of the clinician reviewing the child and place of presentation.

Figure 21: Question 7: Management plan within 4 hours of presentation to hospital



6.8 Question 8: Documentation of Parental or Guardian involvement (Table 7)

Audit Question:

During the initial management and resuscitation of the child or young person presenting to hospital with a decreased conscious level, were their parents or guardians' involvement in their care documented in the clinical record?

- Parent or guardian allowed to stay with their child
- Parent or guardian informed regarding their child's possible underlying diagnosis or treatment
- Parent or guardian informed regarding their child's possible prognosis

Source of the standard:

The Management of a Child with a Decreased Conscious Level guideline and the Decreased Conscious Level Project Board Team

Table 7: Documentation of Parental or Guardian involvement during the initial management and resuscitation: Audit standards

Audit standards	Total audit sample	Cases meeting the standard	% Cases meeting the standard	Median percent (95% Confidence Interval)
parent or guardian allowed to stay with their child	1135	426	37.5%	33.3% (24.3%, 50.0%)
parent or guardian informed regarding their child's possible underlying diagnosis and treatment	1135	532	46.9%	50.0% (40.0%, 60.0%)
parent or guardian informed regarding their child's possible prognosis	1135	400	35.2%	35.1% (22.4%, 50.0%)

6.8.1 The parent or guardian was allowed to stay with their child (Figure 22)

Standard:

All children presenting to hospital with a decreased conscious level should have documentation in their clinical records that their parents or guardians were allowed to stay with them during the initial resuscitation and management.

Performance target: There was no performance target set for this standard.

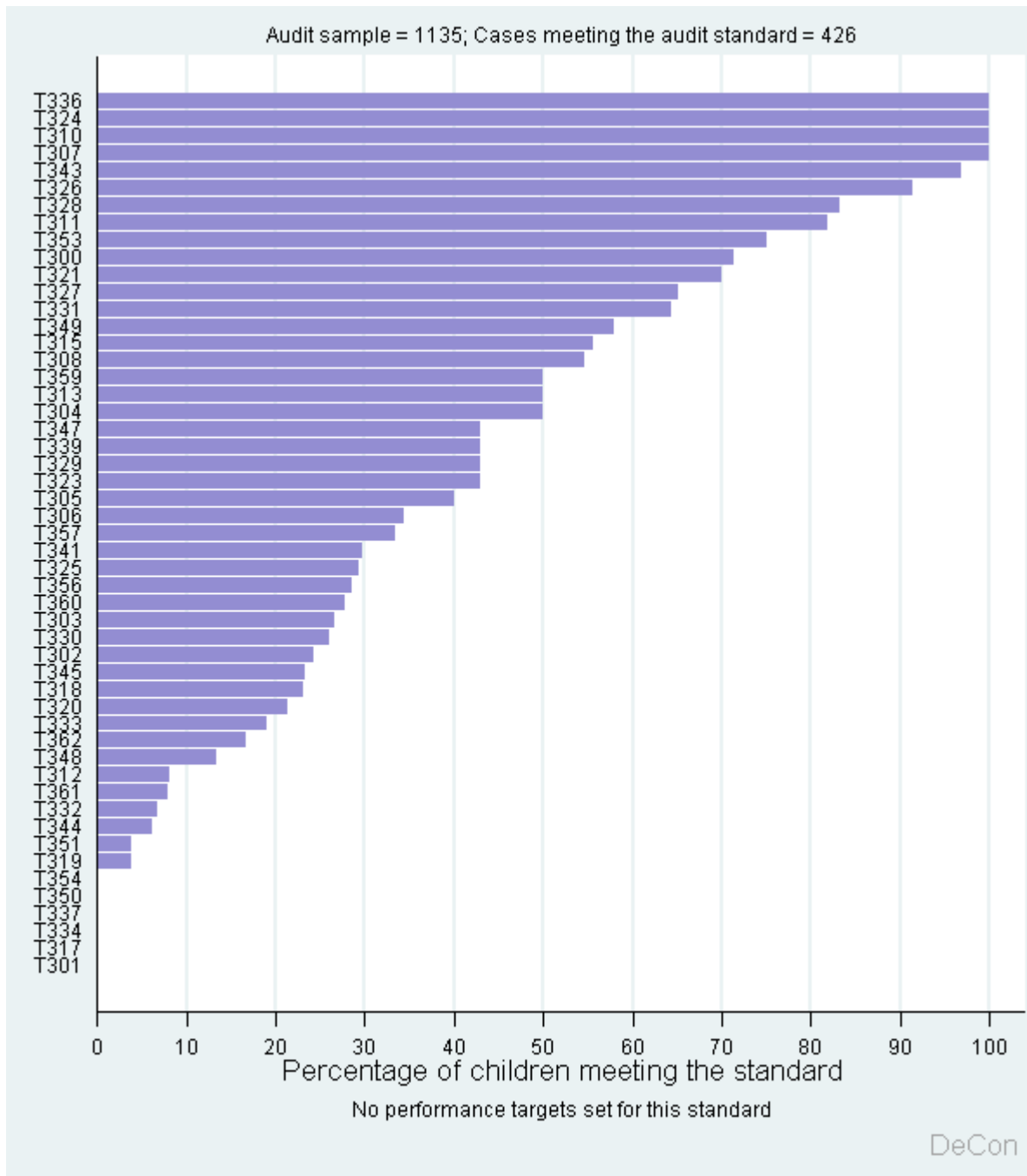
Results:

- Cases meeting the audit standard = 426/1135 (37.5%)

Although the levels of documentation were generally low across all types of units, children presenting to mixed emergency departments (297/701, 42.4%) or paediatric assessment units (10/25, 40.0%) were more likely to have documentation indicating that their parent or guardian was allowed to stay with them during the initial resuscitation and management as compared to those children presenting to paediatric emergency departments (117/407, 28.8%) ($P < 0.005$). A possible explanation for this finding may be that there is a reduced perception of the need for documentation in the latter setting because of the view that this is routine practice.

There were no statistically significant differences in the documentation indicating that the child's parent or guardian was allowed to stay with them during the initial resuscitation and management by the child's age, working diagnosis or the grade of the clinician reviewing the child.

Figure 22: Question 8: Parental or Guardian involvement- parent or guardian allowed to stay with their child during the initial management and resuscitation



6.8.2 Parent or guardian informed of the diagnoses and treatments required (Figure 23)

Standard:

All children presenting to hospital with a decreased conscious level should have documentation in their clinical records that their parents or guardians were informed of the possible underlying diagnosis and treatments required.

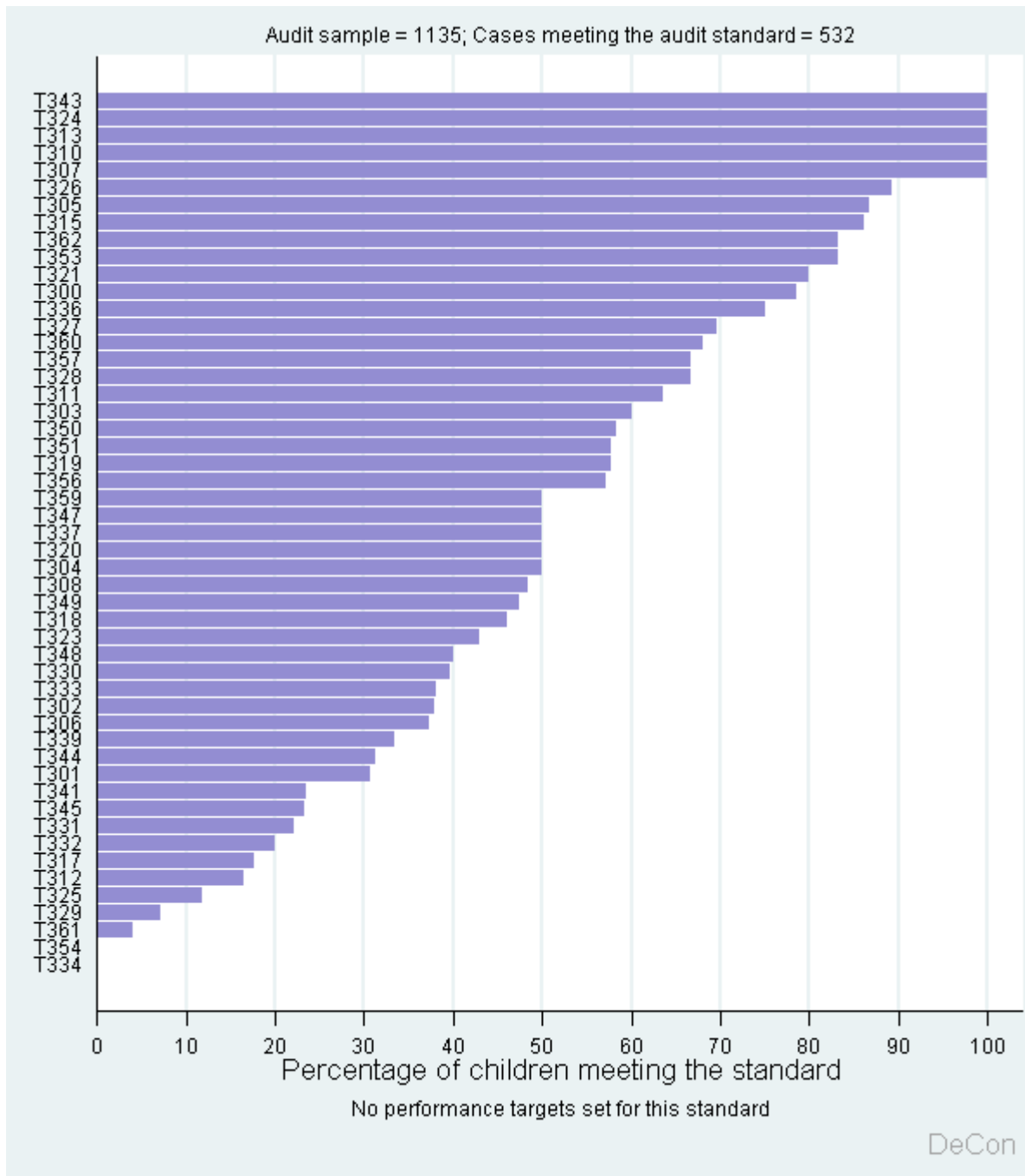
Performance target: There was no performance target set for this standard.

Results:

- Cases meeting the audit standard = 532/1135 (46.9%)

There were no statistically significant differences in documentation indicating that the child's parent or guardian were informed of their possible underlying diagnosis and treatments by the child's age, working diagnosis, the grade of the clinician reviewing the child or place of presentation.

Figure 23: Question 8: Parental or Guardian involvement- parent or guardian informed regarding their child's possible underlying diagnosis and treatment



6.8.3 Parent or guardian kept informed of the possible prognosis (Figure 24)

Standard:

All children presenting to hospital with a decreased conscious level should have documentation in their clinical records that their parents or guardians were informed of the possible prognosis.

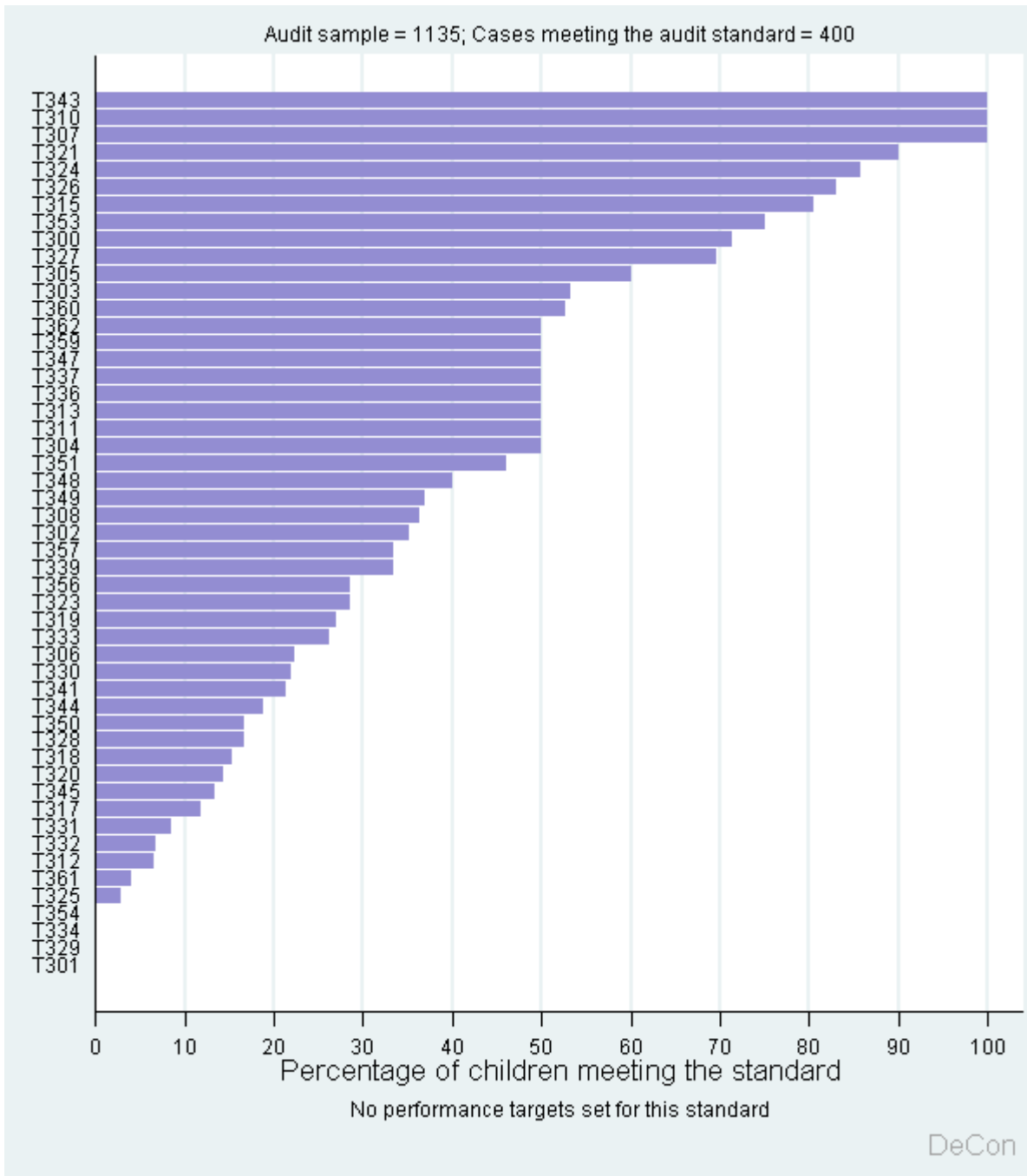
Performance target: There was no performance target set for this standard.

Results: 

- Cases meeting the audit standard = 400/1135 (35.2%)

There were no statistically significant differences in documentation indicating that the child's parent or guardian was informed of their possible prognosis by the child's age, working diagnosis, the grade of the clinician reviewing the child or place of presentation.

Figure 24: Question 8: Parental or Guardian involvement- informed regarding their child's possible prognosis



Comments: Question 8

There were no performance targets set for the standards related to parent or guardian involvement during the initial management and resuscitation of their child. Nonetheless, the majority of the trusts failed to achieve even a minimum (<75%) level of performance.

Documentation of the involvement of parents or guardians and any communication with them regarding their children's diagnoses and prognoses was poor across most trusts. Trusts noted qualitatively that there was poor documentation by clinicians in this area because all of these aspects of care are part of their routine practice, therefore clinicians did not always recognise the importance of documenting this information in the clinical records.

7. Conclusions

This audit found that children and young people presenting to hospital with a decreased conscious level were most likely to be male, over five years of age and present with infection, trauma or alcohol intoxication. Almost thirty percent of the children in this audit presented with a decreased conscious level as a consequence of alcohol intoxication. This finding has significant public health implications as alcohol use and abuse can have a destructive effect on the developing brain and body, as well as on children and young people's psychosocial wellbeing and this is an area which warrants further investigation.

The audit found that there were high levels of inadequate documentation in several chief areas in the care of children and young people presenting to hospital with a decreased conscious level. These included:

- Clinical history taking on initial presentation to hospital;
- Blood pressure and temperature measurements on initial presentation; and
- Communication with parents or guardians regarding their child's diagnosis and prognosis.

The gaps in the documentation of the initial assessment as part of the clinical history taking among the audit sample contradicts the findings of high levels of documentation of both the working diagnosis and the management plan within 4 hours of presentation across all trusts in the audit. Indeed, the latter findings provide some reassurance that these children are not being mismanaged across the board. However, documentation of their clinical history is falling well below an acceptable standard. It would appear that clinicians are uniformly failing to document the initial assessment which led to the diagnosis and management plans; an analogy for this would be providing the answer to a question in an examination but failing to show the working behind the answer.

The poor standard of documentation of blood pressure and temperature in this audit mirrors research findings of inadequate record-keeping regarding observations in paediatric patients in emergency department settings. The use of a care pathway may encourage staff to undertake a full set of observations on all of these patients and could act as an aide memoire prompting less experienced nurses and doctors.

The key challenge of this audit was the identification of eligible cases. This was particularly problematic in some trusts because of several factors such as:

- Busy emergency departments with reduced staffing;
- Lack of organizational structures which facilitate the ease of data collection;
- Difficulty in systematically identifying these patients because they fall into a multitude of diagnostic categories; and
- No clear working relationships between paediatric and emergency medicine specialties which hampered engagement with the audit.

Nonetheless, despite these limitations in case ascertainment, this audit has sufficient cases to provide a good overall picture of the management of children and young people presenting to hospital with a decreased conscious level across the UK, especially for England and to a limited extent Wales and Northern Ireland. Indeed, the audit's findings may have even greater resonance in light of the potential iceberg of unidentified cases.

It is clear from the organizational survey of the participating trusts that a significant number have not adopted the guideline's recommendations. This has implications for the audit's findings among the trusts because it may mean that there is a decreased onus to comply with the guideline accompanied by reduced awareness of its existence among their staff. Certainly, six years on, there is still a crucial need to make sure that all staff, particularly those working in emergency departments, are aware of the guideline's existence. This will contribute towards promoting the standardisation of the management that children and young people presenting to hospital with a decreased conscious level receive.

However, there may be constraints to the provision of adequate care to these children as a consequence of the lack of appropriately trained staff and the piecemeal service that some children may receive in emergency department settings because of difficulties in prioritising their needs, especially in mixed adult/child settings.

8. Recommendations

For health professionals

1. All health professionals should take a comprehensive clinical history in children and young people presenting to hospital with a decreased conscious level irrespective of the differential diagnosis.
2. The clinical history documentation should include information on both the presence of a feature and its absence.
3. If health professionals are unable to obtain an adequate clinical history the reasons for this should be documented in the child's clinical record.
4. On arrival to hospital, all children and young people with a decreased conscious level should receive measurement of the complete set of observations including heart rate, respiratory rate, oxygen saturation, blood pressure and temperature.
5. All health professionals caring for and reviewing these children and young people should be responsible for ensuring that the complete set of observations are measured.
6. On arrival to hospital, all children and young people with a decreased conscious level should have either an AVPU or GCS (adult or modified) undertaken and the measurement documented.
7. If a child's decreased conscious level persists, this child should have their GCS measured and documented every 15 minutes if $GCS \leq 12$ and every 60 minutes if $GCS > 12$ in accordance with the guideline, until there is an improvement in condition.
8. If a child requires regular evaluation of their conscious level, GCS measurements should be commenced in addition to or instead of AVPU.
9. Capillary blood glucose should be undertaken in all children presenting to hospital with a decreased conscious level irrespective of the differential diagnosis.
10. All children presenting to hospital with a decreased conscious level secondary to a metabolic, infective or unknown cause should receive appropriate and early investigation in accordance with the guideline.
11. All health professionals should document in the child's clinical record not only the clinical care given but also any discussions undertaken with parents, as well as children and young people.
12. All health professionals should inform parents or guardians of their child's possible diagnoses and prognosis and document this in the clinical record.

For trusts

13. Health professionals should receive regular training to reinforce good record keeping skills and this should be part of all trusts' compulsory training programme.
14. Observations charts should be incorporated into the emergency department notes whether written or electronic to encourage staff to measure and document the observations of all paediatric patients presenting with an acute illness of which decreased conscious level may be a feature.
15. Participating trusts who failed to meet a minimum target of 75% for the standards in at least one of the four key areas should consider repeating a limited audit in these areas, six months after the dissemination of the audit's findings:
 - Clinical history features of vomiting before or at presentation, fever before or at presentation, convulsions before or at presentation, alternating periods of consciousness and length of symptoms;
 - Use of AVPU or GCS to assess the child's conscious level;
 - Observations of heart rate, respiratory rate, blood pressure and temperature on presentation to hospital;
 - Capillary blood glucose taken within 15 minutes of presentation.

General

16. The guideline should be updated and following one year of the revised guideline being in place, management of the child with a decreased conscious level should be re-audited. The audit should include England, Wales, Northern Ireland and Scotland.
17. All health professionals managing the emergency presentation of children and young people should be made aware of the guideline's existence and the audit findings by engaging with the College of Emergency Medicine, the Royal College of Nursing and other pertinent Royal Colleges. This can be promoted to their respective membership by ensuring hyperlinks to the guideline and the audit, are made available on their websites.
18. All front-line staff both in paediatric departments but also in emergency departments should be made aware of the guideline and the audit's findings by using a multi-faceted dissemination approach.

8.1 Areas for audit:

The following areas should be audited at least annually as part of regular monitoring of the care provided to children and young people presenting to hospital with a decreased conscious level:

- Audit documentation of the clinical history features in all children presenting to hospital with a decreased conscious level:
 - i. vomiting before or at presentation
 - ii. fever before or at presentation
 - iii. convulsions before or at presentation
 - iv. alternating periods of consciousness
 - v. trauma
 - vi. length of symptoms
- Audit documentation of the clinical history features in these specific groups of children presenting to hospital with a decreased conscious level:
 - i. In children less than 5 years- the presence of medication in the child's home and a family history of previous infant deaths
 - ii. In children 5 years and over- headache before or at presentation
- Continuous audit of the documentation of a complete set of observations (heart rate, respiratory rate, oxygen saturation, blood pressure and temperature) in all children presenting to hospital with a decreased conscious level.
- Audit the use of a physiological scoring system such as the GCS or AVPU scales to assess level of consciousness.
- Audit the clinical records and observations charts of all children presenting to hospital with a decreased conscious level focusing on the percentage of children with a GCS less than 12 who have at least 1/2 hourly GCS measurements performed and documented until their condition improves.
- Audit the percentage of children who have their capillary blood glucose taken within 15 minutes and 1 hour of presentation to hospital with a decreased conscious level.
- Undertake parent/guardian or patient survey covering the following areas:
 - i. Percentage of children whose parents or guardians were allowed to stay with them during the initial management and resuscitation;
 - ii. Percentage of children whose parents or guardians were informed regarding their child's possible diagnosis or treatment;
 - iii. Percentage of children whose parents or guardians were informed regarding their child's possible prognosis.

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Appendix A: Participating NHS Trusts and Audit Leads

Audit leads for the pilot NHS trusts

NHS Trusts	Audit Leads
Birmingham Children's Hospital NHS Foundation Trust	Dr Kathleen Berry
Chelsea and Westminster NHS Foundation Trust	Dr Jo Hacking
Imperial College Healthcare NHS Trust (St Mary's Hospital)	Dr Rebecca Salter

Audit leads and assistants for the participating NHS trusts

NHS Trusts	Audit Leads and Assistants
Abertawe Bro Morgannwg University Health Board	<i>Princess of Wales Hospital, Brigend</i> Dr Maximilian Nathan
	<i>Morrison Hospital</i> Dr Dawn Edwards Dr Kirsty Dickson Jardine Dr Saurabh Patwardhan
Airedale NHS Foundation Trust	Dr Pronab Bala
Alder Hey Children's NHS Foundation Trust	Dr Bimal Mehta Dr Sarah Pyper Mr Steven Riley
Aneurin Bevan Health Board	<i>Royal Gwent Hospital</i> Dr Marion Schmidt Mrs Christine Bradley
	<i>Nevill Hall Hospital</i> Dr Yvette Cloete Dr Kathryn Davies
Ashford and St Peter's NHS Foundation Trust	Dr Erin Dawson
Belfast Health and Social Care Trust (Royal Belfast Hospital for Sick Children)	Dr Brigitte Bartholome Dr Elizabeth Dalzell

NHS Trusts	Audit Leads and Assistants
Blackpool, Fylde and Wyre Hospitals NHS Foundation Trust	Dr Raj Verma Dr Vivek Mundada Mr Simon Tucker
Buckinghamshire Healthcare NHS Trusts	Dr Gulab Rastogi Dr Abhijit Mazumber
Calderdale and Huddersfield NHS Foundation Trust	Dr Gill Sharpe
City Hospitals Sunderland NHS Foundation Trust	Dr Charlotte Atkinson Dr Sarah Prudhoe Dr Sarah Coates (nee Lewis)
County Durham and Darlington NHS Foundation Trust	<i>University Hospital of North Durham</i> Dr John Holmes Dr Godfrey Nyamugunduru Miss Tracey Davidson <i>Darlington Hospital</i> Dr Joan Clancy Ms Amanda Dunn
Derby Hospitals NHS Foundation Trust	Dr Gisela Robinson Dr Elizabeth Starkey Dr Kamaljit Kaur Dr Julie Mott Ms Jeanette Steward
Dorset County Hospital NHS Foundation Trust	Dr Phil Parslow
Dudley Group of Hospitals NHS Trust	Dr Renu Fonseka Dr Yasar Sabir Dr Kate Atkinson Dr Chloe Ross
East and North Hertfordshire NHS Trust	<i>Lister Hospital</i> Dr Farrukh Sheikh <i>Queen Elizabeth II Hospital</i> Dr Amin Salem
George Eliot Hospital NHS Trust	Dr Gillian Small

NHS Trusts	Audit Leads and Assistants
Heatherwood and Wexham Park Hospitals NHS Foundation Trust	Dr Peter Sebire Dr Collin Royed Dr Sandra Subtil
Heart of England NHS Foundation Trust	Dr Shachi Buch Dr Chetana Kallappa
Hillingdon NHS Trust	Dr Michele Cruwys Dr Salim Jivanji Miss Mandy Naughton
Lancashire Teaching Hospitals NHS Foundation Trust	Dr Karnam G. Sugumar Dr Harish Sreenivasa Dr Amy Wilson Dr Claere Fehily Ms Asmita Vaidya
North Tees and Hartlepool NHS Trust	Dr Anil Gupta Dr Santosh Gupta Dr Kameshwar Singh Ms Linda Butler
Northern Lincolnshire and Goole Hospitals NHS Foundation Trust	<i>Diana, Princess of Wales Hospital</i> Mr Jason Baker Dr Hassan Al-Moasseb <i>Scunthorpe General Hospital</i> Dr Maged Amin Dr Suresh Kumar Nelapatla
Norfolk & Norwich University Hospitals NHS Foundation Trust	Dr Ruchi Arora Dr Mary-Anne Morris Dr Bina Mukhtyar Dr Tarek Kherbeck
Nottingham University Hospital NHS Trust	Dr Clare Dieppe Dr Rachel Sunley Dr Kate Rankin
Oxford Radcliffe Hospitals NHS Trust	<i>Horton General Hospital</i> Dr Rani Pal Dr Laurie Allibone <i>John Radcliffe Hospital</i> Dr Janet Craze Dr Nadeem Hasan Dr Rhiannon Furr

NHS Trusts	Audit Leads and Assistants
Pennine Acute Hospital NHS Trust	<p><i>North Manchester General Hospital</i> Dr Mudiyur Gopi Dr Amar Soe</p> <p><i>Rochdale Infirmary</i> Mr Christopher Hoare Dr Choy Lee</p> <p><i>Royal Oldham Hospital</i> Dr Rachel Barton</p>
Portsmouth Hospital NHS Trust	Dr Stephen Warriner Mr Alan Charters Dr Rajashekar Golla Miss Nicole Bonner
Princess Alexandra Hospital NHS Trust	Dr Balakumar Thulasi Miss Bridget Mitchelmore
Royal Berkshire NHS Foundation Trust	Dr Nicola Pritchard Dr Sarah Jane Bowen
Royal Devon & Exeter NHS Foundation Trust	Dr Karen Street Dr Eleanor Williamson Dr Rebecca Gumm Dr Pamela Bowman
Royal Surrey County Hospital NHS Trust	Dr Mark Pontin Ms Amanda Stephenson Ms Sneha Patel
Royal United Hospital Bath NHS Trust	Dr Ne-Ron Loh Dr Chris Stutchfield
Royal Wolverhampton Hospitals NHS Trust	Dr Penny Dison Dr Gurjinder Dahel
Shrewsbury & Telford Hospital NHS Trust	<p><i>Princess Royal Hospital</i> Dr Ali Jan Dr Srinivas Parepalli</p> <p><i>Royal Shrewsbury Hospital</i> Dr Arivalagan Kannivelu Dr Mya Aye</p>

NHS Trusts	Audit Leads and Assistants
South Devon Healthcare NHS Foundation Trust	Dr Richard Tozer
Southampton University Hospitals NHS Trust	Dr Katharine Forrest Dr Jason Barling Dr Katie Yallop Miss Karen Grant
Southport & Ormskirk Hospital NHS Trust	Dr Sharryn Gardner
South Warwickshire NHS Foundation Trust	Dr Vinodhini Clarke
St George's Hospital	Dr Thiagarajan Jaiganesh
St Helens & Knowsley NHS Trust	Dr Lakshmi Chilukuri Dr Ijaz Ahmad
St Mary's Hospital, Isle of Wight NHS PCT	Dr Christopher Magier Dr Thomas Lawal-Rieley
Tameside Hospital NHS Foundation Trust	Dr Muhammad Qureshi
Taunton and Somerset NHS Foundation Trust	Dr Pieter Van-Hensbergen Dr Rebecca Cordingley
The Mid Yorkshire Hospitals NHS Trust	<i>Dewsbury and District Hospital</i> Dr Rajeeva Singh Dr Heather Parr <i>Pinderfields General Hospital</i> Dr Fraser Scott
University Hospitals Bristol NHS Foundation Trust	Dr Matt Rotheram Dr Lisa Goldsworthy
University Hospitals of Morecambe Bay NHS Foundation Trust	<i>Furness General Hospital</i> Dr Anas Olabi Dr Laura Bath Ms Lynne Kaighan <i>Royal Lancaster Hospital</i> Dr Clare Peckham Dr Prudence Knight

NHS Trust	Audit Leads and Assistants
University Hospital of South Manchester NHS Foundation Trust	Dr Gopi Vemuri Dr Emily Willis
Walsall Hospitals NHS Trust	Dr Gyan Sinha Dr Indu Anand
West Middlesex University Hospital NHS Trust	Mr Ronald Gange Dr Lydia Egan Miss Joanne Colgan
West Suffolk Hospital NHS Trust	Dr Raman Lakshman Dr Guddi Singh
Whipps Cross University Hospital NHS Trust	Dr Ann Duthie Dr Viswa Vani Penumala
Whittington Hospital NHS Trust	Dr Giles Armstrong Dr Naila Ismayilova
Wrightington, Wigan and Leigh NHS Foundation Trust	Dr Khalil Khalil-Urrehman Dr Singara Velmurugan
Yeovil District Hospital NHS Foundation Trust	Dr Meredith Kane

Appendix B: Service Description Questionnaire

Section A: Your Hospital

1. What is the number of children and young people aged 0 to less than 18 years who were admitted to your hospital in the last calendar year? (Refers to episodes of care)	<i>This information was not used in the report.</i>
1. What is the number of children and young people aged 0 to less than 18 years who attended your hospital in the last calendar year? (Refers to episodes of care)	<i>This data was replaced by HES data in the report.</i>
2. What is the maximum age in years of the children and young people who receive care at your hospital?	
3. Is the guideline Management of a Child with a Decreased Conscious Level employed at your hospital?	Not used Used as a stand-alone guideline Incorporated within another guideline(s) Other, specify

Section B: Resources

In a typical week in your hospital?	
a. What is the most senior grade of paediatrician resident on-site all night?	Consultant Staff Grade Clinical Fellow Associate Specialist ST1-ST3 or equivalent ST4-ST6 or equivalent ST7 or equivalent ST8 or equivalent Uncertain Other, specify
b. Is there a paediatric nurse with APLS, EPLS or equivalent on shift?	No Yes-24/7 Yes- but not 24/7 Uncertain

c. Is there access to paediatric anaesthetic skills or expertise on-site?	No Yes-24/7 Yes- but not 24/7 Uncertain
d. What is the level of paediatric anaesthetic staff expertise available at your hospital? Select all that apply.	Paediatric Anaesthetist Paediatric Intensivist General Anaesthetist with Paediatric Interests General Anaesthetist Uncertain Other, specify

Section C: Services

Does your hospital have the following:	
a. On-site Paediatric Emergency Department?	No Yes-24/7 Yes- but not 24/7 Uncertain
b. On-site Paediatric Intensive Care Unit?	No/Yes
c. On-site Paediatric ward/department?	No/Yes
d. Short stay or assessment unit solely for paediatric patients?	No Yes-24/7 Yes- but not 24/7 Uncertain
e. Access to a laboratory able to process plasma ammonia?	No Yes-24/7 Yes- but not 24/7 Uncertain
f. Is the hospital able to carry out CT scanning on-site?	No Yes-24/7 Yes- but not 24/7 Uncertain

Appendix C: Clinical Audit Questionnaire

Section A: Details of Patient's Attendance

1. Patient's NHS/Hospital number	
2. Patient's date of birth	dd/mm/yyyy
3. Date of presentation to hospital	dd/mm/yyyy
4. Age at presentation in years	
5. Time of presentation to hospital	hh:mm
6. Patient's gender	Male Female Indeterminate
7. Place of presentation to hospital	Mixed Emergency Department Paediatric Emergency Department Paediatric Assessment Unit Paediatric Intensive Care Unit Unknown

Section B: Clinical History

8. At presentation to hospital, was the presence or absence of the recommended features of the clinical history documented in the clinical record?	
a. Vomiting before or at presentation	Yes/No
b. Headache before or at presentation	Yes/No
c. Fever before or at presentation	Yes/No
d. Convulsions before or at presentation	Yes/No
e. Alternating periods of consciousness	Yes/No
f. Trauma	Yes/No
g. Ingestion of medication or recreational drugs	Yes/No
h. Presence of any medication in the child's home	Yes/No
i. Any previous infant deaths in the family	Yes/No
j. Length of symptoms	Yes/No

Section C: Observations and Intubation

9. Were the following observations documented in the patient's clinical record at presentation to hospital?	
a. Heart rate	Yes/No
b. Respiratory rate	Yes/No
c. Oxygen saturation	Yes/No
d. Blood pressure	Yes/No
e. Temperature	Yes/No
10. Was the child or young person with a decreased conscious level intubated?	Yes (Go to Question 11) No (Go to Question 12) Uncertain (Go to Question 12)
11. If yes, what was the reason for intubation? Select all responses that apply.	Airway obstruction when airway unsupported Airway compromised by vomiting Respiratory Rate inadequate for oxygenation or ventilation Oxygen saturation less than 92% despite oxygen therapy Signs of shock despite fluid resuscitation totalling 40 mls/kg or more Looks exhausted Glasgow Coma Score is 8 or less GCS is deteriorating Signs of raised intracranial pressure Other, specify

Section D: Physiological Scoring Systems

12. Which scoring system was documented in the clinical record as being used to evaluate the extent of the patient's conscious level?	AVPU (Go to Question 13 then Go to Question 15) GCS (Go to Question 14) Both AVPU & GCS (Go to Question 13) None (Go to Question 15)
13. What was the actual AVPU assessment recorded at presentation to hospital?	Alert Voice Pain Unresponsive
14. Glasgow Coma Score value and frequency at presentation to hospital	
a. What was the actual GCS value recorded at presentation to hospital?	

b. What was the lowest GCS value recorded during this episode of the patient's presentation to hospital with a decreased conscious level?	
c. Was the GCS documented in the patient's clinical record every 15 minutes if less than or equal to 12 at presentation to hospital?	Yes No Not applicable
d. Was the GCS documented in the patient's clinical record every hour if greater than 12 at presentation to hospital?	Yes No Not applicable
e. What was the frequency of GCS observations documented in the patient's clinical record at presentation to hospital?	Every 15 minutes Every 30 minutes Every 60 minutes (1 hour) Every 90 minutes Every 120 minutes (2 hours) Uncertain Other, specify

Section E: Investigations

15. Were the following recommended core investigations conducted within at least 1 hour of presentation to hospital?	
a. Capillary glucose tested within 15 minutes of presentation	Yes/No
b. Blood gases	Yes/No
c. Dipstick urinalysis	Yes/No
d. Laboratory blood glucose	Yes/No
e. Urea and electrolytes	Yes/No
f. Liver function tests	Yes/No
g. Plasma ammonia	Yes/No
h. Full blood count and film	Yes/No
i. Blood culture	Yes/No
j. 1-2ml of plasma to be separated, frozen and saved for later analysis	Yes/No
k. 1 - 2 ml of plain serum to be saved for later analysis if required	Yes/No
l. 10 mls urine saved for later analysis	Yes/No

Section F: Diagnosis

16. On presentation to hospital, did the patient have any of the following documented in the clinical record?	
a. Signs of shock	Yes/No
b. Presence or absence of a non-blanching rash	Yes/No
c. Pupil size and response	Yes/No
17. Did the patient have a working diagnosis (documented in the clinical record) within 4 hours of presentation to hospital?	Yes (Go to Question 18) No (Go to Question 19)
18. What was the actual working diagnosis (documented in the clinical record) within 4 hours of presentation to hospital? Select all responses that apply.	Shock Sepsis Trauma Diabetic ketoacidosis Hypoglycaemia Hyperammonaemia Bacterial meningitis Herpes simplex encephalitis Intracranial abscess TB meningitis Raised intracranial pressure Hypertension Prolonged convulsion Post-convulsive state Febrile seizure Cause unknown Other, specify

<p>19. What was the diagnosis of the underlying cause of decreased conscious level at hospital transfer/discharge/death? Select all responses that apply.</p>	<p>Shock Sepsis Trauma Diabetic ketoacidosis Hypoglycaemia Hyperammonaemia Non-hyperglycaemic ketoacidosis Bacterial meningitis Herpes simplex encephalitis Intracranial abscess TB meningitis Raised intracranial pressure Hypertension Prolonged convulsion Post-convulsive state Febrile seizure Cause unknown Other, specify</p>
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Section G: Management

<p>20. Did the patient have a management plan in place (documented in the clinical record) within 4 hours of presentation?</p>	<p>Yes/No</p>
<p>21. Who was the most senior clinician reviewing the patient with a decreased conscious level on presentation to hospital?</p>	<p>Consultant Staff Grade Clinical Fellow Associate Specialist ST1-ST3 or equivalent ST4-ST6 or equivalent ST7 or equivalent ST8 or equivalent Uncertain Other, specify</p>

Section H: Guardian or parental involvement

22. During the initial management and resuscitation on presentation to hospital, did the patient have any of the following documented in the clinical record?	
a. Parents or guardians allowed to stay with the child or young person if they wished	Yes/No
b. Parents or guardians informed of the possible working diagnosis and treatments required	Yes/No
c. Parents or guardians informed of the possible prognosis if known	Yes/No

Section I: Outcome

23. What was the outcome of the child or young person who presented to hospital with a decreased conscious level?	Discharged from area of hospital attendance (Go to Question 24) Transferred (Go to Question 25) Died (Go to Question 26) Unknown Other, specify
24. If discharged: What was the discharge destination?	Usual Place of Residence Unknown Other, specify
25. If transferred: What was the transfer destination?	General ward in the hospital Specialist ward in the hospital Paediatric Intensive Care Unit NHS Other Hospital Non-NHS Hospital Unknown Other, specify
26. If died: What was the date of death?	dd/mm/yyyy
27. If died: What was the time of death?	hh:mm

Appendix D: Clinicians' Survey Tool

Section A: Awareness of the Decreased Conscious Level Guideline

Is your trust currently participating in the RCPCH Decreased Conscious Level Multi-site Audit?	Yes No Don't know
1. At what point did you first become aware of the guideline's existence?	Prior to the audit (Go to Qu.2) Through this audit (Go to Qu. 3) Do not remember (Go to Qu. 2)
2. How did you first find out about the guideline? Please select only one response.	Received a formal education/training session Via the RCPCH website Via my trust intranet Journal article From a colleague (please specify) Do not remember Other: specify
3. Have you read the guideline either prior to or since the start of the Decreased Conscious Level Multi-site Audit?	Yes fully Yes partially No Do not remember
4. How do you usually first find out about a guideline's existence or a new guideline's publication? Please select all responses that apply.	Via trust clinical governance meetings Via RCPCH website Via my trust intranet Via a posted copy of the guideline Journal article From a colleague (please specify their speciality Paediatric, Anaesthetic, Emergency Medicine, Nursing or Other) Other: specify
5. What response best describes your knowledge of the information in the Management of a Child with a Decreased Conscious Level guideline prior to this audit?	No knowledge (Go to Qu. 10) Partial knowledge (Go to Qu. 6) Full Knowledge (Go to Qu. 6) Not sure (Go to Qu. 10)

Section B: Features of the Guideline

6. What response best describes your views of the following statements: The Management of a Child with a Decreased Conscious Level guideline:					
	Strongly disagree	Dis-agree	Neither agree nor disagree	Agree	Strongly agree
a. Is relevant to my clinical practice					
b. Is not applicable to my clinical practice					
c. Has a clear presentation and structure					
d. Provides me with all the information I need					
e. Possesses gaps in its information					
f. Is easy to extract the information I need from					
g. Is easy to read					
h. Has a lot of terminology that is difficult to understand					

Section C: Your Use of the Guideline

7. How would you classify your use of the guideline in clinical practice?	Do not use (Go to Qu. 9) Use some aspects relevant to my practice Not sure (Go to Qu. 9)
8. If you have used the guideline: which recommendations have you employed? Select all responses that apply.	Assessment Investigations Treatment Other specify:
9. How do you think the Management of a Child with a Decreased Conscious Level guideline could be improved?	Please comment

Section D: Factors influencing Guideline Use

10. What factors do you believe may positively influence your use of the Management of a Child with a Decreased Conscious Level guideline in clinical practice?

10.1 <i>Content</i>	Strongly disagree	Dis-agree	Neither agree nor disagree	Agree	Strongly agree
a. The broad scope of the guideline					
b. Recommendations based on high level evidence					
c. Recommendations based on high level expert opinion					
d. Some recommendations are based on consensus					
e. My agreement with some aspects of the guideline					
f. My agreement with all aspects of the guideline					
10.2 <i>Accessibility & Resources</i>					
a. Access to the guideline in my workplace					
b. It is an established guideline in my workplace					
c. Sufficient resources to apply guideline's recommendations in my workplace					
d. High level organizational support for the guideline					
10.3 <i>Other</i>					
a. RCPCH endorsement					
b. Endorsement by other professional bodies					
c. My own clinical experience and knowledge					
d. My patient's or their family's preferences					
e. Research evidence in support of the guideline					
11. What factors do you believe may negatively influence your use of the Management of a Child with a Decreased Conscious Level guideline in clinical practice?					
	Strongly disagree	Dis-agree	Neither agree nor disagree	Agree	Strongly agree
11.1 <i>Content</i>					
a. My lack of familiarity with the guideline/subject area					

b. The high volume of information in the guideline					
c. The broad scope of the guideline					
d. The guideline is too long					
e. Too many unfamiliar terms in the guideline					
f. Some recommendations are based on consensus					
g. My disagreement with some aspects of the guideline					
11.2 Accessibility & Resources					
a. Lack of access to the guideline in my workplace					
b. Insufficient resources to apply guideline's recommendations in my workplace					
c. Too expensive to apply the guideline's recommendations in my workplace					
d. Lack of high level organizational support for the guideline					
e. Time limitations					
11.3 Other					
a. My own clinical experience and knowledge					
b. My patient's or their family's preferences					
c. Lack of research evidence in support of the guideline					

Section E: Strategies for Guideline Use

12. What strategies do you think will support your use of guidelines in clinical practice? Please rank the following list in order of importance to you, with 1 being the most important and 8 the least important. Each option (row) must have a different rank.	
a. Provision of education or training sessions on the guideline	
b. Printed paper copy of the guideline	
c. Guideline in an electronic PDF format	

d. Quick reference summary of the guideline	
e. Guideline summarised as a poster	
f. One page algorithm of the guideline's content	
g. Guideline in an e-learning format	
h. Guideline as Powerpoint slides	
i. Please comment on any other strategies which you think support guideline use in your clinical area?	

Section F: About You

13. What is your gender?	Female Male Prefer not to answer
14. What is your age?	< 20 years 20-30 years 31-40 years 41-50 years 51-60 years Over 60 years Prefer not to answer
15. What is your current grade (role)?	Consultant Staff Grade Clinical Fellow Associate Specialist ST1 or equivalent ST2 or equivalent ST3 or equivalent ST4 or equivalent ST5 or equivalent ST6 or equivalent ST7 or equivalent ST8 or equivalent F1 F2 Advanced Nurse Practitioner Nurse Consultant Other, specify
16. How many years have you been at your current grade (role)?	
17. How would you quantify your current clinical experience in the provision of care for children and young people with a decreased conscious level?	Often provide care Sometimes provide care Rarely provide care Never provide care
If you wish to comment about the questionnaire or any other issues relevant to this topic: please use this box to do so.	

Appendix E: Clinicians' Survey: Executive Summary

This executive summary of the Clinicians' Survey provides a brief overview of the descriptive survey *Clinicians' Survey of the Use and Perceptions of the Management of a Child with a Decreased Conscious Level* guideline. A more detailed report of the survey's findings can be found on the DeCon website www.rcpch.ac.uk/decon.

This survey was one component of the DeCon multi-site audit project. It was a survey of clinicians, particularly paediatric doctors' self-reported use of the guideline, *The Management of a Child with a Decreased Conscious Level*, in clinical practice. It also examined clinicians' perceptions of the factors which foster or impede their adoption of the guideline's recommendations and their compliance with guidelines in general.

The aim of this survey was to provide supplementary information to support the dissemination of the updated guideline and more generally the dissemination of College-endorsed guidelines. The survey examined several key areas:

- The awareness and knowledge of the guideline;
- The specific features of the guideline;
- The use of the guideline in clinical practice and any improvements which can be made to update the current guideline;
- The source of information both about the specific guideline *The Management of a Child with a Decreased Conscious Level* and guidelines in general;
- The positive and negative factors which may impact generally on the use and adoption of the guideline;
- The strategies to promote guideline use and dissemination; and
- The demographic and other characteristics of the respondents.

Methodology

The survey was administered using Survey Monkey, an online survey tool. The survey was sent to 283 eligible clinicians, of these 142 were clinicians registered to receive the audit's newsletters and 141 were clinicians who were not registered with the DeCon audit. Clinicians were sent a total of 4 emails if they failed to respond after these they were then sent a postal version of the survey including a cover letter with the survey's website address and a stamped labelled envelope. The postal survey was sent to 153 non-responders or clinicians who failed to complete their survey fully online.

The overall response rate of the survey was 72.0% (204/283) with 111/142 (78.2%) registered and 93/141 (66.0%) un-registered clinicians returning their survey, either online or by post.

Sample

Of the 204 respondents of the survey, 162 (79.4%) completed the survey online and 42 (20.6%) by post. 153/204 (75.0%) of the respondents completed the survey fully and 51/204 (25.0%) completed it partially or incorrectly, thus necessitating exclusion of the relevant data items.

89.2% (182/204) clinicians provided personal data on their gender, age, current role, years spent in the current role and experience of providing care for children with a decreased conscious level.

There were a slightly higher proportion of male respondents (93/182, 51.1%) as compared to female respondents (85/182, 46.7%). 4/182 (2.2%) respondents indicated that they preferred not to provide information on their gender. 63.7% (116/182) clinicians were over 40 years of age and the majority were consultant paediatricians (146/182, 80.2%). This may impact on the survey's generalizability because undoubtedly consultants may have different approaches to accessing and utilising information in clinical guidelines as compared to less senior doctors.

84.8% (173/204) clinicians provided information on the length of time they have been at their current grade or role, with an average of 7.7 years (standard deviation= 5.9 years) and a median of 7.0 years. The number of years at the current grade or role for the respondents ranged from a minimum of 0 years for newly appointed staff to a maximum of 28 years.

Clinician survey results

Despite its publication in 2005, in response to a question on when they first became aware of the guideline, a significant percentage of the respondents reported only having found out about the guideline as a consequence of the audit (85/198, 42.9%).

The clinicians were asked to what extent they had read the guideline, 93.6% (191/204) respondents provided data on this question. 78.5% (150/191) reported having either partially or fully read *The Management of a Child with a Decreased Conscious Level* guideline.

152/204 (74.5%) respondents who reported having either full or partial knowledge of the information in the guideline rated their agreement or disagreement with specific positive and negative statements about the guideline's features. They expressed high levels of agreement with the statements that the guideline was relevant to their clinical practice (146/152, 96.0%), possessed a clear presentation and structure (129/152, 84.9%) provided all the information they needed (115/152, 75.7%), was easy to extract information from (110/152, 72.4%) and was easy to read (109/152, 71.7%).

Strategies to promote guideline use and dissemination

When asked about how they gained information on a guideline's existence or a new guideline's publication, respondents identified their most common sources of information as their colleagues (103/204, 50.5%), journal articles (84/204, 41.2%), the RCPCH website (90/204, 44.1%) or a posted copy of the guideline (87/204, 42.6%).

The clinicians ranked a range of methods identified in the research literature for the promotion of guideline use and dissemination and these were summarised to obtain an average rating for each method. They indicated that the most important means of promoting guideline use were a one page algorithm of the guideline's content, quick reference summary of the guideline, the provision of education and training sessions on the guideline and the guideline summarised as a poster. However, they identified the provision of the guideline as Powerpoint slides and in an e-learning format as being the least important methods of promoting the use of guidelines.

Suggestions for improvement of the guideline

The respondents were asked how the *Management of a Child with a Decreased Conscious Level* guideline could be improved. 64.7% (132/204) clinicians responded to this question and they offered a variety of suggestions. These covered certain broad themes:

1. The need for alteration in the guideline's content and structure;
2. The need for training; and
3. The need for increased awareness and wider dissemination.

The guideline's content and structure

The clinicians highlighted that several changes were required to the guideline's content and structure and offered specific advice such as the following:

- The revision of the guideline and updating the areas on meningitis;
- The provision of an interactive guideline which is easier to navigate by the incorporation of links to other relevant guidelines on diabetes, febrile child and post-seizure management into the current guideline;
- The revision of the investigation section such as the omission of information on the colours of blood bottles for the tests as these are not universal and the inclusion of additional tests such as PCR for meningitis cases and lactate for metabolic cases;
- The provision of additional information on monitoring of children and young people with a decreased conscious level, more specifically the range of blood pressure measurements;

- The reduction in the guideline's length so that it has greater use in an emergency or acute situation;
- The division of the guideline into two areas focusing on the management of children presenting with decreased conscious level irrespective of cause and the investigation and treatment of specific causes;
- The simplification of the algorithms by the adoption of a user-friendly linear format and the reduction in the use of colour;
- The inclusion of alcohol intoxication, post-ictal state and the exclusion of traumatic cause from the guideline;
- The provision of specific guidance on the management of children presenting with a decreased conscious level to district general hospitals and paediatric wards rather than only to emergency department settings.

Training

The respondents focused on several areas related to the need for increased training in the use of the guideline such as:

- The incorporation of education sessions on the guideline in the junior doctors and trainees teaching programme; and
- The provision of education materials including posters and a Powerpoint presentation on the guideline for use in teaching.

Increased awareness and wider dissemination

There was a great emphasis on the importance of increasing staff awareness of the guideline and several of the clinicians suggested that there was a need to raise the awareness of the guideline by wider dissemination to front-line staff including junior doctors and nurses.

