Pediatric Prehospital Safety **E**vent **D**etection **S**ystem (PEDS)

A chart review tool to identify adverse safety events

Reference manual

Introduction

This reference manual accompanies the PEDS chart review tool, which is designed to capture adverse safety events in the prehospital care of children. The act of responding to a call and providing care may have resulted in a safety event. Professionals talk about these events in different ways and use different terms to describe them, and this reference manual provides guidance to reviewers.

The manual provides question-by-question guidance for reviewers, as well as clinical guidance to help reviewers decide what constitutes a safety event.

A gray background is used in the tool and in this reference manual to denote questions that can be answered by a non-clinical data abstractor (like a research or administrative assistant).

The PEDS tool and manual will be periodically updated. To avoid confusion, please ensure that the tool and manual versions correspond to each other. For updated materials, please visit http://storc.org/PEDS/.

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References

Meckler G, Hansen M, Lambert W, O'Brien K, Dickinson C, Dickinson K, Van Otterloo J, Guise JM. Patient Safety Events in the Out-of-Hospital Care of Children: Results of the Children's Safety Initiative Chart Review (submitted for publication, 2017).

Eriksson C, Ovregaard N, Hansen M, Meckler G, Skarica B, Guise JM. A seven-minute chart review tool to identify pediatric adverse safety events (submitted for publication, 2017).

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Instructions for completing chart review

Section 1. Case identification and clinical background

General guidance for Section 1

The PEDS chart review tool relies on the EMS patient care report, where EMS personnel document the patient's status and any interventions. This section of the tool supports abstraction of background information, including patient characteristics and the reviewer's impression of the primary diagnosis. Questions with a gray background may be completed by a non-clinical data abstractor.

There may be cases where there is both an ambulance and fire chart, in this case please use the ambulance chart as the primary source for data collection and the fire chart as a secondary source. If something is not documented, please assume that it did not occur.

Guidance for specific questions in Section 1

1.1 Clinical reviewer name: Enter your name, initials, or another identifier. For ease of analysis and quality control, please use the same identifier every time you complete a chart review.

1.2 Non-clinical reviewer name (optional): If there is a non-clinical data abstractor, enter your name, initials, or another identifier. For ease of analysis and quality control, please use the same identifier every time you complete a chart review.

1.3 Case ID: Assign a unique identifier to each case. We suggest the following format: AA-BBBB

a. AA is your 2-digit site or agency identifier (if applicable).
b. BBBB is a 4-digit identifier for the transport. To protect patient privacy, this identifier should not contain protected health information like date of birth or social security number. If you need to link the Case ID to a specific chart, we suggest creating a separate password-protected linkage file that contains the Case ID and patient identifiers used by the ambulance or fire agency.

1.4 Reason for dispatch: This may be identified in patient care reports as “nature of call” or “chief complaint”.

1.5 Time of arrival on scene: Hour and minute that the team arrived on scene. For ease of analysis, we recommend using 24-hour time and entering only numbers in this field (for example, 1700 instead of 5:00pm).

1.6 Time of arrival to hospital: Hour and minute that the team arrived at hospital. For ease of analysis, we recommend using 24-hour time and entering only numbers in this field (for example, 1700 instead of 5:00pm). In cases where the call does not end at the hospital (for example if a patient dies on scene or the team hands over care to another agency’s team before arrival at the hospital), please enter the time that most appropriately indicates the end of patient care by the prehospital team you are evaluating.

1.7 Transport code priority: Transport priority (sometimes called “emergency response code”) assigned by dispatcher, either Emergency (also known as “Code 3” or “lights and sirens”) or Non-emergency.

1.8 Age: Enter patient age, using whatever time units make most sense.

1.9 Sex: Enter patient gender.

1.10 Weight: Enter patient weight if available; be sure to use appropriate units (lb or kg).

1.11 Length: Enter patient length, using whatever units make most sense. If no number is documented but a category was assigned using a system based on length or age (for example, Broselow or Handtevy), please document that category instead.

1.12 Primary diagnosis: Enter the primary diagnosis for this case. Use your judgment, even if you disagree with the prehospital care team. Select from the options shown in tool. “Other” can be used if your primary diagnosis is not captured in the options provided; in that case, please write your diagnosis in the space provided. Please indicate whether your diagnosis matches the EMS impression and/or management.

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Sections 2-4. Identification of adverse safety events

In each of these sections, please document whether you think an adverse safety event occurred. Since multiple events may have occurred in the care of one patient, please continue through all sections even after identifying an event.

Instructions for completing chart review
Section 2. Assessment, diagnosis, and clinical decision-making

General guidance for Section 2

"Assessment, diagnosis, and clinical decision-making" refers to the assessment and diagnosis of the patient (for example, recognizing abnormal vital signs, or distinguishing croup from asthma), and the decisions made regarding the patient's care. For example, a child with stridor from croup could be incorrectly assessed as having wheezing from asthma, which would result in inappropriate subsequent management of the patient.

History: Consider whether the clinical history is adequate. Is the documented history sufficient to understand what occurred and what should have occurred? Is there an adequate description of why the patient is sick, and does the description justify the care that was documented?

Physical exam: While a complete physical exam may not be necessary for every patient, key components related to the chief complaint should be documented to justify the assessment and management. Examples of important physical exam components for selected complaints:

- Respiratory distress: Presence of spontaneous breathing, chest rise or air movement, evidence of respiratory distress, description of breath sounds (an exam does not have to include all of these, but should provide an idea of the patient's status)
- Altered mental status: Description of neurologic status, or GCS score
- Traumatic injuries: Description of injured body part

Vital signs: Does the narrative provide sufficient information to indicate the approximate range of vital signs (for example, uncompensated shock vs. normal hemodynamics)? Because charting often happens retrospectively, delayed documentation of exact vital signs does not (by itself) constitute an UNSEM. However, if there is delayed documentation of an abnormal vital sign (for example, hypotension), and it is accompanied by delayed action to correct the vital sign abnormality, that would constitute an UNSEM.

Guidance for specific questions in Section 2

2.1 Identification of an adverse safety event: Based on EMS charting, please use your clinical judgment to determine if there was a safety event related to assessment, diagnosis, and/or clinical decision-making. If you select "No", please move on to Question 2.3. If you select "Yes", please specify whether this safety event was an unintended injury or consequence (not solely by disease process), near miss (not a planned event), suboptimal action (an action that can be improved), error, management complication, or other. Please provide details of the safety event in the space provided.

2.2 Details of adverse safety event: If you identified an adverse safety event in the previous question, please select any and all issues that may be related to this event. If you identified additional issues related to this event beyond the provided choices, please document this under "Other".

2.3 Resuscitation protocols: Please select any resuscitation protocols used during the call. Please specify whether each resuscitation protocol was indicated. Also please document any delays,

omitted steps, and incorrect sequence. If you identify any issues, including inappropriate use or non-use of a resuscitation protocol or algorithm, please ensure that you have also identified and described these safety events in Questions 2.1 and 2.2.

2.4 Potential harm from adverse safety event: Using your best clinical judgment, select what level of harm the safety event *could have* caused: no harm, mild temporary harm, or permanent or severe harm. Some safety events do not have the potential to cause harm (like documenting the wrong weight for a child who did not require any interventions or medications), while others have the potential to cause death or permanent harm (like giving a 10-fold epinephrine overdose).

2.5 Preventability of adverse safety event: Given the information EMS had at the time and your best clinical judgment, rank the preventability of the UNSEM on a scale of 1 to 10, where 1 is not at all preventable and 10 is completely preventable.

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Section 3. Procedures and interventions

General guidance for Section 3

This section focuses on procedures (like IV or IO access, defibrillation, or cervical collar placement), as well as airway interventions (from blow-by oxygen to endotracheal intubation). Airway management problems are prevalent and potentially very harmful in critically ill or injured children, and for this reason the PEDS tool places special emphasis on airway interventions.

Determining whether a procedure or intervention was appropriate is sometimes straightforward, as in the case of defibrillation for ventricular fibrillation. However, there are many situations where there is no consensus as to the appropriate intervention (e.g., blow-by oxygen vs nasal cannula for mild hypoxemia). In these situations, the determination that an adverse safety event occurred should be reserved for situations where there was clear deviation from ideal practice.

Guidance for specific questions in Section 3

3.1 Procedures and airway interventions performed: This question contains three tables (procedures, basic airway interventions, and advanced airway interventions) to identify procedures and interventions that were used or should have been used during the care episode. The “Used” column may be completed by a non-clinical data abstractor; the remainder of the table should be completed by a clinical reviewer. For each procedure or intervention, please document whether it was used and whether use was indicated. It’s essential to identify procedures and interventions that were either used without being indicated, or indicated but not used; both of these situations constitute an adverse safety event. Inappropriately delayed procedures or interventions, or technical issues (like too many attempts, or incorrect equipment size) also should be documented as adverse safety events in Question 3.3.

3.2 Confirmation of advanced airway placement: Please select all methods documented by the prehospital personnel to confirm correct airway placement.

3.3 Identification of an adverse safety event: Based on EMS charting, please use your clinical judgment to determine if there was a safety event related to procedures or interventions. If you select "No", please move on to Section 3. If you select "Yes", please specify whether this safety event was an unintended injury or consequence (not solely by disease process), near miss (not a planned event), suboptimal action (an action that can be improved), error, management complication, or other. Please provide details of the safety event in the space provided.

3.4 Details of adverse safety event: If you identified an adverse safety event in the previous question, please select any specific issues you identified. If you identified additional issues related to this event beyond the provided choices, please document this under "Other".

3.5 Potential harm from adverse safety event: Using your best clinical judgment, select what level of harm the safety event *could have* caused: no harm, mild temporary harm, or permanent or severe harm. Some safety events may not have the potential to cause harm, while others have the potential to cause death or permanent harm (like failing to defibrillate a child with ventricular fibrillation).

3.6 Preventability of adverse safety event: Given the information EMS had at the time and your best clinical judgment, rank the preventability of the UNSEM on a scale of 1 to 10, where 1 is not at all preventable and 10 is completely preventable.

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Section 4. Medications and fluids

General guidance for Section 4

This section focuses on identifying issues with medications and fluids that were administered during the care episode. If no medications or fluids were administered but should have been, please document this as an adverse safety event in Section 2: Assessment, diagnosis, and clinical decision-making.

Guidance for specific questions in Section 4

4.1 Medication administration: Please indicate whether any medications were administered during the EMS care episode. This should not include fluids. This question can be answered by a non-clinical data abstractor. If no medications were administered, please proceed to Question 4.7.

4.2 Medication details: Please identify all medications administered during the call in the table, as well as time of administration, dose, and route (and concentration for epinephrine). This table may be filled out by a non-clinical data abstractor. Please use the blank rows to document medications not listed in the table (or additional administrations of medications, if necessary).

4.3 Identification of an adverse safety event: Based on EMS charting, please use your clinical judgment to determine if there was a safety event related to medication administration. If you select "No", please move on to Question 4.7. If you select "Yes", please specify whether this safety event was an unintended injury or consequence (not solely by disease process), near miss (not a planned event), suboptimal action (an action that can be improved), error, management complication, or other. Please provide details of the safety event in the space provided.

4.4 Details of adverse safety event: If you identified an adverse safety event in the previous question, please select any specific issues you identified. If you identified additional issues related to this event beyond the provided choices, please document this under "Other".

4.5 Potential harm from adverse safety event: Using your best clinical judgment, select what level of harm the safety event *could have* caused: no harm, mild temporary harm, or permanent or severe harm. Some safety events may not have the potential to cause harm, while others have the potential to cause death or permanent harm (like giving a 10-fold overdose of morphine).

4.6 Preventability of adverse safety event: Given the information EMS had at the time and your best clinical judgment, rank the preventability of the UNSEM on a scale of 1 to 10, where 1 is not at all preventable and 10 is completely preventable.

4.7 Fluids administered: Please indicate whether any fluids were administered during the EMS care episode. If no fluids were administered please proceed to Section 5. If fluids were administered, please specify route and volume. This question can be answered by a non-clinical data abstractor.

4.8 Identification of an adverse safety event: Based on EMS charting, please use your clinical judgment to determine if there was a safety event related to fluid administration. If you select "No", please move on to Section 5. If you select "Yes", please specify whether this safety event was an unintended injury or consequence (not solely by disease process), near miss (not a planned event), suboptimal action (an action that can be improved), error, management complication, or other. Please provide details of the safety event in the space provided.

4.9 Details of adverse safety event: If you identified an adverse safety event in the previous question, please select any specific issues you identified. If you identified additional issues related to this event beyond the provided choices, please document this under "Other".

4.10 Potential harm from adverse safety event: Using your best clinical judgment, select what level of harm the safety event *could have* caused: no harm, mild temporary harm, or permanent or severe harm. Some safety events may not have the potential to cause harm, while others have the potential to cause death or permanent harm (like volume resuscitation with inappropriate fluid).

4.11 Preventability of adverse safety event: Given the information EMS had at the time and your best clinical judgment, rank the preventability of the UNSEM on a scale of 1 to 10, where 1 is not at all preventable and 10 is completely preventable.

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Section 5. Overall assessment

General guidance for Section 5

In this section, please report your overall impression regarding the primary factor leading to any adverse safety events, as well as the domains that most contributed to the events. You may need to reference the previous sections of the tool to answer these questions.

Guidance for specific questions in Section 5

5.1 Primary factor leading to adverse safety event: If one or more adverse safety events occurred, please describe the primary factor that likely lead to the event(s). For example, the team may have used an inappropriate cardiac arrest resuscitation protocol, which led to administration of inappropriate medications. Or the team may have misdiagnosed croup as asthma, leading to failure to provide potentially life-saving treatment.

5.2. Adverse safety event domain ranking: If one or more adverse safety events occurred, please rank the domains in order of importance of each domain's contribution to the event. For example, if issues in the "Assessment, diagnosis, clinical decision-making" domain were most important in leading to safety events, please rank that domain #1.

Guidance for determining presence of an adverse safety event

There is often not very much data to drive decision-making in the prehospital care of children, and opinions may vary regarding what care truly represents an adverse safety event. The following information provides guidance for dealing with specific situations where this may occur. This guidance is based on a combination of current guidelines, current literature, and expert opinion. When local practice varies from what is described below, users of the PEDS tool may need to adapt this guidance to make it more applicable to local use.

Transport code priority

- For trauma patients with any abnormal vital signs or GCS, the expectation is that they are to be transported code 3 (lights and sirens). If the patient has normal vital signs, code 1 transport is appropriate.
- Inappropriate transport code is a near-miss with no harm likely unless the ambulance crashed, in which case it would classify as an error with potentially permanent or severe harm.

History

- Adverse safety events in history taking are generally suboptimal actions unless they have direct relevance to emergency care, in which case lack of appropriate history should be considered an error with potentially permanent or severe harm. Examples of this kind of error would be failing to note mechanism of trauma.

Weight

- Failure to obtain a correct patient weight (obtained either by history or a length- or age-based approximation) in a patient that is <12 years old or not near adult size should generally be considered a suboptimal action with no harm likely. If the patient's weight has direct relevance to emergency care (for example, medications are being given), failure to obtain a weight is an error with potentially permanent or severe harm.

Vital sign documentation

- Delay in vital sign documentation of >5 minutes is suboptimal (with no harm likely) unless there is a significant trauma mechanism or illness (in those cases, delayed vital sign documentation is an error with potentially permanent or severe harm). If there are scene safety issues or prolonged extrication, delayed vital sign documentation is assumed to be appropriate.
- Failure to document pulse oximetry is an error with potentially permanent or severe harm in certain circumstances (e.g., GSW to chest, severe respiratory distress, altered mental status).

Physical exam

- Failure to document any key aspect of the physical exam is an error. This includes failure to document neurologic status (or GCS) for a patient with altered mental status.

Blood glucose checks

- Failure to check blood glucose in an actively seizing patient, or in a patient with abnormal mental status (or GCS <14) without alternative explanation (like trauma or meningitis) is an error with potentially permanent or severe harm.

Cervical spine immobilization

- Immobilization is considered necessary when there is a:
    - Mechanism such as a fall from greater than 10 feet, motor vehicle accident or pedestrian/bicyclist struck by motor vehicle AND either of the following:
        - any spinal deformity, midline neck pain, tenderness, or torticollis
        - OR unreliable exam due to patient's inability to verbally communicate appropriately (due to age, intoxication, developmental ability, distracting injuries, etc.)
- Unless local EMS practice is different, failure to appropriately immobilize the cervical spine is an error with potentially permanent or severe harm
    - Crying or combative children who are alert and active may not warrant c-spine precautions as it may cause more harm to the child during transport

Airway interventions

- Administration of supplemental oxygen is appropriate for patients with altered mental status, thoracic trauma, baseline oxygen requirement, or vital sign abnormalities; unnecessary oxygen is a suboptimal action with no potential for harm.
- Intubation of a patient with seizure or altered mental status is indicated in any of the following settings:
    - Documented hypoventilation
    - Concern for poor airway protection (e.g., GCS 8 or less, continuing generalized tonic-clonic seizure)
    - Inadequate ability to support ventilation or oxygenation with bag-valve-mask ventilation
- Any unnecessary intubation is an error with potentially permanent or severe harm.

Procedures

- Failure to establish IV or IO access is an error when IV fluids or medication are indicated and there is no reasonable alternative. Severity level will depend on the clinical context.
- If there are three or more IV attempts, this is usually considered a suboptimal action with no potential for harm. If the patient is critically ill, 3 or more IV attempts without an IO attempt is an error with potentially permanent or severe harm.

IV fluids

- If a trauma victim is hypotensive, no volume resuscitation or inadequate resuscitation (would expect at least 20 ml/kg volume resuscitation unless the transport was very short) is an error with potentially permanent or severe harm.

Medications

- Medication overdose or underdosing (at least 20% outside of standard dosing) is considered an error. Severity level will depend on the clinical context. More minor overdosing or underdosing may be considered an adverse safety event depending on the clinical context.
- Medication delays are considered an error. Determination of whether a medication was delayed should depend on the clinical context. For example, failure to give epinephrine within 5 minutes of arrival to the scene of a child with cardiac arrest would be considered an error (in this case, with potentially permanent or severe harm).
- Administration of a long-acting paralytic medication to a continuously seizing patient is considered an error with potentially permanent or severe harm.