The PECARN Incident Reporting System: Overview and Preliminary Findings

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Incident analysis is an important component of high reliability organizations.

Hospitals…

- Generate incident reports
- Analyze IRs
- Resolve issues
- Provide feedback to staff

DO NOT share data or lessons learned
To develop a robust, multi-institutional incident reporting and analysis structure within the PECARN network

To categorize IRs by
- Type and subtype
- Severity of harm to the patient
- Primary service involved
- Contributing factors

To learn something about recurring events to attempt to improve patient safety
19 of 22 PECARN hospitals obtained IRB and legal approval to submit IRs

Monthly IRs are de-identified and sent to the DCC

Randomly assigned for independent review by 2 investigators

Discordant reviews resolved by consensus
Results

- 3106 IRs submitted in the first year
- Descriptive analyses
- Focus on medications today
Variation in Reporting

Incident reporting rate by site

Mean ± 1 SD

Mean site reporting rate

Incident Reports per 1000 patients

Mean − 1 SD
Improvement over Time

Monthly Incident Reports for All Sites

IRs per 1000 patients

Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun
Data Completeness

- Type of incident (98%)
- Severity (83%)
- Primary service involved (57%)
- Contributing factors (86%)*

* Only 41% of IRs had clearly identified contributing factors
Most Common Events

- Laboratory errors (33%)
- Medication errors (16%)
- Radiology (16%)
- Process variance (13%)
## Medication Errors

<table>
<thead>
<tr>
<th>Event Type</th>
<th>N</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wrong dose</td>
<td>234</td>
<td>(40.2%)</td>
</tr>
<tr>
<td>Wrong medication</td>
<td>102</td>
<td>(17.5%)</td>
</tr>
<tr>
<td>Delayed or missing</td>
<td>87</td>
<td>(15.0%)</td>
</tr>
<tr>
<td>Allergy*</td>
<td>43</td>
<td>(7.4%)</td>
</tr>
<tr>
<td>Wrong patient</td>
<td>34</td>
<td>(5.8%)</td>
</tr>
<tr>
<td>Adverse reaction, not allergy</td>
<td>17</td>
<td>(2.9%)</td>
</tr>
</tbody>
</table>
## Medication Errors

<table>
<thead>
<tr>
<th>Medication Type</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anti-infective</td>
<td>145 (25%)</td>
</tr>
<tr>
<td>Analgesics</td>
<td>123 (21%)</td>
</tr>
<tr>
<td>IV fluids</td>
<td>71 (12%)</td>
</tr>
<tr>
<td>Respiratory</td>
<td>60 (10%)</td>
</tr>
<tr>
<td>Cardiovascular</td>
<td>26 (4%)</td>
</tr>
<tr>
<td>Sedatives</td>
<td>23 (4%)</td>
</tr>
<tr>
<td>Anticonvulsants</td>
<td>17 (3%)</td>
</tr>
</tbody>
</table>
## Medication Errors

<table>
<thead>
<tr>
<th>Severity</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unsafe condition</td>
<td>31 (5%)</td>
</tr>
<tr>
<td>Near miss</td>
<td>143 (25%)</td>
</tr>
<tr>
<td>Event without harm</td>
<td>276 (47%)</td>
</tr>
<tr>
<td>Temporary harm</td>
<td>77 (13%)</td>
</tr>
<tr>
<td>Permanent harm</td>
<td>0</td>
</tr>
<tr>
<td>Unknown impact</td>
<td>54 (9%)</td>
</tr>
</tbody>
</table>
Recurring Themes

- **Medication errors**
  - Pounds vs. kg errors
  - Failure to divide total daily dose
  - Decimal point errors
  - Exceeded adult maximum
  - Failure to heed known allergies
  - **Wrong medication**
    - Look alike/sound alike
    - Dispenser stocking errors
Recurring Themes

- Laboratory errors
  - Lost specimens leading to delays in care
  - **Wrong patient**
  - Unlabeled specimens
  - Otherwise labeled incorrectly
Recurring Themes

- Radiology errors
  - Misreads
  - Delays
  - **Wrong patient**
Recurring Themes

- **Human error**
  - Communication
  - Failure to adhere to established procedure
  - Clinical judgment

- **Systems errors**
  - Lack of standardization
  - Manufacturing issues
  - Lack of forcing functions
Limitations

- Voluntary reporting
- Large variation in
  - Rate
  - Quality
  - Diversity
- Contributing factors clearly identified in only 41%
- Limited analysis/resolution data
- Cannot link data to medical records
- Nevertheless, IRs provide reasonable qualitative data to steer improvements
My Safety Wish List

- Standardization
  - kg (m²) only in children
  - Published references
    - Single dose versus daily dose
    - Maximum doses in pediatric section
- Eliminate calculations (e.g. Broselow-Luten)
- Bar coding or other forcing functions

- Safety culture
  - Team skills (communication)
  - Adherence to accepted behavioral standards
  - Principles of high reliability organization
Human Error

Local triggers
Intrinsic defects
Atypical conditions

Latent failures at the managerial levels
Psychological precursors
Unsafe acts

Trajectory of accident opportunity

Defence-in-depth