2019 Pennsylvania Patient Safety Reporting

An Analysis of Serious Events and Incidents from the Nation’s Largest Event Reporting Database

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Pennsylvania is the only state that requires acute healthcare facilities to report all events of harm or potential for harm. With over 3.6 million acute care event reports, the Pennsylvania Patient Safety Reporting System (PA-PSRS) is the largest repository of patient safety data in the United States and one of the largest in the world. Of the 293,400 patient safety event reports submitted by Pennsylvania’s acute care facilities in 2019, 97% were from hospitals, and 3% were from ambulatory surgical facilities (ASPs).

The vast majority of these reports were Incidents (284,847), rather than Serious Events (8,553). Reporting rates for both hospitals and ASPs increased 26% from 2015 to 2019, which is likely due to changes in reporting guidance in 2015. For each of the last five years, the most frequently reported event type was “Error Related to Procedure/Treatment/Test,” (EFTT), with this event type accounting for 33% of all submitted acute care event reports in 2019. “Medication Error,” “Complication of Procedure/Treatment/Test” and “Fall” events were also reported frequently, accounting for 18%, 16%, and 11% of all submitted event reports in 2019, respectively.

The increase in reporting rates each year may reflect improvements in patient safety culture across the Commonwealth, and the analysis within this article highlights a number of areas in which continued patient safety efforts can be applied to reduce harm in acute care settings.

Method

The data from PA-PSRS event reports were extracted on January 30, 2020 to include all reports submitted during calendar year 2019. We also obtained data from the Pennsylvania Health Care Cost Containment Council (PHC4), and those data represent January 1 through June 30, 2019. Therefore, any 2019 rates based on PHC4 data used to normalize reporting trends were estimated via projections of Q3 and Q4 2019, which were based on the rates of increase for the 2018 quarters.

Results

Harm Scores

Harm scores are assigned by healthcare facilities at the time of reporting. Table 1 describes the categories of harm.
How Patient Safety Events Are Reported in Pennsylvania

Event Occurs

Was there an injury?

Yes

No

Was the near miss or hazardous condition caused by an error?

Yes

No

Was the adverse event caused by an error?

Yes

No

Was the injury anticipated, like a complication that is expected due to the patient being at higher risk, or unanticipated, like an allergic reaction to a new medication?

Yes

No

Did the patient require additional healthcare services, like a new treatment requiring a physician’s order or an extended length of stay?

Yes

No

Not Reported

Reported as an Incident

Reported as a Serious Event

Reported as an Incident

A patient day is the basic unit to show the total amount of time someone is in the hospital. If Mr. Smith is admitted to a hospital and spends three days there, that would be counted as three patient days.

In 2019, there were an estimated 8,800,000 patient days for Pennsylvania hospitals and an 284,165 reported events (1 reported event for every 31 patient days).

Of those 284,165 reported events, only 2% were Serious Events, meaning the vast majority of reported events in Pennsylvania are Incidents.
The distribution of all events by harm score submitted during years 2017–2019 is shown in Figure 4 and Table 4. Consistently, the largest number of acute care events are reported with a harm score of C (4 out of every 10), followed by harm scores D, B2, and A. Together, these four harm scores account for 96% of all event reports submitted during years 2017–2019. Also, among Serious Event reports, approximately two-thirds are classified as harm score E.

Next, the High Harm reports are trended over time along with the total for all reports (Figure 5 and Table 3). While the total number of reports submitted each year is on a linear increasing trend, the number of High Harm events has decreased by 311 (43%) from 2005 to 2019. The decrease was sharper from 2005–2013 and plateaued during 2012–2019. The number of High Harm events increased from 343 in 2018 to 415 in 2019 (a 21% increase). However, this increase was not unexpected given the trend for High Harm events reported over time. The number of High Harm events reported in 2018 was lower than expected by the trend, which may be responsible for the larger than expected increase between 2018 and 2019.

Reporting Rates

In addition to looking at increases or decreases in the total number of acute care events, normalized data—such as rates—can be used to assess changes in reporting per patient days for hospitals and per surgical encounters for ambulatory surgical facilities (ASFs). As shown in Figure 6, ASFs have a higher rate of reporting Serious Events compared to hospitals. The reporting rate for both hospitals and ASFs (Figure 7) increased 26% from 2015 to 2019 (a 21% increase). However, this increase was not unexpected given the trend for Serious Event reports over time. The number of Serious Event reports reported in 2018 was lower than expected by the trend, which may be responsible for the larger than expected increase between 2018 and 2019.

Event Types

When a report of an Incident or Serious Event is submitted to PA-PSRS, an event type along with one or two more levels of subtype are chosen to reflect the nature of the event.

scores across an increasing level of patient harm. Harm scores A through D are classified as Incidents, harm scores E through I are classified as Serious Events, and harm scores G, H, and I are considered High Harm events. Table 2 shows a breakdown of Incidents and Serious Events by facility type from the last three years.

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Event Types

When a report of an Incident or Serious Event is submitted to PA-PSRS, an event type along with one or two more levels of subtype are chosen to reflect the nature of the event.
### Figure 8: Number of Reports Submitted by Event Type in Descending Order by 2019 Frequency

<table>
<thead>
<tr>
<th>Event Type</th>
<th>2019</th>
<th>2018</th>
<th>2017</th>
<th>2016</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Error Related to Procedure/ Treatment/ Test</td>
<td>89,154</td>
<td>80,103</td>
<td>73,961</td>
<td>63,132</td>
<td>57,884</td>
</tr>
<tr>
<td>Medication Error</td>
<td>43,742</td>
<td>48,546</td>
<td>51,979</td>
<td>62,788</td>
<td>61,323</td>
</tr>
<tr>
<td>Complication of Procedure/ Treatment/ Test</td>
<td>37,984</td>
<td>40,461</td>
<td>43,202</td>
<td>46,520</td>
<td>41,794</td>
</tr>
<tr>
<td>Fall</td>
<td>34,992</td>
<td>34,041</td>
<td>33,657</td>
<td>31,699</td>
<td>33,997</td>
</tr>
<tr>
<td>Other/ Miscellaneous</td>
<td>24,467</td>
<td>24,131</td>
<td>21,792</td>
<td>22,691</td>
<td>20,200</td>
</tr>
<tr>
<td>Skin Integrity</td>
<td>20,494</td>
<td>20,897</td>
<td>19,982</td>
<td>17,984</td>
<td>12,000</td>
</tr>
<tr>
<td>Equipment/ Supplies/ Devices</td>
<td>6,360</td>
<td>4,994</td>
<td>4,894</td>
<td>7,985</td>
<td>8,730</td>
</tr>
<tr>
<td>Transfusion</td>
<td>3,245</td>
<td>4,284</td>
<td>5,017</td>
<td>6,264</td>
<td>6,180</td>
</tr>
<tr>
<td>Adverse Drug Reaction (Not a Medication Error)</td>
<td>5,065</td>
<td>5,672</td>
<td>5,669</td>
<td>5,958</td>
<td>5,682</td>
</tr>
<tr>
<td>Patient Self-Harm</td>
<td>599</td>
<td>1,549</td>
<td>2,136</td>
<td>2,439</td>
<td>2,179</td>
</tr>
</tbody>
</table>

### Figure 9: Number of Serious Event Reports for Error Related to P/T/T by Sub Type in Descending Order by 2019 Frequency

<table>
<thead>
<tr>
<th>Sub Type</th>
<th>2019</th>
<th>2018</th>
<th>2017</th>
<th>2016</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgery/ Invasive Procedure Problem</td>
<td>828</td>
<td>630</td>
<td>550</td>
<td>508</td>
<td>519</td>
</tr>
<tr>
<td>Respiratory Care</td>
<td>54</td>
<td>39</td>
<td>23</td>
<td>15</td>
<td>10</td>
</tr>
<tr>
<td>Radiology/ Imaging Test Problem</td>
<td>49</td>
<td>43</td>
<td>40</td>
<td>42</td>
<td>49</td>
</tr>
<tr>
<td>Laboratory Test Problem</td>
<td>10</td>
<td>27</td>
<td>33</td>
<td>15</td>
<td>8</td>
</tr>
<tr>
<td>Referral/ Consult Problem</td>
<td>4</td>
<td>8</td>
<td>4</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Dietary</td>
<td>7</td>
<td>6</td>
<td>3</td>
<td>4</td>
<td>8</td>
</tr>
</tbody>
</table>

0 100 200 300 400 500
### Figure 10: Number of Serious Event Reports for Medication Error by Sub Type in Descending Order by 2019 Frequency

<table>
<thead>
<tr>
<th>Sub Type</th>
<th>2019</th>
<th>2018</th>
<th>2017</th>
<th>2016</th>
<th>2015</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wrong*</td>
<td>103</td>
<td>93</td>
<td>87</td>
<td>87</td>
<td>94</td>
<td>462</td>
</tr>
<tr>
<td>Extra Dose</td>
<td>22</td>
<td>21</td>
<td>15</td>
<td>13</td>
<td>12</td>
<td>65</td>
</tr>
<tr>
<td>Other (Specify)</td>
<td>34</td>
<td>27</td>
<td>26</td>
<td>20</td>
<td>19</td>
<td>116</td>
</tr>
<tr>
<td>Dose Omission</td>
<td>20</td>
<td>18</td>
<td>12</td>
<td>14</td>
<td>12</td>
<td>74</td>
</tr>
<tr>
<td>Monitoring Error (Contraindicated Drugs)</td>
<td>18</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>76</td>
</tr>
<tr>
<td>Medication List Incorrect</td>
<td>12</td>
<td>9</td>
<td>7</td>
<td>11</td>
<td>9</td>
<td>59</td>
</tr>
<tr>
<td>Prescription/Refill Delayed</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>13</td>
</tr>
<tr>
<td>Unauthorized Drug</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Inadequate Pain Mgmt.</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

*Wrong covers several types of events such as wrong dose, drug, dosage form, rate, time, route, concentration, etc.

### Figure 11: Number of Serious Event Reports for P/T/T by Sub Type in Descending Order by 2019 Frequency

<table>
<thead>
<tr>
<th>Sub Type</th>
<th>2019</th>
<th>2018</th>
<th>2017</th>
<th>2016</th>
<th>2015</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complication Following Surgery/Invasive Procedure</td>
<td>2,947</td>
<td>2,579</td>
<td>2,643</td>
<td>2,739</td>
<td>2,739</td>
<td>13,409</td>
</tr>
<tr>
<td>Other (Specify)</td>
<td>312</td>
<td>242</td>
<td>242</td>
<td>247</td>
<td>194</td>
<td>1,247</td>
</tr>
<tr>
<td>Healthcare-Associated Infection*</td>
<td>229</td>
<td>143</td>
<td>110</td>
<td>75</td>
<td>75</td>
<td>607</td>
</tr>
<tr>
<td>IV Site Complication (Phlebitis, Bruising, Infarction)</td>
<td>222</td>
<td>233</td>
<td>221</td>
<td>234</td>
<td>219</td>
<td>1,129</td>
</tr>
<tr>
<td>Anesthesia Event</td>
<td>202</td>
<td>174</td>
<td>117</td>
<td>95</td>
<td>71</td>
<td>699</td>
</tr>
<tr>
<td>Maternal Complication</td>
<td>150</td>
<td>152</td>
<td>134</td>
<td>129</td>
<td>101</td>
<td>657</td>
</tr>
<tr>
<td>Catheter/Tube Problem</td>
<td>118</td>
<td>76</td>
<td>81</td>
<td>73</td>
<td>79</td>
<td>403</td>
</tr>
<tr>
<td>Neonatal Complication</td>
<td>77</td>
<td>34</td>
<td>54</td>
<td>35</td>
<td>34</td>
<td>206</td>
</tr>
<tr>
<td>Emergency Department</td>
<td>56</td>
<td>35</td>
<td>37</td>
<td>38</td>
<td>60</td>
<td>217</td>
</tr>
<tr>
<td>Cardiopulmonary Arrest Outside of ICU Setting</td>
<td>39</td>
<td>35</td>
<td>38</td>
<td>60</td>
<td>68</td>
<td>270</td>
</tr>
<tr>
<td>Extravasation of Drug/Radiologic Contrast</td>
<td>32</td>
<td>36</td>
<td>35</td>
<td>31</td>
<td>27</td>
<td>161</td>
</tr>
<tr>
<td>Onset of Hypoglycemia During Care</td>
<td>32</td>
<td>31</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>154</td>
</tr>
</tbody>
</table>

*Includes only healthcare-associated infections (HAIs) reported in PA-PSRS; Does not include infections reported by hospitals to CDC’s National Healthcare Safety Network (NHSN)

*Wrong covers several types of events such as wrong dose, drug, dosage form, rate, time, route, concentration, etc.
Events are defined by 288 possible combinations of event types and subtypes. In the PA-PSRS reporting taxonomy for Incidents and Serious Events, there are 10 main event types, and Figure 9 shows the number of reports submitted for each event type over the past five years. For each of the last five years, the most prevalent event type was “Error related to Procedure/Treatment/Test,” in 2019, this event type accounted for 96,207 reports, which accounted for 33% of all submitted acute care event reports. This category of event type has shown an increase each year since 2015 and an overall increase of 57% from 2015 to 2019.

The second most prevalent event type was “Complication of Procedure/Treatment/Test,” with 52,788 reports submitted in 2019, which was 18% of all submitted reports. The third most prevalent event type was “Medication Error.” This event type accounted for 46,550 reports in 2019, which accounted for 16% of all submitted reports. Finally, event type “Fall” accounted for 11% of all reports submitted in 2019.

Across all event reports, an increase in laboratory test problems drives the increase in the Error Related to Procedure/Treatment/Test category. However, according to Figure 9, laboratory test problems are not associated with an increase in Serious Events. The increase in reports of laboratory test problems was predominately due to a few facilities with increasing attention to specimen quality issues that did not cause harm to the patients.

Medication Error
Over half of all events involving medication errors are reported under the event subtype “Wrong.” However, as shown in Figure 10, there has been no increase in Serious Events in this subcategory of medication error reports.

Across all event reports, an increase in laboratory test problems drives the increase in the Error Related to Procedure/Treatment/Test category. However, according to Figure 9, laboratory test problems are not associated with an increase in Serious Events. The increase in reports of laboratory test problems was predominately due to a few facilities with increasing attention to specimen quality issues that did not cause harm to the patients.

FIGURE 12: NUMBER OF REPORTS SUBMITTED BY EVENT TYPE AND HARM SCORE BY YEAR

FIGURE 13: NUMBER OF EVENT REPORTS BY CARE AREA GROUP AND HARM SCORE – 2019

FIGURE 14: NUMBER OF EVENT REPORTS BY CARE AREA GROUP AND EVENT TYPE – 2019
Conclusion

There were 293,400 acute care events reported in PA-PSRS during 2019, representing a 3.2% increase over 2018. Reports of Incidents and Serious Events have increased each year since 2016. The number of reported high harm events has decreased from 726 in 2005 to 415 in 2019. The top four event types, accounting for more than three quarters of the acute event reports in 2019, are “Error Related to Procedure/Treatment/Test,” “Complication of Procedure/Treatment/Test,” and “Fall.” Overall, the increase in reporting rates each year may reflect improvements in patient safety culture across the Commonwealth, and the analysis within this article has highlighted a number of areas in which continued patient safety efforts can be applied to the greatest effect in acute care facilities.

Note: This analysis was exempted from review by the Advarra Institutional Review Board.

References


About the Authors

Shawn Kepner is a statistician at the Patient Safety Authority. Rebecca Jones is the director of Data Science and Research for the Patient Safety Authority. Regina Hoffman is the executive director of the Patient Safety Authority. Caitlyn Allen (caitallen@pa.gov) is the director of Engagement at the Patient Safety Authority. Daniel Glunk is the vice chair of the board of the Patient Safety Authority. Eric Weitz is a board member of the Patient Safety Authority. Stanton Smulens is the chair of the board of the Patient Safety Authority.

Complication of Procedure/Treatment/Test

Although the total number of events reported as Complications of Procedure/Treatment/Test has increased each year since 2015, Figure 11 shows that the associated Serious Events have had a small effect on the increase.

Event Type and Harm Score

Figure 12 contains submitted reports distributed by harm score for each of the 10 main event types. This is the first visualization in this article that cross tabulates the report counts across two of the main categorical topics mentioned at the beginning of this section. For the most prevalent event type, “Error related to Procedure/Treatment/Test,” harm score C is reported most frequently; the intersection of this event type and harm score was the most common in 2019, with a total of 50,972 events and representing 17% of all reported events. The next most common intersection is “Complication of Procedure/Treatment/Test” and harm score D, representing 27,798 events in 2019.

Care Area

Care area is an informative dimension to look at to determine whether there are indications of patient safety concerns specific to particular care areas. Within the acute care data, there are 179 care areas to capture where events occur. These care areas are placed into one of 23 possible care area groups in order to cross tabulate a more manageable number of category elements with other variables of interest. In Figure 13 we show a cross tabulation of care area group with harm score. Highlighting and shading is used to show the cells in which event report counts were concentrated in 2019. In this figure, the largest concentrations of event reports appear in the cross sections of the Med/Surg care area group and harm scores C and D. Also, Surgical Services is responsible for large portions of harm scores E and F. There are other insights that can be acquired by looking at the table across a row or down a column to see the distribution of event reports over a care area group or a harm score.

A cross tabulation of care area group and event type is provided in Figure 14. Almost half of the Medication Errors in 2019 were from the Med/Surg, Pediatric, and PICU care area groups. Also, the largest two concentrations of event reports are at the intersections of “Error Related to Procedure/Treatment/Test” with Surgical Services and Emergency care area groups. The Med/Surg, Laboratory, ICU, and Imaging/Diagnostic care area groups also contribute large numbers to the “Error Related to Procedure/Treatment/Test” event type.

Ambulatory Surgical Facilities

Hospitals submitted 97% of the 293,400 acute care event reports in 2019. Therefore, it is helpful to look at the facilities other than hospitals, which are grouped as Ambulatory Surgical Facilities (ASFs), comprised mostly of ambulatory surgical centers, along with abortion facilities and birthing centers. The distribution of event reports across the event types for ASFs is shown in Figure 15. ASFs show a different distribution compared to the overall data distributed in Figure 8. Compared to all reports, medication errors and falls drop down the list for ASFs. Also, the relatively large increases in reported errors related to procedures, treatments, and tests at ASFs is due in large part to an increase in reported cancellations of procedures.