The Impact of Utilizing Smart Pumps Operating on Outdated Drug Libraries
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BACKGROUND
• The data surrounding smart pumps operating on outdated drug libraries is limited.
• Abnormal infusion related processes cause smart pumps to fire alerts.
• Overwhelming amounts of alerts can cause a decrease in responsiveness, commonly known as alert fatigue.
• When alerts are overlooked, it can lead to harm in patient care.

OBJECTIVES
• To assess alert impact caused by smart pumps operating on outdated drug libraries within the HSHS Illinois region facilities.
• To update 50% of the outdated smart pumps located at St. Elizabeth’s Hospital.
• To educate the pharmacy department of the alert risk associated with outdated drug libraries.

METHODS

Study Design
• Retrospective, Descriptive Analysis
• Primary Measure: The number of alerts fired by outdated drug libraries versus updated drug libraries.
• Secondary Measure: The number of alerts reduced by updating smart pump drug libraries.

Inclusion Criteria
• BD Alaris Smart Pumps located in the HSHS Illinois Region.
• Both smart pumps operating on outdated and updated drug libraries were included.
• Outdated Pump: Any pump operating on a drug library earlier than 4/2021.
• Updated Pump: Any pump operating on the 4/2021 drug library.

Confounding Variables
• Smart pump activity of use
• Network Connectivity
• Smart pumps out of range

Data Analysis
• The BD Alaris Guardrails Suite produced the alert reports for all smart pumps.
• Microsoft Excel was utilized to combine all the alert reports into one table.
• The Pivot Table function provided by excel calculated the primary and secondary measures within the study design.

RESULTS

Figure 1: The number of outdated and updated pumps at each facility in 04/2021.

Figure 2: The total number of outdated and updated pumps combined for all facilities in 04/2021.

Table 1: The total number of alerts fired by outdated and updated pumps in 4/2021.

<table>
<thead>
<tr>
<th>Facility</th>
<th># of Pumps</th>
<th>Outdated Alerts</th>
<th>Updated Alerts</th>
<th>Total Alerts</th>
</tr>
</thead>
<tbody>
<tr>
<td>St John's</td>
<td>115</td>
<td>5657</td>
<td>5932</td>
<td>7191</td>
</tr>
<tr>
<td>St Francis</td>
<td>54</td>
<td>35184</td>
<td>357</td>
<td>35184</td>
</tr>
<tr>
<td>St Anthony's</td>
<td>558</td>
<td>1277</td>
<td>171</td>
<td>1448</td>
</tr>
<tr>
<td>Urbana Family</td>
<td>257</td>
<td>101</td>
<td>16</td>
<td>117</td>
</tr>
<tr>
<td>Highland</td>
<td>1277</td>
<td>19</td>
<td>82</td>
<td>201</td>
</tr>
<tr>
<td>Litchfield</td>
<td>271</td>
<td>17.5%</td>
<td>82.5%</td>
<td>1000</td>
</tr>
<tr>
<td>Breese</td>
<td>63</td>
<td>8</td>
<td>94</td>
<td>102</td>
</tr>
<tr>
<td>Holy Family</td>
<td>35</td>
<td>35</td>
<td>35</td>
<td>70</td>
</tr>
<tr>
<td>Shelbyville</td>
<td>10</td>
<td>3</td>
<td>7</td>
<td>10</td>
</tr>
<tr>
<td>Family Hospital</td>
<td>82</td>
<td>11</td>
<td>71</td>
<td>82</td>
</tr>
<tr>
<td>Anthony's Family</td>
<td>63</td>
<td>8</td>
<td>94</td>
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<tr>
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</tbody>
</table>

DISCUSSION
Smart Pump outcomes:
• A small majority of outdated pumps created a huge risk for alert fatigue.
• Only 17.5% of the total pumps contained outdated drug libraries, but they caused almost 80% of the alerts fired.
• If more pumps contained outdated drug libraries, the alarm volume and alert fatigue risk would have increased.

Locating Smart Pumps
• Radio frequency identification (RFID) technology was utilized to locate the outdated smart pumps at St. Elizabeth Hospital.
• Each smart pumps RFID tag number was entered into a real time location service (RTLS) entitled Enterprise View, to provide the last location tracked.
• Locating and updating 30 outdated smart pumps required a duration of 10 days.

Limitations to Providing Updates:
• Some pumps were actively being used by patients.
• Certain pumps lacked network connectivity.
• The last location identified for several pumps was not correct.
• Some pumps were not in the building possibly due to loss.
• St. Elizabeth O’Fallon is the only hospital in HSHS that utilizes RFID technology.
• The more pumps at the facility, the longer the update process will take.
• Geographics limited this study from being reproduced at other sites.

CONCLUSION
• Smart pumps operating on outdated drug libraries were capable of firing 20 more alerts than pumps operating on updated drug libraries.
• Updating smart pumps after each drug library update is vital to reduce the risk of alert fatigue in smart pump users.
• The St. Elizabeth pharmacy department is aware of the exact alert risk an outdated smart pump poses.