BACKGROUND

Anaphylaxis is a severe, potentially life-threatening allergic reaction which can lead to catastrophic outcomes (Greenberger, 2015). There is universal expert consensus that rapid intramuscular injection of epinephrine constitutes first-line treatment of anaphylaxis (Farbman et al., 2017). After leaving the hospital, patients are at risk for a biphasic reaction or reencountering the allergen that triggered the anaphylactic reaction that was treated in the Emergency Department (ED) (Lee, Bellolio, et al., 2015).

Anaphylaxis guidelines at children’s hospitals require that patients seen in the ED be discharged home with an Epinephrine auto-injector (EAI) (Lee et al., 2016).

LOCAL PROBLEM

Alfred I. duPont Hospital for Children (AIDP) is a tertiary children’s hospital located in suburban Delaware with an annual volume of 60,000 patients per year. Patients diagnosed with allergic reactions were discharged home with an EAI to be used in case of future exposures. These devices were dispensed from the ED automated medication cabinet (Pyxis™).

The following issues were identified in EAI dispensing:

- Dispensed EAI were not considered ED medications since not administered, leading to insurance denials. Either the hospital absorbed most of the cost or some families were billed after discharge.
- Between 1/2016-11/2016, a total of 34 EAI devices were dispensed which led to a financial loss to the organization of approximately $8,636 in that time frame.
- Our organization lacked a reliable method to guide ordering, dispensing and documenting in the electronic health record (EHR) and medication administration record (MAR).

AIM STATEMENT

This collaborative quality improvement project aimed to decrease the number of EAI that are dispensed to patients presenting to a tertiary children’s ED with an allergic reaction from a median of 15% to 8% over a 6 month time period.

- Outcome Measure: Percentage of patients presenting to the ED with an allergic reaction who were dispensed rather than prescribed an EAI.
- Balancing Measure: 48 hour ED return rate

RESULTS

Percentage of Patients Dispensed vs. Prescribed an EAI

<table>
<thead>
<tr>
<th>Percentage of Patients Dispensed</th>
<th>Pre-Intervention</th>
<th>Post-Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>22%</td>
<td>15%</td>
<td></td>
</tr>
</tbody>
</table>

G Chart - Frequency of EAI Rx Between EAI Dispersers

<table>
<thead>
<tr>
<th>$10,000</th>
<th>$20,000</th>
<th>$30,000</th>
<th>$40,000</th>
<th>$50,000</th>
<th>$60,000</th>
<th>$70,000</th>
<th>$80,000</th>
<th>$90,000</th>
<th>$100,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>20</td>
<td>30</td>
<td>40</td>
<td>50</td>
<td>60</td>
<td>70</td>
<td>80</td>
<td>90</td>
<td>100</td>
</tr>
</tbody>
</table>

DISCUSSION

- Proportion of patients who were dispensed an EAI decreased from a median of 15% in the pre-improvement implementation period to 8% in the post-improvement implementation period.
- A significant shift in the centerline with a special cause variation (8 points above the center line) was noted on 10/18/16.
- Number of patients who were prescribed an EAI between patients dispensed an EAI increased from 4.7 to 22.
- The new process was officially instituted on November 2016 and the education began in September 2016.
- The improvement has been sustained through July 2018 with a continued positive trend.
- Cost of dispensing EAI to patients presenting with allergic reactions decreased by 73% from $3810 per 100 patients to $1017 per 100 patients.
- In the pre-intervention period 0/158 patients with allergic reactions had return visits to the ED within 48 hours of discharge. In the post-intervention period 3/372 (0.8%) of patients returned to the ED within 48 hours of discharge. None of these patients had significant long-term morbidity and would have all required repeat EMA evaluation for biphasic reactions whether or not they were dispensed an EAI on their initial encounter.
- Standardizing this process has led to consistency in ensuring patient access to EAI prior to discharge, when clinically indicated.

REFERENCES


Note: This report is based on data from the Hospital-at-Home Program at Alfred I. duPont Hospital for Children in Delaware, USA.

For more detailed information, please visit https://www.chop.edu/clinicalpathways/epinephrine-auto-injector-pathway.