A Cost Saving Quality Improvement Project to Decrease Dispensing Epinephrine Auto-injectors from the Emergency Department

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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 lifesaving 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 ED, is a tertiary suburban pediatric ED 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 EAIs 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 $8636 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).

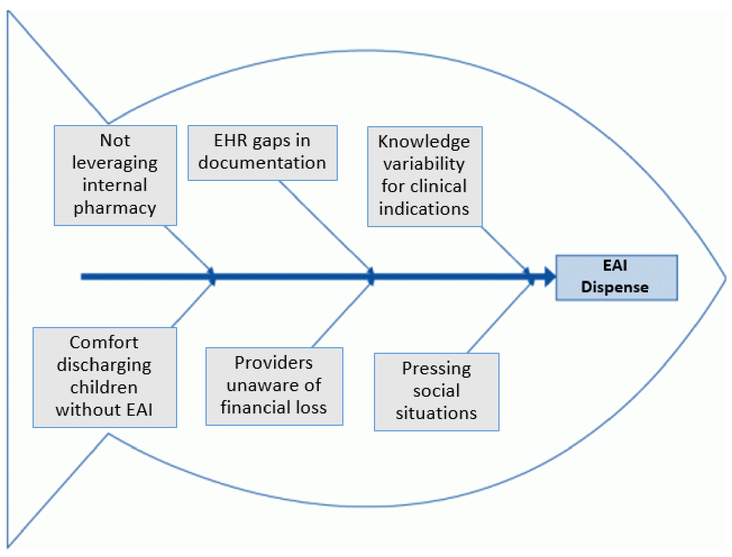
= **$8,636**

AIM STATEMENT

This collaborative quality improvement project aimed to decrease the number of EAIs that are dispensed to patients presenting to a tertiary suburban pediatric 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

ROOT CAUSE ANALYSIS



MULTIDISCIPLINARY TEAM

Arezoo Zomorrodi, ED MD
Shobhana Sathish, ED MD
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Patricia London, ED RN
Natalie Schmid, ED RN
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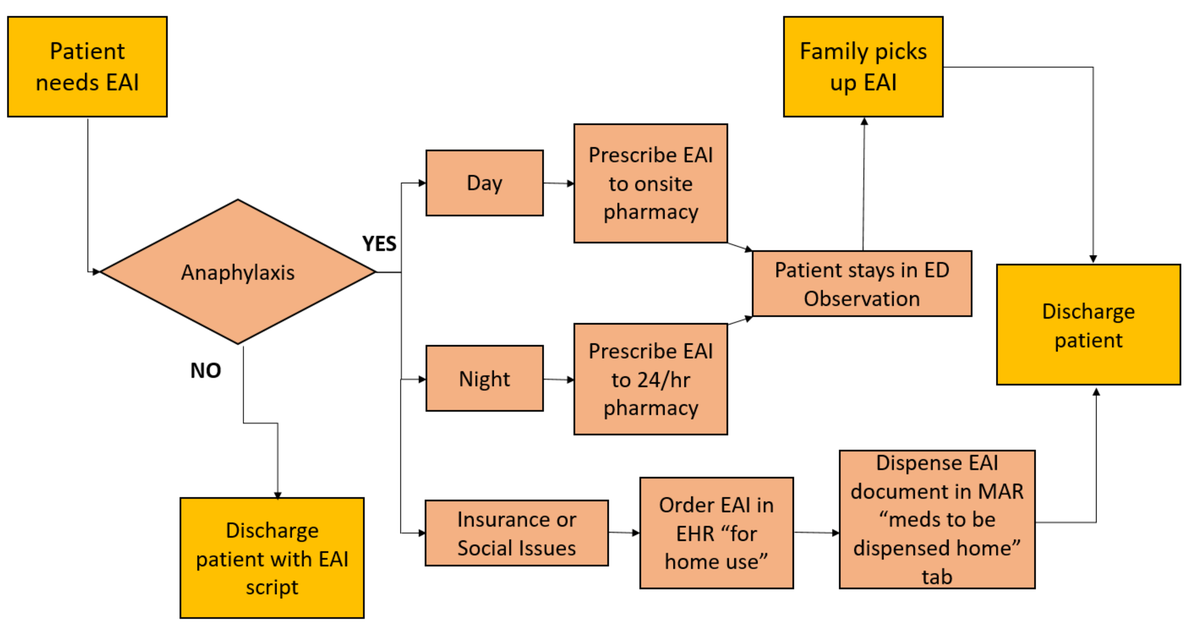
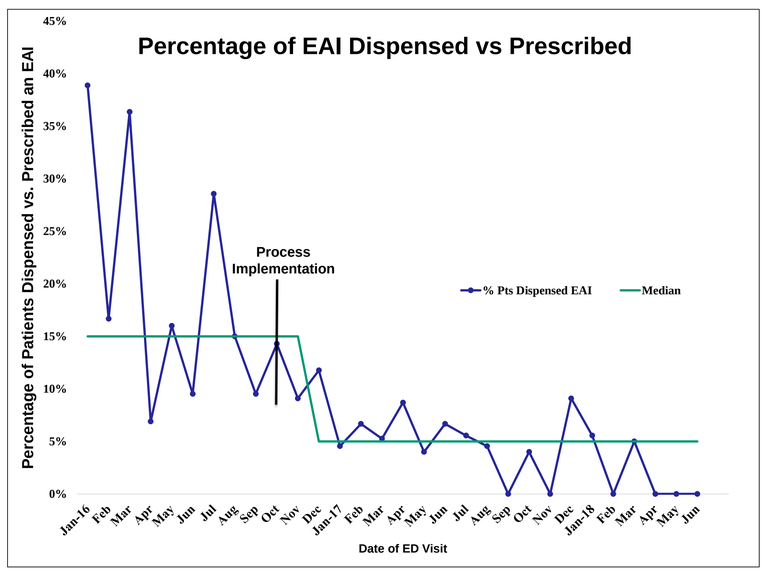
PROCESS MAPPING AND PRIORITIZATION

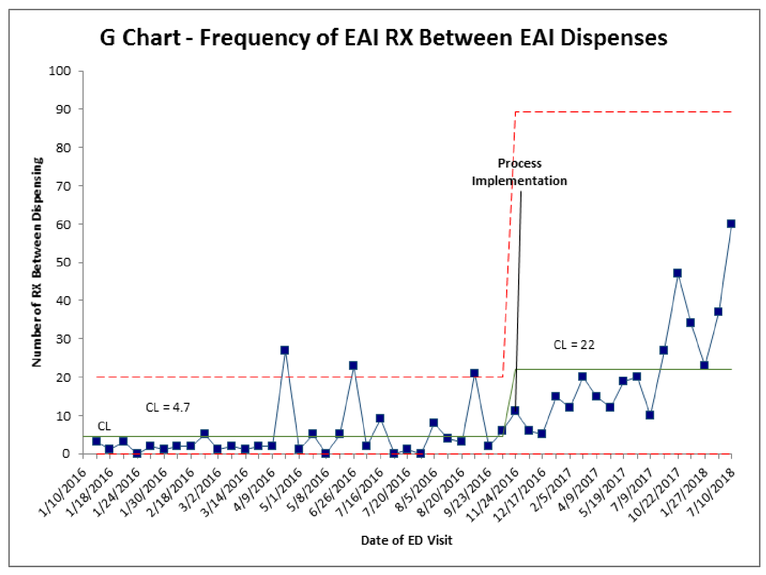
A multidisciplinary team process mapped the delivery of care to patients presenting to the ED with allergic reactions. Waste and variability in the process was identified and a new process was created.

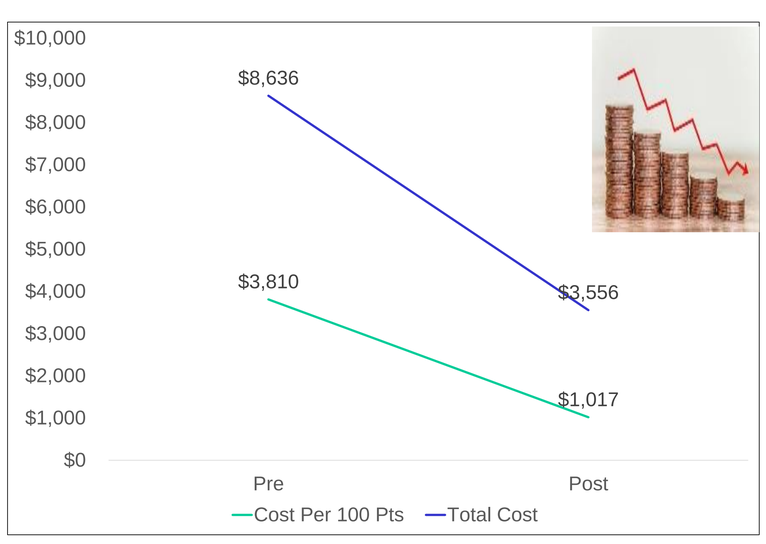
- Once the need for auto injectors is identified, an electronic prescription is sent to **onsite outpatient pharmacy** or **nearby 24 hour pharmacy** (based on time of day and insurance).
- Family members are directed to obtain the EAI from the pharmacy while the **patient remains under ED observation**.
- If the family does not have transportation, a **cab voucher** is provided for a round trip to the nearest pharmacy by social work.
- **Orders** were created in EHR to prescribe EAI "for home use" to be used under unusual circumstances.
- If the family is uninsured or unusual circumstances prevent a trip to the pharmacy, then an EAI is dispensed from the ED supply and documented in the EHR **"for home use"**.
- MAR was updated to show **"meds to be dispensed home"** section.
- Providers were **educated on the cost** of dispensing EAIs.
- ED staff were **educated** on the new process and it went live on Nov 2016.

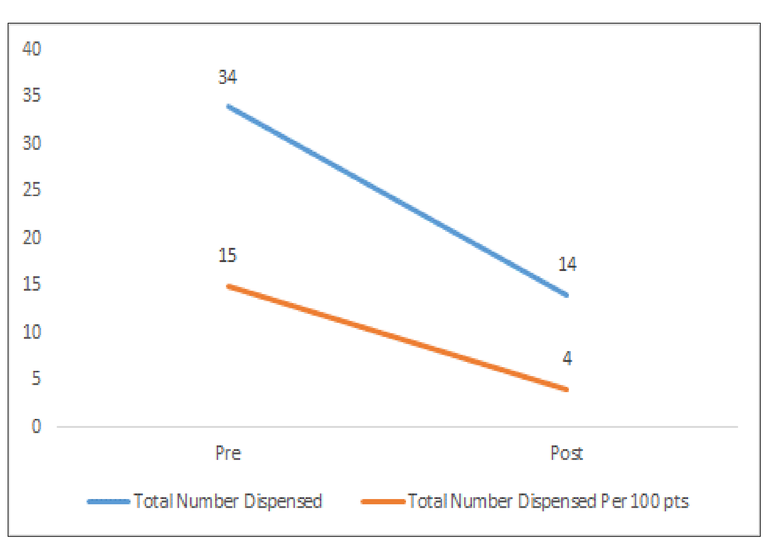


RESULTS









DISCUSSION

- Proportion of patients who were dispensed an EAI decreased from a median of **15% in the pre-improvement** implementation period to **5% 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, however 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 ED evaluation for biphasic reactions whether or not they were dispensed an EAI on their initial encounter.
- Standardizing this process has led to consistency with ensuring patient access to EAIs prior to discharge, when clinically indicated.

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