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May 11th, 12:00 PM - 12:15 PM

### Optimization of Perioperative Prophylaxis in Penicillin-Allergic Labeled Patients

Katie A. VanderVelde

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# Optimizing Surgical Prophylaxis in Penicillin-Allergic Labeled Patients

Katie VanderVelde, MD

Pediatric Infectious Diseases Fellow

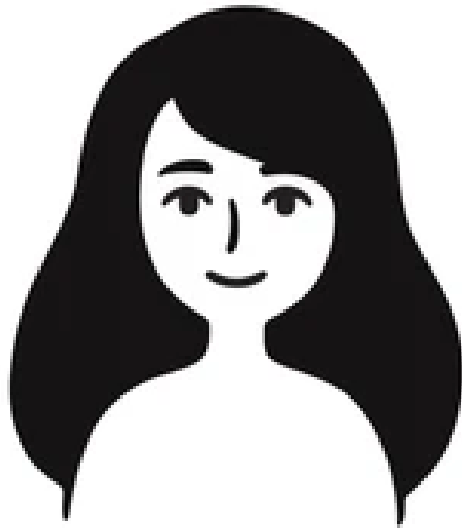


# Disclosures

- None

# Identifying the Problem

Penicillin Allergic!

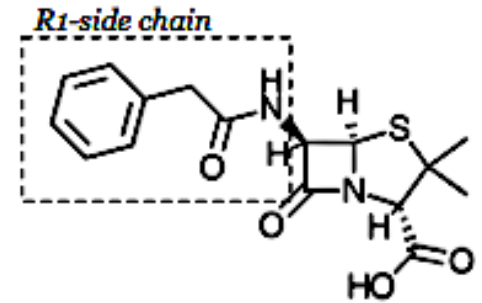


	Bacteria
Cefazolin	S
Clindamycin	R

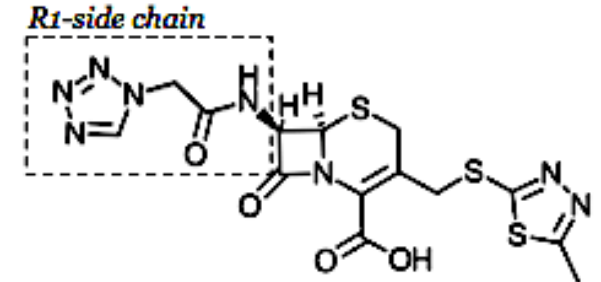
- Question... could she have had cefazolin for surgical prophylaxis?

# Introduction

- Cefazolin and penicillin (PCN)
- 5 million children in US have a PCN allergy label
  - 1-3% considered true allergy
- At CMH
  - 6.6% of surgical patients receiving prophylaxis are labeled PCN allergic
  - **26% with PCN allergy label receive cefazolin for surgical prophylaxis**



Penicillin



Cefazolin

# Introduction

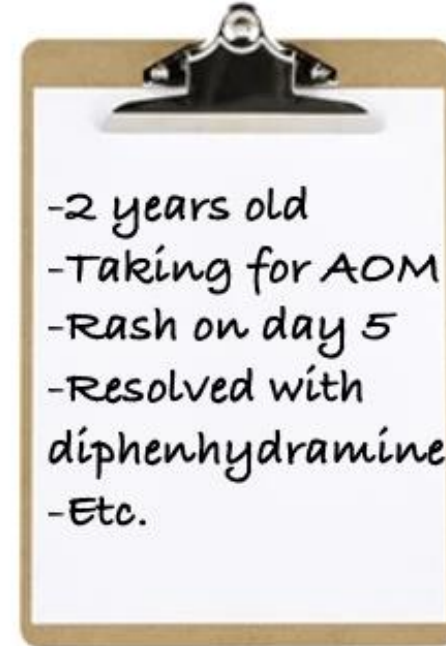
- **Verification**

- Confirming what is documented



- **Clarification**

- Involves obtaining information and classifying reaction severity



# Aims

- Primary:
  - Increase cefazolin usage in patients with a PCN allergy label receiving surgical prophylaxis from 26% to 80% by January 2021
- Secondary:
  - Avoid cefazolin in patients with a true beta-lactam drug allergy
  - Improve documentation of adverse drug reaction (ADR) labels

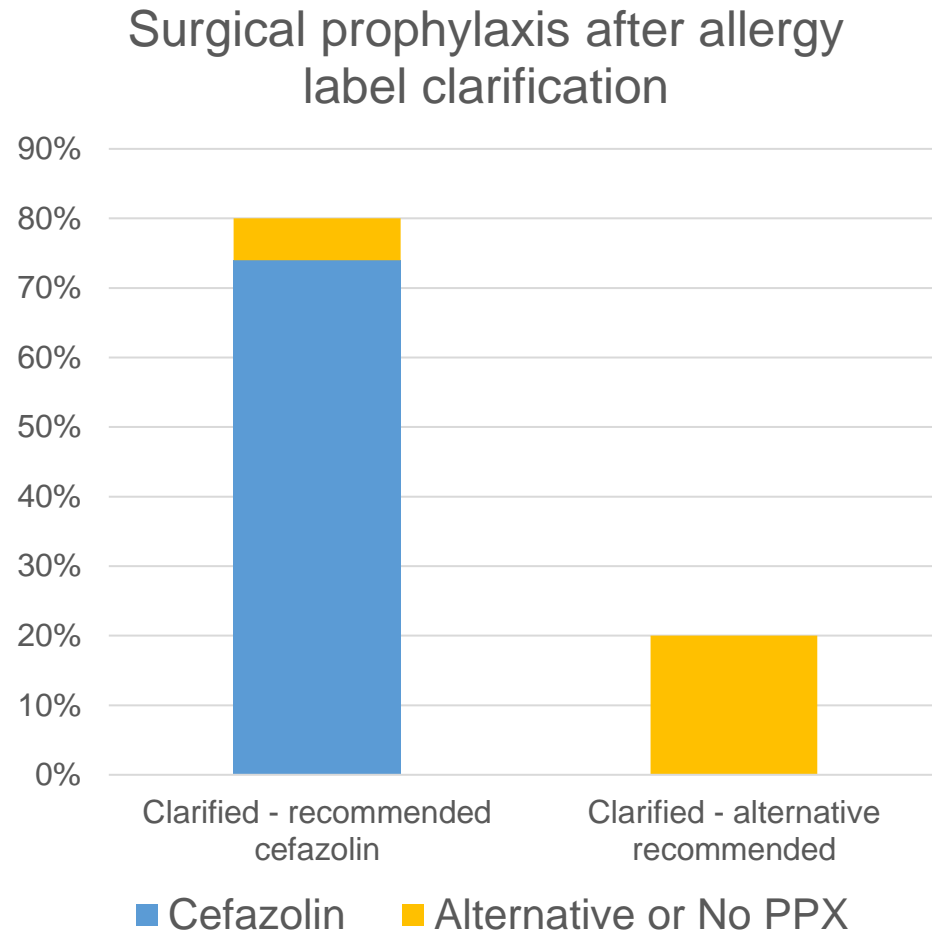
# Physician Referral (PDSA 1)

- Process:
  - Physician-driven referral with pharmacist phone interview
  - Duration: 52 weeks



# Results – Physician Referral (PDSA 1)

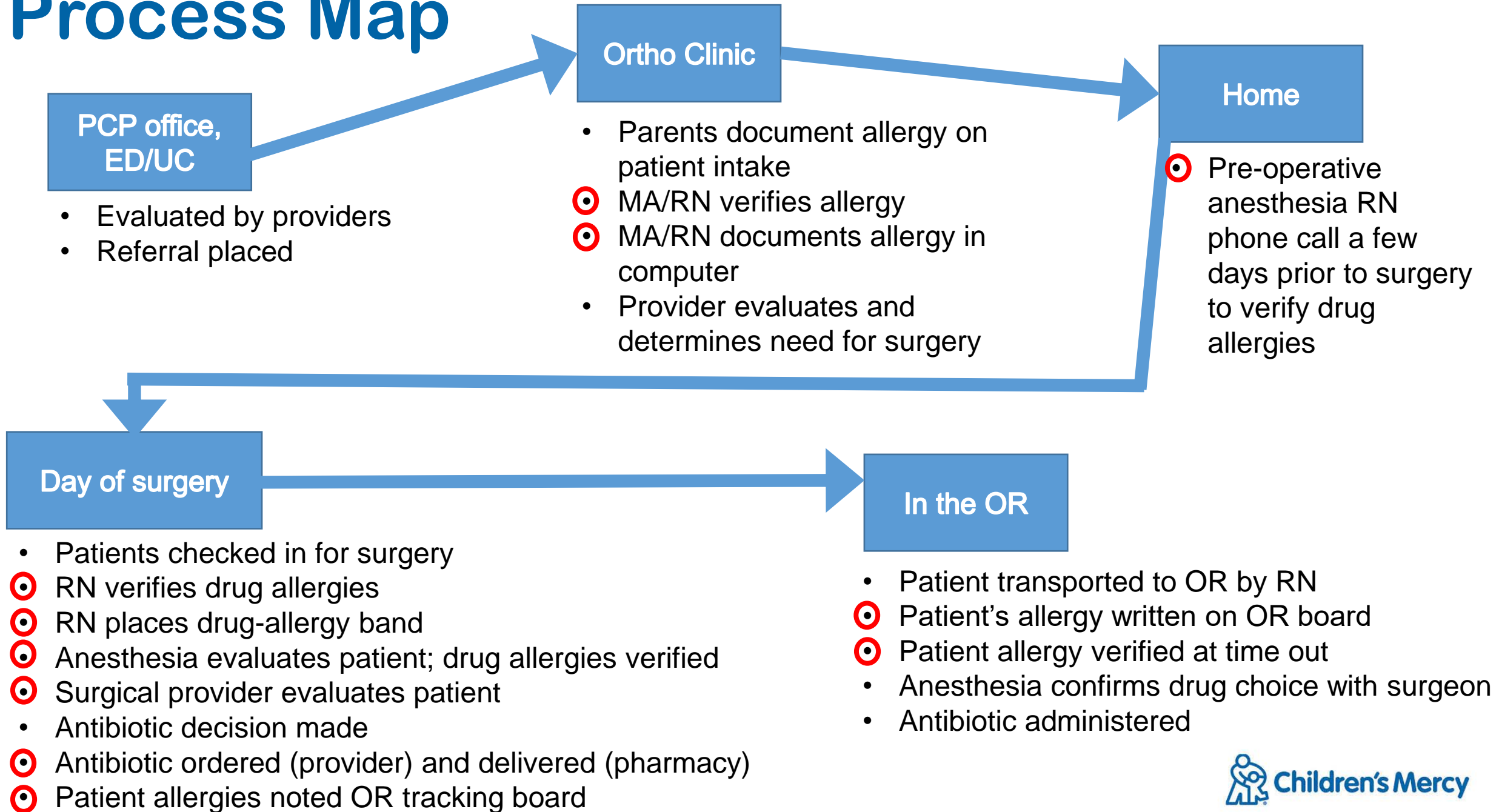
- Outcome:
  - 0.4 patients/week
  - 80% deemed safe to receive cefazolin
    - **92% received cefazolin**
  - 20% referred for further evaluation or discouraged from using cefazolin



# Automation of Patient Identification (PDSA 2)

- Process:
  - Computer-generated tool
    - All patients scheduled for orthopedic surgery over next 5 weeks
    - Drug allergies
    - Contact information
    - Manually filtered
  - Observational walks to identify opportunities for improvement
  - Duration: 8 weeks

# Process Map



# Key Driver Diagram

Aim

← Key Drivers

← Interventions

**Global Aim:**

*Remove unnecessary PCN drug allergy labels from children at our children's hospital*

**Project Aim:**

Increase the use of cefazolin for surgical prophylaxis in children scheduled for non-spine orthopedic surgery who have PCN drug allergy labels from 26% to 80% by January 2021.

**Early identification of PCN allergy labels and severity**

**Adequate documentation of PCN allergy labels**

**Drug selection verification and justification**

**Communication amongst medical team members and with family**

1. Review patients scheduled for orthopedic clinic appointments to identify PCN allergy labels

2. Review patients scheduled for surgery to identify PCN allergy labels

3. Include patient drug allergy information on ortho surgery referral request.

4. Place hard-stop on alternative order to cefazolin for surgical prophylaxis.

5. Nursing/provider education regarding drug allergies, alternatives, and drug cross-reactivity.

6. Include verified/recommended antibiotics in ADR banner bar.

7. Include anesthesia on communication from QI team.

8. Include report of drug verification in surgical time out or morning huddle.

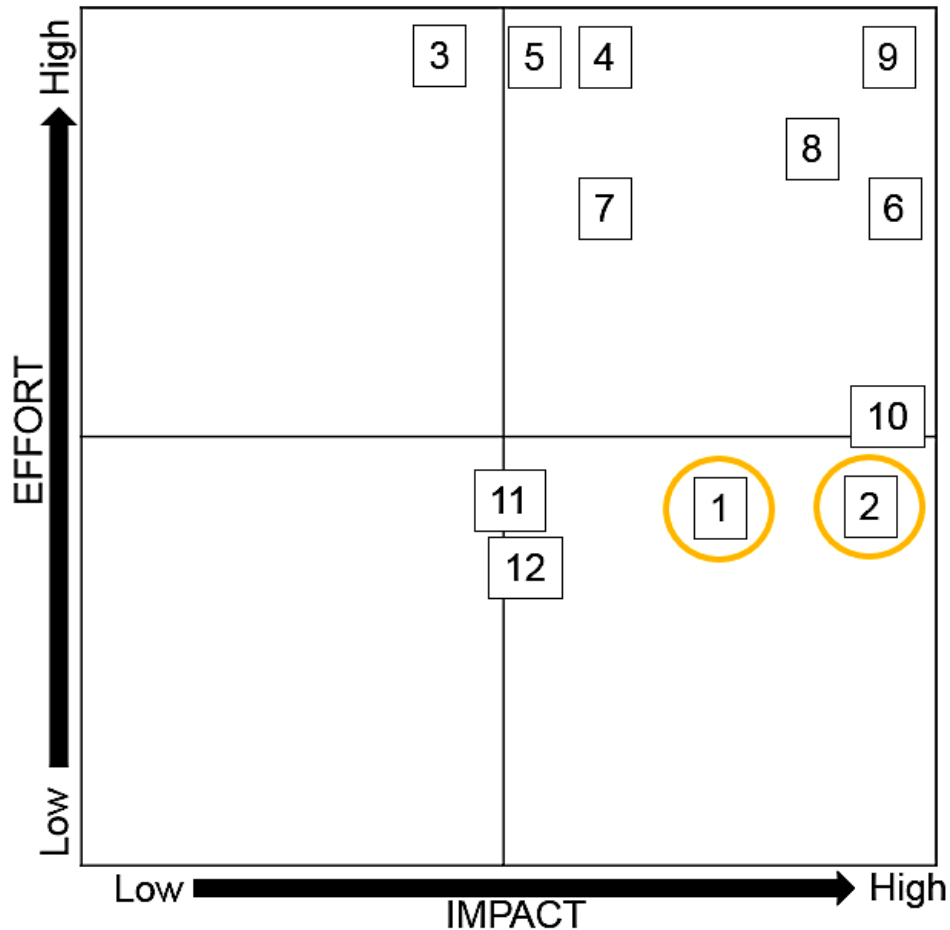
9. More pharmacist involvement for drug verification prior to dispensing.

10. Change/develop OR pharmacy protocol for alternative abx selection.

11. Provide family with portal message regarding drug allergy clarification and surgical prophylaxis drug recommendation.

12. Provide family with letter (via mail) of drug allergy clarification and surgical prophylaxis drug recommendation.

# PICK Chart



## ← Interventions

1. Review patients scheduled for orthopedic clinic appointments to identify PCN allergy labels
2. Review patients scheduled for surgery to identify PCN allergy labels
3. Include patient drug allergy information on ortho surgery referral request.
4. Place hard-stop on alternative order to cefazolin for surgical prophylaxis.
5. Nursing/provider education regarding drug allergies, alternatives, and drug cross-reactivity.
6. Include verified/recommended antibiotics in ADR banner bar.
7. Include anesthesia on communication from QI team.
8. Include report of drug verification in surgical time out or morning huddle.
9. More pharmacist involvement for drug verification prior to dispensing.
10. Change/develop OR pharmacy protocol for alternative abx selection.
11. Provide family with portal message regarding drug allergy clarification and surgical prophylaxis drug recommendation.
12. Provide family with letter (via mail) of drug allergy clarification and surgical prophylaxis drug recommendation.

# Results – Automated Patient Identification (PDSA 2)

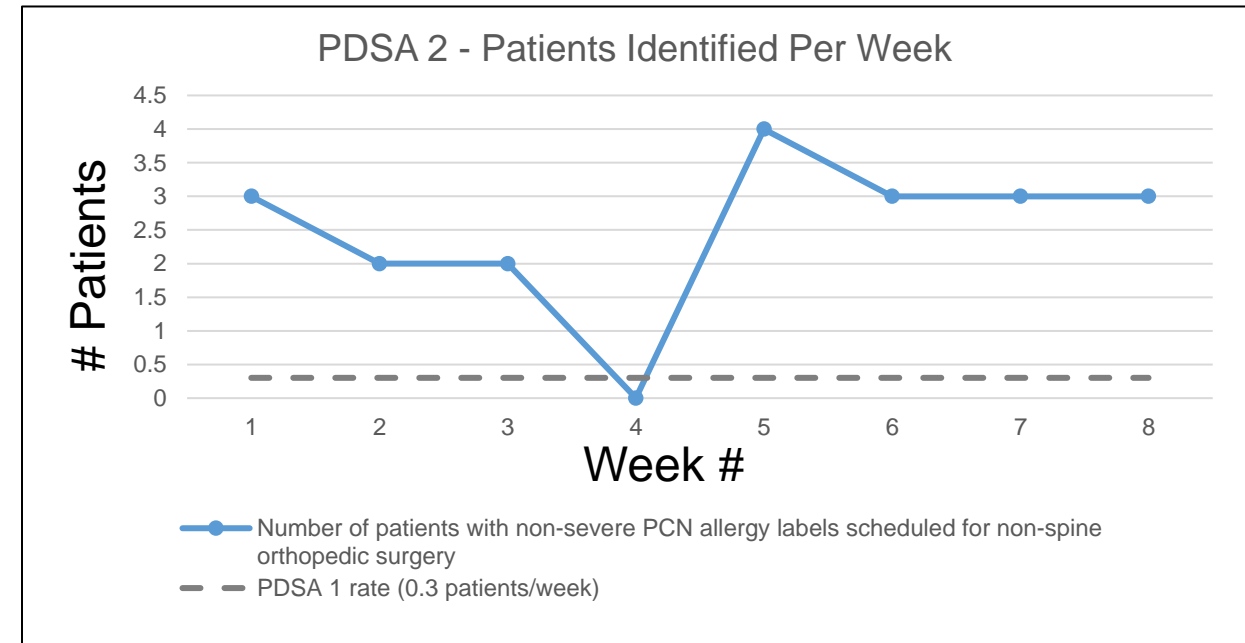
- Outcome
  - 2.6 patients/week
    - Classified – 75% cefazolin
    - Unknown – 33% cefazolin
- Incidence rate ratio

Alternative in  
Unknown PCN  
Allergy Label

= 2.7

Alternative in  
Classified PCN  
Allergy Label

(95% CI: 1.4 to 4.9; p = 0.0013)



Type: Allergy/Hypersensitivity Immunologic response (allergy) or other mechanism unique to patient (rash, anaphylaxis)

\*Substance: amoxicillin [icon] Free text

Reaction(s): [icon] Add Free Text

Severity: Unknown [dropdown] At: <not entered>

Info source: <not entered> Onset: <not entered>

Recorded on behalf of: [icon]

\*Category: Drug [dropdown]

Status: Active [dropdown]

Comments: [text area]

# PDSA Cycles 3, 4 and 5

## Automated Identification with Clarification (PDSA 3)

- Combined phone interview (PDSA 1) with use of patient identification tool (PDSA 2)

## Re-scheduling of Patient Identification (PDSA 4)

- Continued PDSA 3
- Re-timed automated tool for improved processing
- Added allergy clarification referral

## Automation of Patient Interview (PDSA 5)

- Continued PDSA 4
- Allergy interview sent via Patient Portal

12 weeks

27 weeks

22 weeks

# Results

## Automated Identification with Clarification (PDSA 3)

- 2.8 patients/week
- 64% clarified
  - 93% received cefazolin
  - 1.2% severe PCN allergy
- Odds of receiving cefazolin with clarification = **3.4**

12 weeks

## Re-scheduling of Patient Identification (PDSA 4)

- 2.1 patients/week
- 91% clarified
  - 95% received cefazolin
- 5 patients referred for de-labeling

27 weeks

## Automation of Patient Interview (PDSA 5)

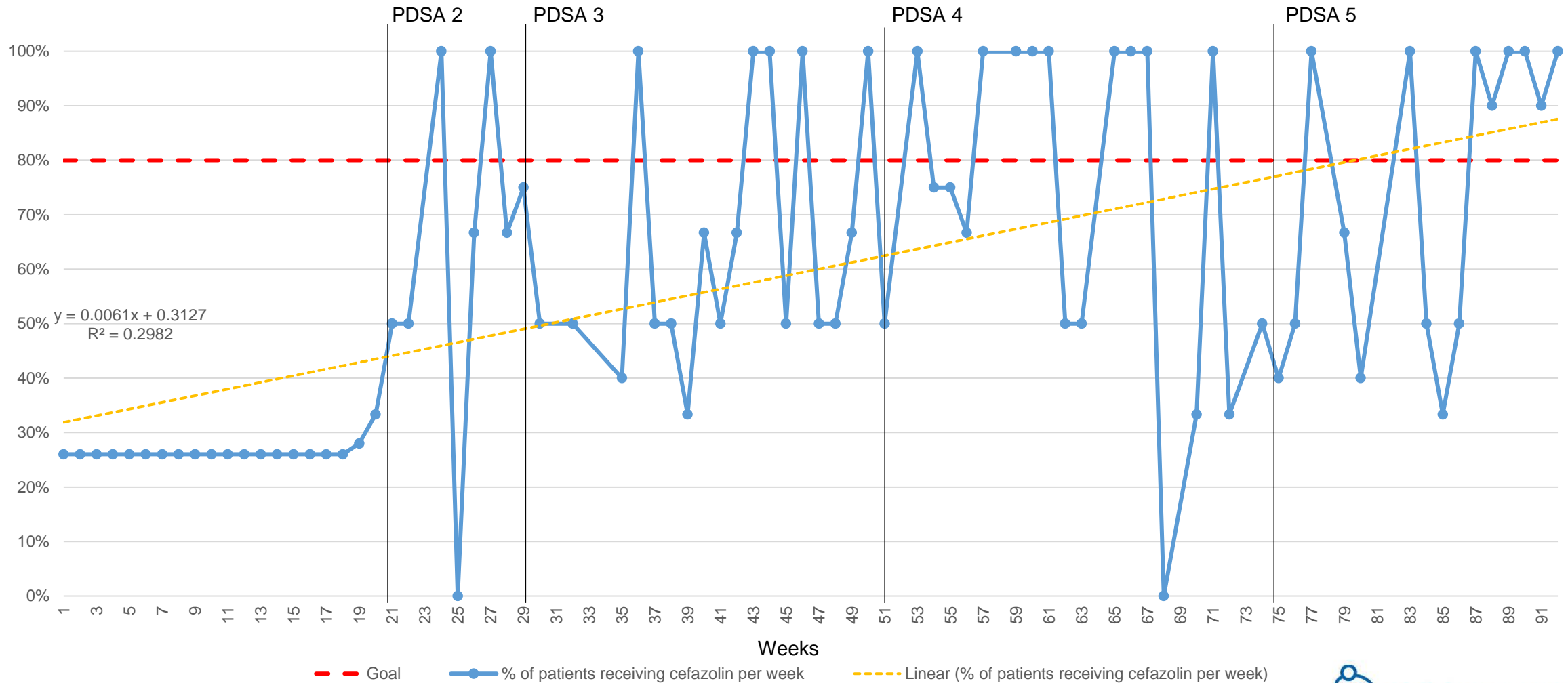
- 2.1 patients/week
- 80% clarified
  - 80% received cefazolin
- 13% response rate
  - 50% required additional clarification

22 weeks

(95% CI 1.3 to 9.4; P = 0.017)



# Percent of Patients with PCN Allergy Label Who Were Identified and Received Cefazolin



# Conclusions

- **Clarification increases the likelihood that a patient will receive cefazolin and does not increase ADRs**
- Identification needs to be automated
- Interviews are needed for true clarification
- Pre-surgical evaluation is an opportunity to clarify drug allergies

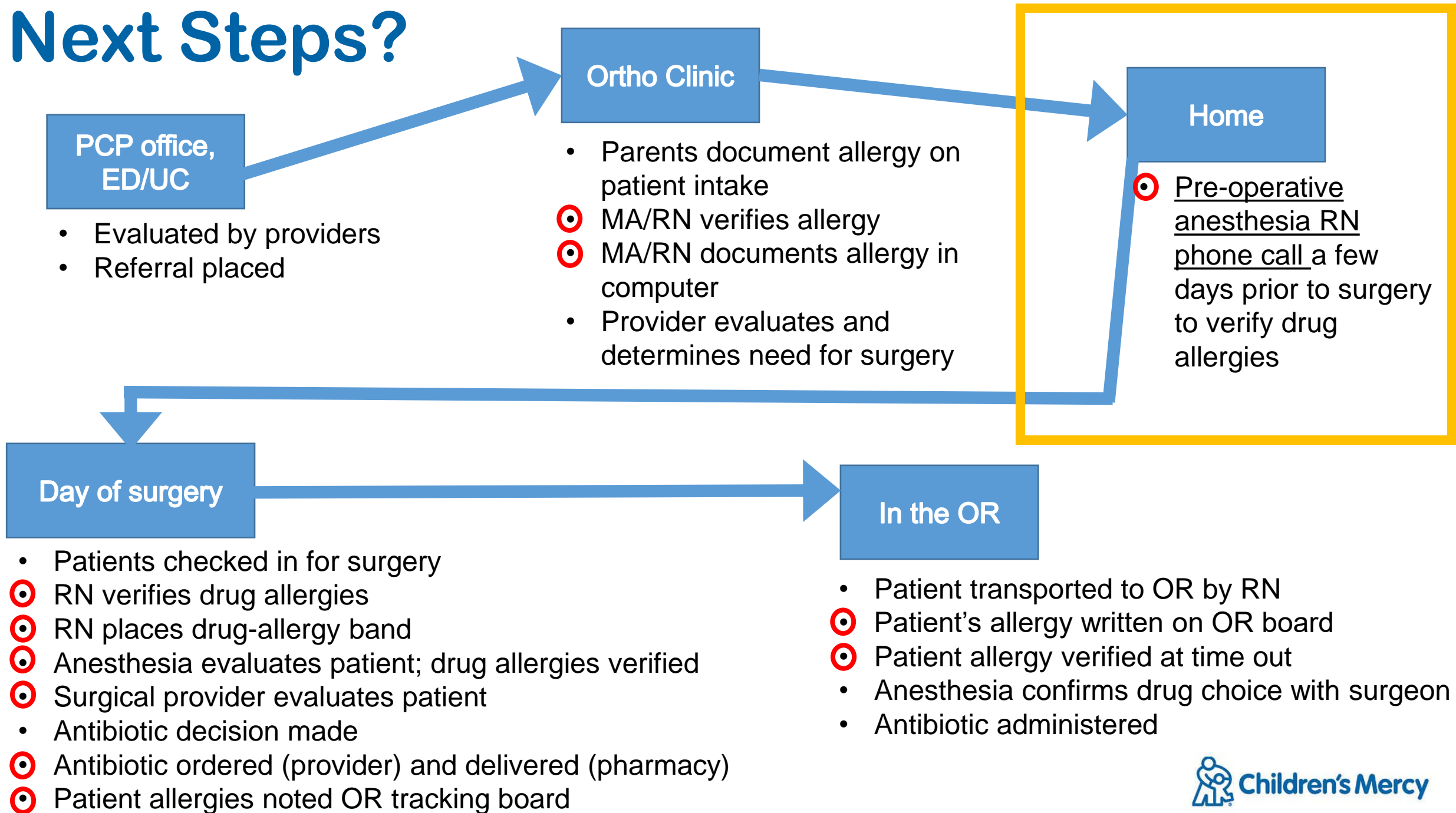
# Thank you!

- Dr. Jennifer Goldman
- Sarah Suppes, PharmD
- Kate Gibbs and Dr. Rana El Feghaly
- Dr. Kevin Latz, Angie Vanderpool, and the Orthopedic surgery division

# Questions?



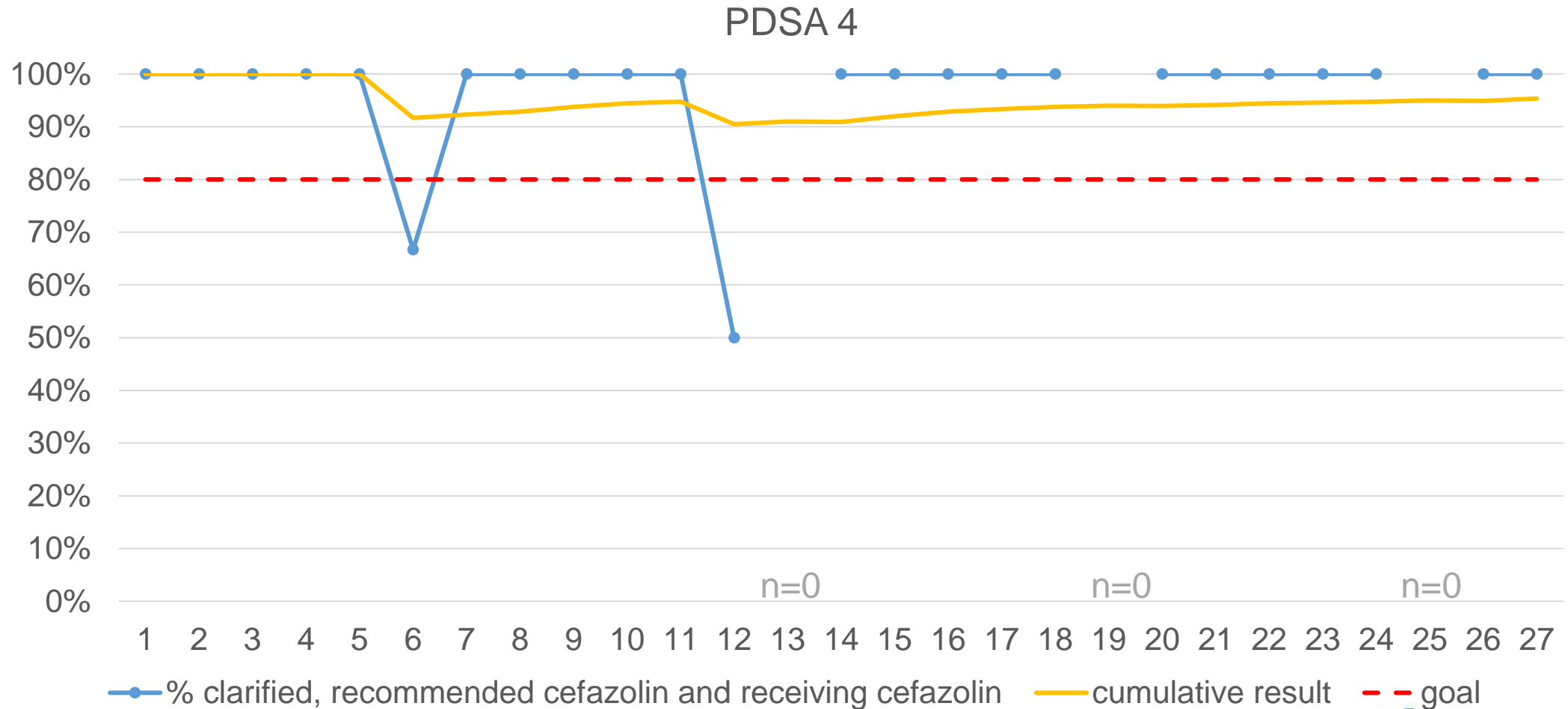
# Next Steps?



# Measures

- Main outcome measure:
  - Percent of patients undergoing orthopedic surgery with a non-severe PCN allergy label who receive cefazolin for surgical prophylaxis
- Process measures:
  - Number of patients identified (patients per week)
  - Number of patients clarified
  - Number of patients receiving cefazolin, an alternative, or no prophylaxis
- Additional measures:
  - Rates of cefazolin usage overall, per allergy severity category
- Balancing measures
  - ADRs
  - Patients with prior clarification who receive cefazolin vs not

# Run Chart – PDSA 4 Outcome Measure





# Run Chart – All Cycles Process Measure

Number of Patients Identified Per Week

