

Close Your Eyes, We'll Immunize!

Pediatric Influenza Vaccination in the Perioperative Period

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Disclosures and Acknowledgements:

- Elizabeth O'Brien is a working group member on the AAP-sponsored INVEST QI Initiative



Background

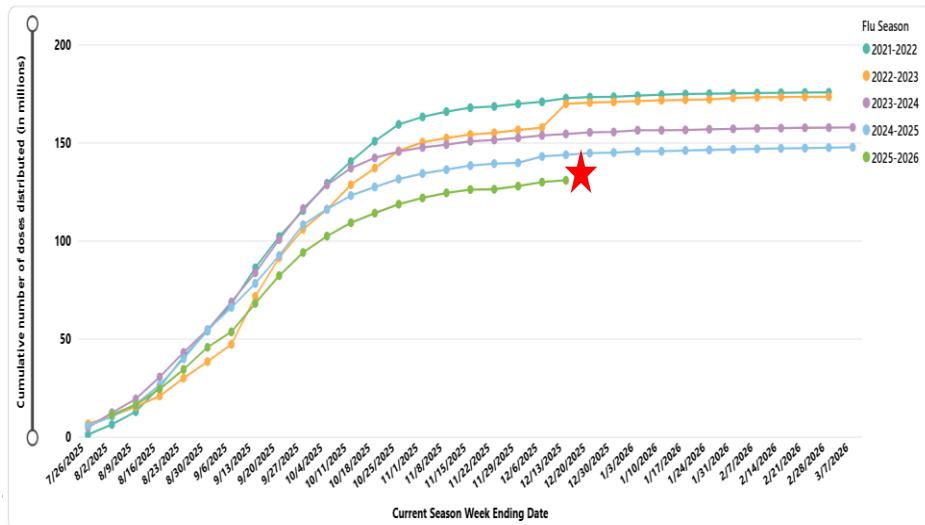
- Flu vaccines are approved in children ≥ 6 months
- Effective for preventing influenza directly and community flu burden in our most vulnerable.
 - Children <5 years-old
 - Children <2 years-old
 - Children with co-morbidities
- Pediatric influenza deaths hit a record high in 2024-2025 season
 - 89% of deaths were in unvaccinated children



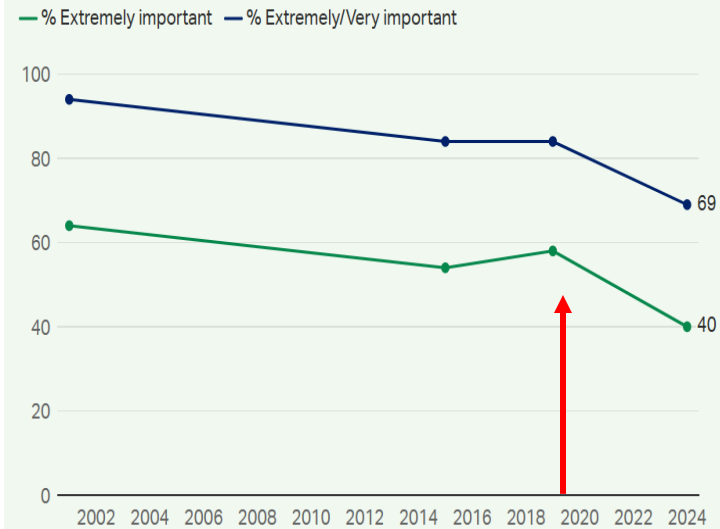
Background

Likely Multifactorial:

1. Vaccine hesitancy is **rising**
2. Vaccination is **decreasing**



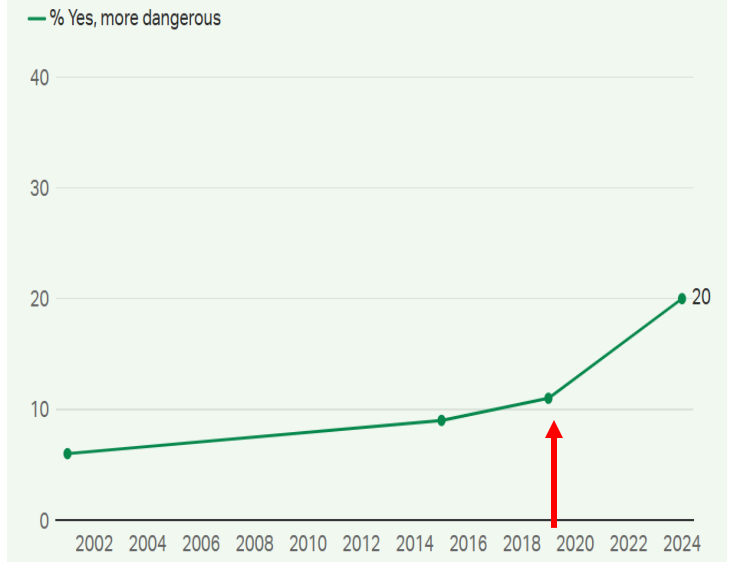
How important is it that parents get their children vaccinated -- extremely important, very important, somewhat important, not very important or not at all important?



Get the data • Download image

GALLUP®

Do you think vaccines are more dangerous than the diseases they are designed to prevent, or not?



Get the data • Download image

GALLUP®

Background:

The goal post is moving...

- 2024 Child and Adolescent Vaccine Schedule included 17 routine immunizations for all children
- January 5th, 2026, CDC updated the childhood vaccine schedule to include 11 immunizations
 - 6 now fall in a category of shared-clinical decision making: Rotavirus, COVID-19, **influenza**, hepatitis A, B, and meningococcal



Background:

- Increasing pediatric flu vaccines:
 - Inpatient setting
 - Pediatric ED
 - Specialty care clinics (oncology, pulmonology)
- The OR is a special place!
 - Our patients are usually healthy
 - Our patients are usually asleep



A Teachable Moment

Influenza Vaccination in Perioperative Settings: A Teachable Moment

Rao, Suchitra M.B.B.S., M.S.C.S.; Morrissey, Tyler M.D.; Ziniel, Sonja I. Ph.D., M.A.; Mandler, Tessa M.D.; Yaster, Myron M.D.; Strupp, Kim M. M.D.¹

[Author Information](#)👍

Anesthesiology 137(6):p 745-747, December 2022. | DOI: 10.1097/ALN.0000000000004341



Safety of Perioperative Vaccines

- 43,000 adult patients, 6400 flu vaccines administered perioperatively
- No significant differences in hospital LOS, postop fevers, or SSI rates
- Rao et al., saw no increase in adverse events in vaccine group

> [Ann Intern Med.](#) 2016 May 3;164(9):593-9. doi: 10.7326/M15-1667. Epub 2016 Mar 15.

Safety of Seasonal Influenza Vaccination in Hospitalized Surgical Patients: A Cohort Study

Sara Y Tartof, Lei Qian, Gunter K Rieg, Calvin C Yu, Lina S Sy, Hung Fu Tseng, Rulin C Hechter, Steven J Jacobsen

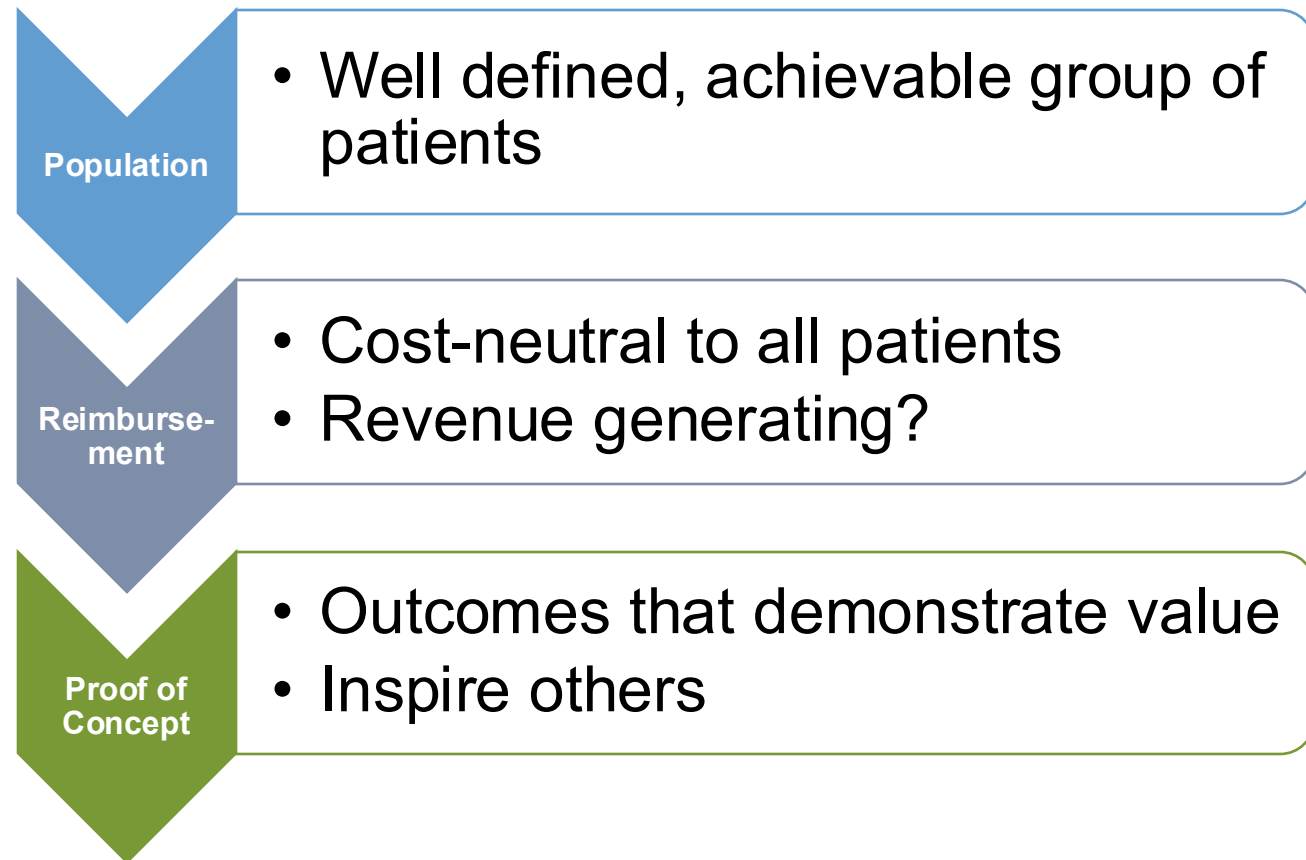
Quality Initiative: Close Your Eyes, We'll Immunize!

SMART Aim: To develop a perioperative flu vaccine program at the Children's Hospital of Philadelphia by October 2023 utilizing Plan-Do-Study-Act methodology.

Close Your Eyes, We'll Immunize!

We developed a multidisciplinary team:

- Anesthesiology
- Infectious Disease
- Perioperative Nursing
- Pharmacy
- Epic/EHR expertise



Close Your Eyes, We'll Immunize!

Same-Day Surgery
Patients at CHOP/KOP

Philanthropic funds to
cover all flu vaccines

Enterprise-wide flu
vaccine campaign

THE FLU VACCINE...

1

...IS DELIVERED WHILE
UNDER ANESTHESIA

...REDUCES THE
RISK OF GETTING
THE FLU

2

3

...REDUCES THE RISK OF
SPREADING THE FLU TO
FRIENDS AND FAMILY

...REDUCES THE RECOVERY TIME AND
THE SEVERITY OF THE SYMPTOMS IF
YOU CONTRACT THE FLU

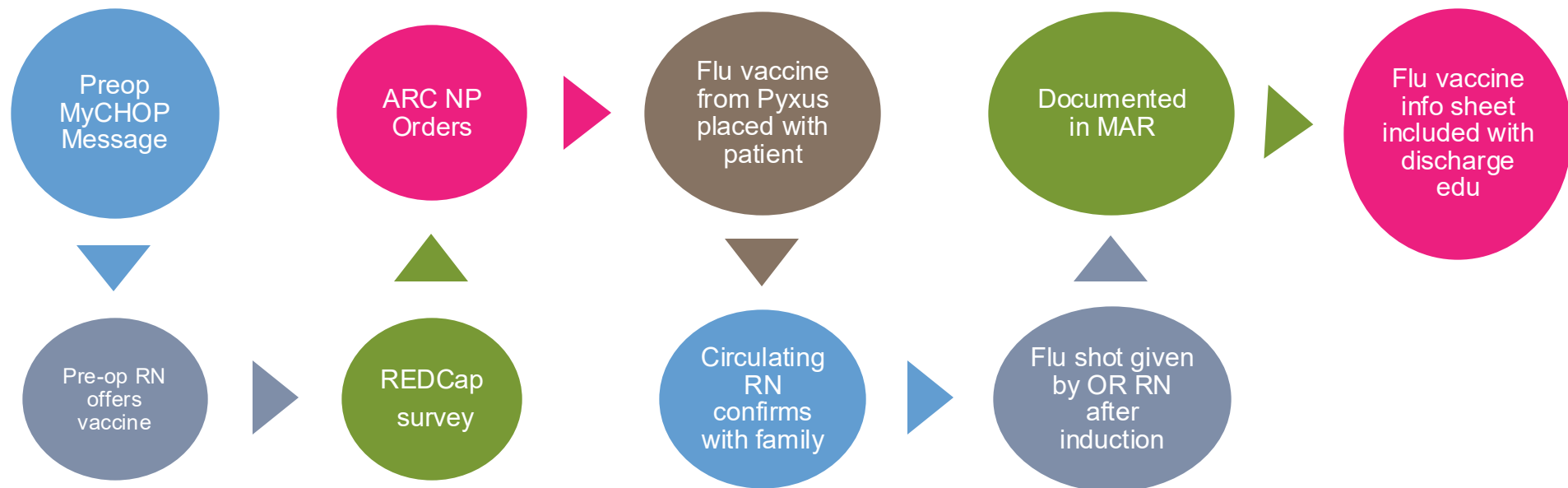
4

5

...DOES NOT CAUSE THE
FLU

I AM A
SUPERHERO!
I WAS BRAVE
TODAY!

Close Your Eyes, We'll Immunize!



Patient Message

Frog Mychart
 Frogteen Zzchoptest
 Frognonpatient Zzchoptest
 Jack Liu

To: Jeff Oostmeyer

Regarding: Frog Mychart

Close Your Eyes and Get Immunized!

Bold
 Italic
 Underline
 Link
 Unlink
 Insert SmartText
 Undo
 Redo

Dear CHOP Families,

Flu season is here — are you ready?

There are simple steps you can take to make sure everyone stays healthy. Clinicians at Children's Hospital of Philadelphia (CHOP) support the U.S. Centers for Disease Control and Prevention (CDC) recommendations that all people age 6 months or older should receive the flu vaccine every year, with rare exemptions. **We are offering a new program to provide both on the spot family education and the painless injection of flu vaccinations to healthy outpatients undergoing elective surgical procedures while they are asleep in the operating room.** Attached you will find the Vaccine Information Statement (VIS) located on the CDC website.

For more flu facts and resources, visit www.chop.edu/navigating-flu-season

CDC website resources, www.cdc.gov/flu

Thank you,
Your CHOP Healthcare Team

Message Type
 Medical Advice

Dates
 Delay sending messages until
 Date

Notify me if patient has not read by
 Date

Patient Replies
 Send patient replies:
 To provider and department

To pool

Directly to me
 Do not allow replies

Tasks & Attachments

Attachment Influenza Vaccine VIS

Appointment Add

General Questionnaire Add

Orders

Clear All Orders

Anesthesia Pre Op Orders
 Leave Feedback
 Remove Order Sets

▼ CYEWI Perioperative Influenza Vaccine
 ▼ CYEWI Perioperative Influenza Vaccine

influenza inactivated virus vaccine injection
 0.5 mL, Intramuscular, ONCE, Day of Procedure (PreOp)

SmartSet Base: IP AGE RESTRICTOR >=6 MONTHS [6687]

General Information
 Contact released?: Yes Contact date: 11/3/23 Contact: 1 Type: SmartSet Base

Linked Criteria
 1. IP AGE RESTRICTOR >=6 MONTHS (CRITERIA) [6644]
 Logic: 1

BestPractice Advisory Criteria: IP AGE RESTRICTOR >=6 MONTHS (CRITERIA) [6644]

General Information
 Contact released?: Yes Contact date: 10/26/23 Contact: 1 Type: Criteria

Age
 From age: 6 months

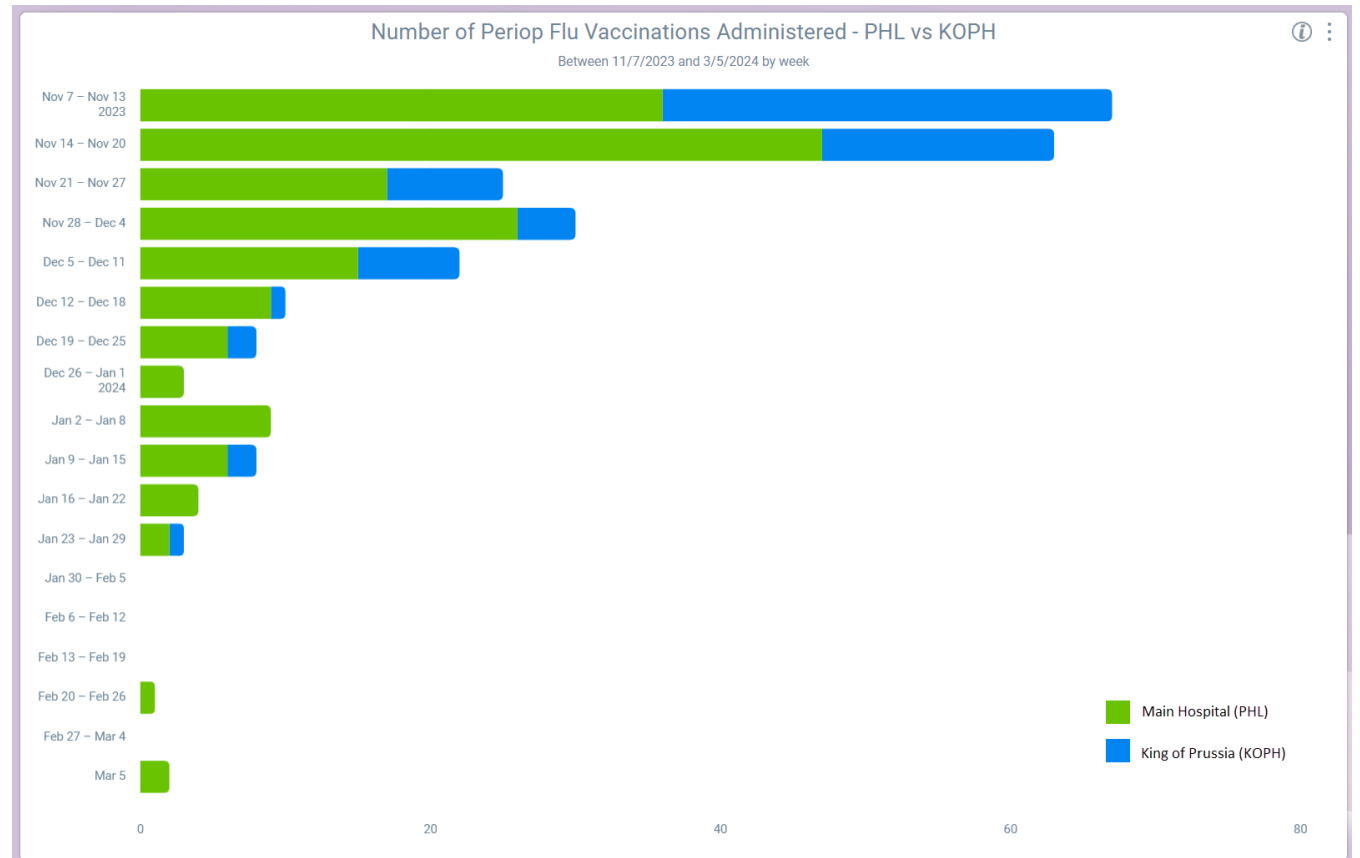
Exclusion Criteria:

- Severe or life-threatening allergies to ingredients in the flu vaccine (outside of egg protein)
- History of Guillain-Barre Syndrome
- All bone marrow transplant patients
- Patients on CAR-T therapy
- Patients undergoing cochlear implant procedure
- Patients undergoing injection of Botox (at this time)
- Patients undergoing procedures in Interventional Radiology

CYEWI Year 1:

255 Vaccines Delivered

- Roughly 8% of eligible patients
- Most common reason for declining was “already received it.”



CYEWI Year 1:

- 1 histamine reaction at the site
- No further care sought by patient and family



CYEWI Year 2

SMART Aim: To increase the number of flu vaccines administered through the perioperative flu vaccine program to 1500 vaccines by February 1, 2025.

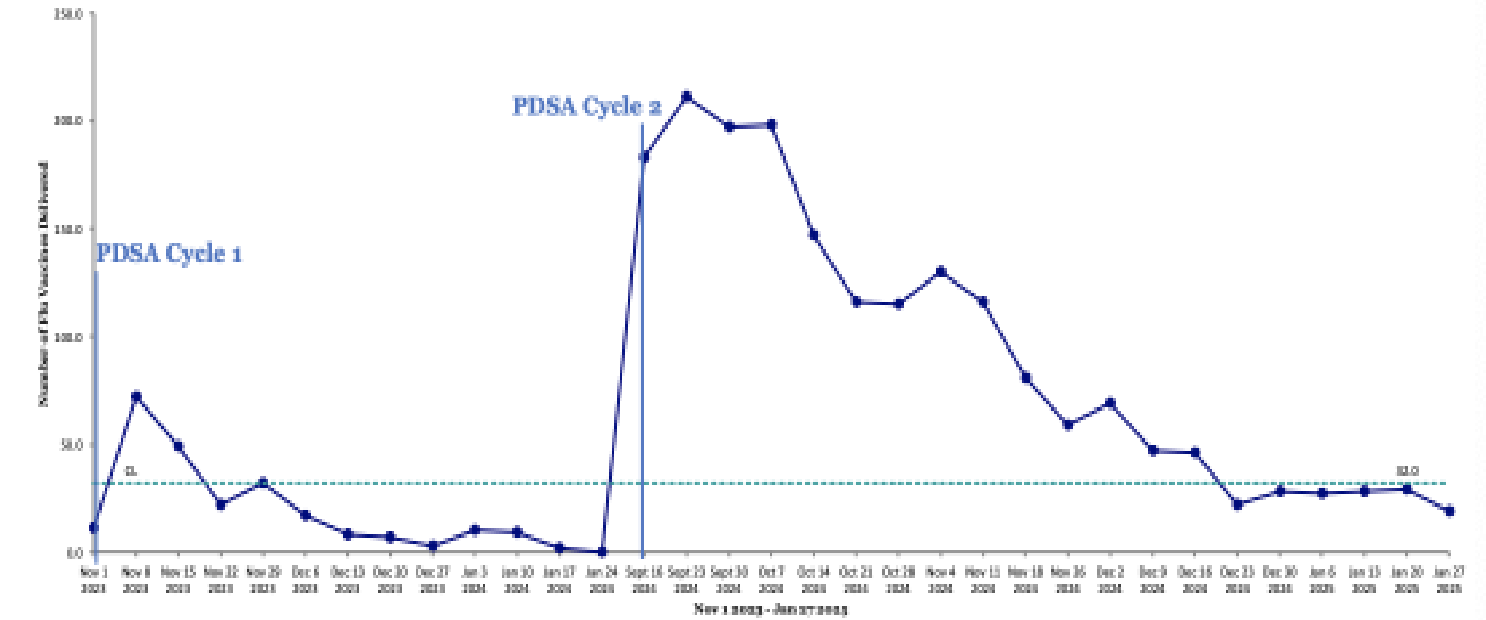
PDSA Cycle 2 Interventions:

- Start earlier!
- Expand target population to all GA cases, ASCs, NORA, and sedation
- Streamlined vaccine order set and data collection

CYEWI Year 2

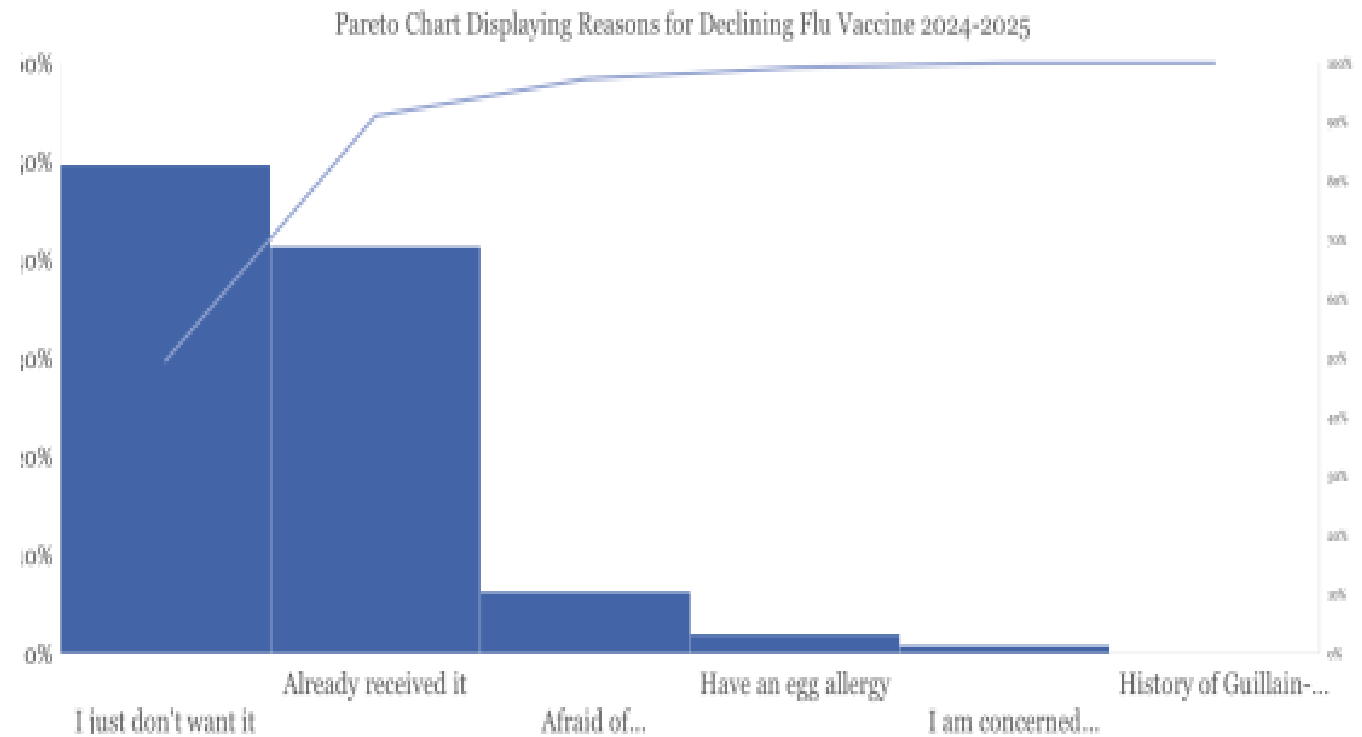
1854 vaccines
administered

Number of Flu Vaccines Delivered - Run Chart



CYEWI Year 2

- Increase in vaccine hesitancy in 2024-2025



CYEWI Year 2: Silver Linings

- 30% of patients who received a flu vaccine through our program reported they would **not** have otherwise gotten the shot!
- Not only did **no** families pay out of pocket for the flu shot, we generated >\$60,000 in revenue!

| Payor Grouping | Cases | Total Charges Flu Vaccine | Payments for Flu Vaccine | Expected Reimbursement for Flu Vaccine |
|--|--------------|------------------------------|-----------------------------|--|
| Commercial - All | 790 | 155,804 | 61,902 | 68,890 |
| Medicaid - All | 66 | 13,017 | 2,147 | 2,643 |
| Other | 13 | 2,564 | 47 | 104 |
| International | 11 | 2,169 | - | 1,351 |
| Encounters - flu vaccine is separately payable per contract | 880 | 173,554 | 64,096 | 72,987 |
| Commercial - All | 496 | 97,821 | - | - |
| Medicaid - All | 477 | 94,911 | - | - |
| Other | 33 | 6,508 | - | - |
| Not Specified | 2 | 394 | - | - |
| Encounters - flu vaccine included in payment for other services | 1,008 | 199,634 | - | - |
| Grand Total | 1,888 | 373,188 | 64,096 | 72,987 |

CYEWI Year 2

- Adverse events:
 - 6 patients reported low-grade fevers to their surgical specialties.
 - None required intervention or additional care visits.

DON'T BE AS SICK AS A DOG.



GET YOUR **FLU SHOT**

CYEWI Year 3

- **SMART Aim:** To increase the number of flu vaccines administered through the perioperative flu vaccine program to 3500 vaccines by February 1, 2026.

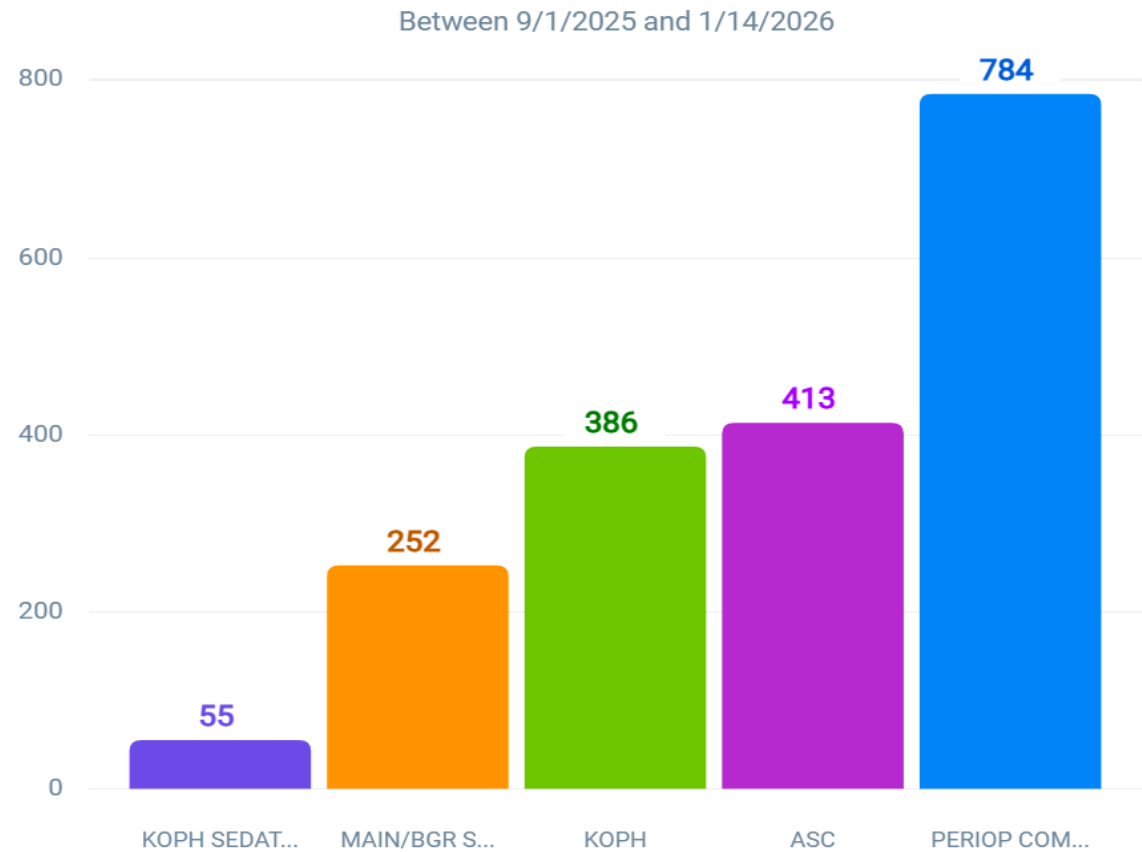


PDSA Cycle 3 Interventions:

- Earlier enterprise-wide flu vaccine campaign (Flash the Flu Fighter)
- Flu champions to interface with different subspecialties (PMR, GI, oncology, etc.)

CYEWI Year 3

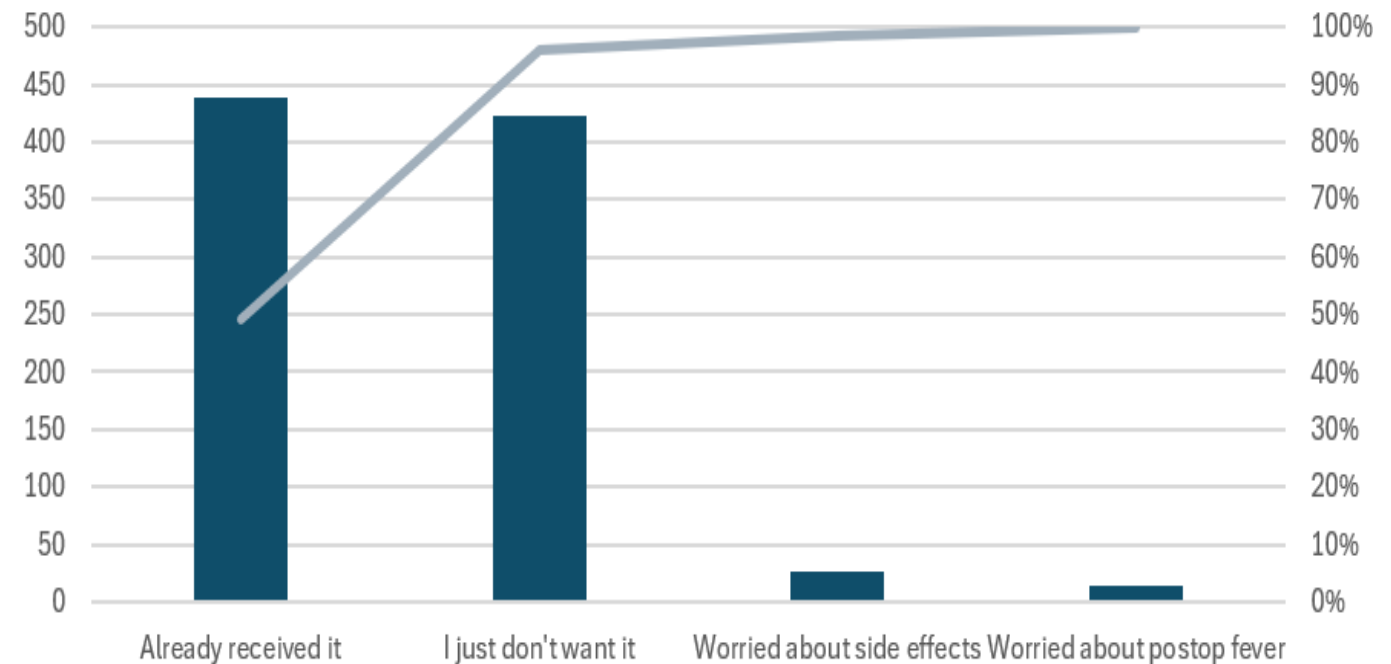
1890 vaccines
administered so far...



CYEWI Year 3

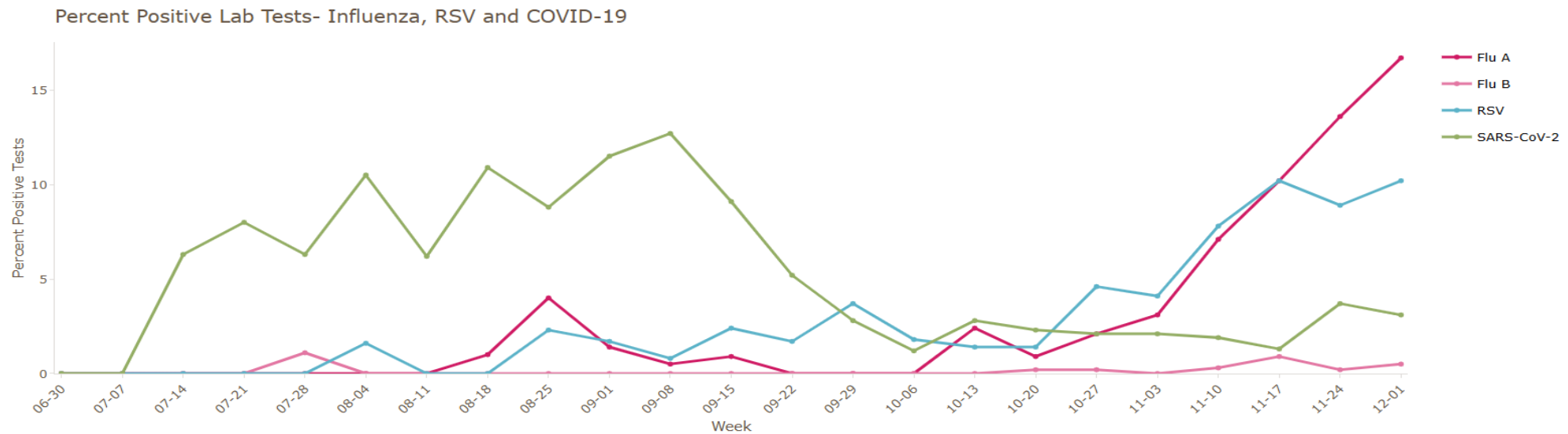
- Fewer concerns about perioperative complications related to the flu shot.
- Still high levels of vaccine hesitancy.

Pareto Chart for Reasons for Refusal



CYEWI Year 3

- 28.7% reported they would **not** have otherwise gotten a flu shot.
- No major adverse events reported this year



CYEWI Year 3

• **Future Directions:**

- Expand target population to children under sedation or GA in other locations
 - ED
 - PICU
 - Children with special behavioral needs and other vaccines
- Expand similar programs to other hospitals

• **Future Directions:**

- Flu champions sending monthly updates to numerous care settings on CYEWI progress and room for improvement.



Summary:

- Using iterative PDSA cycles, CYEWI has administered roughly 4000 flu vaccines!
- 1300 children would not have otherwise received a flu vaccine.



*The Pediatric Anesthesia Quality
Improvement Initiative*



Questions? Feedback? **THANK YOU!**

