



Children. Our everything.



Preventing Influenza in the Pediatric Patient at Hospital Discharge: Give it a Shot!

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April 4, 2017



A 12-month-old male presents to the emergency room with nasal congestion, cough, fever to 104 degrees Fahrenheit and increased work of breathing. His mother states that he was hospitalized approximately 6 weeks ago for RSV bronchiolitis. Antigen testing reveals that the patient has influenza A. He is admitted for 3 days due to an oxygen requirement.

Review of his records indicates that he did not receive the influenza vaccine this year, despite multiple opportunities, including the recent hospitalization.



US Influenza Burden

Influenza-associated hospitalizations

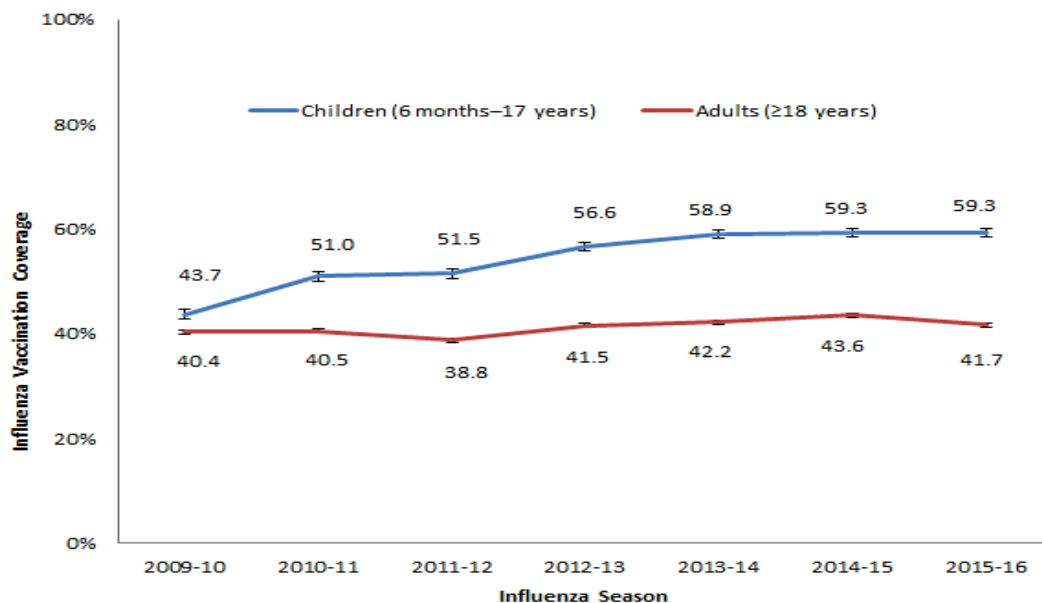
- In children <5-years-old, hospitalizations has ranged from 7,000 to 26,000

Influenza-associated pediatric mortality

- 37 to 171 influenza-associated pediatric deaths per season
 - 2009-358 pediatric deaths were reported
- 2016-2017 40 influenza-associated pediatric deaths so far



Figure 1. Seasonal Flu Vaccination Coverage by Age Group and Season, United States, 2009–2016



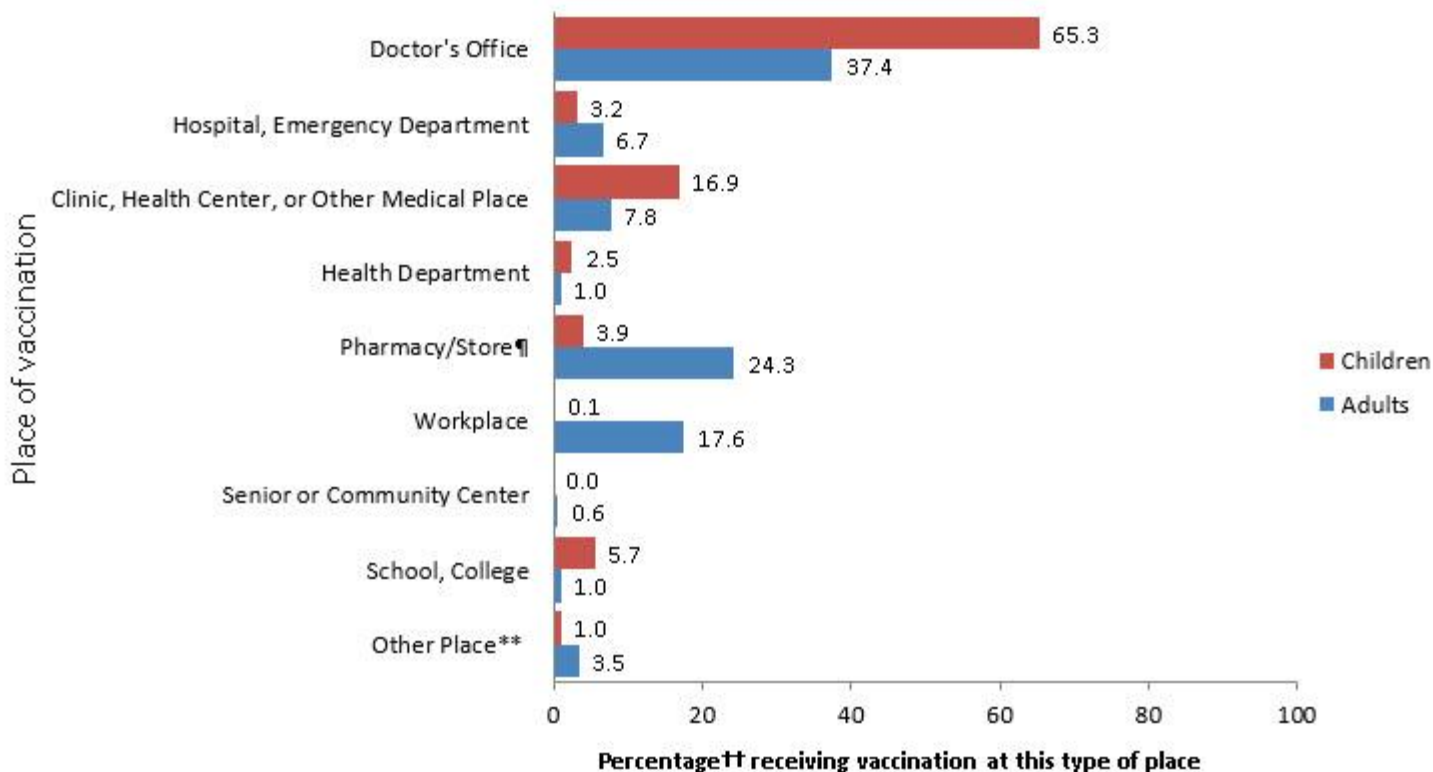
Error bars represent 95% confidence intervals around the estimates.

The 2009-10 estimates do not include the influenza A (H1N1) pdm09 monovalent vaccine.

Starting with the 2011-12 season, adult estimates reflect changes in BRFSS survey methods: the addition of cellular telephone samples and a new weighting method.



Place of flu vaccination (%) for children and adults, National Immunization Survey-Flu and National Internet Flu Survey, United States, early 2016–17 flu season



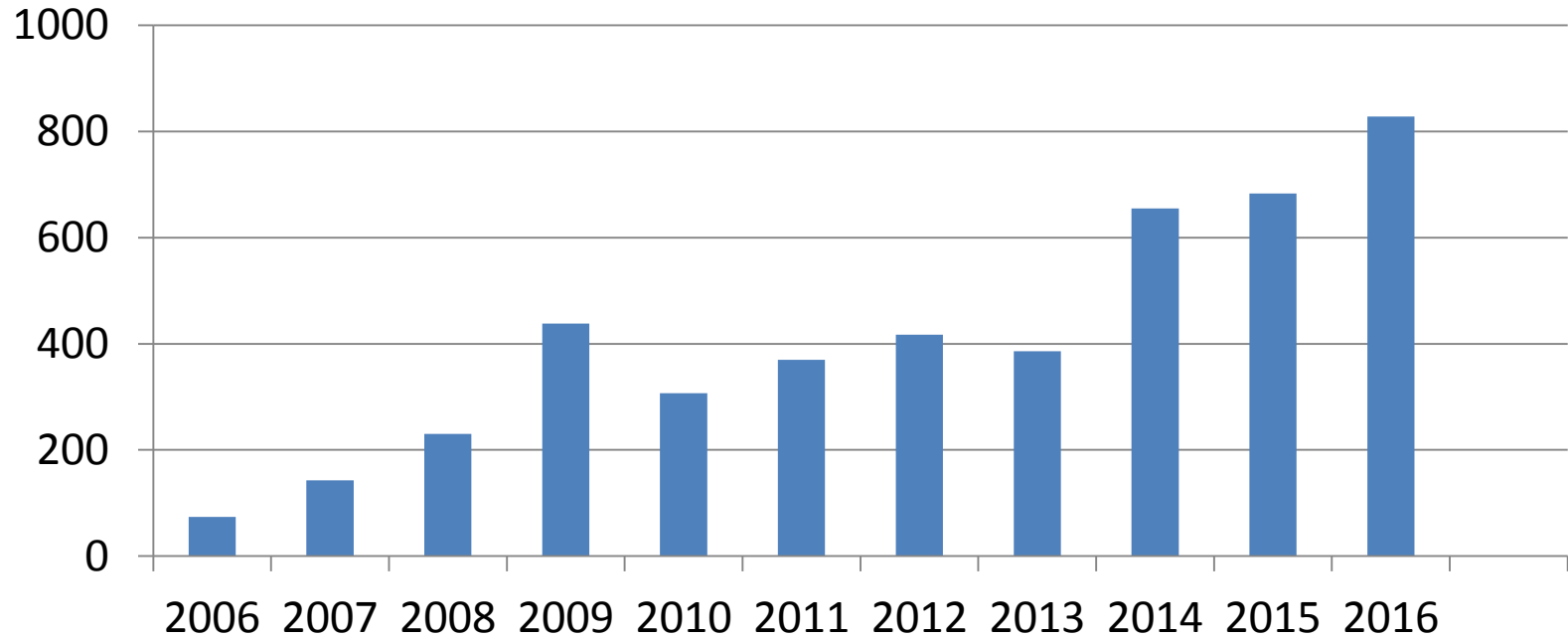


Children's Hospital Orange County

- Children's Hospital Orange County (CHOC) is a large tertiary children's hospital located in Southern California serving approximately hospitalized 12,000 children annually
- The influenza vaccine is offered to hospitalized patients near the time of discharge
- Parents of hospitalized children are offered the influenza and Tdap vaccines



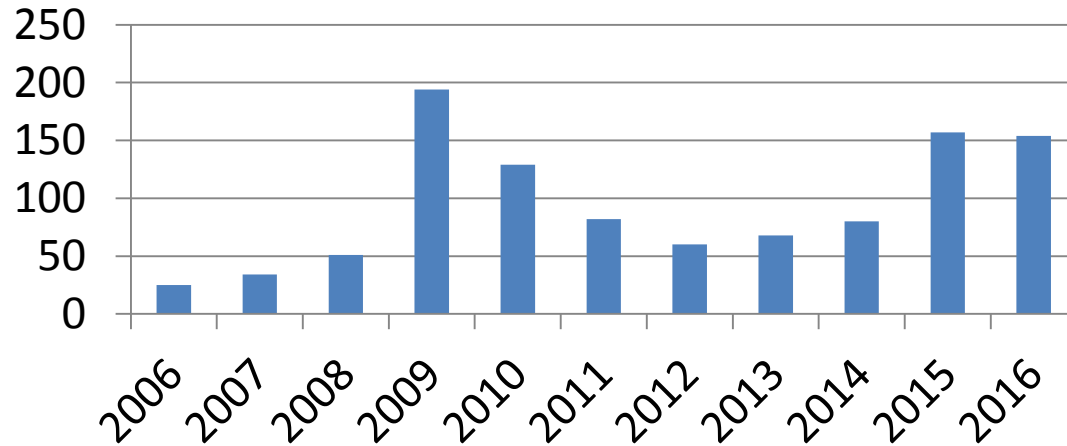
Children's Hospital Orange County: Influenza Vaccines Administered By Year at Hospital Discharge





High-Risk Hospitalized Population

- Approximately 1,500 Heme/Onc patients hospitalized annually
- In 2016- 154 or 10% of Heme/Onc patients immunized with influenza vaccine at hospital discharge





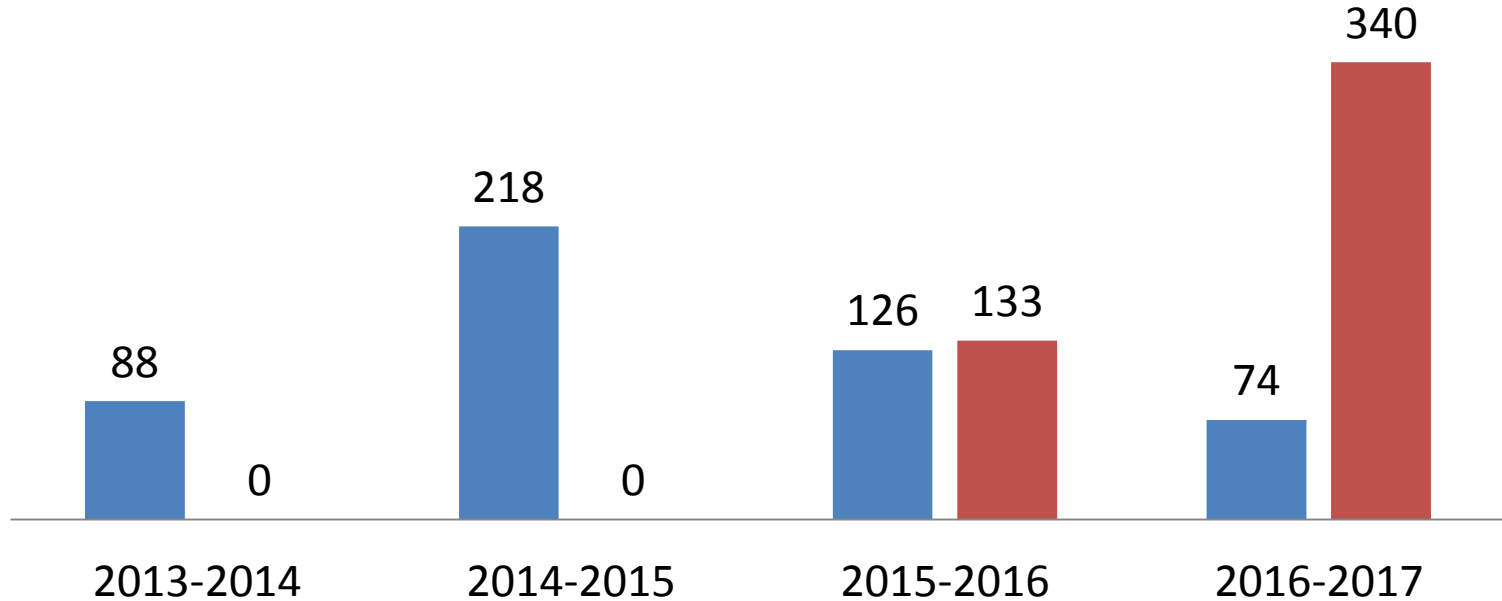
Methods to Increase Vaccination

- Offering Influenza and Tdap vaccination to parents of hospitalized children
- Visual reminders on computers used for order entry on the oncology floor
- Interface of the California Immunization Registry (CAIR) System with our electronic medical record
- Provider education



Vaccines Given to Parents of Hospitalized Children

■ Tdap ■ Influenza





Provider Education

- Create a culture of acceptance of vaccination
 - >90% of employees vaccinated with the influenza vaccine annually
- Reminders in consult notes from Infectious Disease consults, Nephrology consults, Rheumatology consults, Neurology consults, etc.

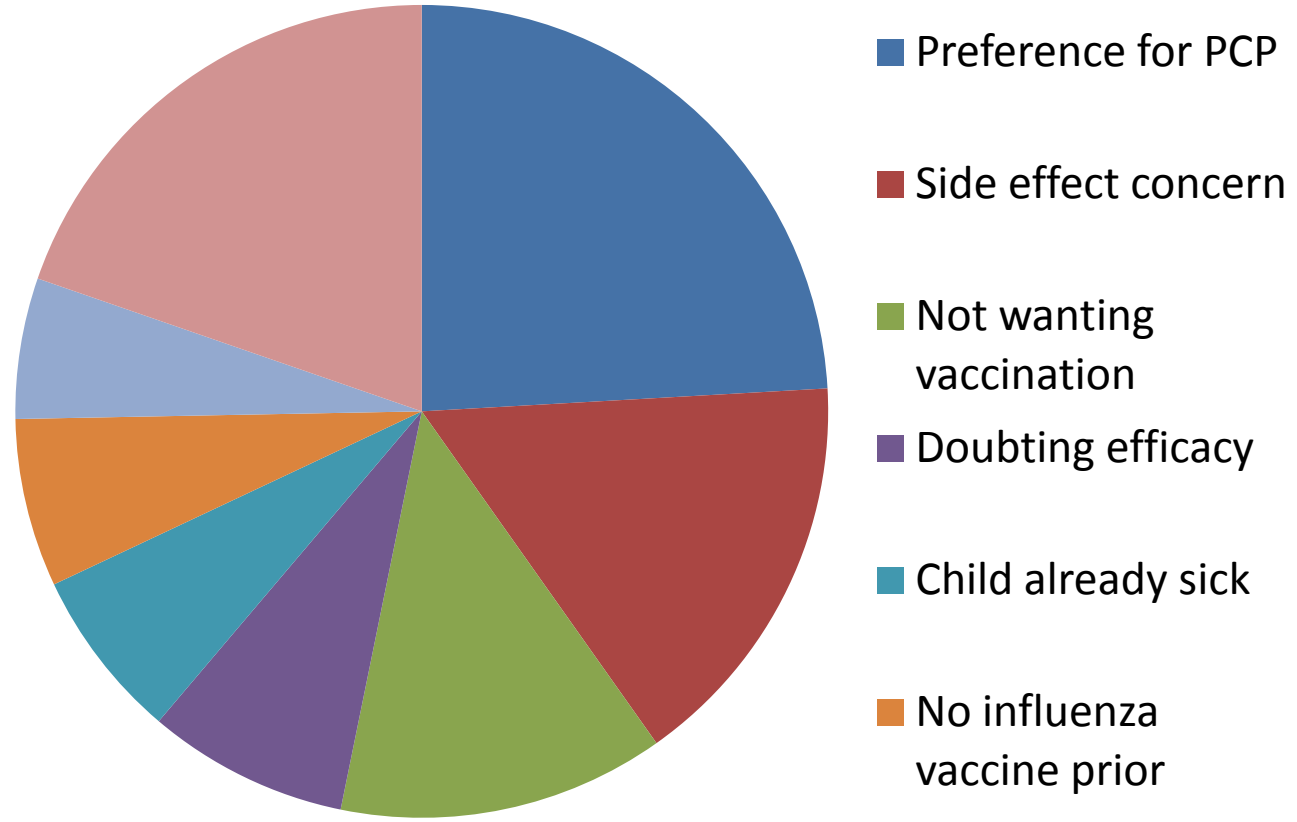


Barriers to Vaccination

- Children 6 months to 18 years offered influenza vaccine during hospitalization at 2 community hospitals
- 325 of 796 patients were eligible for influenza vaccine
- 49.8% of eligible patients and families refused the influenza vaccine at hospital discharge



Reasons for Non-vaccination





Next Steps

- Computerized Reminder in EMR can increase the delivery of preventive care
 - 3416 patients (53.6%) were eligible for preventive therapy
 - The use of reminders led to high ordering rate for influenza vaccination
 - 51.4% of eligible hospitalized patients received the influenza vaccine in the intervention group compared to 1.0% in the control group



Next Steps

Orders Medication List

Add to Phase Start: Duration:

<input type="checkbox"/>	<input type="checkbox"/>	Component	Status	Details	Order Com...
<input type="checkbox"/>	<input checked="" type="checkbox"/>	insulin lispro (insulin lispro (HumaLOG) LUXURA HumaPen HD for Insulin:Carb Ratio)		Snacks PRN Carbohydrate Intake	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	insulin lispro (insulin lispro (HumaLOG) LUXURA HumaPen HD for Insulin:Carb Ratio)		BEDTIME PRN Carbohydrate Intake	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	insulin aspart (insulin aspart (NovoLOG) PEN for Insulin:Carb Ratio)		TID AC & Snacks	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	insulin aspart (insulin aspart (NovoLOG) PEN for Insulin:Carb Ratio)		TID AC	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	insulin aspart (insulin aspart (NovoLOG) PEN for Insulin:Carb Ratio)		Snacks PRN Carbohydrate Intake	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	insulin aspart (insulin aspart (NovoLOG) PEN for Insulin:Carb Ratio)		BEDTIME PRN Carbohydrate Intake	
Other Medications					
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	glucagon		1 mg IV ONE TIME PRN SEE NOTE for Reason, STAT, Note: Hypoglycemia with loss of consciousness or seizure; If IV route not available may give IM, Dosing Guidelines: > 20 kg	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	metFORMIN		250 mg Oral BID Meals, Routine	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	pioqlitazone		15 mg Oral DAILY	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	acetaminophen		15 mg/kg Oral q4h PRN Pain or Fever (>=38.5C), Routine	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	sodium chloride (Saline Lock (Peripheral))		1 mL IV Lock SEE NOTE PRN Line Patency, Note: per protocol	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	lidocaine topical (LMX 4)		1 Application Topical SEE NOTE PRN Procedure, Note: for IV starts and phlebotomy per protocol	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	pentafluoropropane-tetrafluoroethane topical (Pain Ease Topical Spray)		1 Application Topical SEE NOTE PRN Procedure, Routine, Note: for IV starts and phlebotomy per protocol	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	lidocaine (lidocaine 1% injectable, buffered (J-Tip))		0.2 mL Subcut SEE NOTE PRN Procedure, Note: for IV starts/phlebotomy; administer with J-Tip needleless injector	
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	pneumococcal 23-valent vaccine		0.5 mL IM Once (when indicated), Note: Give on day of discharge, Dosing Guidelines: > 2 yrs	



Thank you!

Special thanks to:

Dr. Jasjit Singh

Wendi Gornick

Phuong Wood



References:

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Dexter, Paul R., et al. "A computerized reminder system to increase the use of preventive care for hospitalized patients." *New England Journal of Medicine* 345.13 (2001): 965-970.