EMPOWERING CLINICIANS TO BECOME CHAMPIONS FOR INFLUENZA VACCINATION

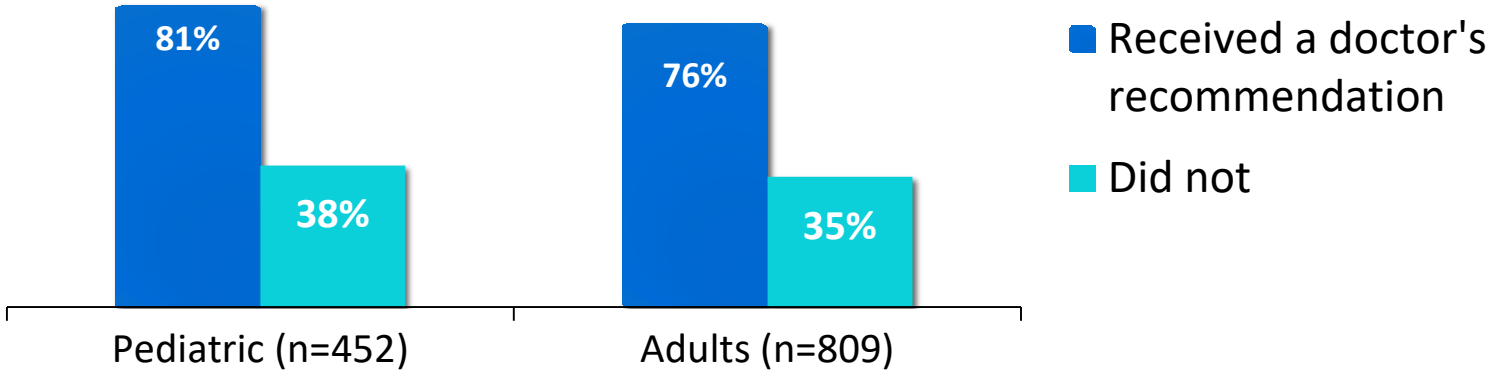
SANOFI PASTEUR

HCP Recommendations Drive Flu Vaccinations[1]

Percent Receiving Vaccination in Doctor's Office

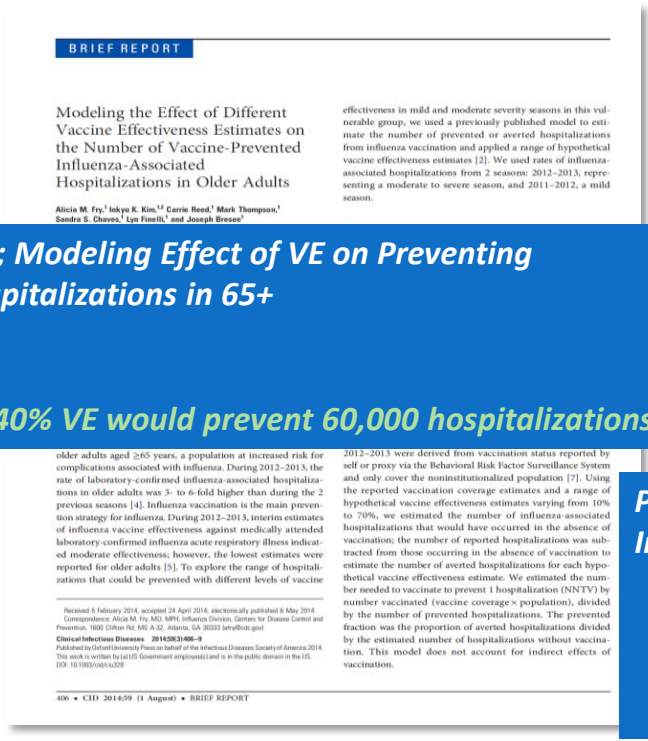
73%	53%
Pediatric (n=427)	Adults (n=835)

Percent Receiving Vaccination With and Without a Doctor's Recommendation



Reference: 1. Sanofi Pasteur. Data on file (2015-2016 National consumer influenza immunization study: immunization trends), July 2016. MKT32484.

Even When Vaccine Effectiveness (VE) is <50%, Current Vaccines Can Have a Major Impact[1,2]



BRIEF REPORT

Modeling the Effect of Different Vaccine Effectiveness Estimates on the Number of Vaccine-Prevented Influenza-Associated Hospitalizations in Older Adults

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effectiveness in mild and moderate severity seasons in this vulnerable group, we used a previously published model to estimate the number of prevented or averted hospitalizations from influenza vaccination and applied a range of hypothetical vaccine effectiveness estimates [2]. We used rates of influenza-associated hospitalizations from 2 seasons: 2012–2013, representing a moderate to severe season, and 2011–2012, a mild season.

older adults aged ≥65 years, a population at increased risk for complications associated with influenza. During 2012–2013, the rate of laboratory-confirmed influenza-associated hospitalizations in older adults was 3- to 6-fold higher than during the 2 previous seasons [4]. Influenza vaccination is the main prevention strategy for influenza. During 2012–2013, interim estimates of influenza vaccine effectiveness against medically attended laboratory-confirmed influenza acute respiratory illness indicated moderate effectiveness; however, the lowest estimates were reported for older adults [5]. To explore the range of hospitalizations that could be prevented with different levels of vaccine

2012–2013 were derived from vaccination status reported by self or proxy via the Behavioral Risk Factor Surveillance System and only cover the noninstitutionalized population [7]. Using the reported vaccination coverage estimates and a range of hypothetical vaccine effectiveness estimates varying from 10% to 70%, we estimated the number of influenza-associated hospitalizations that would have occurred in the absence of vaccination; the number of reported hospitalizations was subtracted from those occurring in the absence of vaccination to estimate the number of averted hospitalizations for each hypothetical vaccine effectiveness estimate. We estimated the number needed to vaccinate to prevent 1 hospitalization (NNTV) by number vaccinated (vaccine coverage × population), divided by the number of prevented hospitalizations. The prevented fraction was the proportion of averted hospitalizations divided by the estimated number of hospitalizations without vaccination. This model does not account for indirect effects of vaccination.

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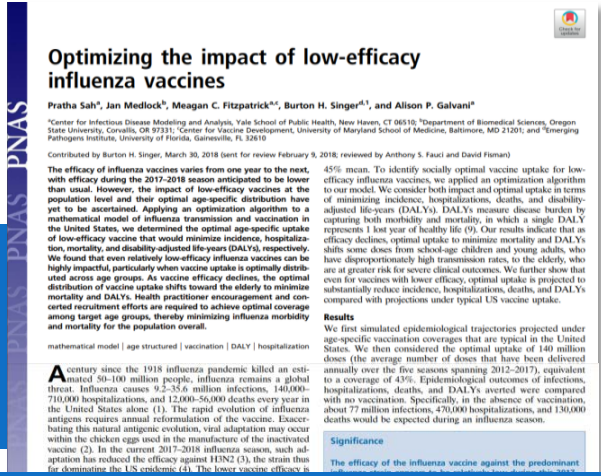
CID; Modeling Effect of VE on Preventing Hospitalizations in 65+

40% VE would prevent 60,000 hospitalizations



PNAS

Optimizing the impact of low-efficacy influenza vaccines

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Contributed by Burton H. Singer, March 30, 2018 (sent for review February 9, 2018; reviewed by Anthony S. Fauci and David Fisman)

The efficacy of influenza vaccines varies from one year to the next, with efficacy during the 2017–2018 season anticipated to be lower than usual. However, the impact of low-efficacy vaccines at the population level and their optimal age-specific distribution have yet to be ascertained. Applying an optimization algorithm to a mathematical model of influenza transmission and vaccination in the United States, we determined the optimal age-specific uptake of low-efficacy vaccine that would minimize incidence, hospitalization, mortality, and disability-adjusted life-years (DALYs), respectively. We found that even relatively low-efficacy influenza vaccines can be highly impactful, particularly when vaccine uptake is optimally distributed across age groups. As vaccine efficacy declines, the optimal distribution of vaccine uptake shifts toward the elderly to minimize mortality and DALYs. Health practitioner encouragement and concerted recruitment efforts are required to achieve optimal coverage among target age groups, thereby minimizing influenza morbidity and mortality for the population overall.

mathematical model | age structured | vaccination | DALY | hospitalization

A century since the 1918 influenza pandemic killed an estimated 50–100 million people, influenza remains a global threat. Influenza causes 9.2–35.6 million infections, 140,000–710,000 hospitalizations, and 12,000–56,000 deaths every year in the United States alone (1). The rapid evolution of influenza antigens requires annual reformulation of the vaccine. Exacerbating this natural antigenic evolution, viral adaptation may occur within the chicken eggs used in the manufacture of the inactivated vaccine (2). In the current 2017–2018 influenza season, such adaptation has reduced the efficacy against H3N2 (3), the strain thus for dominating the US epidemic (4). The lower vaccine efficacy is

45% mean. To identify socially optimal vaccine uptake for low-efficacy influenza vaccines, we applied an optimization algorithm to our model. We consider both impact and optimal uptake in terms of minimizing incidence, hospitalizations, deaths, and disability-adjusted life-years (DALYs). DALYs measure disease burden by capturing both morbidity and mortality, in which a single DALY represents 1 lost year of healthy life (9). Our results indicate that as efficacy declines, optimal uptake to minimize mortality and DALYs shifts some doses from school-age children and young adults, who have disproportionately high transmission rates, to the elderly, who are at greater risk for severe clinical outcomes. We further show that even for vaccines with lower efficacy, optimal uptake is projected to substantially reduce incidence, hospitalizations, deaths, and DALYs compared with projections under typical US vaccine uptake.

Results

We first simulated epidemiological trajectories projected under age-specific vaccination coverages that are typical in the United States. We then considered the optimal uptake of 140 million doses (the average number of doses that have been delivered annually over the five seasons spanning 2012–2017), equivalent to a coverage of 43%. Epidemiological outcomes of infections, hospitalizations, deaths, and DALYs averted were compared with no vaccination. Specifically, in the absence of vaccination, about 77 million infections, 470,000 hospitalizations, and 130,000 deaths would be expected during an influenza season.

Significance

The efficacy of the influenza vaccine against the predominant

PNAS; Optimizing the Impact of Low-efficacy Influenza Vaccines

20% VE projected to avert 130,000 hospitalizations and 62,000 deaths

References: 1. Fry AM, et al. *Clinical Infectious Diseases.* 2014;59(3):406-409. **2.** Sah P, et al. *PNAS.* 2018;115(20):5151-5156.

Research Shows “Words that Work” Can Change Behavior

- Parents, patients, and the healthcare team underappreciate impact of influenza
  - Each year, the flu is one of the deadliest vaccine-preventable diseases. It kills more children in the U.S. than meningococcal meningitis and whooping cough combined
  - This past season adults 50 yrs of age. and older had the highest rates of hospitalization
  - Seniors 65 and adults with chronic conditions tend to have the worst outcomes from influenza
- Similar messages on risk of influenza resonated between HCPs and Parents
  - Parent’s and patients appreciated understanding role of vaccination on reducing severe outcomes
  - Influenza affects all, not only very young or very old or those who are immunocompromised

Root Causes for Flu Vaccination Hesitancy and Where to Focus

Root Causes:

- Perceived lack of vaccine efficacy
- Lack of understanding of the devastation influenza has and the benefits of vaccination

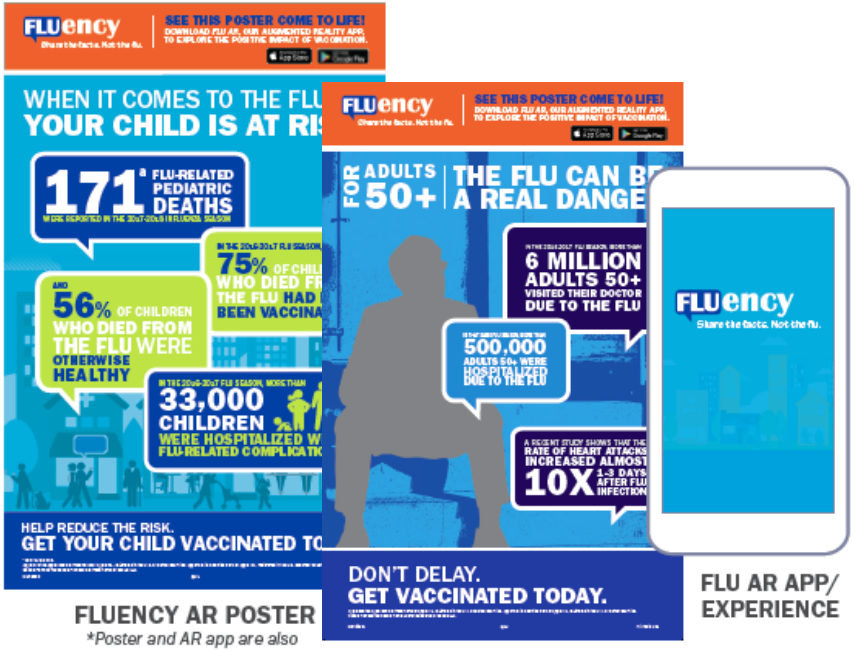
Where to Focus:

- HCP
  - Presumptive approach – “Flu shot today, left or right arm?”, flu vaccination not optional
  - Arm with key facts that are simple to address with patients
- Parents and Patients
  - Increase awareness of the devastation of influenza and the importance of vaccination at point of care

FLUency

Share the facts. Not the flu.

SUPPORTING YOUR INFLUENZA IMMUNIZATION EFFORTS ACROSS ALL AGES



FLUENCY AR POSTER

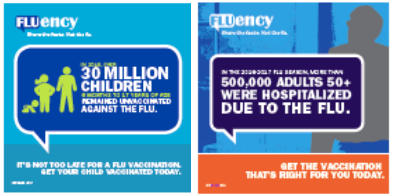
Poster and AR app are also available in Spanish

FLU AR APP/ EXPERIENCE

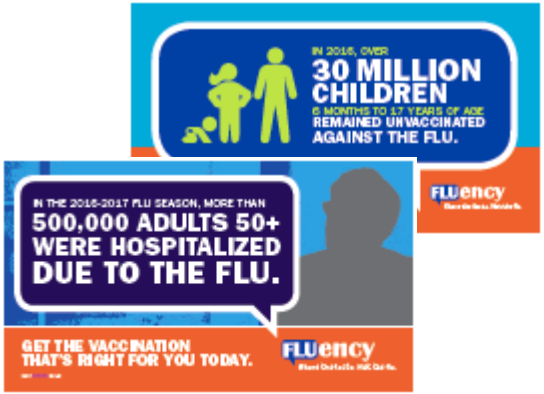
FLUENCY AR POSTER

Poster and AR app are also available in Spanish

EMPLOYEE HEALTH POSTER



FACEBOOK CONTENT



TWITTER CONTENT

SUPPORTING YOUR INFLUENZA IMMUNIZATION EFFORTS ACROSS ALL AGES

FLUency
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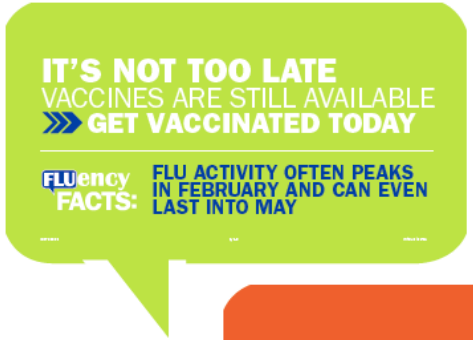
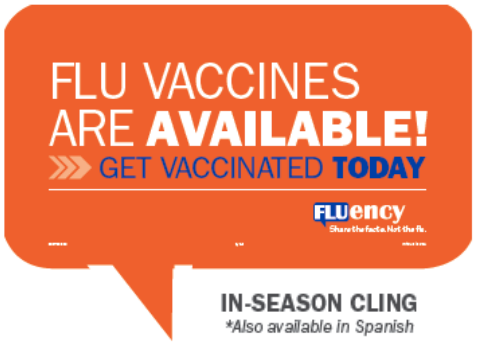
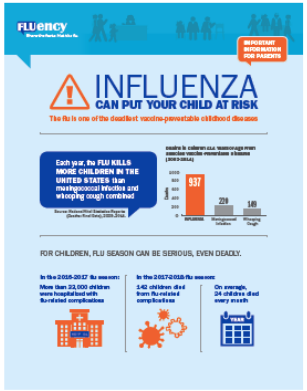


POST-SEASON CLING
*Also available in Spanish



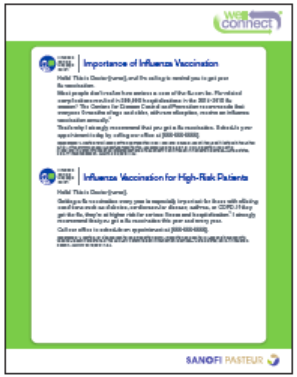
IN-SEASON CLING
*Also available in Spanish



HCP-to-Parent Flashcard

Email Templates

APPOINTMENT CARDS



WELLCONNECT®
SCRIPTS

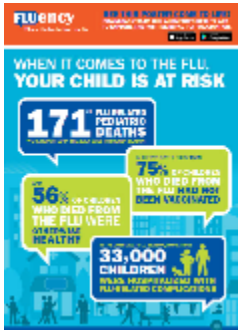
Pediatric Example

HCP Flashcard

Influenza Pediatric Unbranded Disease Awareness Flashcard

Patient Poster & Flashcard

FLUency Consumer Flashcard and Poster



Pediatric Example

- **HCP " Words that Work"**
- Influenza is the disease we are furthest from our goal
  - Influenza kills more children each year when compared to other vaccine preventable diseases
  - Last year influenza impacted 183 families
- Data From the CDC Show That Influenza Deaths Affect All Pediatric Age Groups
  - Approx. 80% of children who died from influenza last year weren't vaccinated
- Influenza impacts otherwise healthy children
  - Approx. 60% of those children who died were otherwise healthy
- Pediatric influenza immunization rates are low

- **Parent/Patient " Words that Work"**
- Influenza can put your child at risk
- Each year flu kills more children in than any disease we vaccinate to help prevent
- Influenza can be serious, even deadly for all children – including those who are otherwise healthy
- Approx. 80% of children who died last season were not vaccinated
- Approx. 60% of children who died from influenza were otherwise healthy
- Approx. 33,0000 children are hospitalized annually from flu related complications
- Today we are going to give a flu shot

Fluency Resources Available to NAIIS Members

https://www.vaccineshoppe.com/index.cfm?fa=anon.pe

- Email templates
- Office support tools (flashcards, posters, clingz, telephone scripts)
- Facebook social media posts
- Twitter social media posts
- Spanish materials

Thank you