What's New with Flu in 2019-2020

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September 24th, 2019

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Disclosures

- I have no conflicts of interest.
- I do NOT intend to discuss an unapproved or investigative use of a commercial product/device in my presentation.

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Outline

- Review 2018-2019 influenza season activity and vaccination coverage rates
- Discuss influenza vaccine effectiveness
- Describe influenza recommendations for 2019-2020 influenza season
- Discuss communication messages

The 2018-2019 Influenza Season

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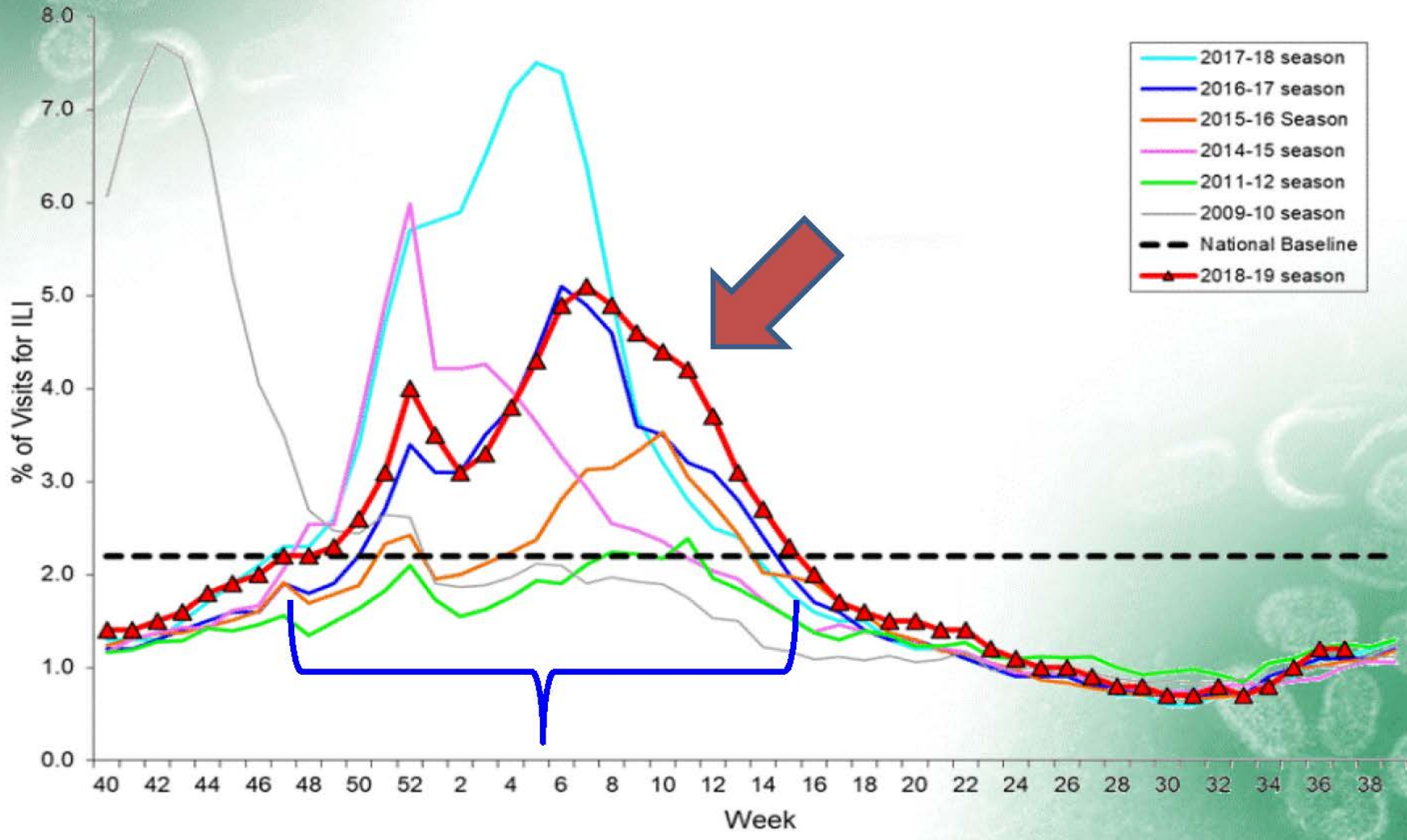
FLUVIEW

A Weekly Influenza Surveillance Report Prepared by the Influenza Division

Percentage of Visits for Influenza-like Illness (ILI) Reported by the U.S. Outpatient Influenza-like Illness Surveillance Network (ILINet), Weekly National Summary, 2018-2019 and Selected Previous Seasons



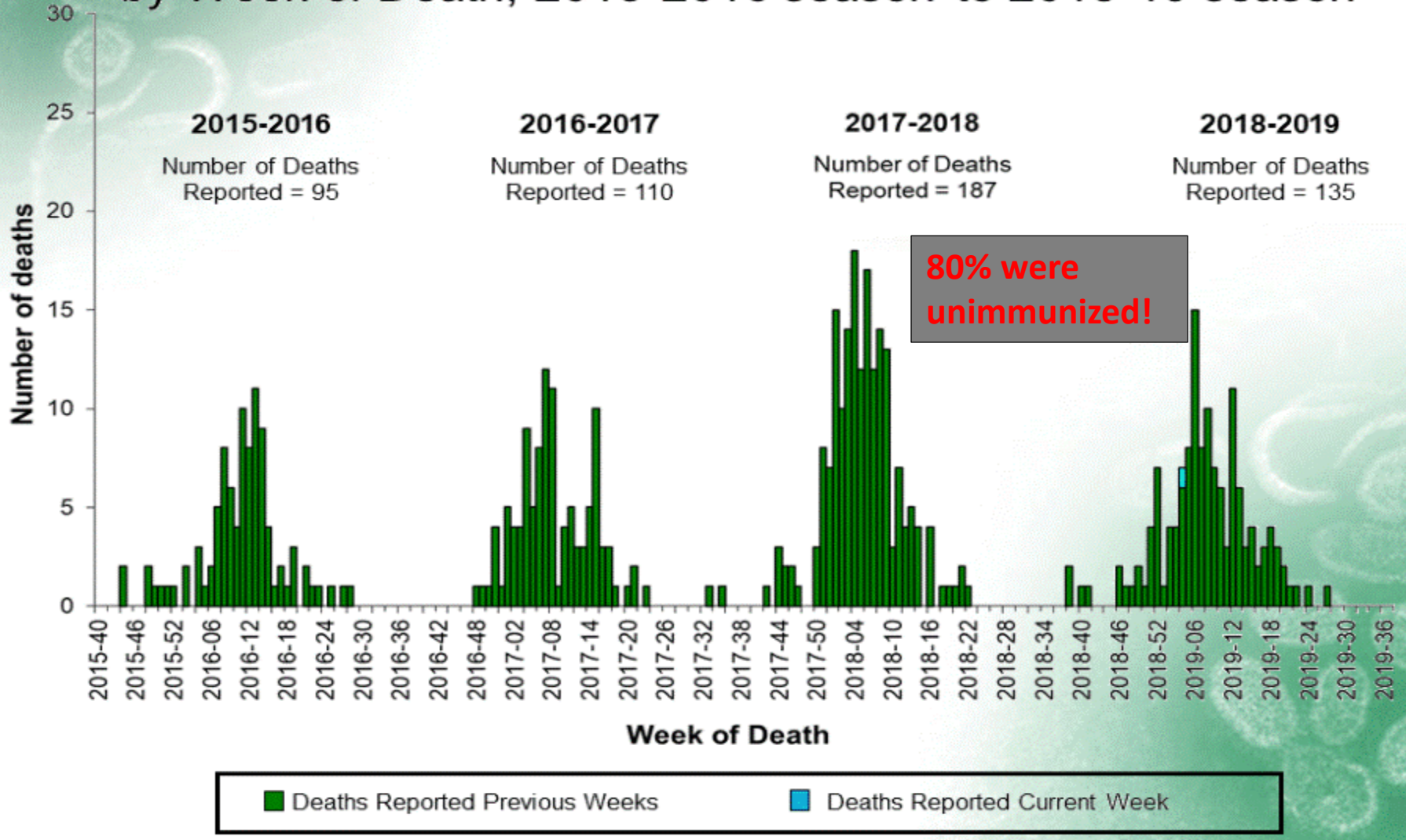
FLUVIEW

A Weekly Influenza Surveillance Report Prepared by the Influenza Division

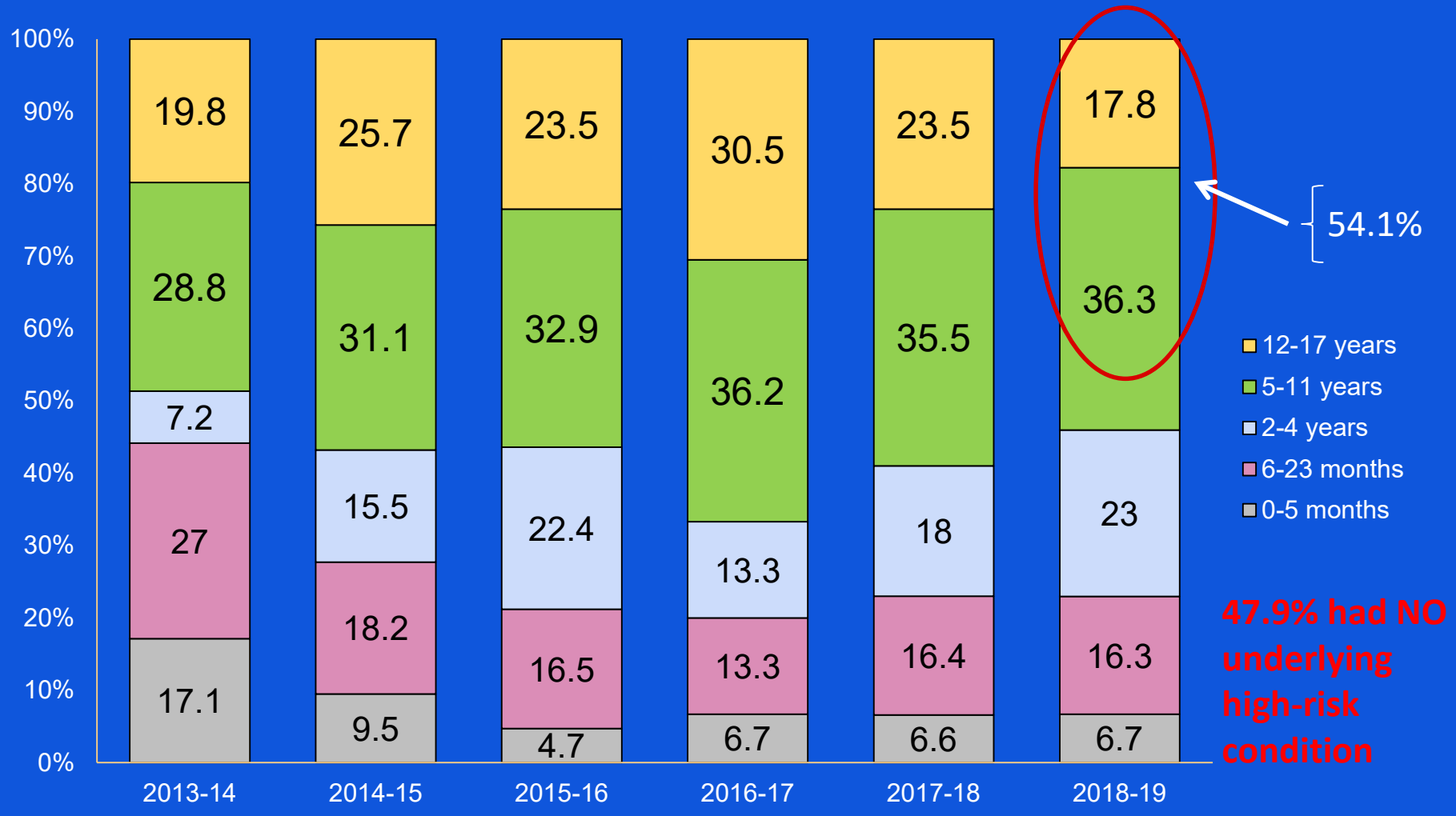
CDC

Centers for Disease Control and Prevention

Influenza-Associated Pediatric Deaths by Week of Death, 2015-2016 season to 2018-19 season

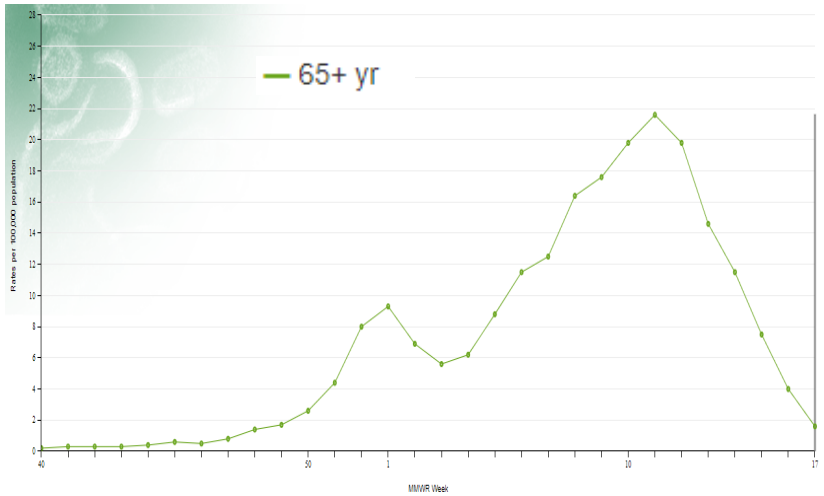


Influenza-Associated Pediatric Deaths by Age Group (percent of total deaths)

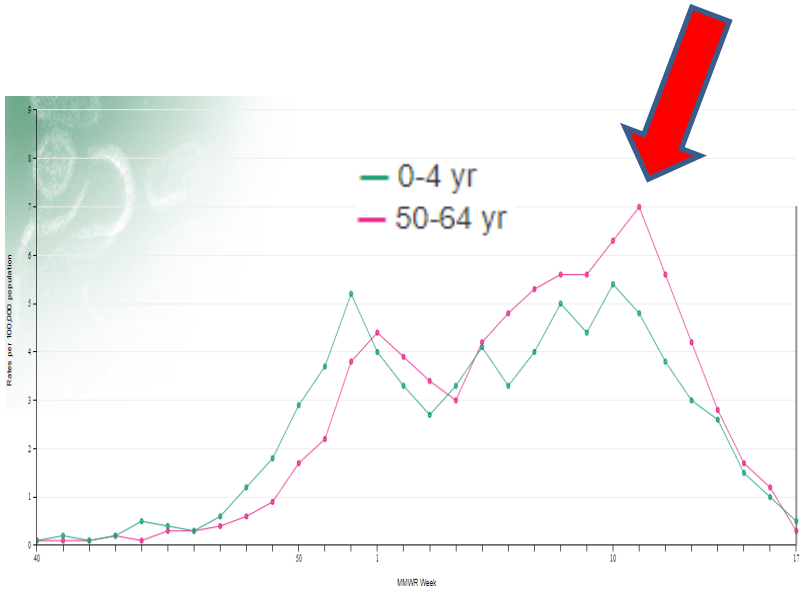


*Data through September 24th, 2019

2018 – 2019 Hospitalization Rates…

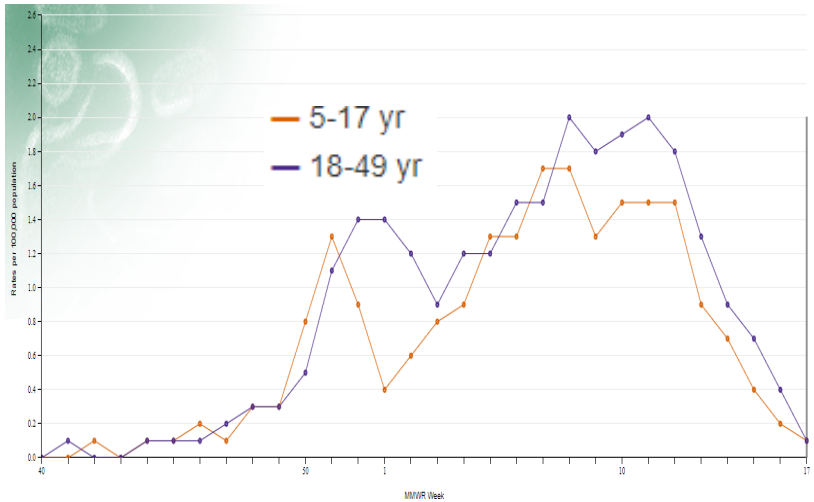


65 + years
Cumulative Rate: 216.6/100,000



5-17 years
Cumulative Rate: 21.0/100,000

18-49 years
Cumulative Rate: 26.0/100,000



0-4 years
Cumulative Rate: 74.0/100,000

50-64 years
Cumulative Rate: 80.0/100,000

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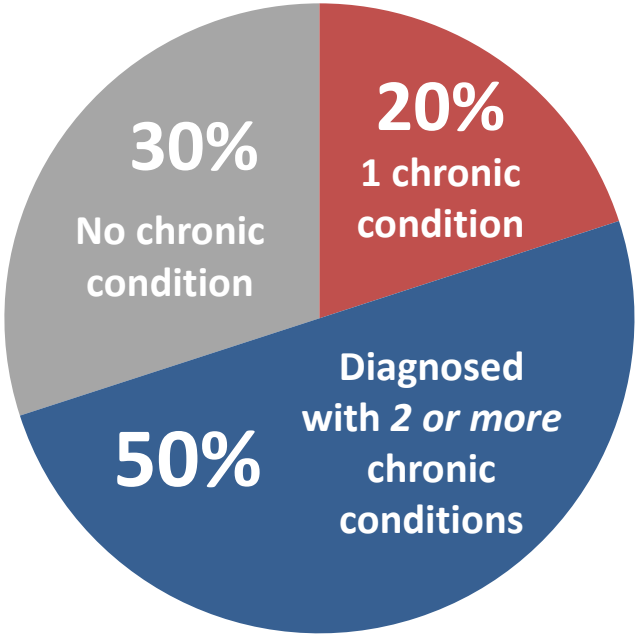
Prevalence of Chronic Conditions and Their Association With Influenza Hospitalizations in Adults 50 Years of Age and Older

Prevalence of Chronic Conditions US Adults 50-64 Years of Age[1]



Americans 50 years of age and older are a priority group for influenza immunization.[2]

- In a study covering the 2005-2006, 2006-2007, and 2007-2008 influenza seasons, >80% of adults hospitalized with lab-confirmed influenza had 1 or more underlying medical condition; half had 2 or more conditions[3]
- In the 2016-2017 influenza season, 94.2% of hospitalized adult patients with influenza had at least 1 underlying medical condition[4]

References: 1. CDC, AARP, American Medical Association. https://www.cdc.gov/aging/pdf/promoting-preventive-services.pdf. Accessed March 1, 2018. 2. CDC. https://www.cdc.gov/flu/protect/ whoshouldvax.htm. Accessed March 1, 2018. 3. Dao CN, et al; Emerging Infections Program Network. *J Infect Dis*. 2010;202(6):881-888. 4. CDC. https://www.cdc.gov/flu/weekly/weeklyarchives2016-2017/Week20.htm. Accessed March 1, 2018.

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Influenza and Cardiovascular Disease

- Incidence of admissions for acute myocardial infarction was six times as high during the 7 days after laboratory confirmation of influenza infection[1]
- A study in VA patients showed that 24% of 600 VA patients who tested positive for influenza had acute cardiac injury and 80% occurred within 3 days of the influenza diagnosis[2]
- A systematic review showed consistent associations between influenza and acute myocardial infarction, with weaker evidence of an association with cardiovascular death[3]
- Acute infections, such as influenza, have been associated with cardiovascular events, and it is hypothesized to be due to triggering of inflammation that elicit cardiovascular events[4]

1. Kwong JC, et al. N Engl J Med 2018; 378:345-353.
2. Ludwig A, et al. BMC Cardiovasc Disord. 2015 Sep 30;15:109. doi: 10.1186/s12872-015-0095-0.
3. Warren-Gash C, et al. Lancet Infect Dis. 2009 Oct;9(10):601-10.
4. Santos-Gallego CG, et al. JAHA 2018; 7(22):e011175.

Influenza and Diabetes

- People with diabetes experienced more hyperglycemic events, and substantial increases in pneumonia, sepsis, and coronary heart disease up to 4 weeks after an influenza claim, as compared to a non-influenza period in the same year[1]
- People with diabetes are 3-6 times more likely to be hospitalized during influenza epidemics[2]
- People with diabetes have a much higher rate of death associated with an influenza infection[3]
- Influenza vaccination recommended by the World Health Organization for high risk patients with diabetes

1. Samson SI, Lee W-N, Quisel T, et al. Diabetes. 2018;67(Supplement 1):1616.
2. Bouter KP, Diabetes Res Clin Pract 1991;12:61-8. Allard R, Diabetes Care 2010;33:1491-3.
3. https://www.gov.uk/government/publications/influenza-the-green-book-chapter-19 (p4).

FLUVIEW

A Weekly Influenza Surveillance Report Prepared by the Influenza Division

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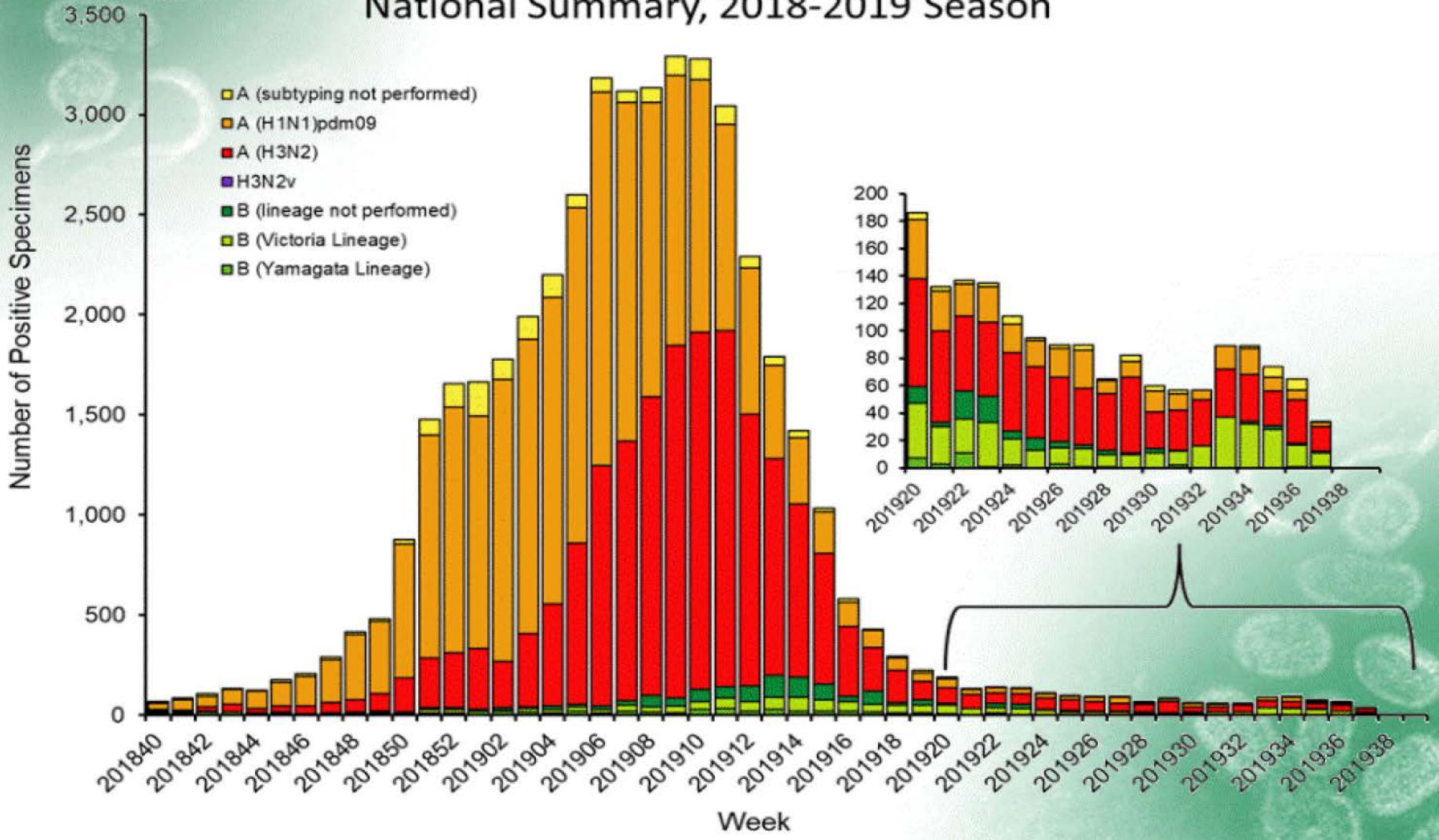
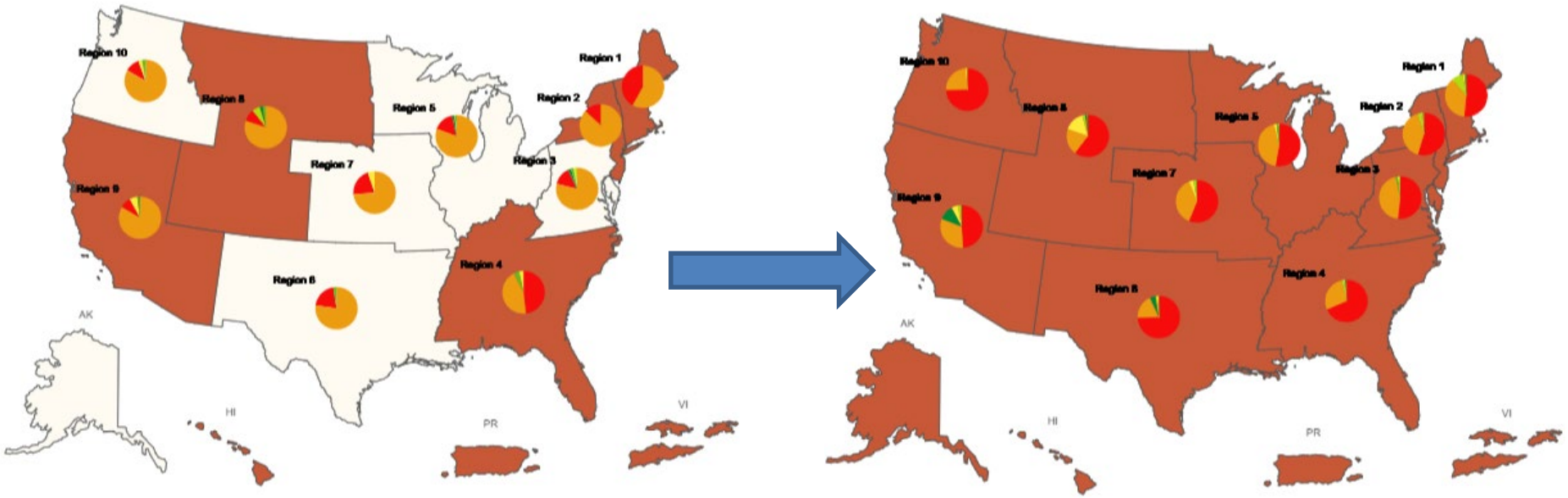
Influenza Positive Tests Reported to CDC by U.S. Public Health Laboratories, National Summary, 2018-2019 Season



H1N1 → H3N2



Early December 2018 → Mid/Late March 2019

- A (subtyping not performed)
- B (lineage not performed)
- A (H1N1)pdm09
- B (Victoria Lineage)
- A (H3N2)
- B (Yamagata Lineage)

Graphic courtesy of Alicia Budd, CDC

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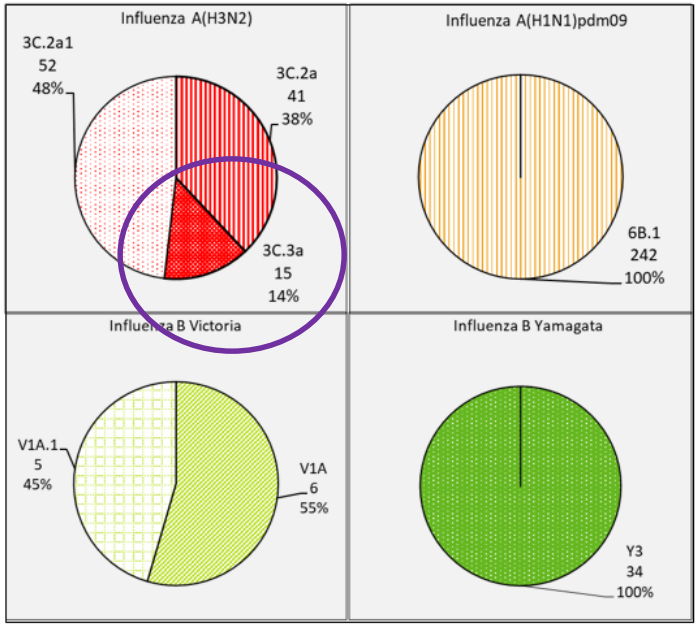
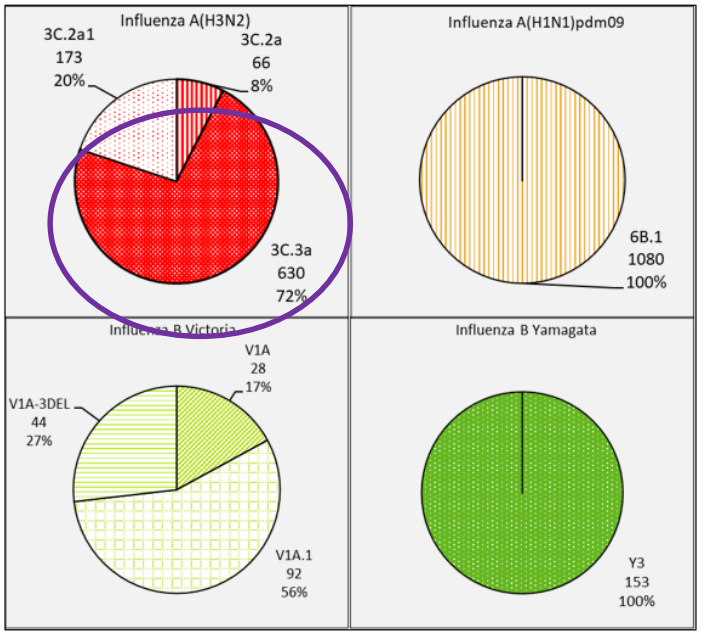
Changing Proportion of H3 Genetic Clades/Sub-clades



End of 2018



Late April 2019

Graphic courtesy of Alicia Budd, CDC

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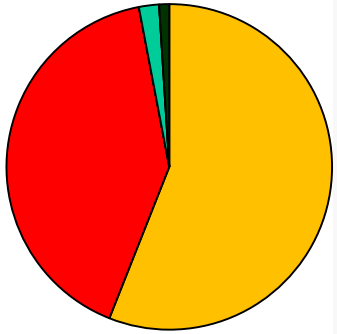
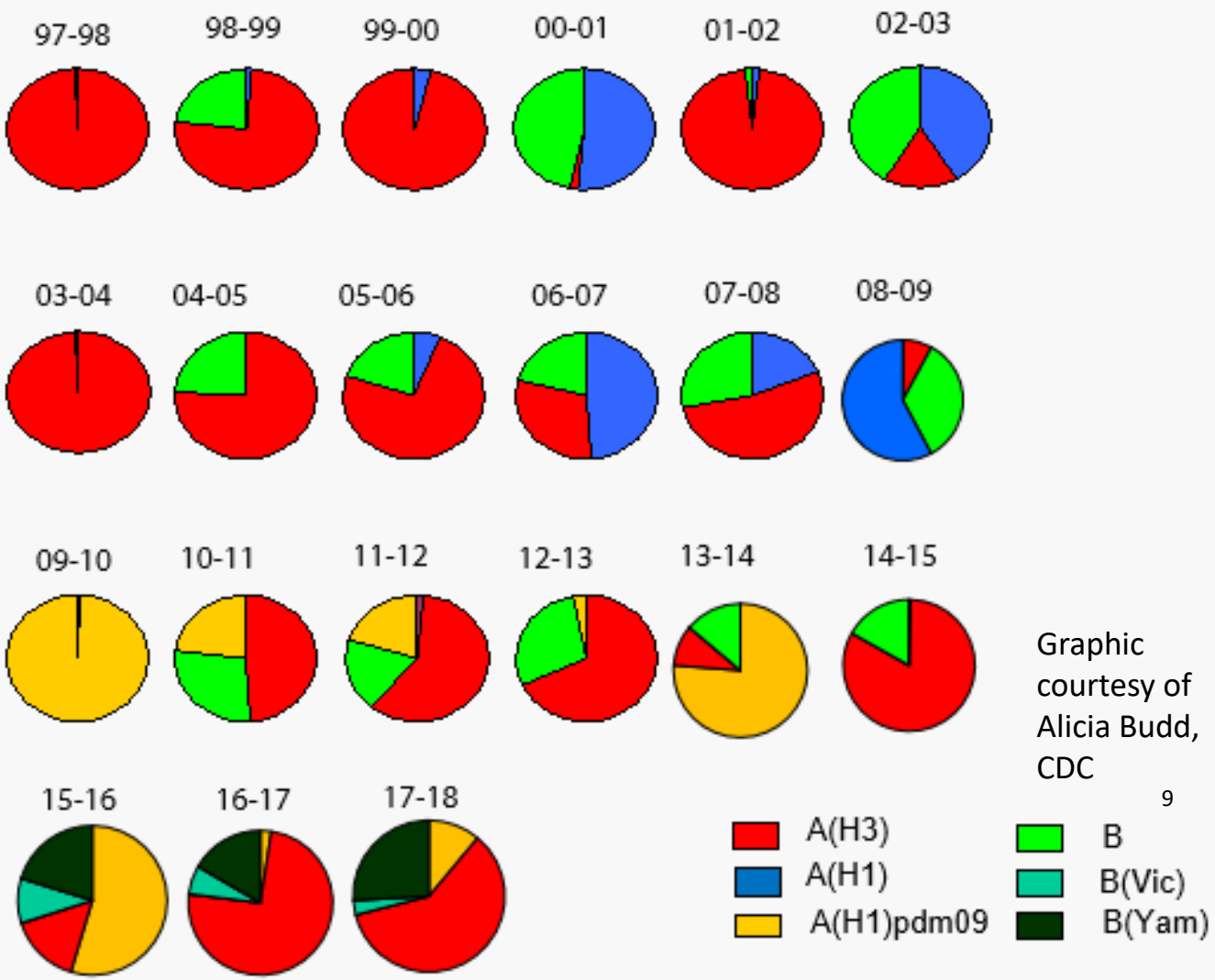
Influenza Virus Co-circulation, 1997-1998 through 2018-2019



2018-2019

H1 – 56%
H3 – 41%



Graphic courtesy of Alicia Budd, CDC

Summary of Influenza Activity 2018-2019

- Two separate waves of influenza A activity – H1 first then H3
- Almost equal proportions of H1 and H3 by season end, but H1 wins out, barely
  - H3 drifted away from strain in the vaccine
  - WHO delays vaccine strain selection by a month
- Very little B virus circulation and no later B wave
- Record breaking long season as measured by ILI activity

The 2018-2019 Influenza Season – Vaccination Coverage (preliminary, final numbers released September 26th, 2019)

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2018-2019 Pediatric Influenza Vaccination Coverage (Preliminary*)

- 59.9% of all children 6 months through 17 years of age vaccinated
- 70.9% of children 6 months to 4 years vaccinated
- 60.7% of children 5 to 12 years vaccinated
- 49.7% of children 13 to 17 years vaccinated

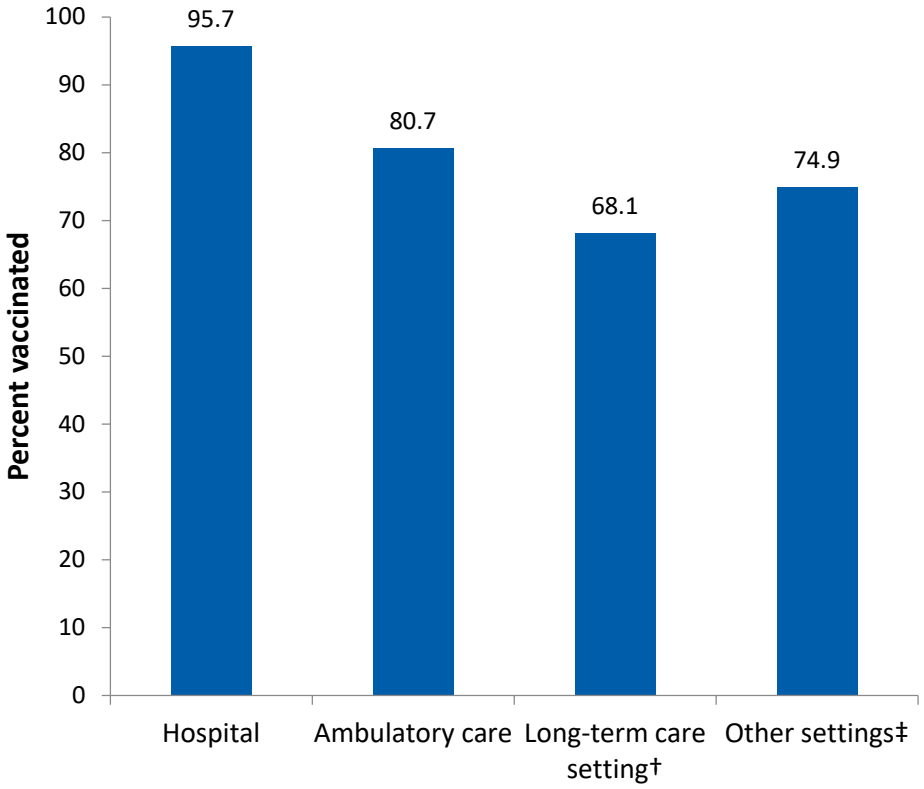
*Preliminary results from NIS-Flu interviews conducted October through March of each season, presented at May 2019 NAIIS meeting

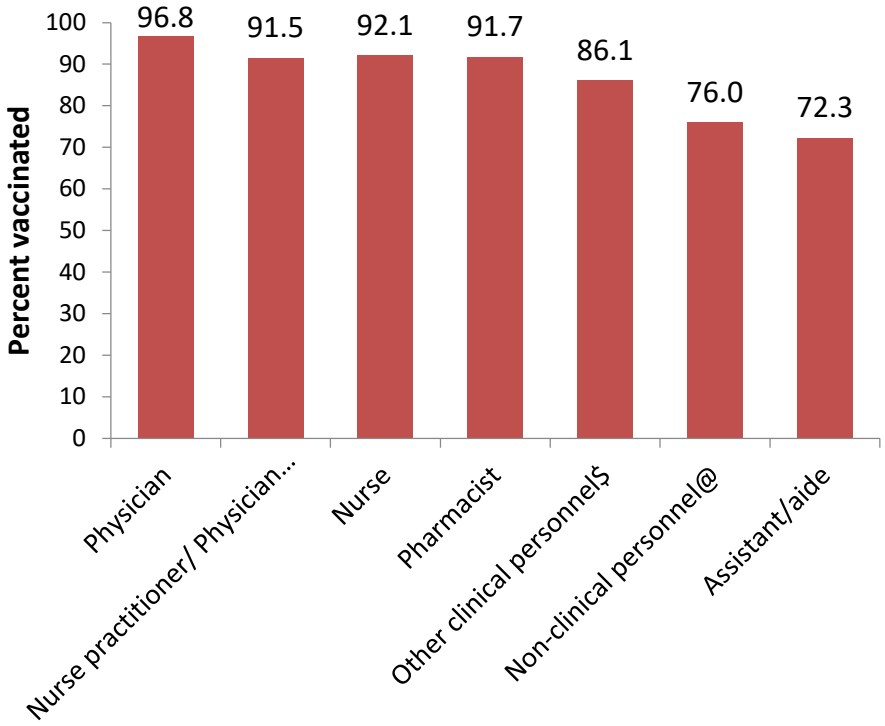
2018-2019 Adult Influenza Vaccination Coverage (Preliminary*)

- Only 34.4 of all adults over 18 years of age vaccinated
- Only 55.9% of those over 65 years of age vaccinated
- Only 36.9% of adult between 50 -64 years of age vaccinated
- Only 24.3% of adults 18-64 years of age vaccinated
  - From 2017-18, only 38.8% of adults 18-64 years of age with at least one high-risk medical condition vaccinated (cf. 46.4% previous year)

*Preliminary results from BRFSS interviews conducted October through December 2018, presented at May 2019 NAIIS meeting

2018-2019 Influenza Vaccination Coverage – Healthcare Personnel (preliminary#)





Internet Panel Survey, United States, as of early April 2019

† Nursing home, assisted living facility, other long-term care facility, home health agency or home health care.

‡ Settings other than hospitals, ambulatory care setting, or long-term care facilities; includes dentist office or dental clinic, pharmacy, EMS, and other settings where clinical care or related services was provided to patients.

$ Allied health professional, dentist, technician, or technologist.

@ Administrative support staff or manager and nonclinical support staff (including food service workers, housekeeping staff, maintenance staff, janitor, and laundry workers).

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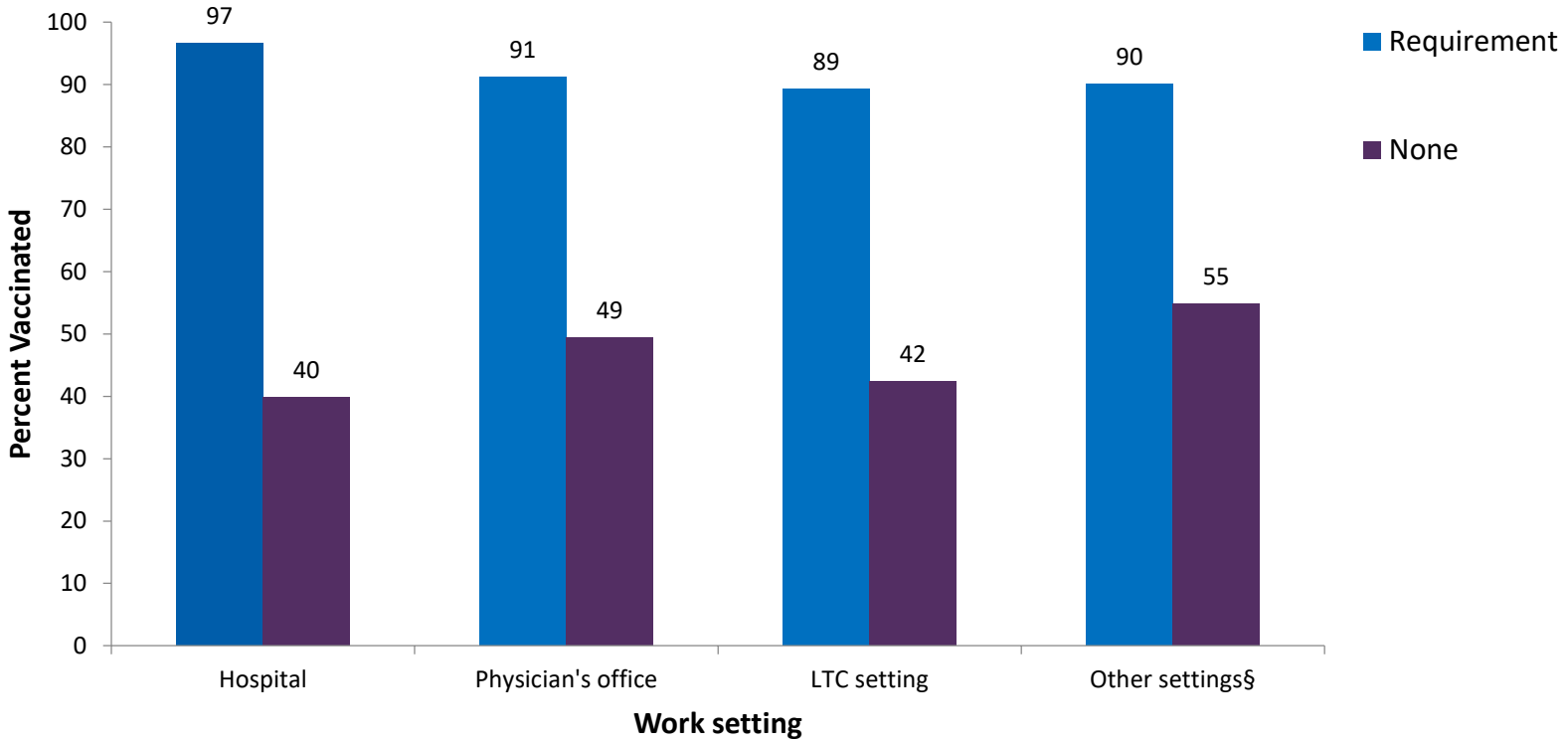
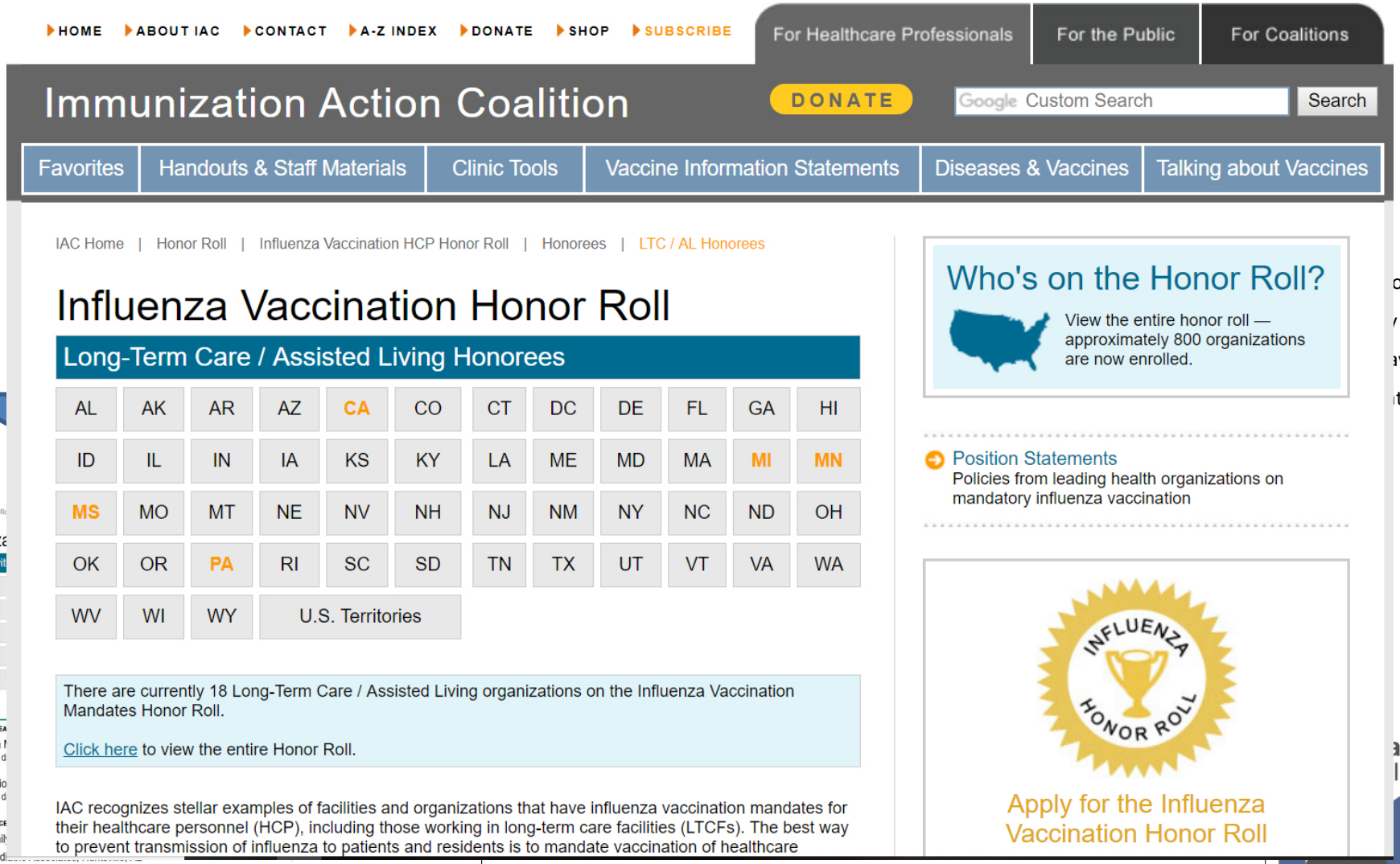
Impact of Employer Policy on Healthcare Personnel Vaccination (by setting)*



§ Settings other than hospitals, ambulatory care setting, or long-term care facilities; includes dentist office or dental clinic, pharmacy, EMS, and other settings where clinical care or related services was provided to patients.

*** Internet Panel Survey, United States, March 27–April 17, 2018**

Healthcare Personnel Vaccination Policy by Setting



2018-2019 Influenza Vaccination Coverage in Healthcare Personnel (Preliminary, early April 2019)

- HP 2020 goal of 90%.
- 81.0% vaccinated by internet panel surveys, some improvement over previous season data at this time point.
- Long-term care facilities had lower coverage (68.1%) than other facility types (hospitals at 95.7%).
- Higher vaccination coverage among HCP was associated with employer vaccination requirements or access to vaccination at the workplace at no cost.

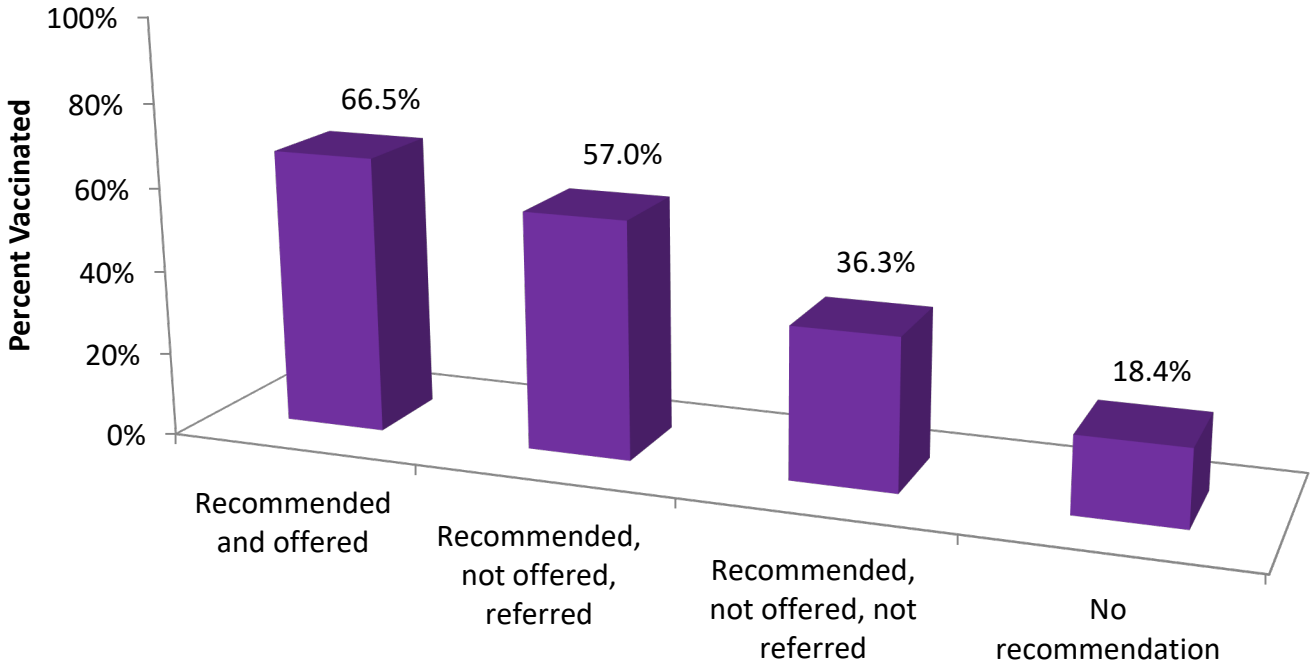
2018-2019 Influenza Vaccination Coverage – Pregnant Women (preliminary*)

- Pregnant Women (HP 2020 goal of 80%)
  - –53.7% vaccinated (cf. 49.1 previous season)
  - –Of the pregnant women who reported visiting a doctor or other medical professional at least once before or during pregnancy,
    - 67.2% reported receiving a recommendation for and offer of flu vaccination from a doctor or other medical professional
    - 13.9% received only a recommendation for and no offer of flu vaccination
    - 18.9% did not receive a recommendation for or an offer of flu vaccination

*** Internet Panel Survey, United States, through January 2019**

Influenza Vaccination Among Pregnant Women by Provider Recommendation or Offer of Vaccination, 2018-19 Season (preliminary*)

Influenza vaccination coverage before and during pregnancy among women pregnant any time after August 1, 2018 and who visited a health care provider at least once since July 2018, by provider recommendation or offer



*** Internet Panel Survey, United States, through early April, 2019**

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Impact of influenza on pregnant women[1]

- Up to 4X increased risk of hospitalization, especially in third trimester, and for those with co-morbid conditions*
- Up to 8X increased risk for influenza-associated complications, including death, particularly for those with co-morbid conditions**
- Increased risk for influenza-associated complications among postpartum women
  - Risk highest during the first postpartum week

*** Chronic cardiac disease, chronic pulmonary disease, diabetes mellitus, chronic renal disease, malignancies, and immunosuppressive disorders**

**** Preexisting diabetes mellitus, pulmonary disease that included asthma, heart disease, renal disease, and anemia**

1. Rasmussen, S.A., et al. 2012. American Journal of Obstetrics & Gynecology; 207(3): S3 - S8.

Some coverage thoughts

- Influenza vaccination coverage appears to still be well below HP2020 targets
  - May see little improvement in adults ☹
  - Improvement may have occurred in the pediatric population ☺
  - Coverage in the 65 years and older population remains very poor...☹
  - Coverage in the 18-64 years of age high risk adults unacceptably low…☹
  - Coverage in pregnant women has leveled off; a strong provider recommendation makes a difference
  - HCW coverage remains strong, except in LTCF! ☺

Vaccine Effectiveness

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Preliminary Adjusted VE against medically attended influenza, US Flu VE Network, 2018-19

- Interim results for 2018–19 season through February 2, 2019) indicate protection against influenza
  - 47% (CI: 35, 57) vaccine effectiveness against any influenza virus
  - 46% (CI: 30, 58) against H1N1pdm09, 44% (CI: 13, 64) against H3N2
- H3N2 predominates in later season with drifted strain

MMWR. February 15, 2019 / 68(6);135–139

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However…

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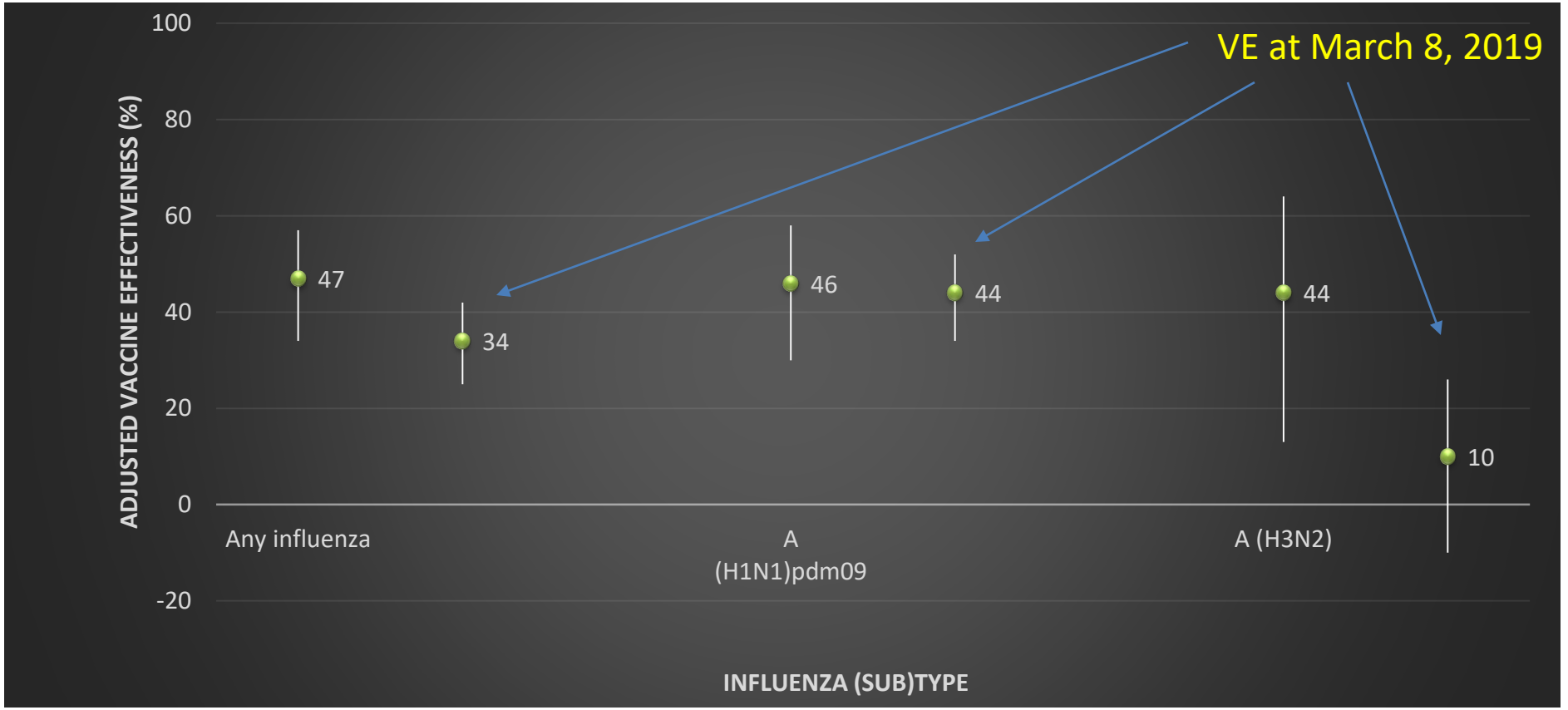
Preliminary Adjusted VE against medically attended influenza, US Flu VE Network, 2018-19*



*** Multivariate logistic regression models adjusted for site, age categories (6m-8y, 9-17y 18-49y, 50-64y, ≥65y), sex, race/Hispanic ethnicity, self-rated general health status, interval from onset to enrollment, and calendar time (biweekly intervals), presented at May 2019 NAIIS Meeting**

Preliminary Adjusted VE against medically attended influenza, US Flu VE Network, 2018-19

Any Influenza A and B	Adjusted VE*	(95% CI)*
All patients aged ≥ 6 months	29%	(21 to 35)
6 mos–8 y	49%	(38 to 58)
9–17	6%	(-22 to 27)
18–49	25%	(10 to 37)
50-64	12%	(-12 to 31)
≥65	12%	(-29 to 41)

* Multivariate logistic regression models adjusted for site, age categories (6m-8y, 9-17y 18-49y, 50-64y, ≥65y), sex, race/Hispanic ethnicity, self-rated general health status, interval from onset to enrollment, and calendar time (biweekly intervals)

Preliminary Adjusted VE against medically attended influenza by virus subtype, US Flu VE Network, 2018-19

Influenza Subtype	Adjusted VE*	(95% CI)*
Any influenza	29%	(21 to 35)
A(H1N1)pdm09	44%	(36 to 51)
A(H3N2)	9%	(-4 to 20)
A(H3N2) clade 3C.3a	11%	(-6 to 26)
A(H3N2) clade 3C.2a1	45%	(5 to 68)

* Multivariate logistic regression models adjusted for site, age categories (6m-8y, 9-17y 18-49y, 50-64y, ≥65y), sex, race/Hispanic ethnicity, self-rated general health status, interval from onset to enrollment, and calendar time (biweekly intervals)

Preliminary VE against influenza hospitalizations in adults, HAIVEN, 2018-19

Any Influenza A and B	Adjusted VE*	(95% CI)*
All patients aged ≥ 18 years	25%	(1 to 41)
18–49	1%	(-58 to 38)
50-64	47%	(22 to 63)
≥65	15%	(-24 to 41)

* Multivariate logistic regression models adjusted site, age group, sex, race/ethnicity, days from illness onset to specimen collection, calendar time of illness onset, home oxygen use, frailty score, and number of self-reported hospitalizations in the past year

Preliminary VE against pediatric influenza hospitalizations, NVSN, 2018-19

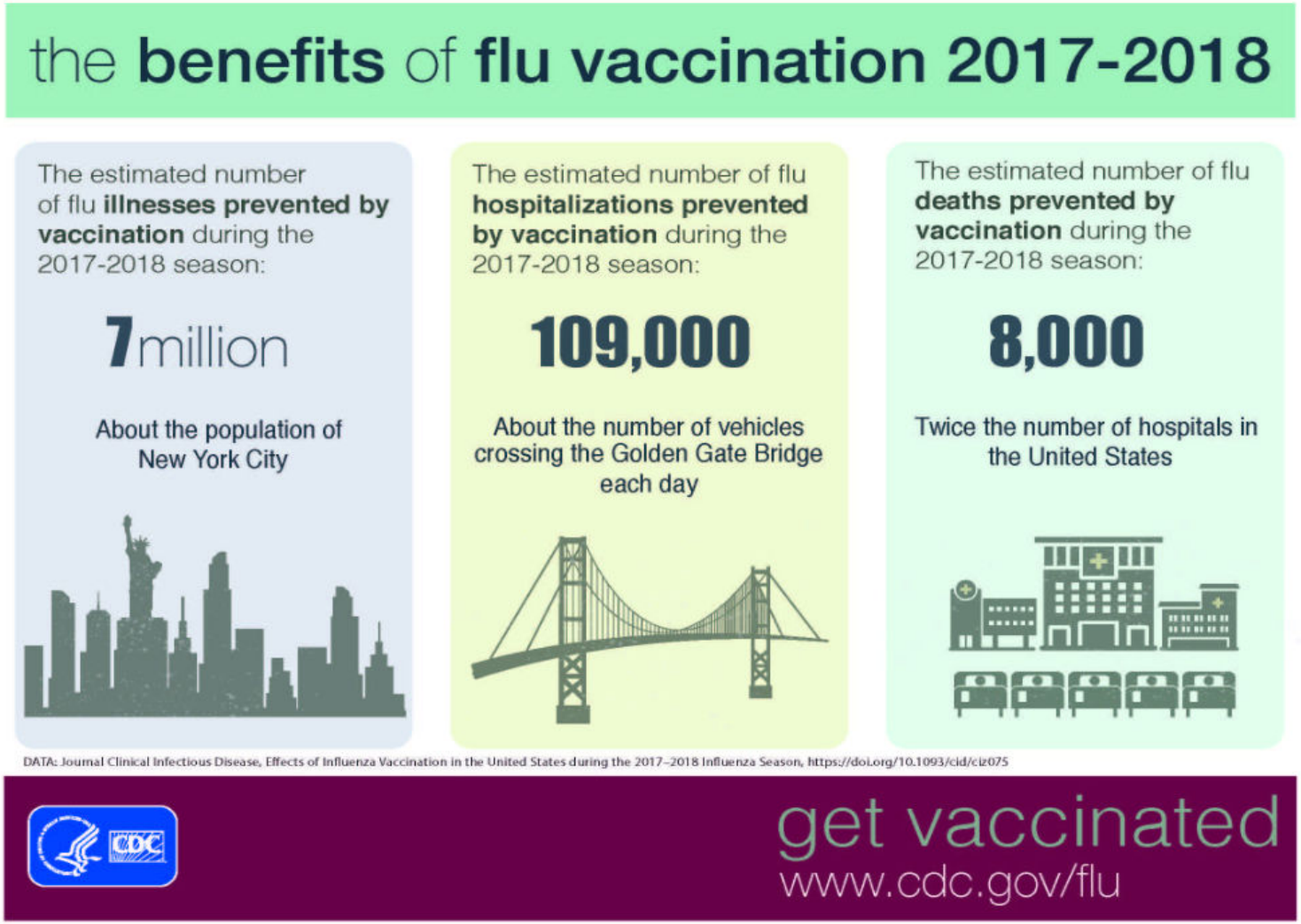
Any Influenza A and B	Adjusted VE*	(95% CI)*
All patients aged 6 mos. to 17 years	31%	(5 to 51)
6 mos. to 8 years	26%	(-6 to 49)
9 to 17 years	53%	(5 to 77)
By virus subtype		
H3N2	13%	(-31 to 43)
H1N1pdm09	48%	(14 to 68)

* Multivariate logistic regression models adjusted for age group, study site, and calendar time (month of enrollment)

Summary of preliminary VE for the 2018-2019 influenza season

- Increased percentage of A(H3N2) cases enrolled in US Flu VE network through 8 March
  - Updated interim results suggests reduced VE against A(H3N2) compared to earlier estimate published in February 15 MMWR (vs. no change in H1N1pdm09 estimate)
- Circulation of antigenically drifted A(H3N2) clade 3C.3a
  - Supports WHO delay and decision to update A(H3N2) vaccine component
- Remember that vaccine offers significant protection against influenza hospitalizations
  - Vaccine reduced influenza hospitalizations by 22% among all adults and by 24% among adults ≥65 years of age (influenza A and B viruses) in 2017-18 season

Another way to look at influenza vaccine effectiveness – negative outcomes averted



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Another way to look at influenza vaccine effectiveness – negative outcomes averted

- Influenza vaccination was associated with reduced risk of laboratory-confirmed influenza-associated pediatric death[1]
  - Estimated influenza vaccine effectiveness was 65% (95% credible interval, 54% to 74%) against laboratory-confirmed influenza-associated deaths among children
- Influenza vaccination reduces the risk of hospitalization for children 6 – 59 months of age during most influenza seasons[2]

1. **Flannery et al. 2017. Pediatrics. May.doi: 10.1542/peds.2016-4244**
2. **Buchan SA, et al. 2017. PLoS ONE. doi: 10.1371/journal.pone.0187834**

Even when VE is < 50%, current vaccines can have a major impact

BRIEF REPORT

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

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

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

40% VE would prevent 60,000 hospitalizations

influenza-associated morbidity and mortality is concentrated in 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

[2]. Influenza vaccination coverage rates from 2011–2012 and 2012–2013 were derived from vaccination status reported by self or proxy via the Behavioral Risk Factor Surveillance Sy and only cover the noninstitutionalized population [7]. U the reported vaccination coverage estimates and a rang hypothetical vaccine effectiveness estimates varying from to 70%, we estimated the number of influenza-associ hospitalizations that would have occurred in the absenc vaccination; the number of reported hospitalizations was tracted from those occurring in the absence of vaccinatio estimate the number of averted hospitalizations for each hy thetical vaccine effectiveness estimate. We estimated the n ber needed to vaccinate to prevent 1 hospitalization (NNTV number vaccinated (vaccine coverage × population), div by the number of prevented hospitalizations. The preve fraction was the proportion of averted hospitalizations div by the estimated number of hospitalizations without vacc tion. This model does not account for indirect effect vaccination.

Received 5 February 2014; accepted 24 April 2014; electronically published 6 May 2014.
Correspondence: Alicia M. Fry, MD, MPH, Influenza Division, Centers for Disease Control and Prevention, 1600 Clifton Rd, MS A-32, Atlanta, GA 30333 (afry@cdc.gov).

Clinical Infectious Diseases 2014;59(3):406–9
Published by Oxford University Press on behalf of the Infectious Diseases Society of America 2014. This work is written by (a) US Government employee(s) and is in the public domain in the US.
DOI: 10.1093/cid/ciu328

406 • CID 2014:59 (1 August) • BRIEF REPORT

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

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

PNAS; Optimizing the Impact of Low-efficacy Influenza Vaccines

20% VE projected to avert 1[illegible] hospitalizations and 62,000 [illegible]

mission and vaccination to evaluate the effect of influenza vaccines with relatively low efficacy, which we define as below the

1073/pnas.1802479115/-/DCSupplemental.

Vaccine Effectiveness – Influenza and CVD

- Acute respiratory illness or influenza-like illness increases acute MI risk 2x; 5x is those with history of MI
- Influenza vaccination effectiveness: Meta-analyses[1–2]
  - 29% (95%CI 9,44) against acute MI in persons with existing CVD
  - 36% (95%CI 14,53) against major cardiac events with existing CVD
- Vaccine effectiveness 29% in acute MI prevention
  - "On par or better than accepted preventive measures [as] statins (36%), anti-hypertensives (15–18%), and smoking cessation (26%)"
  - Influenza vaccination recommended as secondary prevention by American College of Cardiology and American Heart Association

1. Barnes M, et al. Acute myocardial infarction and influenza: a meta-analysis of case–control studies. Heart 2015;101:1738–1747

2. Udell JA, et al. Association between influenza vaccination and cardiovascular outcomes in high-risk patients: a meta-analysis. JAMA 2013;310:1711–20

Vaccine Effectiveness – Influenza and Diabetes

- Six cohort and five case-control studies were included in a recently-published systematic review and meta-analysis[1].
- In working age persons with diabetes mellitus,
  - There was pooled VE of 58% against all cause hospitalization
  - No significant effects on all-cause mortality and influenza-like illness
- In elderly patients with diabetes mellitus, adjusted VEs of 38% against all-cause mortality and 23% against all-cause hospitalization were seen.

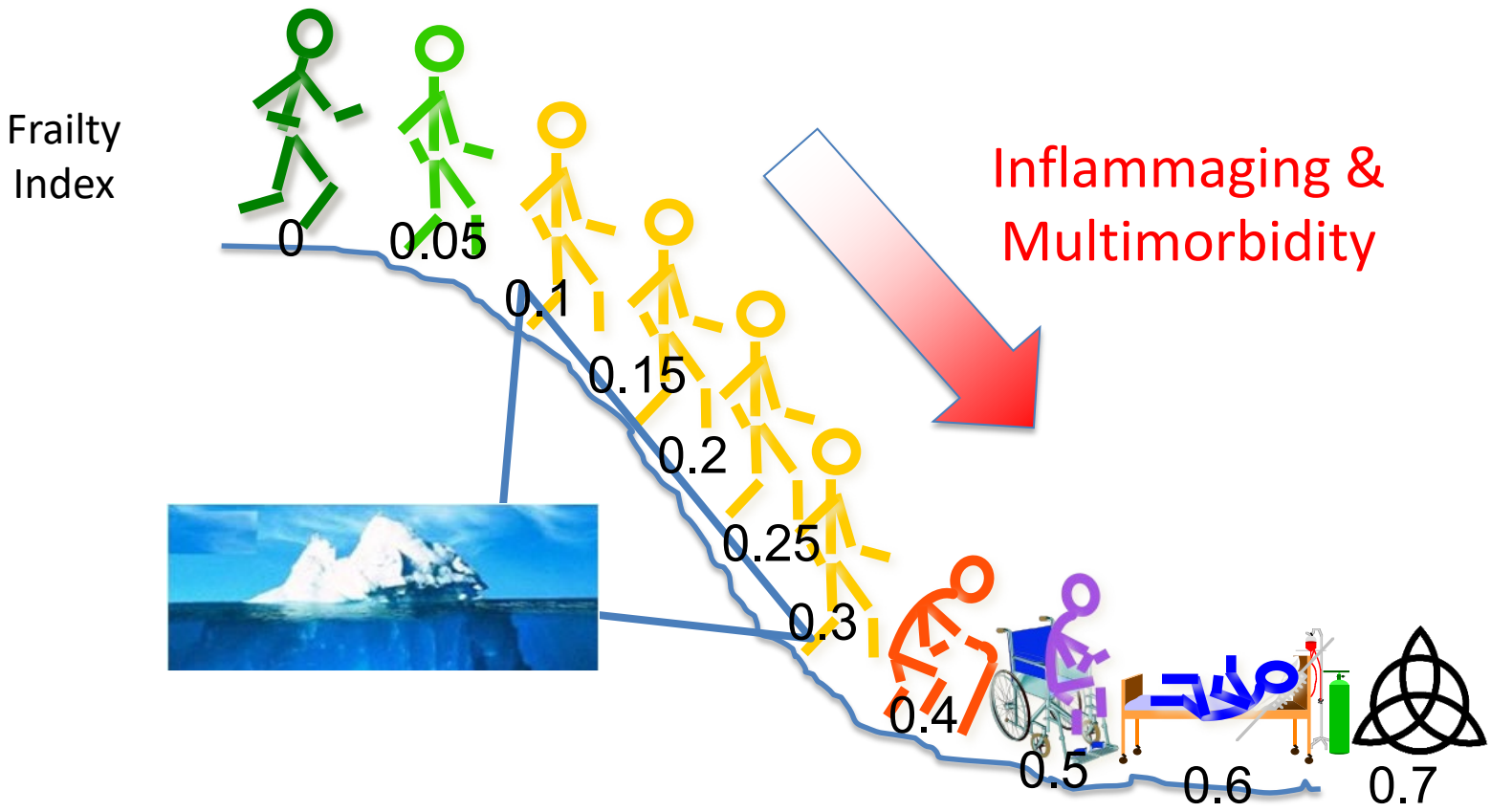
1. Remschmidt C, Wichmann O, Harder T. Vaccines for the prevention of seasonal influenza in patients with diabetes: systematic review and meta-analysis. BMC Med 2015;13:53.

Vaccine Effectiveness – Influenza and Diabetes

- A retrospective study demonstrated that influenza vaccination was associated with a significant decrease in risk for hospital admission due to stroke, heart failure, and influenza or pneumonia.[1]
- However, another recent systematic review that factored in confounders such as indirect health outcomes, selection and health seeking bias, and the frequent absence of adjustment for pneumococcal vaccination status, indicated that the overall evidence for influenza vaccine effectiveness may be low.[2]
- Yet another report states that the present evidence suggests that influenza vaccination among adults and elderly with diabetes mellitus is efficacious and safe.[3]

1. Eszter P. Vamos, Utz J. Pape, Vasa Curcin, Matthew J. Harris, Jonathan Valabhji, Azeem Majeed and Christopher Millett. CMAJ October 04, 2016 188 (14) E342-E351.
2. Casanova L, Gobin N, Villania P, Verger P. 2016. Primary Care Diabetes 10(6):398–406.
3. M. Goeijenbier, T.T. van Sloten, L. Slobbe, C. Mathieu, P. van Genderen, Walter E.P. Beyer, Albert D.M.E. Osterhaus. 2017. Vaccine 35(38):5095-5101

Resilience to Influenza with Aging



Graphic courtesy of Janet McIlhaney, MD

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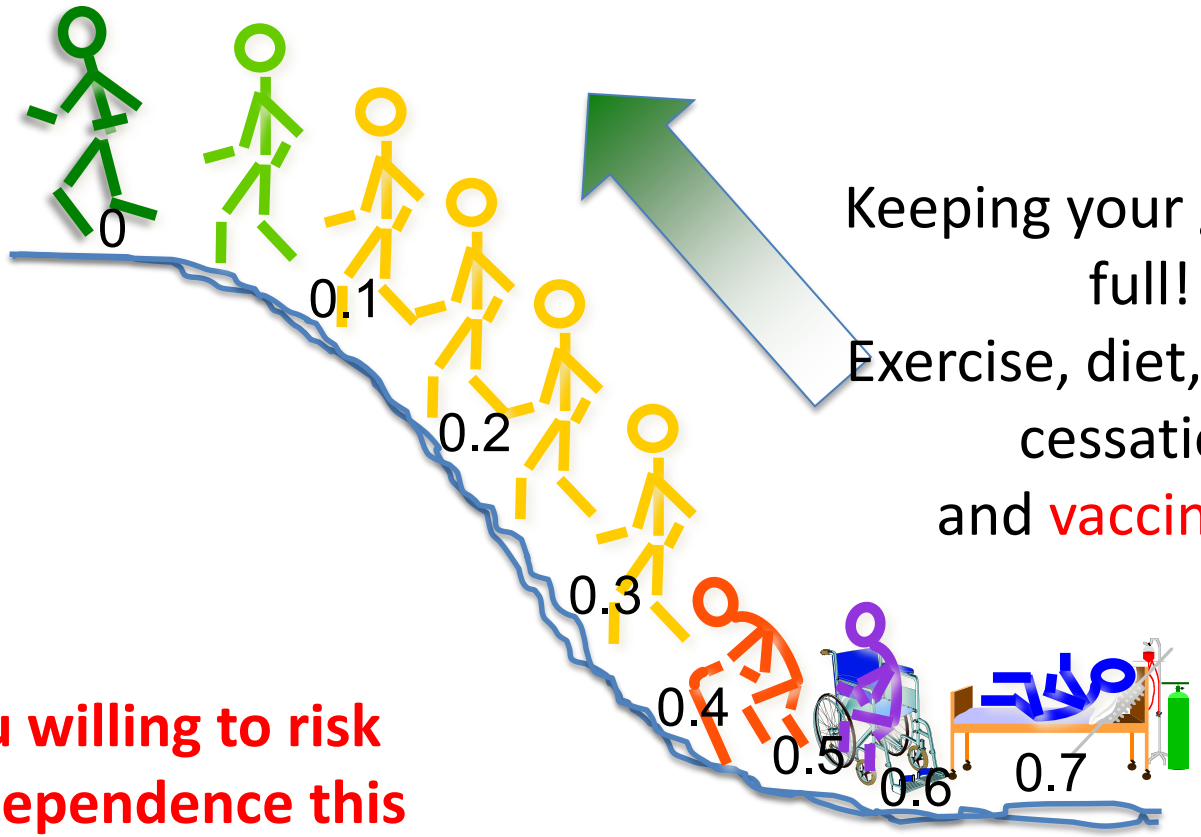

Keeping your glass half full!
Exercise, diet, smoking cessation
and vaccination

Are you willing to risk your independence this winter?

Graphic courtesy of Janet McIlhaney, MD

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2019-2020 Influenza Vaccine Strains

- Two strain changes from last year!
- New seasonal influenza vaccine formulations
  - Trivalent preparations: an A/Brisbane/02/2018 (H1N1)pdm09–like virus, A/Kansas/14/2017 (H3N2)-like virus, and a B/Colorado/06/2017-like (B/Victoria lineage) virus (Victoria lineage).
  - Quadrivalent preparation adds a B/Phuket/3073/2013–like virus (Yamagata lineage).

Influenza Vaccines 2019-2020 (www.immunize.org/catg.d/p4072.pdf)

Influenza Vaccine Products for the 2019–2020 Influenza Season

Manufacturer	Trade Name (vaccine abbreviation)[1]	How Supplied	Mercury Content (mcg Hg/0.5mL)	Age Range	CVX Code	Vaccine Product Billing Code[2] CPT
AstraZeneca	FluMist (LAIV4)	0.2 mL (single-use nasal spray)	0	2 through 49 years	149	90672
GlaxoSmithKline	Fluarix (IIV4)	0.5 mL (single-dose syringe)	0	6 months & older[3]	150	90686
	FluLaval (IIV4)	0.5 mL (single-dose syringe)	0	6 months & older[3]	150	90686
		5.0 mL (multi-dose vial)	<25	6 months & older[3]	158	90688
Sanofi Pasteur	Flublok (RIV4)	0.5 mL (single-dose syringe)	0	18 years & older	185	90682
	Fluzone (IIV4)	0.25 mL (single-dose syringe)	0	6 through 35 months[3]	161	90685
		0.5 mL (single-dose syringe)	0	6 months & older[3]	150	90686
		0.5 mL (single-dose vial)	0	6 months & older[3]	150	90686
		5.0 mL (multi-dose vial)	25	6 through 35 months[3]	158	90687
		5.0 mL (multi-dose vial)	25	3 years & older	158	90688
	Fluzone High-Dose (IIV3-HD)	0.5 mL (single-dose syringe)	0	65 years & older	135	90662
Seqirus	Afluria (IIV4)	0.25 mL (single-dose syringe)	0	6 through 35 months[3]	161	90685
		0.5 mL (single-dose syringe)	0	3 years & older[3]	150	90686
		5.0 mL (multi-dose vial)	24.5	6 through 35 months[3]	158	90687
		5.0 mL (multi-dose vial)	24.5	3 years & older[4]	158	90688
	Fluad (aIIV3)	0.5 mL (single-dose syringe)	0	65 years & older	168	90653
	Flucelvax (ccIIV4)	0.5 mL (single-dose syringe)	0	4 years & older	171	90674
		5.0 mL (multi-dose vial)	25	4 years & older	186	90756

Notes

1. IIV3/IIV4 = egg-based trivalent/quadrivalent inactivated influenza vaccine (injectable); where necessary to refer to cell culture-based vaccine, the prefix "cc" is used (e.g., ccIIV4); RIV4 = quadrivalent recombinant hemagglutinin influenza vaccine (injectable); aIIV3 = adjuvanted trivalent inactivated influenza vaccine.
2. An administration code should always be reported in addition to the vaccine product code. Note: Third party payers may have specific policies and guidelines that might require providing additional information on their claim forms.
3. Dosing for infants and children age 6 through 35 months:
   - Afluria 0.25 mL
   - Fluarix 0.5 mL
   - FluLaval 0.5 mL
   - Fluzone 0.25 mL or 0.5 mL
4. Afluria is approved by the Food and Drug Administration for intramuscular administration with the PharmaJet Stratis Needle-Free Injection System for persons age 18 through 64 years.

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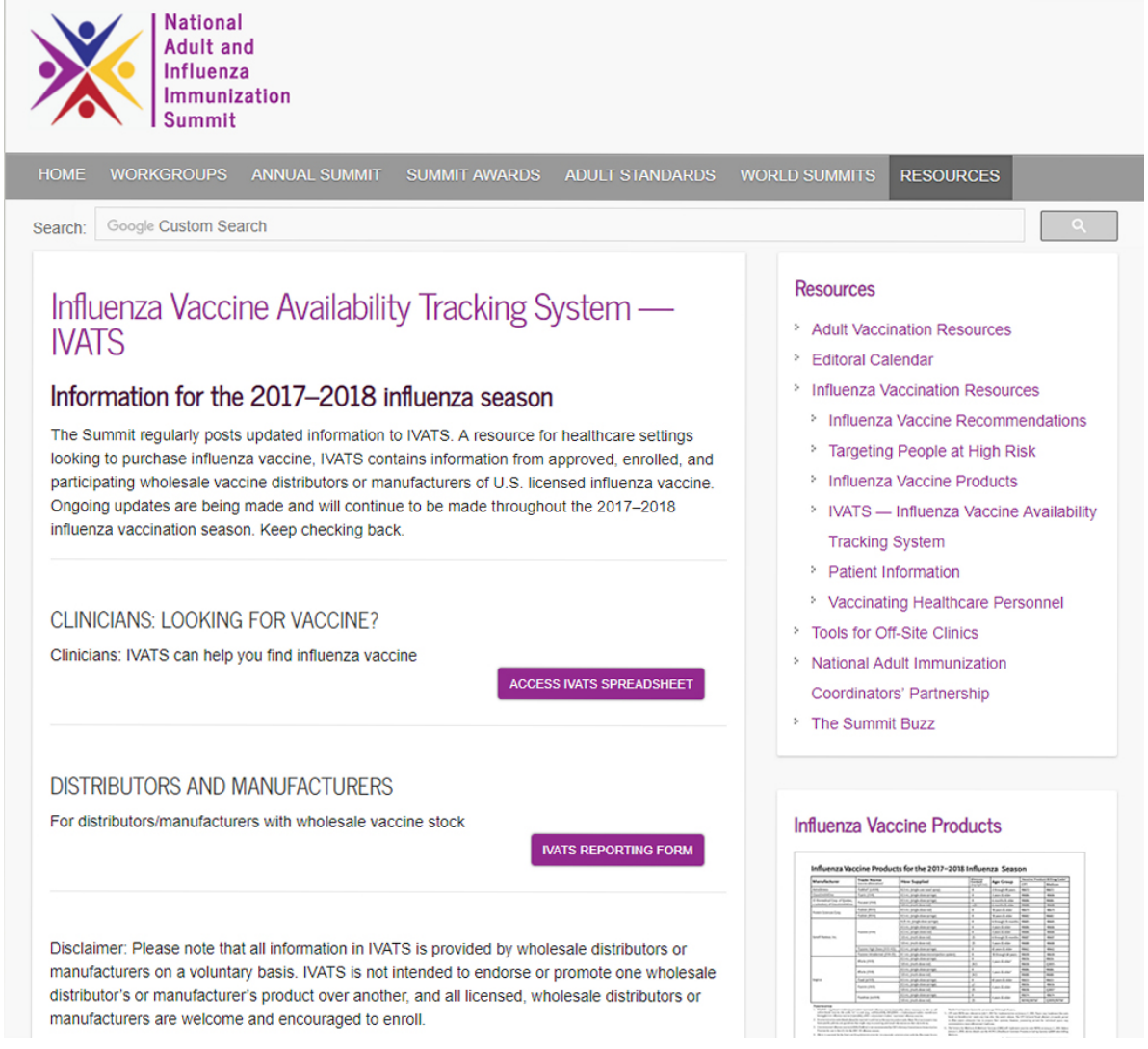
The Summit's Influenza Vaccine Availability Tracking System (IVATS)



https://www.izsummitpartners.org/ivats/

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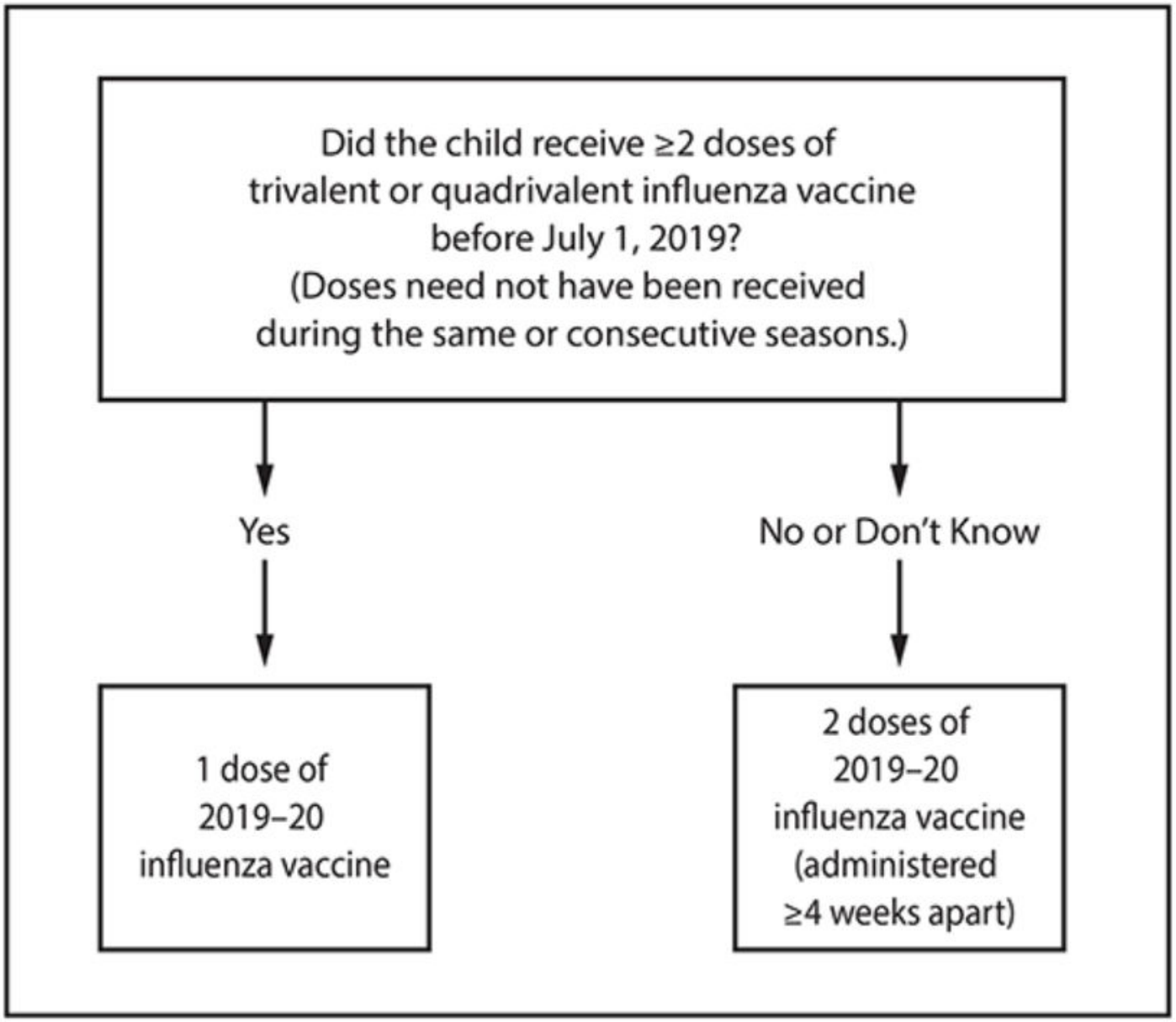
ACIP Influenza Recommendations (2019-20)

- All persons 6 months of age or older should receive influenza immunization
  - Influenza vaccination should not be delayed to procure a specific vaccine preparation if an appropriate one is already available
- LAIV is back! But capacity is low for 2019 – 20 season
- You should receive a flu vaccine by the end of October, if possible.
  - For those requiring only 1 dose for the season, early vaccination (i.e., in July and August) is likely to be associated with suboptimal immunity before the end of the influenza season, particularly among older adults.

ACIP Influenza Recommendations (2019-20)

- Vaccination should be offered as long as influenza viruses are circulating and unexpired vaccine is available
  - Vaccine administered in December or later, even if influenza activity has already begun, is likely to be beneficial in the majority of influenza seasons
- Final 2019 – 20 recommendations: https://www.cdc.gov/mmwr/volumes/68/rr/rr6803a1.htm?s_cid=rr6803a1_w

ACIP Pediatric Algorithm (2019-20)



For children aged 8 years who require 2 doses of vaccine, both doses should be administered even if the child turns age 9 years between receipt of dose 1 and dose 2.

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How do we discuss Vaccine Effectiveness?

- Address vaccine effectiveness directly, early, and as needed, during season
- Communicate the variability and unpredictability of flu
- Acknowledge that flu vaccination is not a perfect tool, but it is the best way to protect against flu infection
- Communicate the benefits of flu vaccination beyond prevention of disease
  - Flu vaccination can reduce doctors' visits, missed work and school due to flu, as well as prevent flu-related hospitalizations and deaths.

More messaging on Vaccine Effectiveness…

- So do not measure vaccine effectiveness by incidence alone
  - Hospitalizations prevented
  - Medical visits prevented
  - Quality of Life Benefits - *vaccine preventable disability*

Some communications thoughts

- Important benefits can be gained by increasing vaccination rates across all age groups with currently available vaccines.
  - One CDC study* concluded that flu vaccination prevented an estimated 13.6 million flu cases, 5.8 million medical visit & nearly 113,000 flu-related hospitalizations in the United States over a 6-year period (2005-2011).

*Kostova, D. et al. 2013. PLoS ONE 8(6): e66312.doi:10.1371/journal.pone.0066312

More messaging on Vaccine Effectiveness…

- Questions about efficacy and duration remain
  - Do not base efficacy or duration of immunity discussions on one season but look collectively at multiple seasons
    - Use impact data, and data over multiple years to provide perspective on vaccine benefits
  - Vaccine in the patient is 40%-60% effective; vaccine on the shelf is 0% effective.

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Messaging on Vaccination Timing*

- July through August
  - It might be too soon to get vaccinated unless the person is a child needing two doses of vaccine. CDC recommends flu vaccination by the end of October
- Beginning September
  - CDC recommends flu vaccination by the end of October.

While it's fine to get vaccinated in September, keep four things in mind:

1. Current flu levels are (low/rising/high);
2. It takes about two weeks after vaccination for protective antibodies to develop;
3. Immunity from vaccination wanes over time; and,
4. Flu activity most often peaks in February and can last as late as May.

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*** From the CDC, presented at the NAIIS Weekly call September 19th, 2019**

Messaging on Vaccination Timing*

- October
  - Get vaccinated before the end of OctoberBeginning September
- Beginning in November
  - CDC recommends vaccination continue as long as influenza viruses are circulating. Though the timing of flu season varies, significant flu activity can last as late as May.
- Early December through February
  - It's not too late to get vaccinated. CDC recommends vaccination continue as long as influenza viruses are circulating. Though the timing of flu season varies, flu season most often peaks in December and February, but significant flu activity can last as late as May

*** From the CDC, presented at the NAIIS Weekly call September 19th, 2019**

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Messaging on Vaccination Timing*

- March-May
  - Flu viruses are circulating at X levels nationally though activity varies by location. CDC recommends vaccination continue as long as influenza viruses are circulating. Check FluView Interactive for more information about flu activity in your state: https://www.cdc.gov/flu/weekly/fluviewinteractive.htm
- June
  - Most flu vaccine expires by the end of June. If you haven't gotten vaccinated and plan a trip to the Southern Hemisphere, where their flu season is just beginning, or plan to travel in a relatively crowded setting where people from many parts of the country might be in close proximity, e.g., a cruise, get a flu vaccine at least two weeks before traveling. Vaccine for the upcoming season will be available next fall.

* **From the CDC, presented at the NAIIS Weekly call September 19th, 2019**

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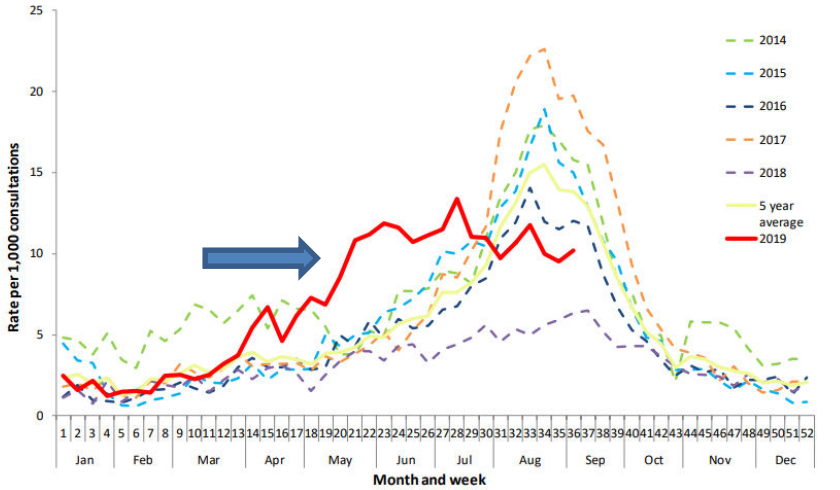
Dispelling Myths and Handling Objections About Flu Shots

OBJECTION:	The flu shot will give me the flu.
RESPONSE:	It's impossible to get the flu from the flu vaccine. It is made with viruses that are not infectious or with no viruses at all. You can get the flu from someone else.
OBJECTION:	I'm healthy. I don't need a shot.
RESPONSE:	Every year, healthy people get sick from the flu, and some even die. Many people have underlying conditions that they are not aware of. Even with a mild case, you can still pass the virus along to the people you love and care about.
OBJECTION:	I've never had the flu.
RESPONSE:	Every year, up to 20% of Americans get the flu—that's up to 60 million people—many of whom have not had the flu before.
OBJECTION:	The flu shot doesn't work.
RESPONSE:	Effectiveness varies from season to season and between flu strains. Vaccine effectiveness is not just measured by the percentage of disease prevented but more importantly, by the myriad of negative outcomes that vaccination prevents even if you catch the flu, such as hospitalization and quality of life (disability).

IAC Resource for clinicians (www.influenza-defense.org

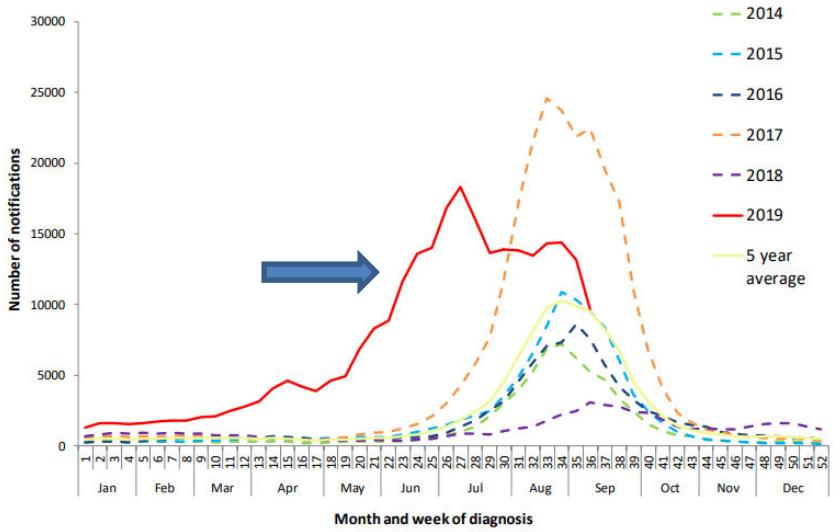
2019 Southern Hemisphere Influenza Season

Figure 2. Unweighted rate of ILI reported from sentinel GP surveillance systems, Australia, 1 January 2014 to 8 September 2019, by month and week.



Source: ASPREN

Figure 5. Notifications of laboratory confirmed influenza, Australia, 1 January 2013 to 8 September 2019, by month and week of diagnosis.*



Source: NNDSS

*NNDSS notification data provided for the current and most recent weeks may be incomplete. All data are preliminary and subject to change as updates are received.

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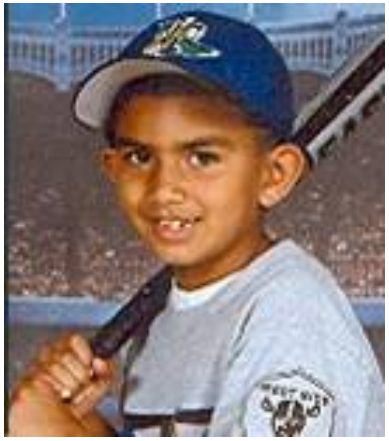
Why do we immunize against influenza?

Amanda, died at age 4½ yrs from influenza

Breanne, died at age 15 mos from influenza complications



Lucio, died at age 8 yrs from influenza complications

Alana, died at age 5½ yrs from influenza

Barry, a veteran fire-fighter, died at age 44 yrs from influenza

Slide Courtesy of Families Fighting Flu

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