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C P
Community Physician Partnership
P

Improving Adult Vaccination Practices

Preventing Pneumococcal Disease in Your High-Risk and Older Patients

Susan J. Rehm, MD, FACP, FIDSA
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Cleveland Clinic
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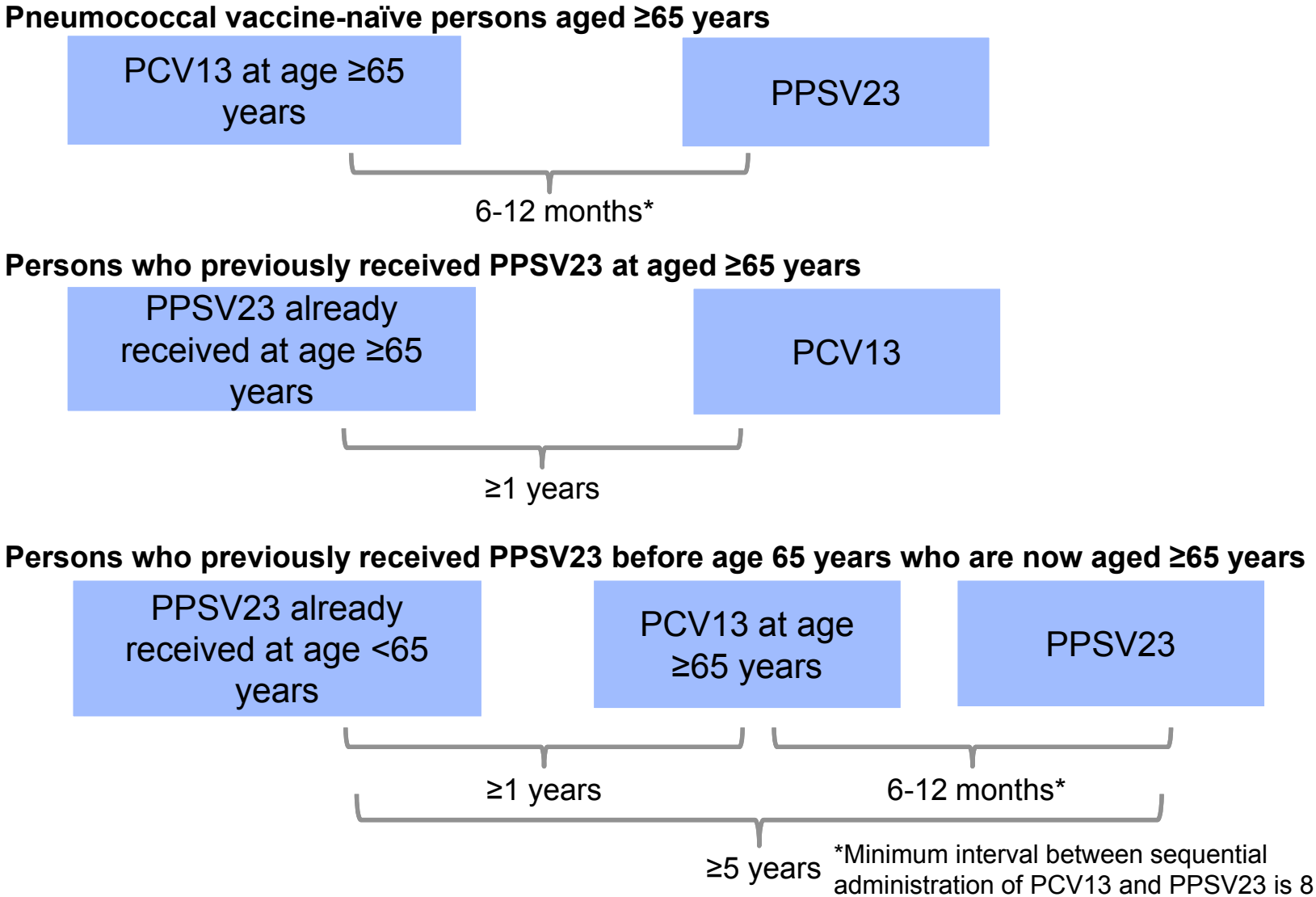
Updated ACIP Recommendations



*Minimum interval between sequential administration of PCV13 and PPSV23 is 8 weeks; PPSV23 can be given later than 6-12 months after PCV13 if this window is missed.

Tomczyk S, et al. *MMWR Morb Mortal Wkly Rep*. 2014;63(37):822-5.

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Case

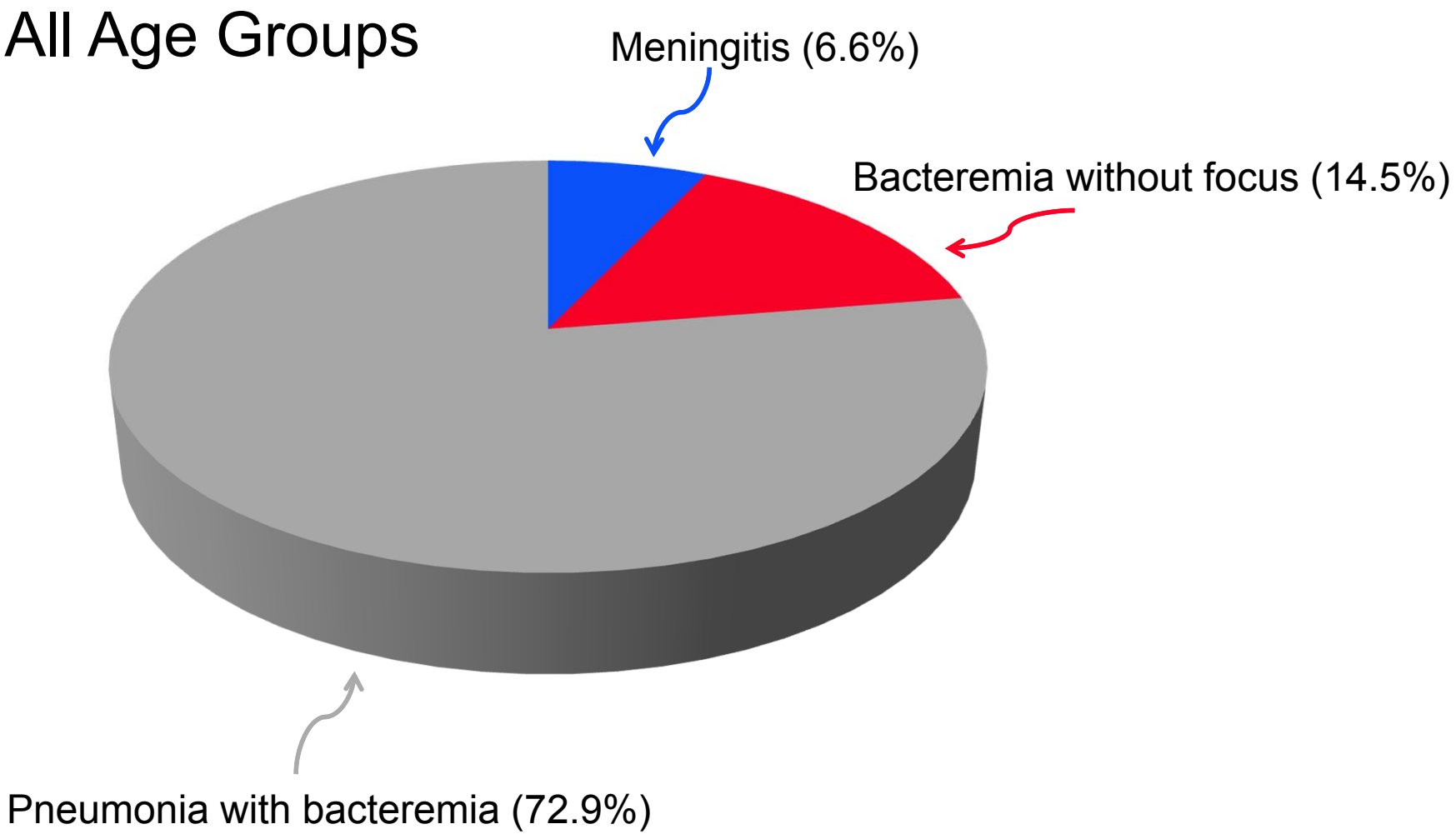
One of your patients, a 44-year old woman with rheumatoid arthritis, comes to see you because of sinus congestion after an upper respiratory infection. During the visit she mentions that she will be starting adalimumab (TNF inhibitor) treatments later this month. She is up-to-date with Tdap and was vaccinated for influenza last fall. Should she receive the pneumococcal vaccine?

Clinical Syndromes of Pneumococcal Disease

Syndrome	Impact in United States	Case-fatality Rate
Pneumococcal pneumonia	• Estimated 175,000 hospitalizations per year • Up to 36% of adult community-acquired pneumonia and 50% of hospital-acquired pneumonia	5%-7%; higher in elderly
Pneumococcal bacteremia	More than 50,000 cases per year	~20%; up to 60% among the elderly
Pneumococcal meningitis	Estimated 3,000-6,000 cases per year	~30%; up to 80% in the elderly

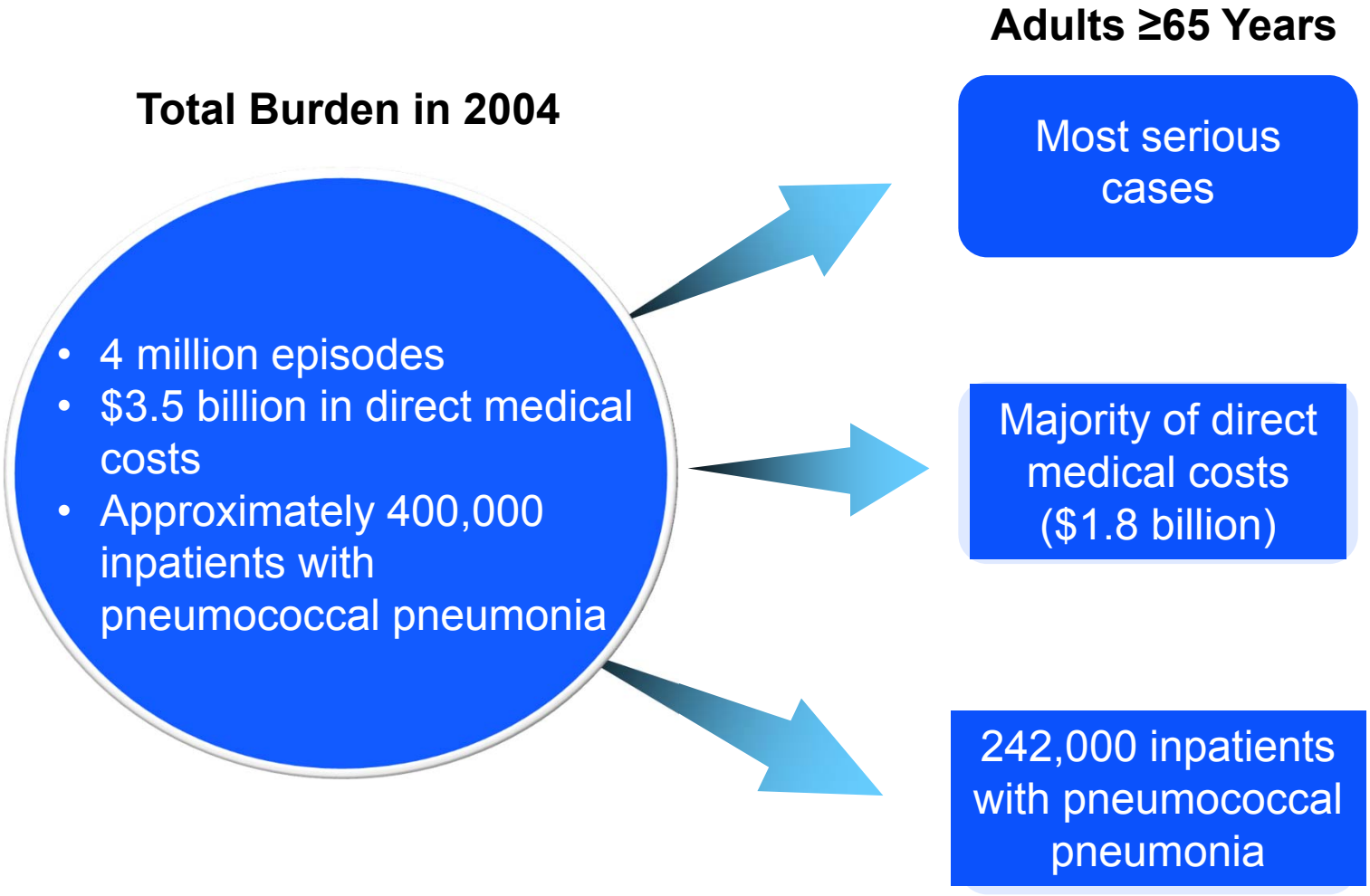
CDC. http://www.cdc.gov/vaccines/pubs/pinkbook/pneumo.html. Accessed June 30, 2014.

S. pneumoniae Active Bacterial Core Surveillance Provisional Data: US 2011



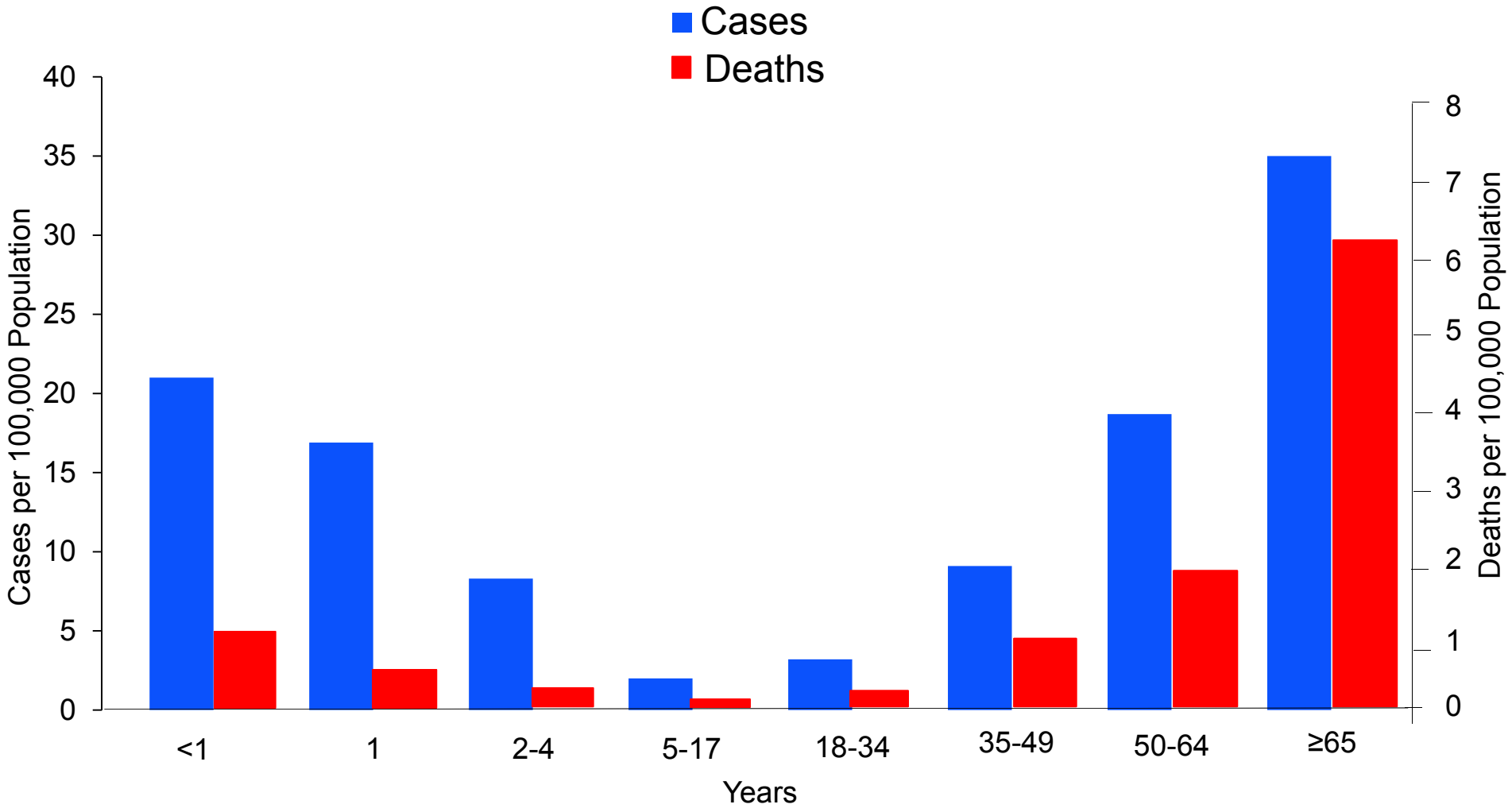
CDC. Available at: http://www.cdc.gov/abcs/reports-findings/survreports/spneu11.html. Accessed June 30, 2014.

The Burden of Pneumococcal Disease is High in Older Adults



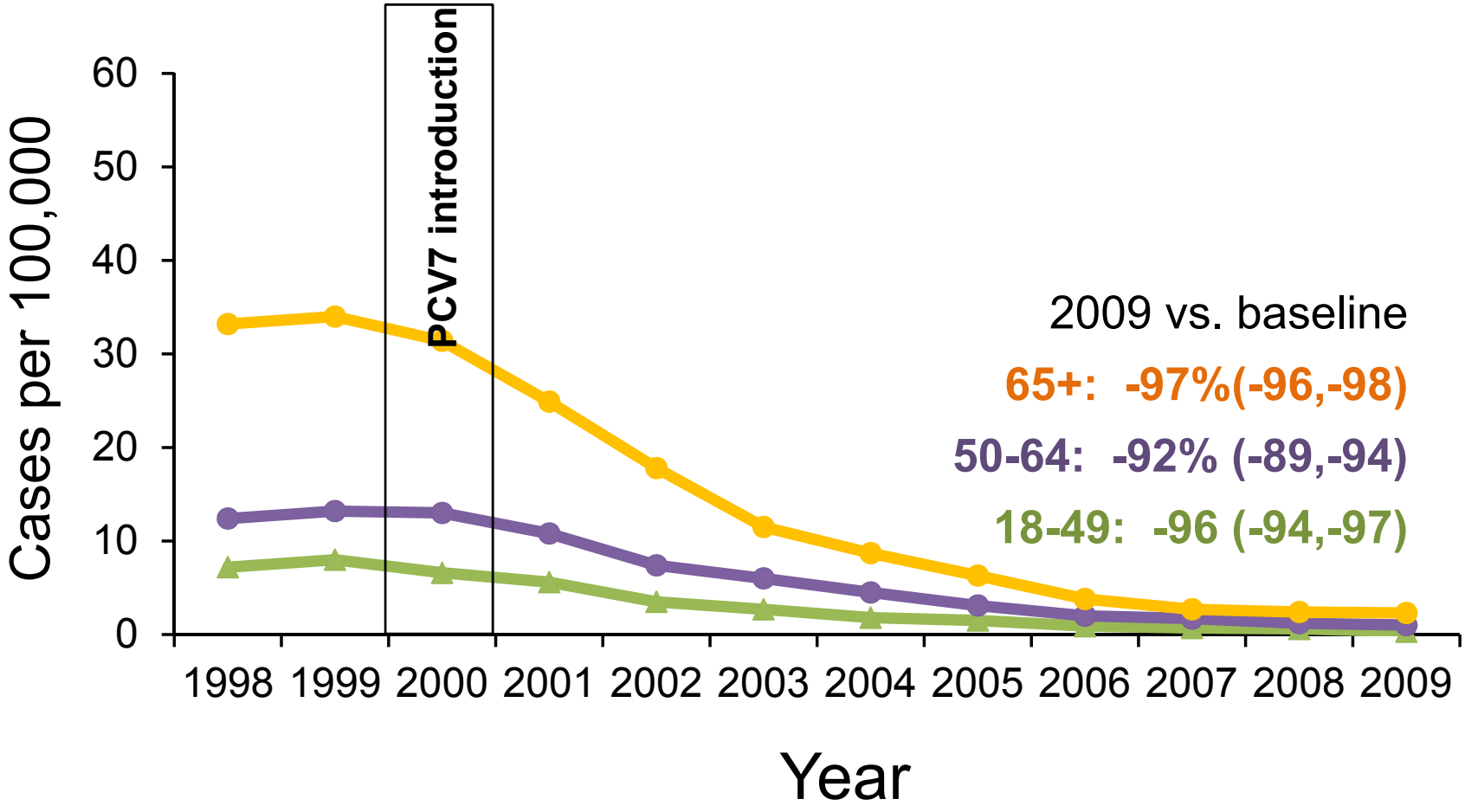
Huang SS et al. *Vaccine*. 2011;29(18):3398-412.

S. pneumoniae Cases and Deaths: US 2011



CDC. Available at: http://www.cdc.gov/abcs/reports-findings/survreports/spneu11.html. Accessed June 30, 2014.

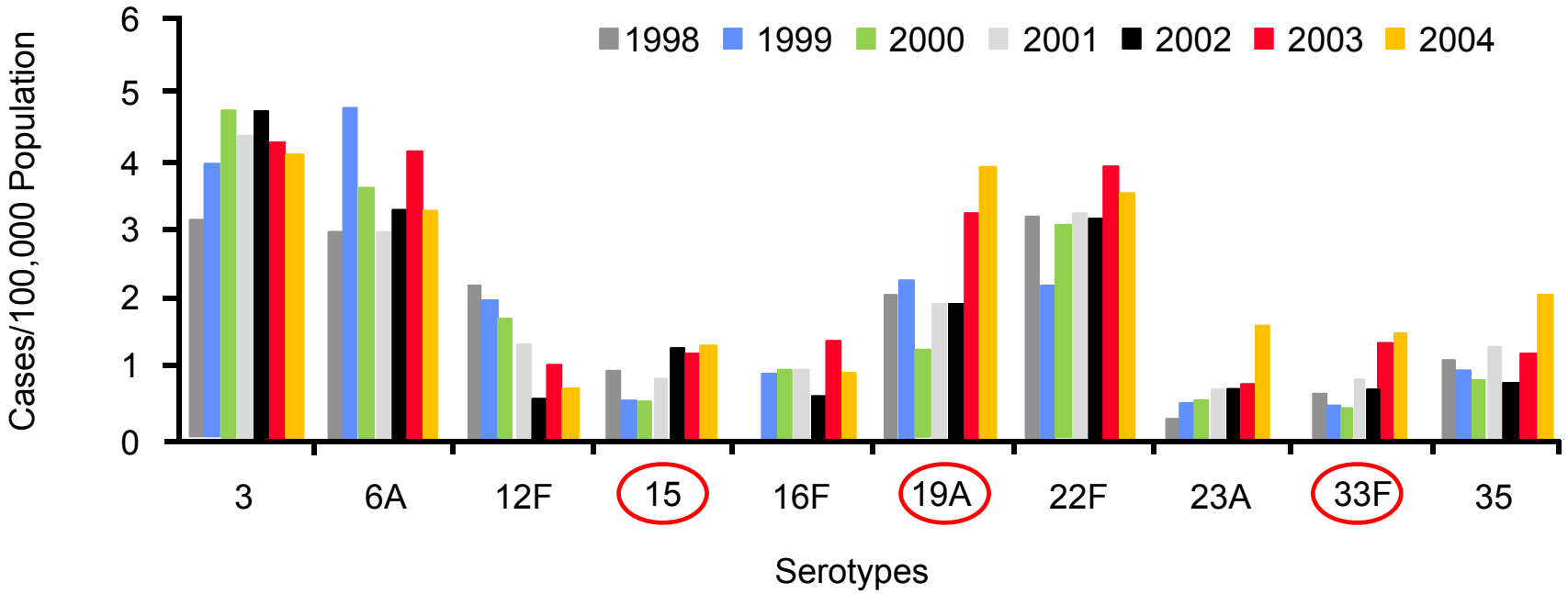
Conjugate Vaccines Benefit the Unvaccinated
Rates of IPD Caused by PCV7 Serotypes, Adults ≥18 years old



Moore, IDSA, 2009

Change in Serotype-Specific Incidence of Invasive Pneumococcal Infections

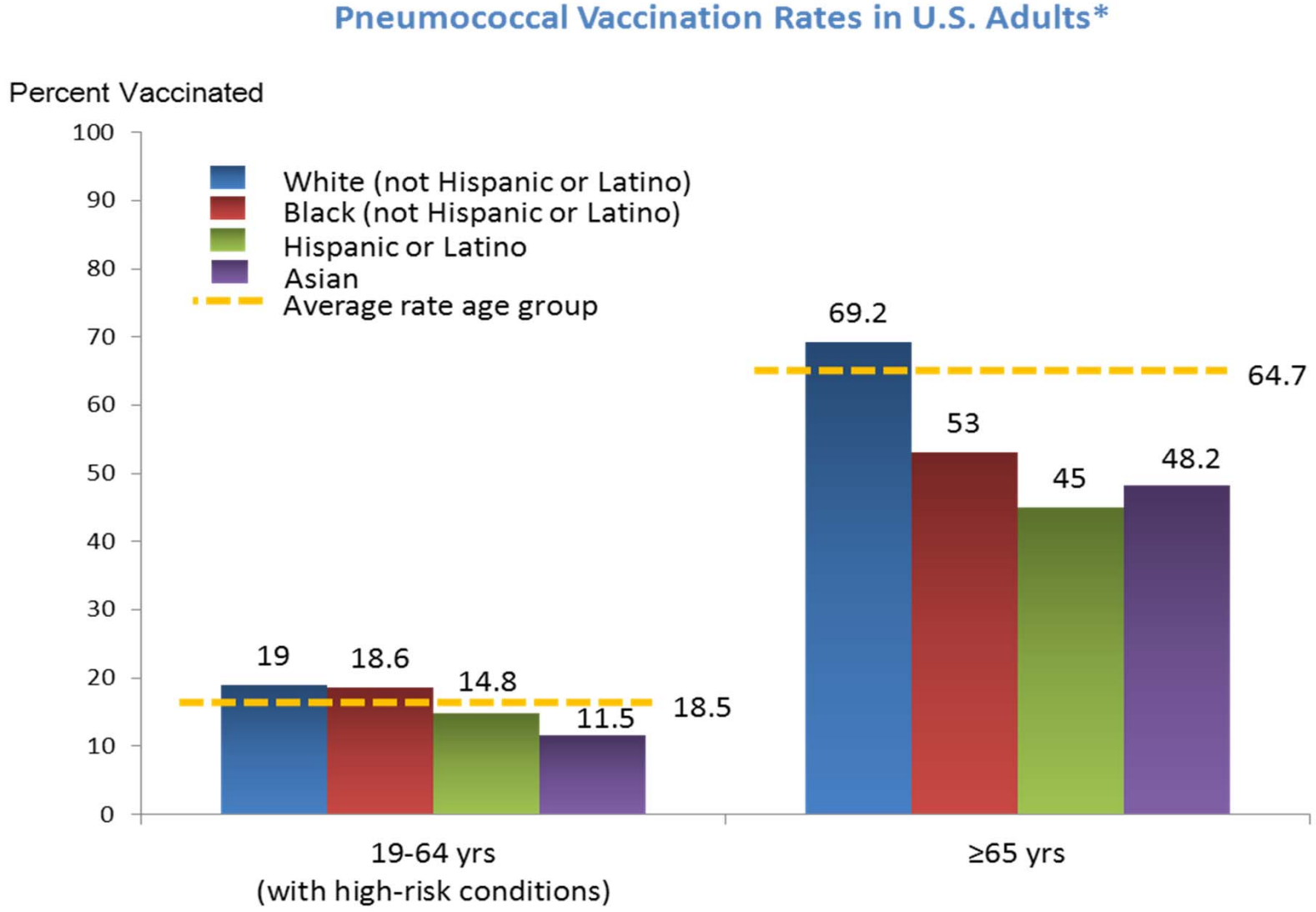
Adults ≥ 65 years



Adapted from: Hicks LA et al. *J Infect Dis*. 2007;196:1346-1354.

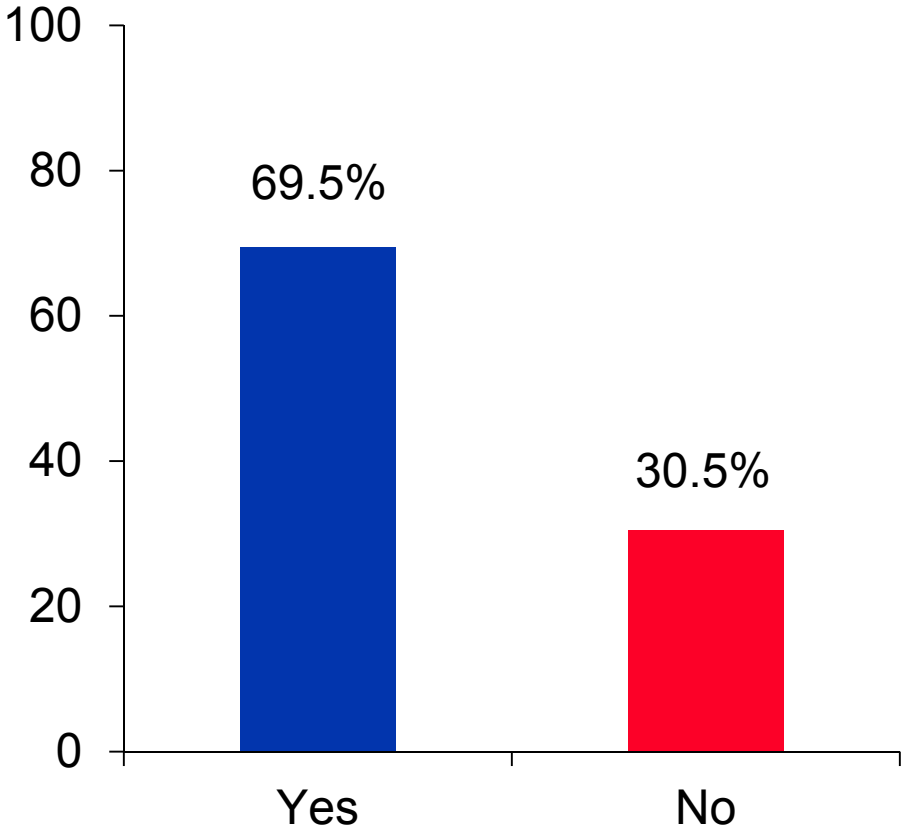
Room for Improvement

73 Million Adults at Risk Haven't Received Pneumococcal Vaccine



CDC. *MMWR.* 2012;61:66-72.
CDC/NCHS. National Health Interview Survey, 2010 & 2011

Adults ≥65 Years in Ohio With Pneumococcal Vaccine: 2012



Healthy People 2020 goal:
Increase the percentage of noninstitutionalized adults aged 65 years and older who are vaccinated against pneumococcal disease to 90%

Cleveland Clinic Community Physician Partnership Quality Alliance
In 2013, 59% of healthy adults aged 65 years and older had received the PPSV23 vaccine

CDC. Available at: http://apps.nccd.cdc.gov/BRFSS/display.asp?yr=2012&state=OH&qkey=8351&grp=0&SUBMIT3=Go. Accessed June 30, 2014.

Licensed Pneumococcal Vaccines in the US

Property	Pneumococcal conjugate vaccine (PCV13)	Pneumococcal polysaccharide vaccine (PPSV23)
Trade Name (manufacturer)	Prevnar® (Wyeth)	Pneumovax® (Merck)
Indications	PCV13 is approved for prevention of pneumococcal disease in: • Children 6 weeks through 17 years of age • Adults 50 years of age and older PCV13 is approved for prevention of otitis media caused by *S. pneumoniae* serotypes in children 6 weeks through 5 years of age	PPSV23 is approved for use in persons 50 years of age or older and persons aged ≥2 years who are at increased risk for pneumococcal disease

Prevnar (pneumococcal 13-valent conjugate vaccine) [prescribing information]. http://labeling.pfizer.com/showlabeling.aspx?id=501; Pneumovax (pneumococcal vaccine polyvalent) [prescribing information]. http://www.merck.com/product/usa/pi_circulars/p/pneumovax_23/pneumovax_pi.pdf.

Pneumococcal Vaccines

Serotype	Pneumovax® (PPSV23)	Prevnar® (PCV 7)	Prevnar 13® (PCV 13)
1	**X**		**X**
3	**X**		**X**
4	**X**	**X**	**X**
5	**X**		**X**
6A			**X**
6B	**X**	**X**	**X**
7F	**X**		**X**
9V	**X**	**X**	**X**
18C	**X**	**X**	**X**
19		**X**	**X**
19A	**X**		**X**
19F	**X**	**X**	**X**
23F	**X**	**X**	**X**
Others	**2, 8, 9N, 10A, 11A, 12F, 14, 15B, 17F, 20, 22F, 33F**		

File TM, et al. *Infect Dis Clin Pract*. 2012;20(1):3-8.

Polysaccharide vs Conjugate Vaccine

Property	Polysaccharide	Conjugate
Immunogenicity in children <2 years	No	Yes
B cell dependent immune response	Yes	Yes
T cell dependent immune response	No	Yes
Immune memory	No	Yes
Booster effect	No	Yes
Long term protection	No	Yes
Reduction of carriage	No	Yes
Herd immunity	No	Yes

Pneumococcal Polysaccharide (PPSV23) Vaccine Indications

- **All adults aged 65 years and older;**
- **Adults younger than age 65 years with**
  - **chronic lung disease (including chronic obstructive pulmonary disease, emphysema, and asthma);**
  - **chronic cardiovascular diseases;**
  - **diabetes mellitus;**
  - **chronic renal failure and nephrotic syndrome;**
  - **chronic liver disease (including cirrhosis);**
  - **alcoholism;**
  - **cochlear implants;**
  - **cerebrospinal fluid leaks;**
  - **immunocompromising conditions (leukemia, lymphoma, multiple myeloma, generalized malignancy; congenital or acquired immunodeficiencies, including HIV infection; conditions requiring treatment with immunosuppressive drugs**
  - **functional or anatomic asplenia (e.g., sickle cell disease and other hemoglobinopathies, congenital or acquired asplenia, splenic dysfunction, or splenectomy [if elective splenectomy is planned, vaccinate at least 2 weeks before surgery])**
- **Residents of nursing homes or long-term care facilities; and**
- **Adults who smoke cigarettes**

CDC. *MMWR*. 2010;59(34):1102-6.
CDC. *MMWR*. 2013;62(1):9-19.

Revaccination with PPSV23

- **One-time revaccination 5 years after the first dose is recommended for persons aged 19 through 64 years with**
  - **chronic renal failure or nephrotic syndrome;**
  - **functional or anatomic asplenia (e.g., sickle cell disease or splenectomy);**
  - **immunocompromising conditions.**

- **Persons who received 1 or 2 doses of PPSV23 before age 65 years for any indication should receive another dose of the vaccine at age 65 years or later if at least 5 years have passed since their previous dose.**
- **No further doses are needed for persons vaccinated with PPSV23 at or after age 65 years.**

CDC. *MMWR*. 2010;59(34):1102-6.
CDC. *MMWR*. 2013;62(1):9-19.

Pneumococcal Conjugate Vaccine (PCV13)

- **Adults aged 19 years or older with immunocompromising conditions (including chronic renal failure and nephrotic syndrome), functional or anatomic asplenia, CSF leaks or cochlear implants, and who have not previously received PCV13 or PPSV23 should receive a single dose of PCV13 followed by a dose of PPSV23 at least 8 weeks later.**
- **Adults aged 19 years or older with the aforementioned conditions who have previously received one or more doses of PPSV23 should receive a dose of PCV13 one or more years after the last PPSV23 dose was received.**
- **For those that require additional doses of PPSV23, the first such dose should be given no sooner than 8 weeks after PCV13 and at least 5 years since the most recent dose of PPSV23.**
- **When indicated, PCV13 should be administered to patients who are uncertain of their vaccination status history and there is no record**

CDC. *MMWR*. 2013;62(1):9-19.

Contraindications to Pneumococcal Vaccination

- **Severe allergy to a vaccine component or previous life-threatening allergic reaction to PCV13 or PPSV23**
- **Adults with mild illness can be vaccinated; those with moderate or severe illness may require waiting until recovery to be vaccinated**

Efficacy of PPV23 in Adults

- **Meta-analysis of 25 studies**
  - **18 randomized controlled trials (RCTs), N=64,852**
  - **7 non-RCTs, N=62,294**

Variable	Odds Ratio (95% CI)
Culture-confirmed invasive pneumococcal disease	0.26 (0.14-0.45)
All-cause pneumonia	0.71 (0.45-1.12)
All-cause mortality	0.90 (0.74-1.09)

Moberley S et al. *Cochrane Database Syst Rev*. 2013;1:CD000422.

Efficacy of PPV23 in Older Adults

- **Retrospective cohort study; N=47,365; ≥65 years; 1998-2001**

Variable	Multivariate-adjusted Hazard Ratio (95% CI)	*P* Value
Pneumococcal bacteremia	0.56 (0.33-0.93)	*P*=0.03
Hospitalization for pneumonia	1.14 (1.02-1.28)	*P*=0.02
Outpatient pneumonia	1.04 (0.96-1.13)	*P*=0.31
Community-acquired pneumonia	1.07 (0.99-1.14)	N/A

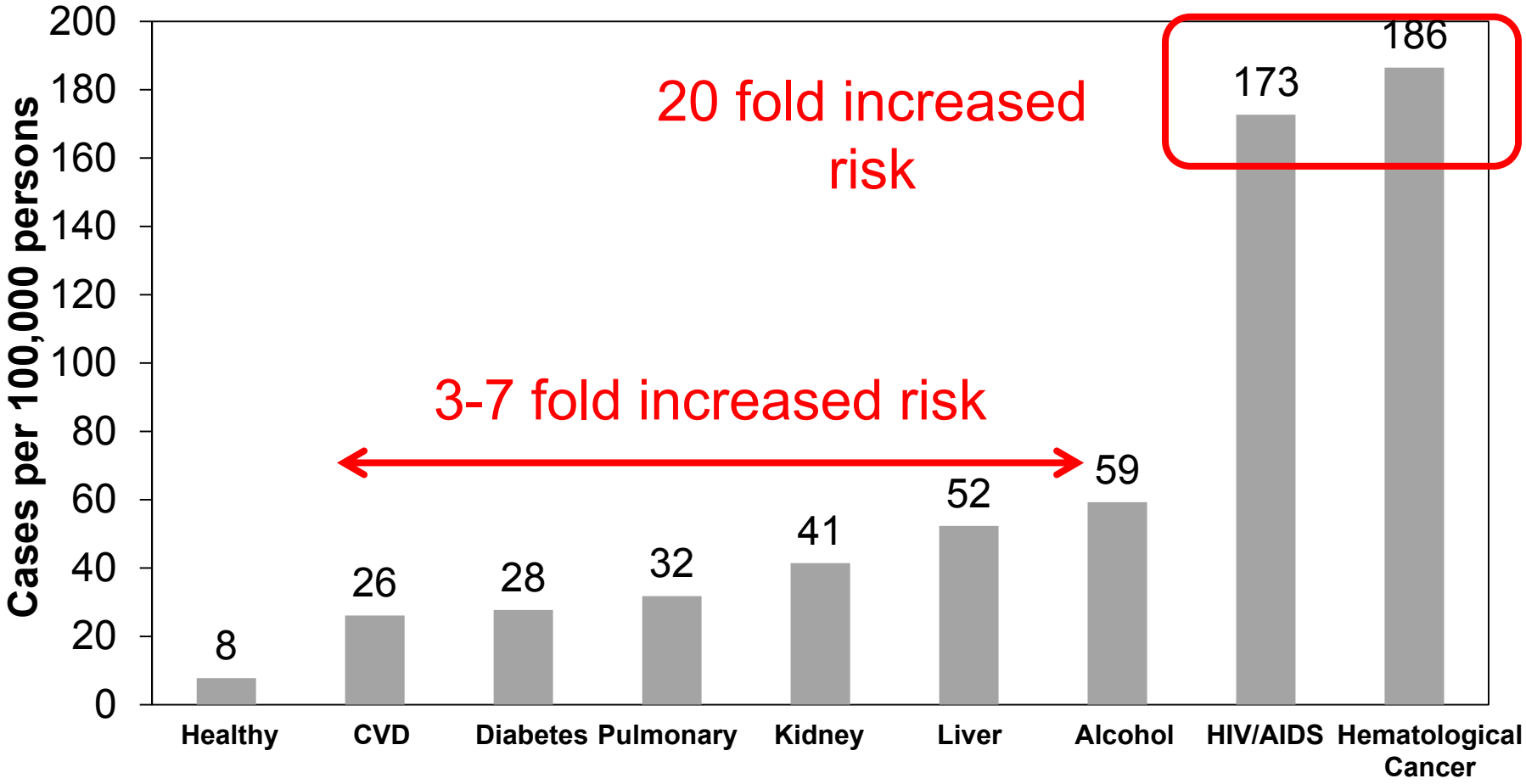
Jackson L et al. *N Engl J Med*. 2003;348:1747-1755.

Efficacy of PCV13 in Older Adults

- **Approval in adults based on immunogenicity studies comparing PCV13 antibody responses with PPSV23**
  - **In adults aged 60–64 and >70 years, PCV13 elicited mean antibody titers comparable with, or higher than, responses elicited by PPSV23**
  - **In studies of HIV-infected subjects, antibody responses to single dose of PCV7 comparable with PPSV23**
- **PCV13 tolerability comparable to PPSV23**
- **Randomized, placebo-controlled clinical trial of PCV in adults ≥ 65 years ongoing**

Hak E et al. *Netherlands J Med*. 2008;66(9):378-383; *MMWR*. 2012;61(40):816-819.

Incidence of IPD Among Adults 18-64 Years of Age with Selected Conditions United States, 2009



Kyaw, *JID* 2005;192:377-86 & CDC Unpublished

Conclusions from the ACIP Pneumococcal Working Group: BOTH PCV13 and PPSV23 Recommended for Adults with Immunocompromising and Certain Other Conditions

- Congenital or acquired immunodeficiencies
- HIV infection
- Chronic renal failure or nephrotic syndrome
- Leukemias, lymphomas, Hodgkins disease
- Generalized malignancy
- Diseases requiring treatment with immunosuppressive drugs, including long-term systemic corticosteroids or radiation therapy
- Solid organ transplantation
- Multiple myeloma
- Functional or anatomic asplenia
- Cochlear implants
- CSF leaks

CDC. *MMWR*. 2012;61(40):816-9.

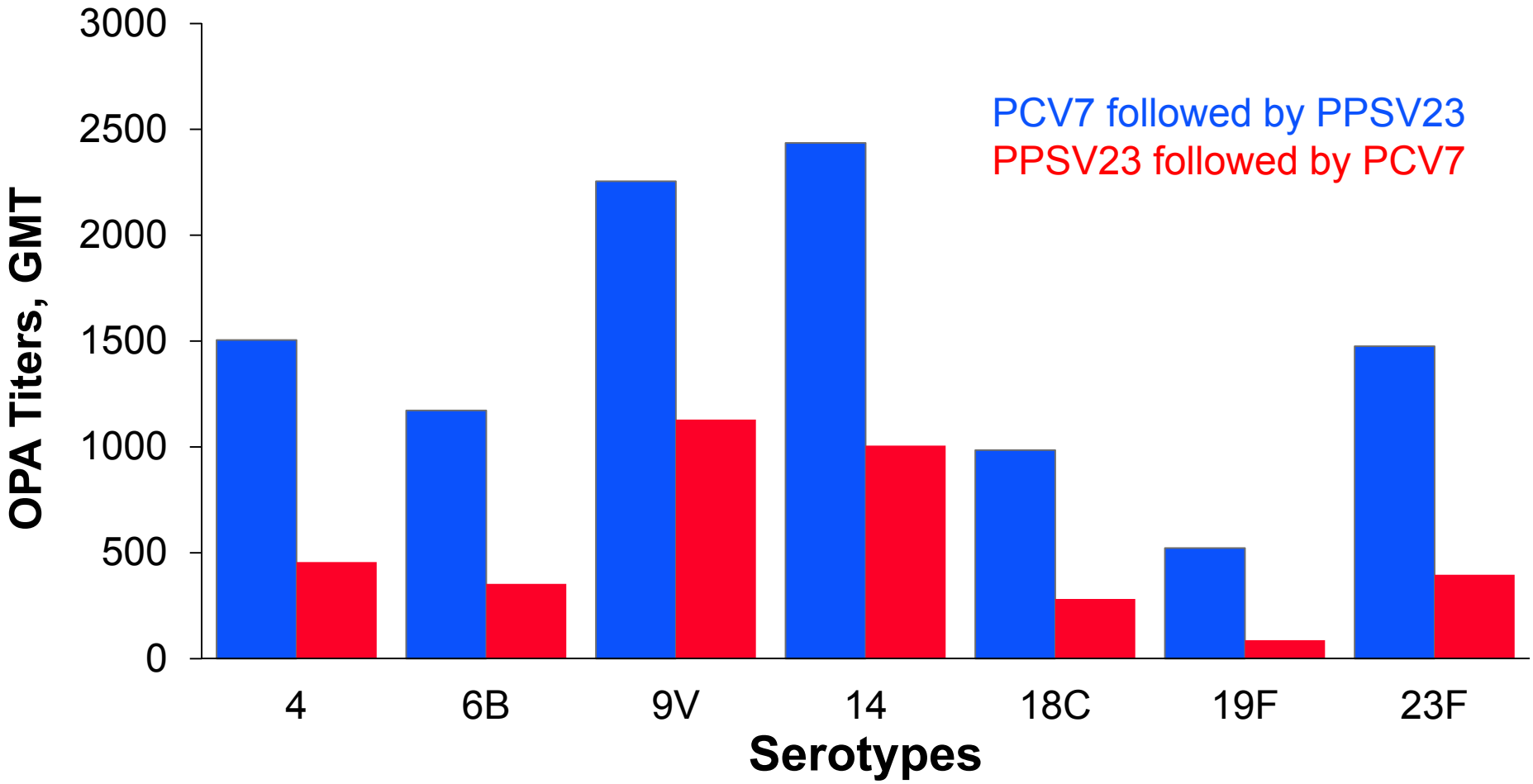
Medical Conditions and Other Indications for Administration of Pneumococcal Vaccine

		PCV13	PPSV23	
Risk Group	**Underlying Medical Condition**	**Recommended**	**Recommended**	**Revaccination 5 Years After First Dose**
Immunocompetent persons	Chronic heart disease		√	
	Chronic lung disease		√	
	Diabetes mellitus		√	
	Cerebrospinal fluid leak	√	√	
	Cochlear implant	√	√	
	Alcoholism		√	
	Chronic liver disease. Cirrhosis		√	
	Cigarette smoking		√	
Persons with functional or anatomic asplenia	Sickle cell disease/other hemoglobinopathy	√	√	√
	Congenital or acquired asplenia	√	√	√
Immunocompromised persons	Congenital or acquired immunodeficiency	√	√	√
	Human immunodeficiency	√	√	√
	Chronic renal failure	√	√	√
	Nephrotic syndrome	√	√	√
	Leukemia	√	√	√
	Lymphoma	√	√	√
	Hodgkin disease	√	√	√
	Generalized malignancy	√	√	√
	Iatrogenic immunosuppression	√	√	√
	Solid organ transplant	√	√	√
	Multiple myeloma	√	√	√

CDC. *MMWR*. 2012;61(40):816-9.

Sequence Makes a Difference

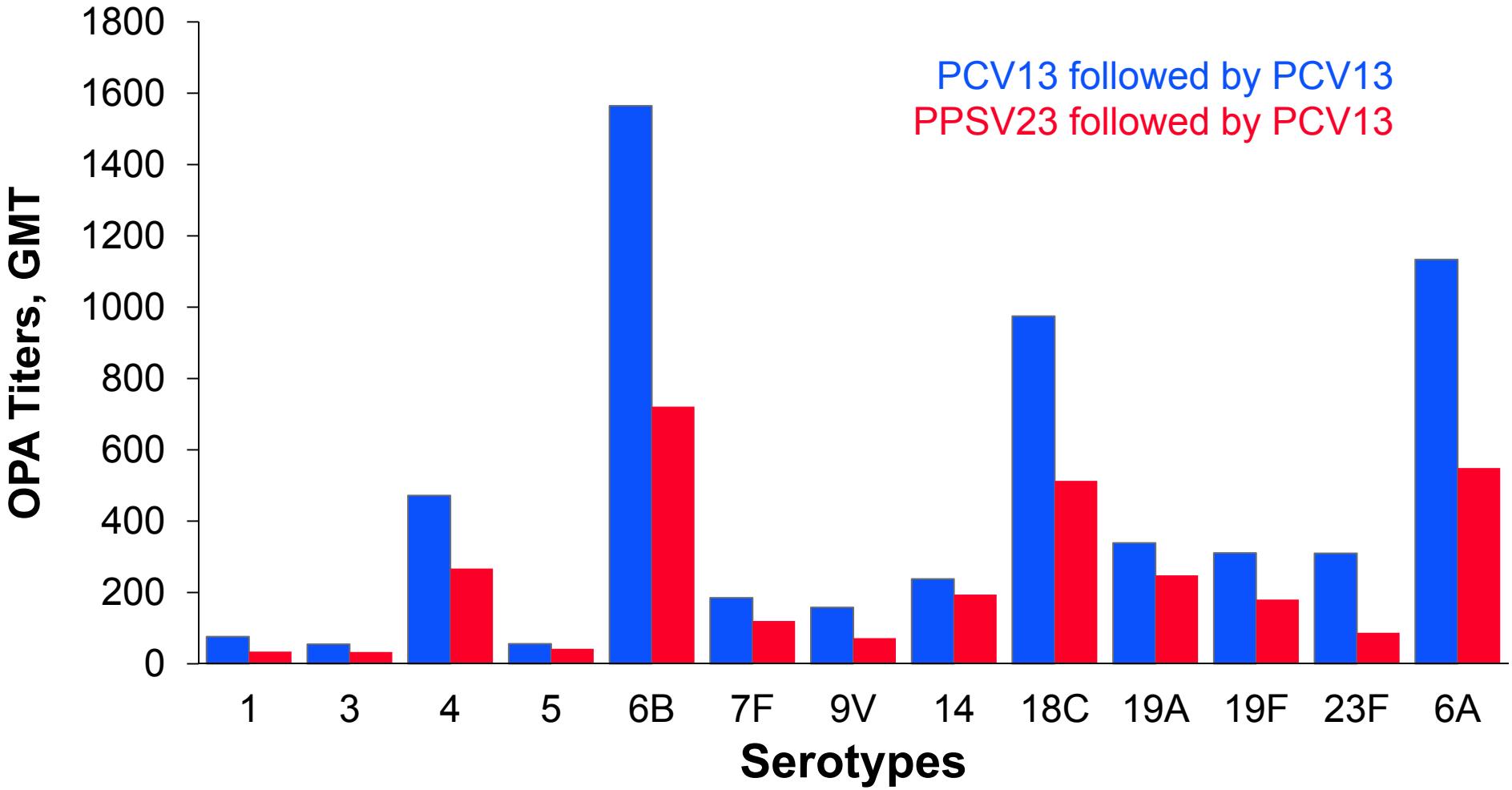
(Adults ≥ 70 years of age, vaccine naïve)



De Roux A, et al. *Clin Infect Dis*. 2008 Apr 1;46(7):1015-23.

Sequence Makes a Difference

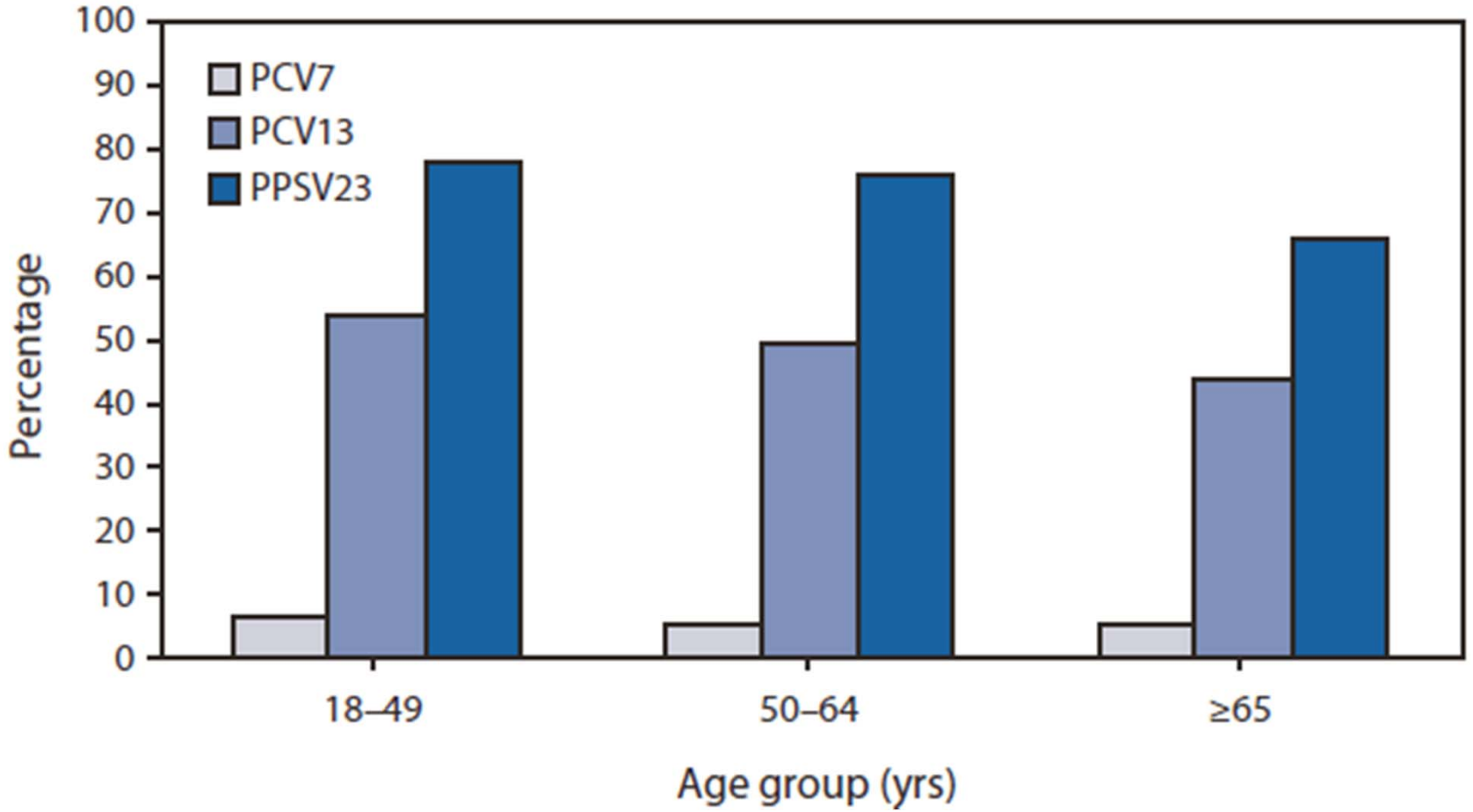
(Adults ≥70 years of age, prevaccinated with PPSV23)



Jackson LA, et al. *Vaccine*. 2013 Aug 2;31(35):3594-602.

Why Use Both PCV13 and PPSV23?

Percentage of Invasive Pneumococcal Disease Cases Caused by Serotypes Covered in Pneumococcal Vaccine Formulations United States, Adults Aged ≥ 18 Years, 2008



CDC. *MMWR.* 2010 Sep 3;59(34):1102-6.

Case

Your 73-year old patient is relocating to a retirement community and requires an assessment of his overall vaccination status. He received the PPSV23 vaccine at age 63 years since was a smoker at the time, but has since quit smoking. What do you recommend for this patient?

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Every life deserves world class care.

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Improving Adult Vaccination Practices

Influenza Prevention: The 2014-2015 Season and Beyond

William Schaffner, MD
Professor, Preventive Medicine
Department of Health Policy
Professor, Division of Infectious Diseases
Vanderbilt University School of Medicine
Nashville, TN

Case Presentation

- **A 54-year old woman is seen for a urinary tract infection at the beginning of influenza season. When asked about the influenza vaccine, she notes that she once had “a bad reaction” to the shot and that she has never had the flu. She doesn’t work outside of her home, but she babysits for her two young grandchildren. How do you counsel her on the importance of influenza vaccination?**

Influenza

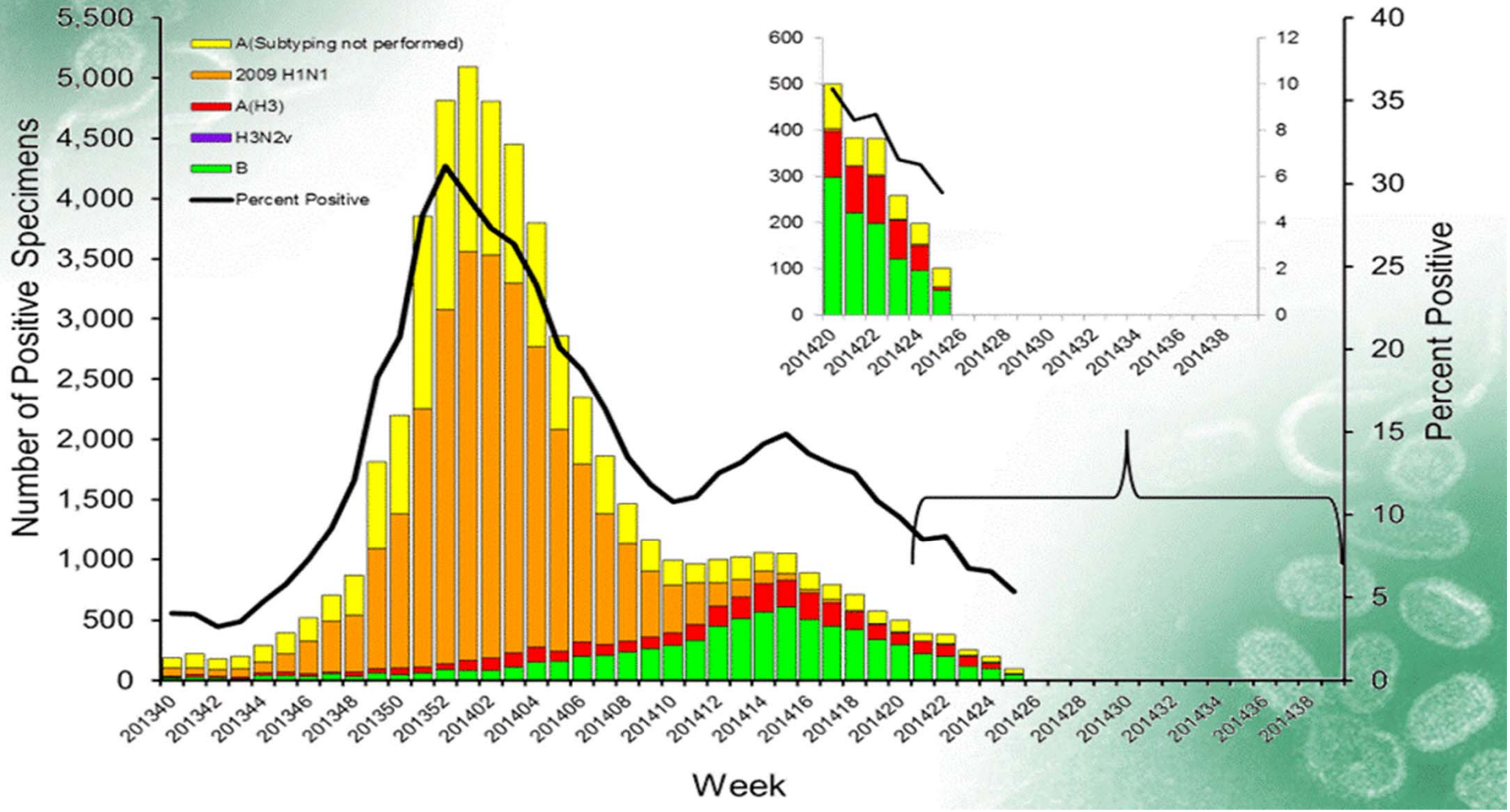
- **Enveloped RNA virus**
- **3 types based on hemagglutinin (HA) and neuraminidase (NA) surface antigens and internal structure**
  - **A: Multiple hosts - birds, mammals (human); many HA and NA**
    - **Highly pathogenic strains**
    - **Mild strains**
  - **B: Human host-1 HA and 1 NA**
  - **C: Human host-Mild upper respiratory illness**
- **20K-30K influenza-associated deaths/year in United States**
  - **>90% of mortalities in people aged >65 years**
- **200K+ associated hospitalizations, exacerbations**

CDC. Available at: http://www.cdc.gov/flu/about/viruses/types.htm; Thompson MG, et al. *MMWR*. 2010;59:1057-1062.

FLUVIEW

A Weekly Influenza Surveillance Report Prepared by the Influenza Division

Influenza Positive Tests Reported to CDC by U.S. WHO/NREVSS Collaborating Laboratories, National Summary, 2013-14



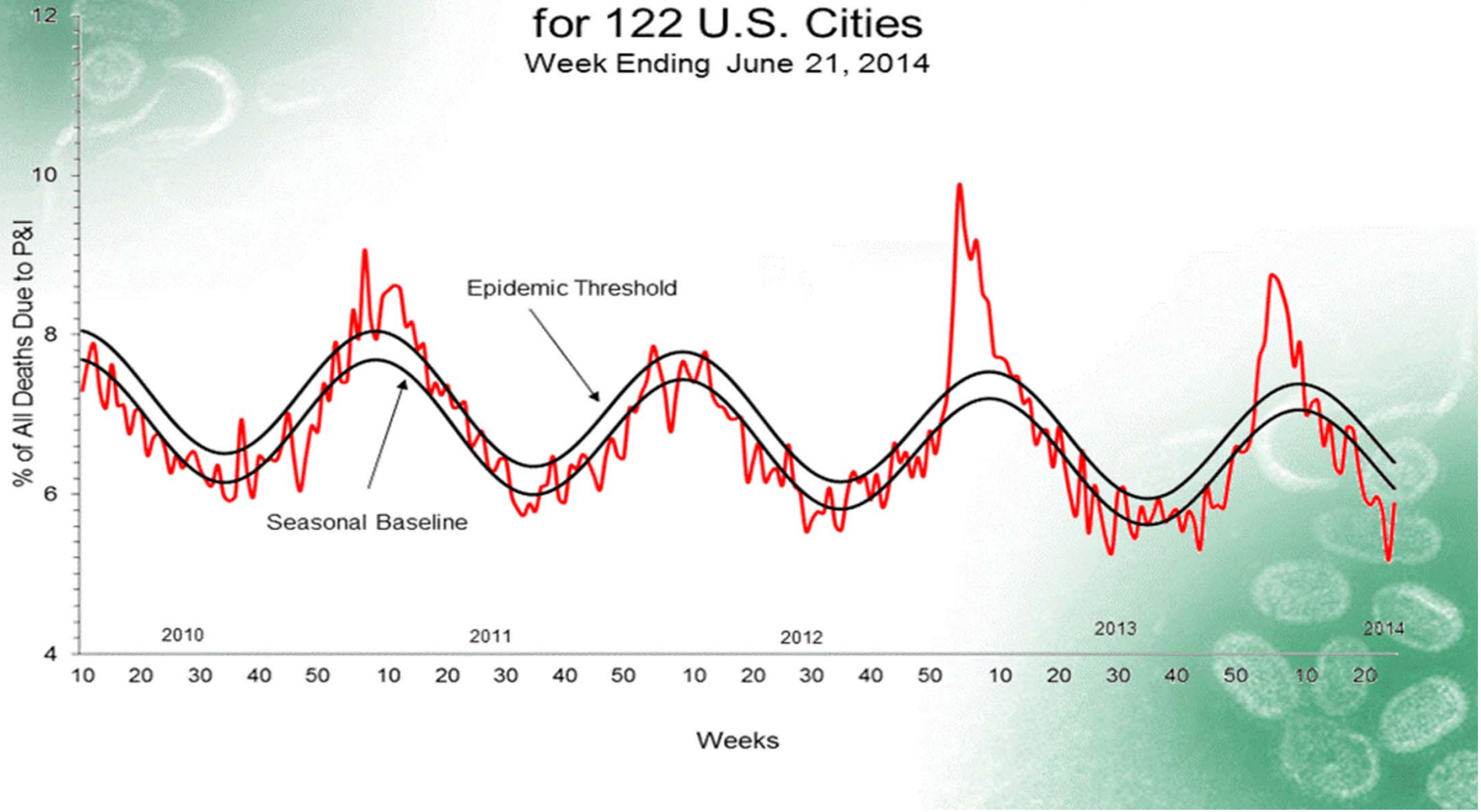
FLUVIEW

A Weekly Influenza Surveillance Report Prepared by the Influenza Division

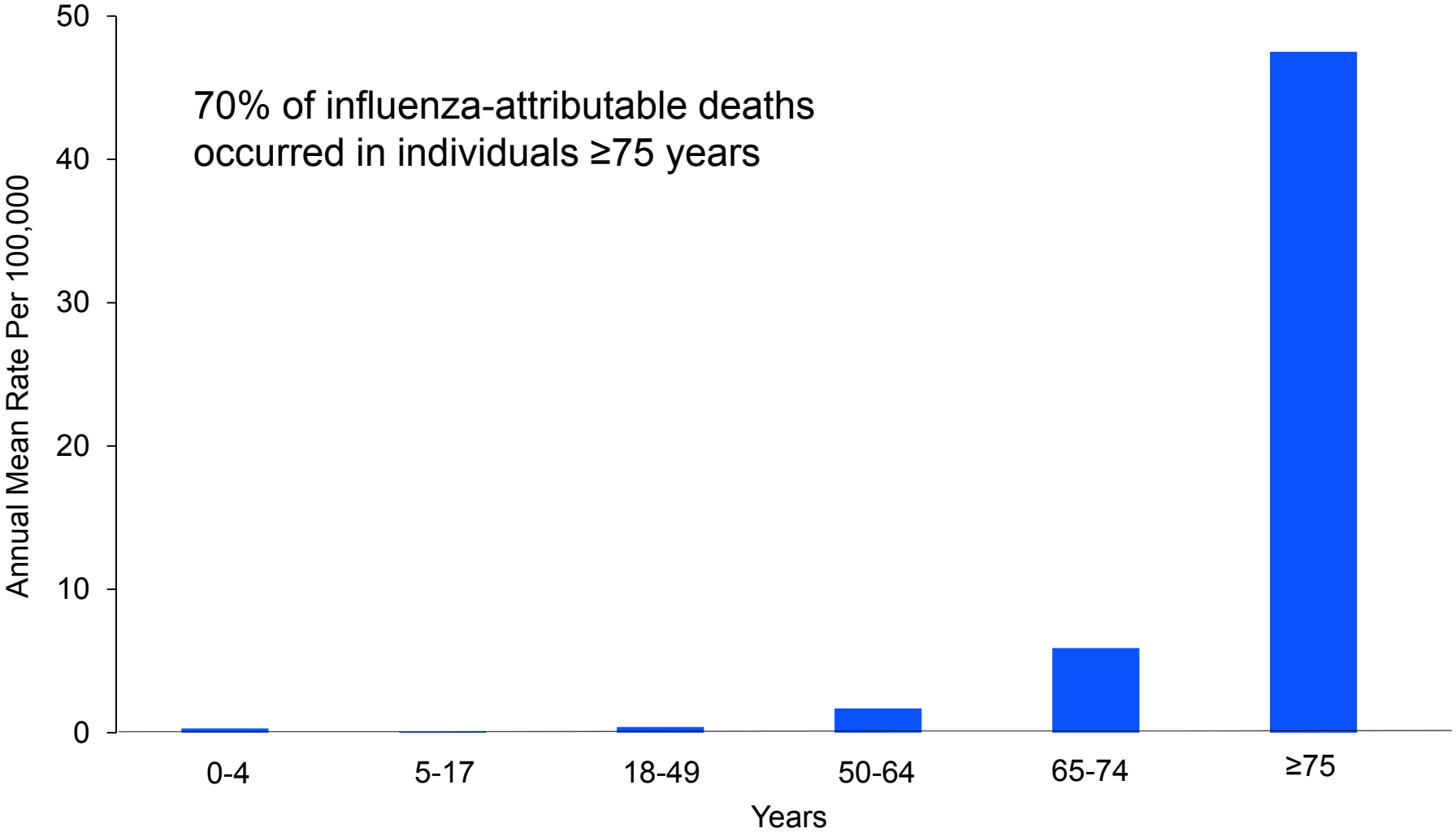
CDC
Centers for Disease Control and Prevention

Pneumonia and Influenza Mortality for 122 U.S. Cities

Week Ending June 21, 2014



Average Mortality Attributable to Influenza (Pneumonia and Influenza)



Matias G, et al. *Influenza Other Respir Viruses*. 2014 Jun 27.

Influenza Vaccines

- **Seasonal flu vaccines typically protect against three influenza viruses (trivalent) estimated to be most common**
  - **Quadrivalent vaccines (against 2 A and 2 B types) approved in 2013**

Route of Administration	Approved For
Inactivated (trivalent)	
Intramuscular injection	≥6 months
High-dose intramuscular injection	≥65 years
Intradermal injection	18-64 years
Cell-based vaccine (severe egg allergy)	≥18 years
Recombinant injection (only HA)	18-49 years
Inactivated (quadrivalent)	
Intramuscular injection	≥3 years
Live Attenuated Influenza Vaccine	
Nasal spray (quadrivalent)	2-49 years (healthy, not pregnant)

CDC. http://www.cdc.gov/flu/protect/keyfacts.htm

Influenza Vaccine Priorities

- **Everyone should receive the flu vaccine when vaccine supplies are adequate**
  - People at greatest risk for complications or most likely to get or spread the flu should be immunized as soon as vaccine is available

Populations of Special Emphasis
Newborns (after 6 months of age) and children
Adults aged ≥65 years of age
Adults aged 50-64 years of age
Persons aged 2-64 years with underlying chronic medical conditions
Women pregnant during the influenza season
Residents of nursing homes and long-term care facilities
All health care workers
Out-of-home caregivers and household contacts of persons in high-risk groups

http://www.health.ny.gov/diseases/communicable/influenza/vaccination_priority_groups.htm

Contraindications and Precautions

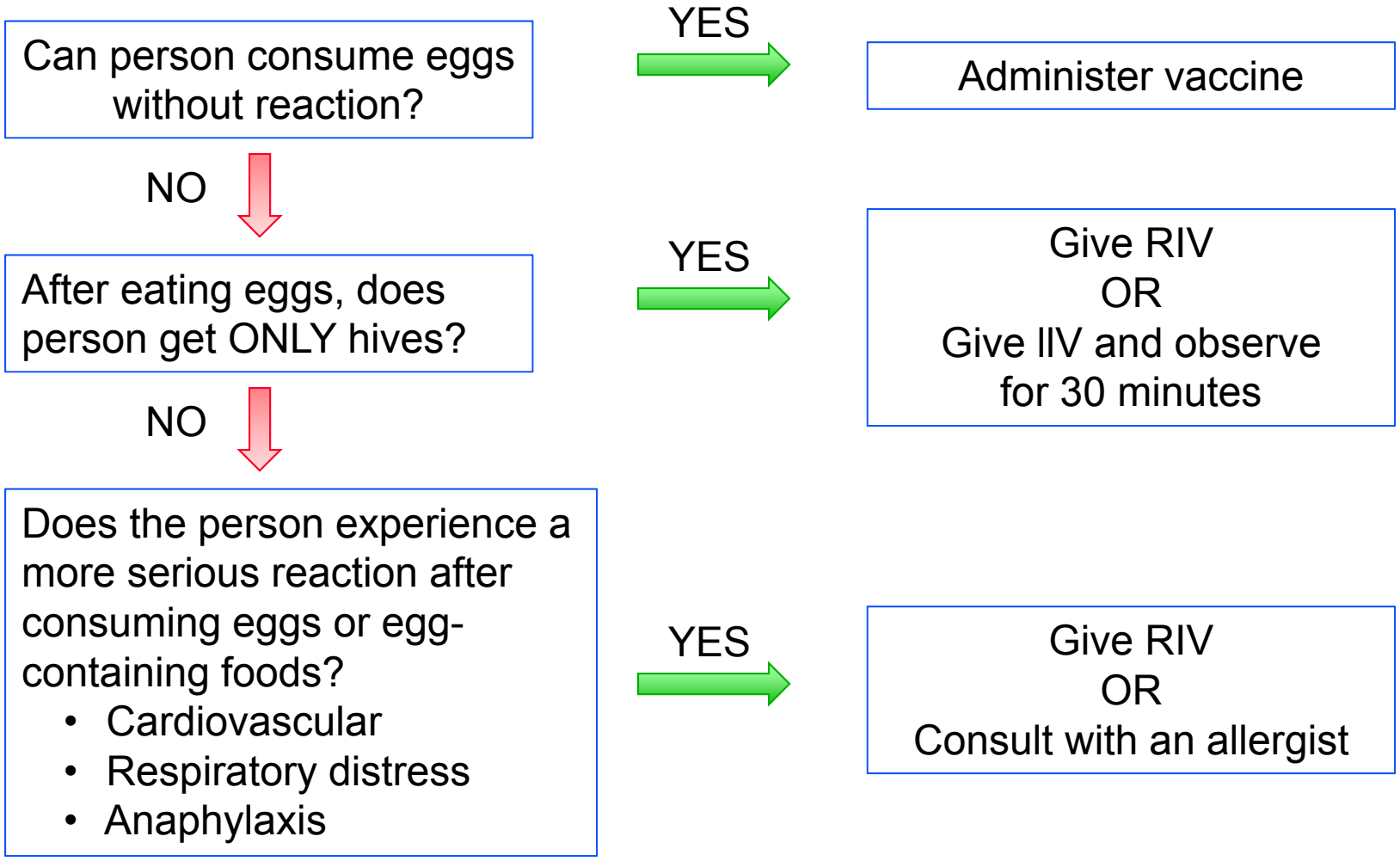
Contraindications

- History of severe allergic reaction to any component of the vaccine, including egg protein, or after previous dose of any influenza vaccine

Precautions

- Moderate to severe illness with or without fever; wait for recovery
- History of Guillain-Barré syndrome within 6 weeks of receipt of influenza vaccine

Influenza Vaccines and Egg Allergy



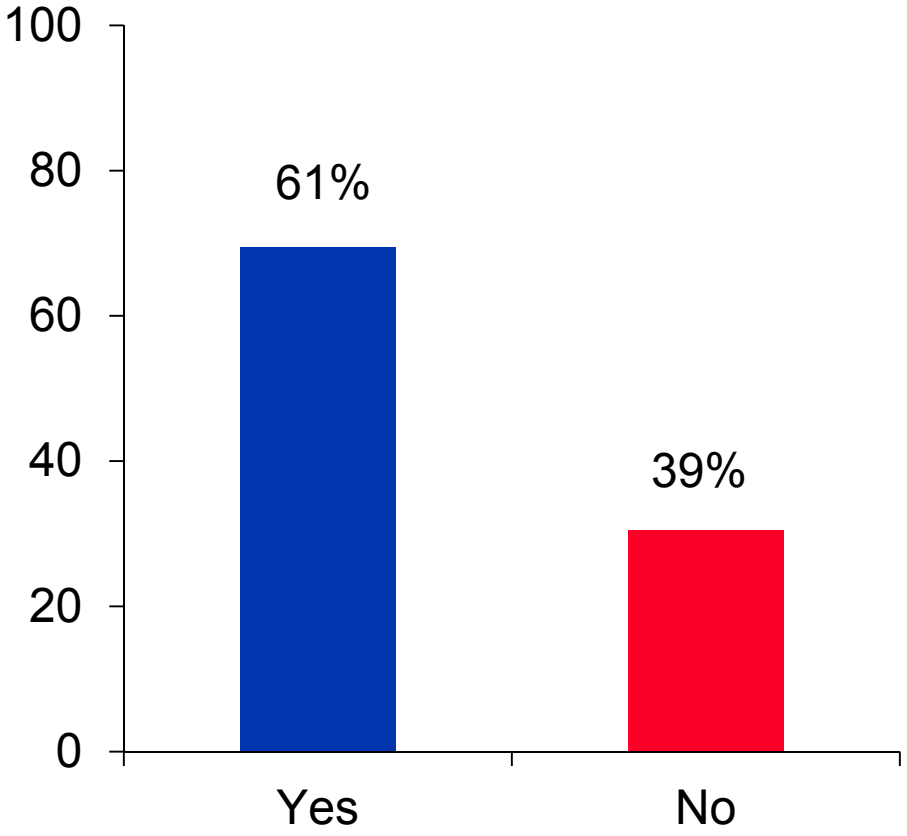
Immunization Action Coalition. http://www.immunize.org/catg.d/p3094.pdf.

Influenza Vaccine Efficacy

- **No trials met inclusion criteria for adults aged 65 and older**
- **Meta-analysis of 10 randomized controlled trials**
  - **Efficacy in 8 of 12 analyzed flu seasons**
  - **Pooled efficacy 59% in adults 18-64 years (95% CI, 51%-67%)**
- **Significant protection against medically attended influenza in outpatient or inpatient settings observed in 6 (35%) of 17 analyses in 9 studies, ranging from 47%-72%**

Osterholm MT et al. *Lancet Infect Dis*. 2011;12:36-44.

Adults ≥65 Years in Ohio Vaccinated Against Influenza: 2012



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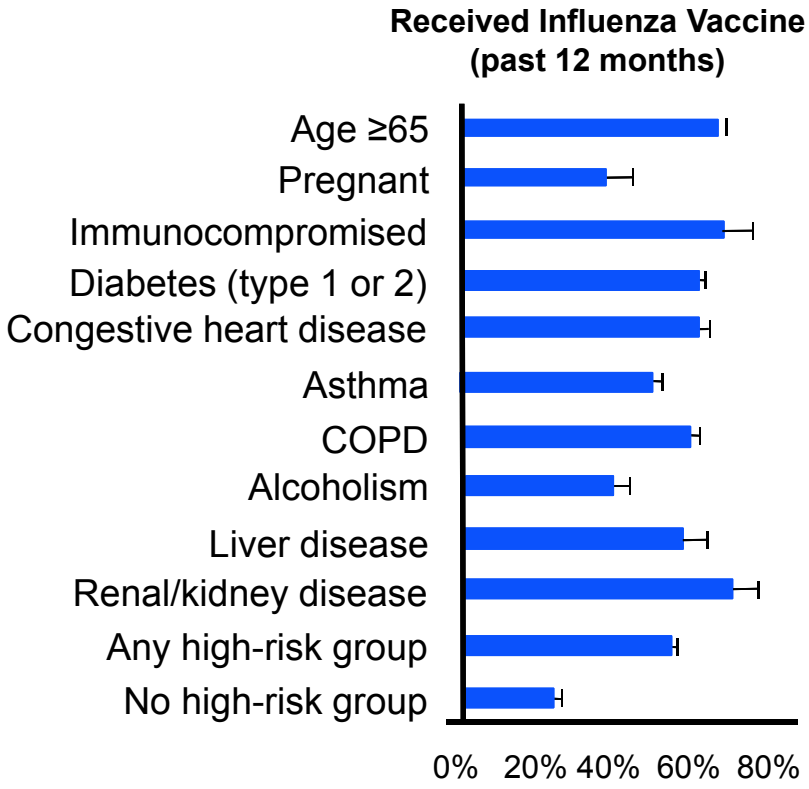
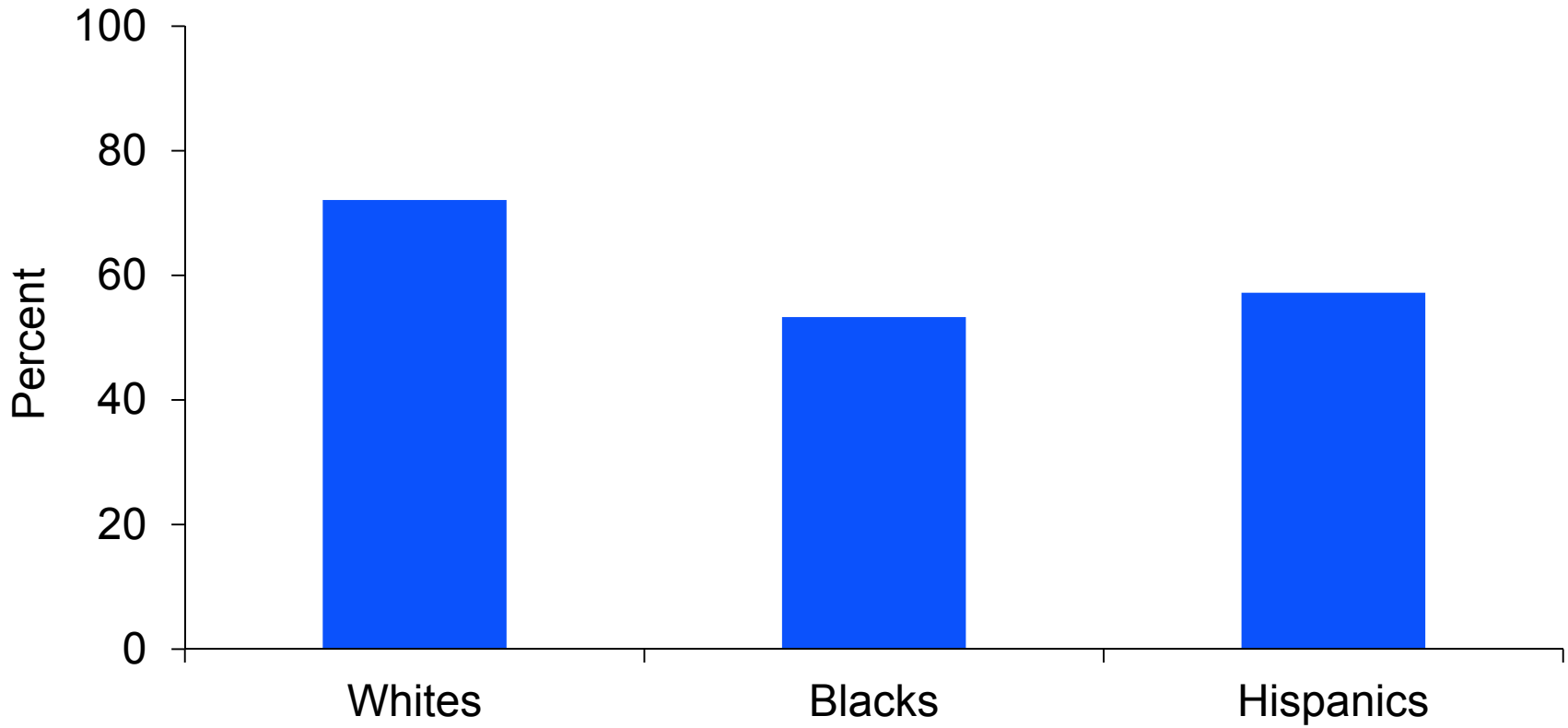
Centers for Disease Control and Prevention. Available at: http://apps.nccd.cdc.gov/BRFSS/display.asp?yr=2012&cat=IM&qkey=8341&state=OH. Accessed June 30, 2014.

Influenza Vaccination in High-risk Patients



Adapted from: Annunziata K et al. *PLoS One*. 2012;7(11):e50553.

Racial/Ethnic Disparities in Influenza Vaccination



MMWR. 2013;62(ss04);1-29.

Case Presentation

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Influenza and Pneumococcal Infection

- **Influenza increases pneumococcal disease incidence**
  - **Sequential-infection hypothesis: 1918–19 influenza pandemic caused by novel influenza strain followed by secondary opportunistic bacterial pneumonias**
- **Vaccination for seasonal influenza missed opportunity for pneumococcal vaccination**

Gilchrist SA et al. *Am J Public Health*. 2012;102(4):596-605.; Mahamat A et al. *Hum Vaccin Immunother*. 2013;9(1):128-35.

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Every life deserves world class care.

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Improving Adult Vaccination Practices

Developing an Action Plan for Your Practice

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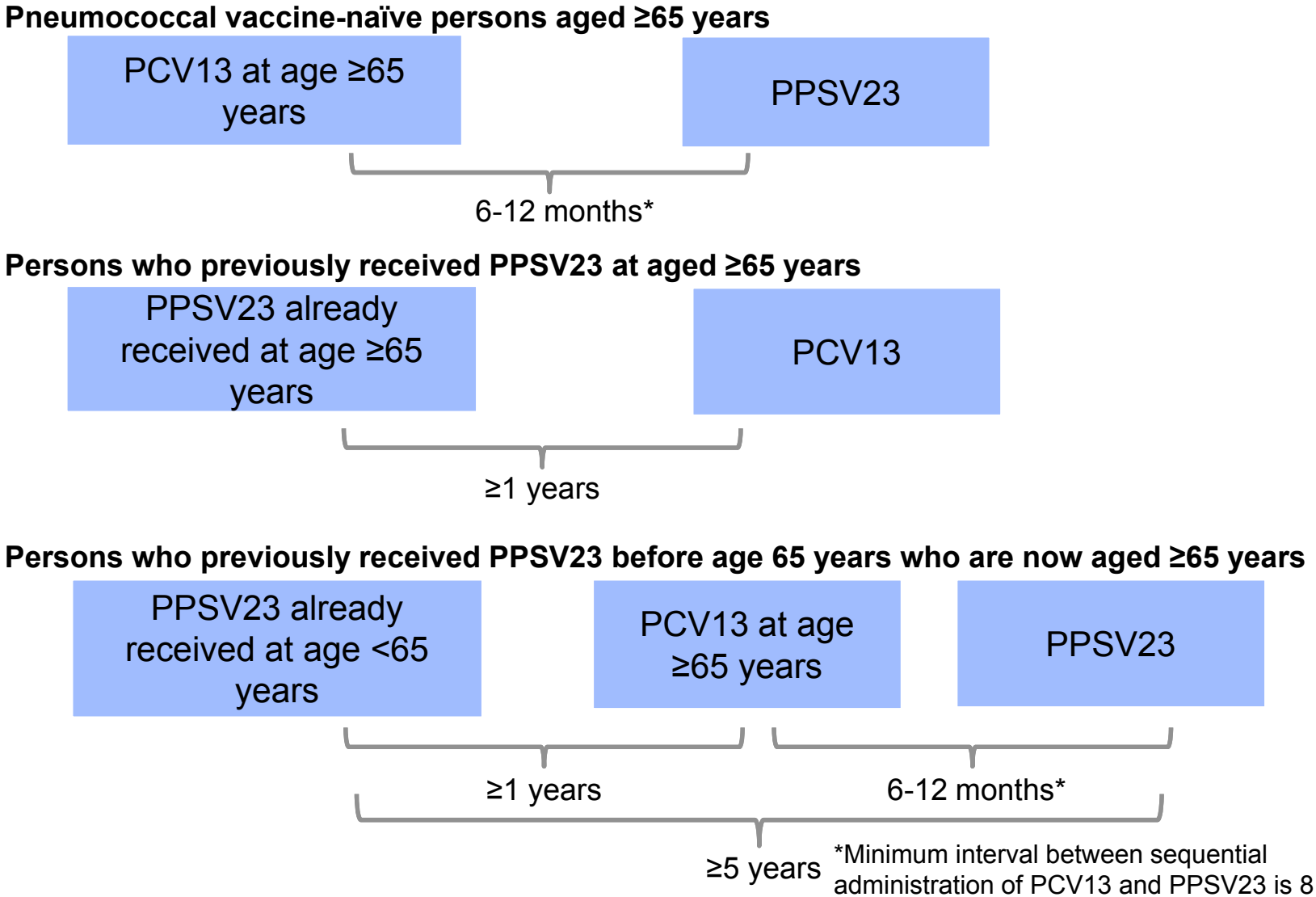
William Schaffner, MD
Professor, Preventive Medicine
Department of Health Policy
Professor, Division of Infectious Diseases
Vanderbilt University School of Medicine
Nashville, TN

Updated ACIP Recommendations



*Minimum interval between sequential administration of PCV13 and PPSV23 is 8 weeks; PPSV23 can be given later than 6-12 months after PCV13 if this window is missed.

Tomczyk S, et al. *MMWR Morb Mortal Wkly Rep*. 2014;63(37):822-5.

Case Presentation

- **A 51-year old man with hypertension is seen in October for a blood pressure check 6 months after initiating an antihypertensive. How can your practice avoid a missed opportunity for vaccinations?**

Vaccination Rates in Ohio: How Are We Doing?

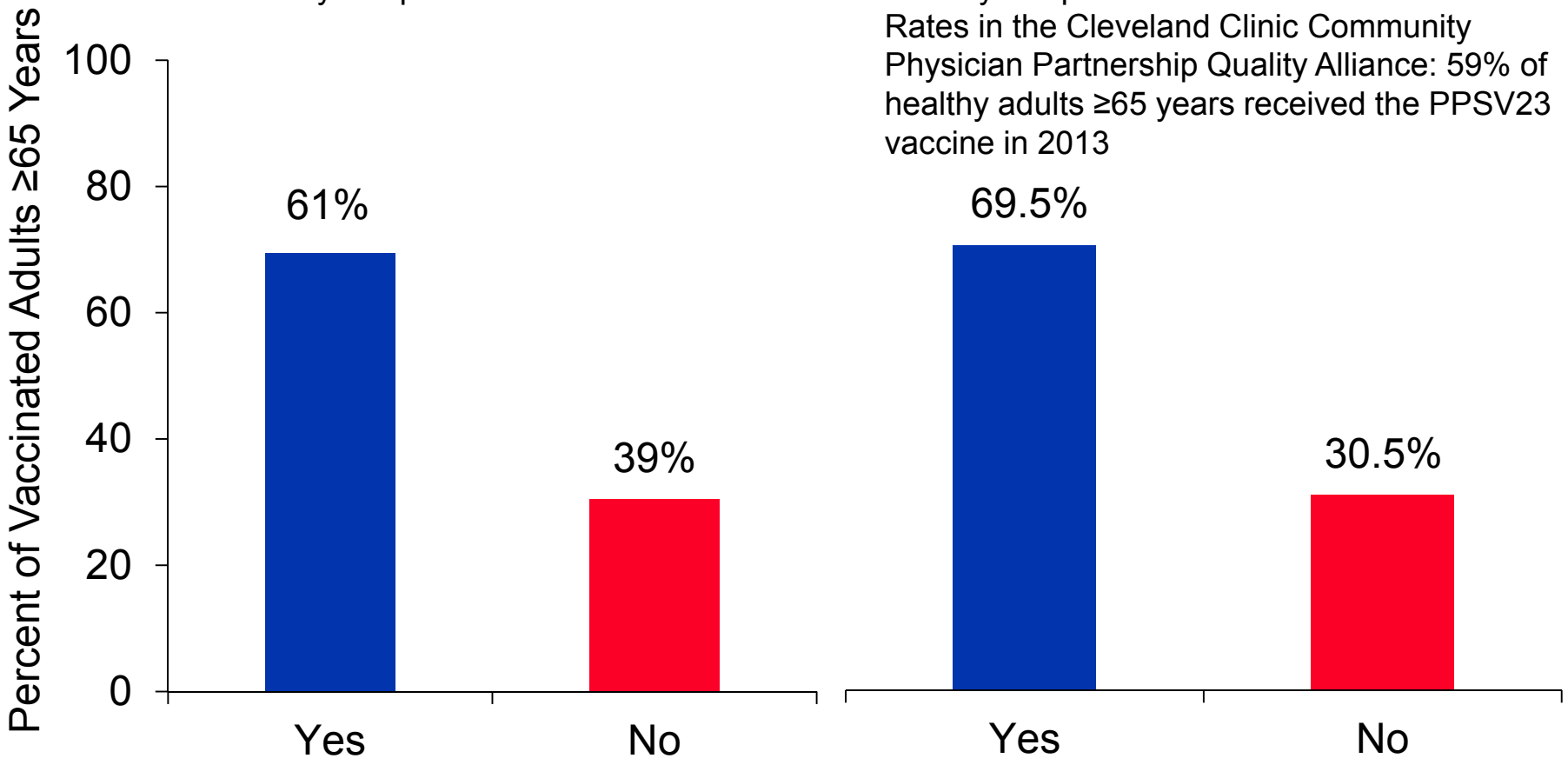
Seasonal Influenza Vaccine

Healthy People 2020 Goal: 90%

Pneumococcal Vaccine

Healthy People 2020 Goal: 90%

Rates in the Cleveland Clinic Community Physician Partnership Quality Alliance: 59% of healthy adults ≥65 years received the PPSV23 vaccine in 2013



Centers for Disease Control and Prevention. Available at: http://apps.nccd.cdc.gov/BRFSS/display.asp?yr=2012&cat=IM&qkey=8341&state=OH; http://apps.nccd.cdc.gov/BRFSS/display.asp?yr=2012&state=OH&qkey=8351&grp=0&SUBMIT3=Go. Accessed June 30, 2014.

Why Aren't We Achieving Goals?

- **Missed opportunities to vaccinate**
  - **Failure to assume responsibility**
  - **Competing priorities**
  - **Incomplete/inaccessible documentation of previous vaccines**
  - **Health care system delivery challenges**
- **Refusal of vaccine by patients**
  - **Lack of perception about risk**
  - **Misconceptions about vaccine efficacy**
  - **Fear of adverse events**
- **Healthcare provider lack of knowledge or fear**
- **Lack of access/availability**

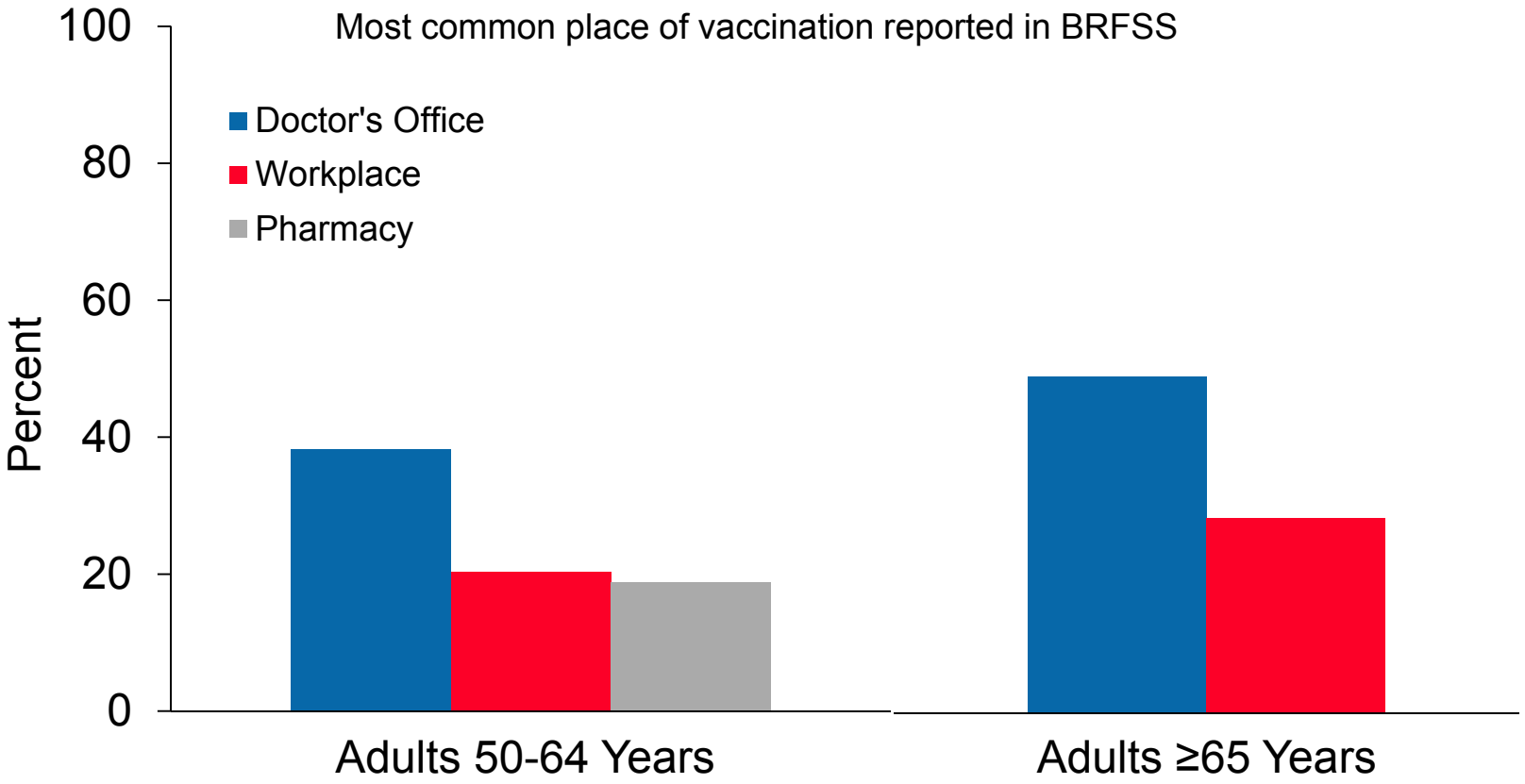
Brownfield E et al. *Am J Infect Control*. 2012;40(7):672-4; Rehm S et al. *Postgrad Med*. 2012;124(3):71-9.

Patient Attitudes About Influenza Vaccination

Survey Question	Total	Vaccinated Respondents	Unvaccinated Respondents
“Are you in a group that is recommended to get a flu vaccination this year?” (Among those reporting “yes”)	46.8	66.4	30.4
“How effective do you think the flu vaccination is in preventing the flu this season?” (Among those reporting “very/somewhat effective”)	86.8	94.8	79.6
“If you do not get a flu vaccination during a flu season, what do you think your chances are of getting the flu?” (Among those reporting “very/somewhat high”)	46.5	70.6	26.8
“How safe do you think the flu vaccine is?” (Among those reporting “very/somewhat safe”)	89.3	96.9	82.7
“How worried were you/would you be about getting the flu from the flu vaccination?” (Among those reporting “very/somewhat worried”)	29.6	14.4	42.5

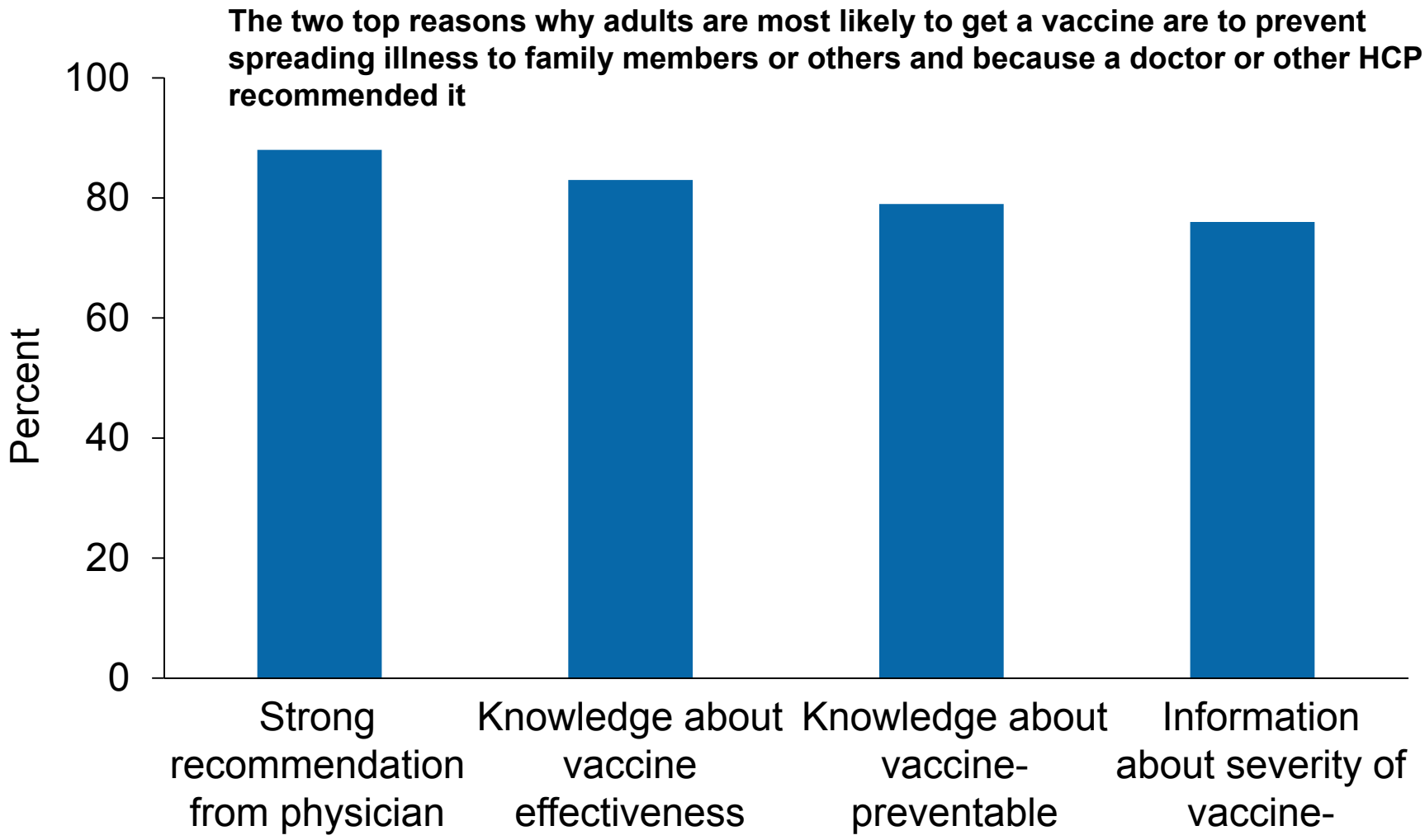
MMWR. 2013;62:1-28.

Influenza Vaccination in Nontraditional Settings



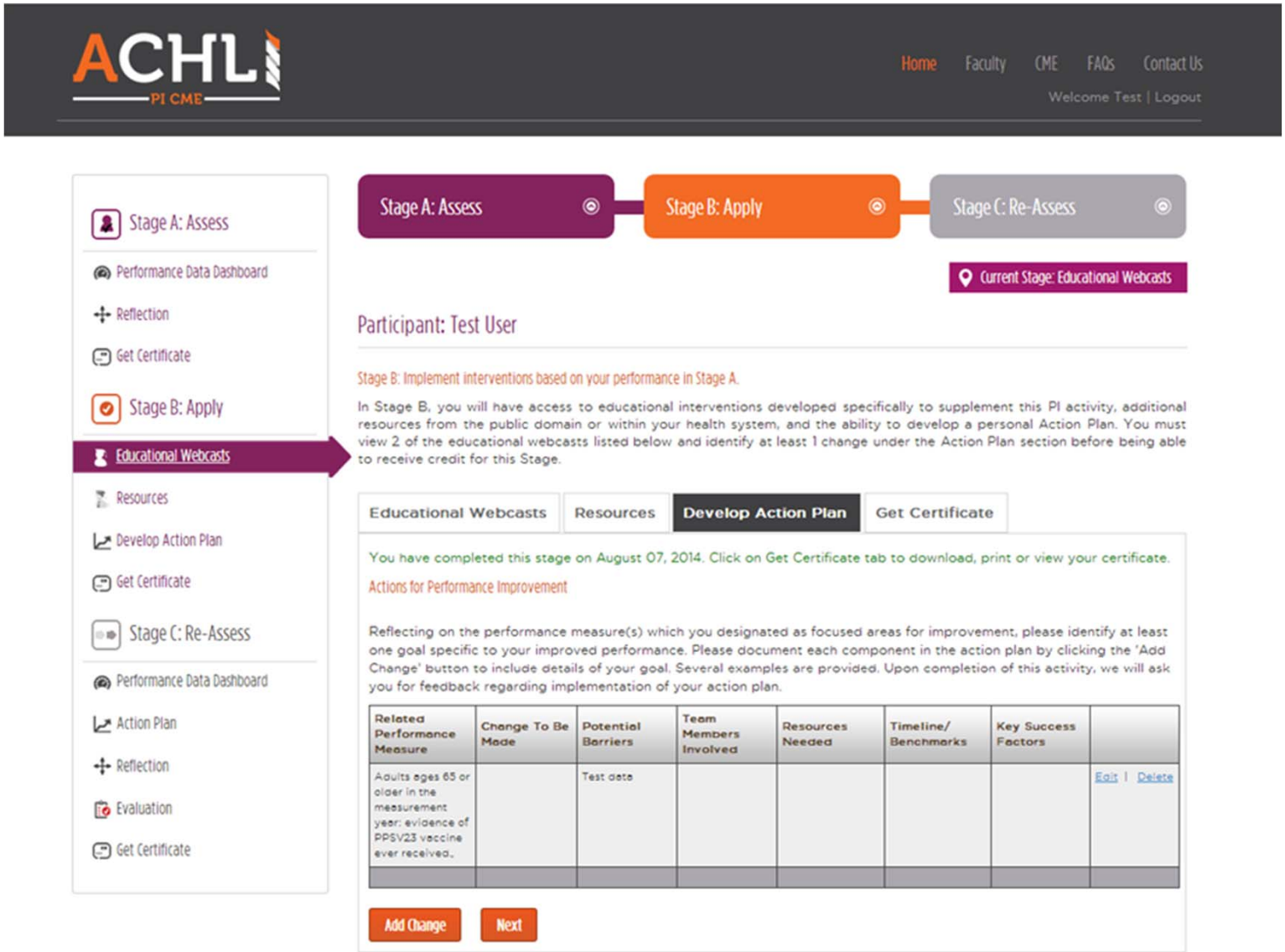
MMWR. 2013;62:1-28.

NFID Survey: Motivating Patients



NFID. Available at: http://www.adultvaccination.com/newsroom/Events/2010-cdc-vaccination-rates-news-conference/2010-Survey-Backgrounder.pdf

Developing an Action Plan



Strategies to Improve Immunization Rates

Increase Vaccine Access

Extend vaccination season

Vaccinate at all visit types

Extend hours for vaccine-only clinics

Vaccinate at nontraditional sites

Increase Demand

Patient education

Mailed /telephone patient reminders

Overcome Practice-related Barriers

Standing orders

Chart reminders

Performance feedback

Provider education

CDC. http://www2a.cdc.gov/vaccines/ed/whatworks/strategies_list.asp. Accessed July 17, 2014.

Interventions That Improve Vaccination Rates for Adults

Intervention	Adjusted Odds Ratio
Community engagement	3.0
Visit structure change	2.44
Patient financial incentive	1.98
Audit and feedback	1.83
Case management	1.66
Clinical reminders	1.53
Team change	1.44
Patient outreach	1.42

Lau D et al. *Ann Fam Med.* 2012;10(6):538-46.

Healthcare Provider Roles

- **Educate yourself and other health care workers**
- **Recommend vaccination to high-priority patients**
- **Set up systems for promoting vaccination**
- **Evaluate your efforts and provide feedback**
- **Consider new locations for vaccine delivery**
- **Get vaccinated!**

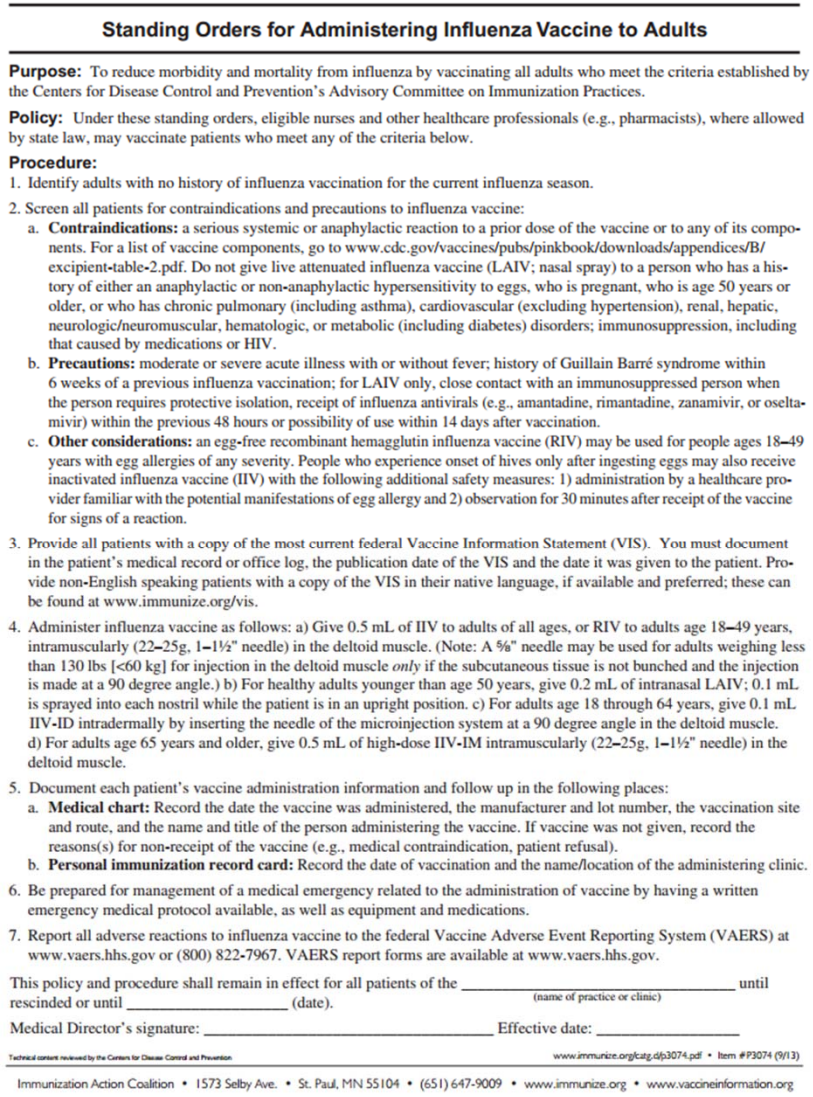
Nichol KL. *Cleve Clin J Med*. 2006;73(11):1009-15.

Educating Your Patients

- **Display educational materials (eg, posters, fact sheets) in common areas**
- **Encourage patients to incorporate vaccines into wellness efforts**
- **Use strong language, eg, “You should be vaccinated”**
- **Engage trusted community leaders**

NFID. http://aahivm.org/Upload_Module/upload/Provider%20Resources/Pneumococcal%20CTA%20Older%20Americans%20AAHIVM%20Partner.pdf.

Standing Orders Are Among the Most Effective Strategies



Standing Orders for Administering Influenza Vaccine to Adults

Purpose: To reduce morbidity and mortality from influenza by vaccinating all adults who meet the criteria established by the Centers for Disease Control and Prevention's Advisory Committee on Immunization Practices.

Policy: Under these standing orders, eligible nurses and other healthcare professionals (e.g., pharmacists), where allowed by state law, may vaccinate patients who meet any of the criteria below.

Procedure:

1. Identify adults with no history of influenza vaccination for the current influenza season.
2. Screen all patients for contraindications and precautions to influenza vaccine:
   a. **Contraindications:** a serious systemic or anaphylactic reaction to a prior dose of the vaccine or to any of its components. For a list of vaccine components, go to www.cdc.gov/vaccines/pubs/pinkbook/downloads/appendices/B/excipient-table-2.pdf. Do not give live attenuated influenza vaccine (LAIV; nasal spray) to a person who has a history of either an anaphylactic or non-anaphylactic hypersensitivity to eggs, who is pregnant, who is age 50 years or older, or who has chronic pulmonary (including asthma), cardiovascular (excluding hypertension), renal, hepatic, neurologic/neuromuscular, hematologic, or metabolic (including diabetes) disorders; immunosuppression, including that caused by medications or HIV.
   b. **Precautions:** moderate or severe acute illness with or without fever; history of Guillain Barré syndrome within 6 weeks of a previous influenza vaccination; for LAIV only, close contact with an immunosuppressed person when the person requires protective isolation, receipt of influenza antivirals (e.g., amantadine, rimantadine, zanamivir, or oseltamivir) within the previous 48 hours or possibility of use within 14 days after vaccination.
   c. **Other considerations:** an egg-free recombinant hemagglutin influenza vaccine (RIV) may be used for people ages 18–49 years with egg allergies of any severity. People who experience onset of hives only after ingesting eggs may also receive inactivated influenza vaccine (IIV) with the following additional safety measures: 1) administration by a healthcare provider familiar with the potential manifestations of egg allergy and 2) observation for 30 minutes after receipt of the vaccine for signs of a reaction.
3. Provide all patients with a copy of the most current federal Vaccine Information Statement (VIS). You must document in the patient's medical record or office log, the publication date of the VIS and the date it was given to the patient. Provide non-English speaking patients with a copy of the VIS in their native language, if available and preferred; these can be found at www.immunize.org/vis.
4. Administer influenza vaccine as follows: a) Give 0.5 mL of IIV to adults of all ages, or RIV to adults age 18–49 years, intramuscularly (22–25g, 1–1½" needle) in the deltoid muscle. (Note: A ⅝" needle may be used for adults weighing less than 130 lbs [<60 kg] for injection in the deltoid muscle *only* if the subcutaneous tissue is not bunched and the injection is made at a 90 degree angle.) b) For healthy adults younger than age 50 years, give 0.2 mL of intranasal LAIV; 0.1 mL is sprayed into each nostril while the patient is in an upright position. c) For adults age 18 through 64 years, give 0.1 mL IIV-ID intradermally by inserting the needle of the microinjection system at a 90 degree angle in the deltoid muscle. d) For adults age 65 years and older, give 0.5 mL of high-dose IIV-IM intramuscularly (22–25g, 1–1½" needle) in the deltoid muscle.
5. Document each patient's vaccine administration information and follow up in the following places:
   a. **Medical chart:** Record the date the vaccine was administered, the manufacturer and lot number, the vaccination site and route, and the name and title of the person administering the vaccine. If vaccine was not given, record the reasons(s) for non-receipt of the vaccine (e.g., medical contraindication, patient refusal).
   b. **Personal immunization record card:** Record the date of vaccination and the name/location of the administering clinic.
6. Be prepared for management of a medical emergency related to the administration of vaccine by having a written emergency medical protocol available, as well as equipment and medications.
7. Report all adverse reactions to influenza vaccine to the federal Vaccine Adverse Event Reporting System (VAERS) at www.vaers.hhs.gov or (800) 822-7967. VAERS report forms are available at www.vaers.hhs.gov.

This policy and procedure shall remain in effect for all patients of the _____ (name of practice or clinic) until rescinded or until _____ (date).

Medical Director's signature: _____ Effective date: _____

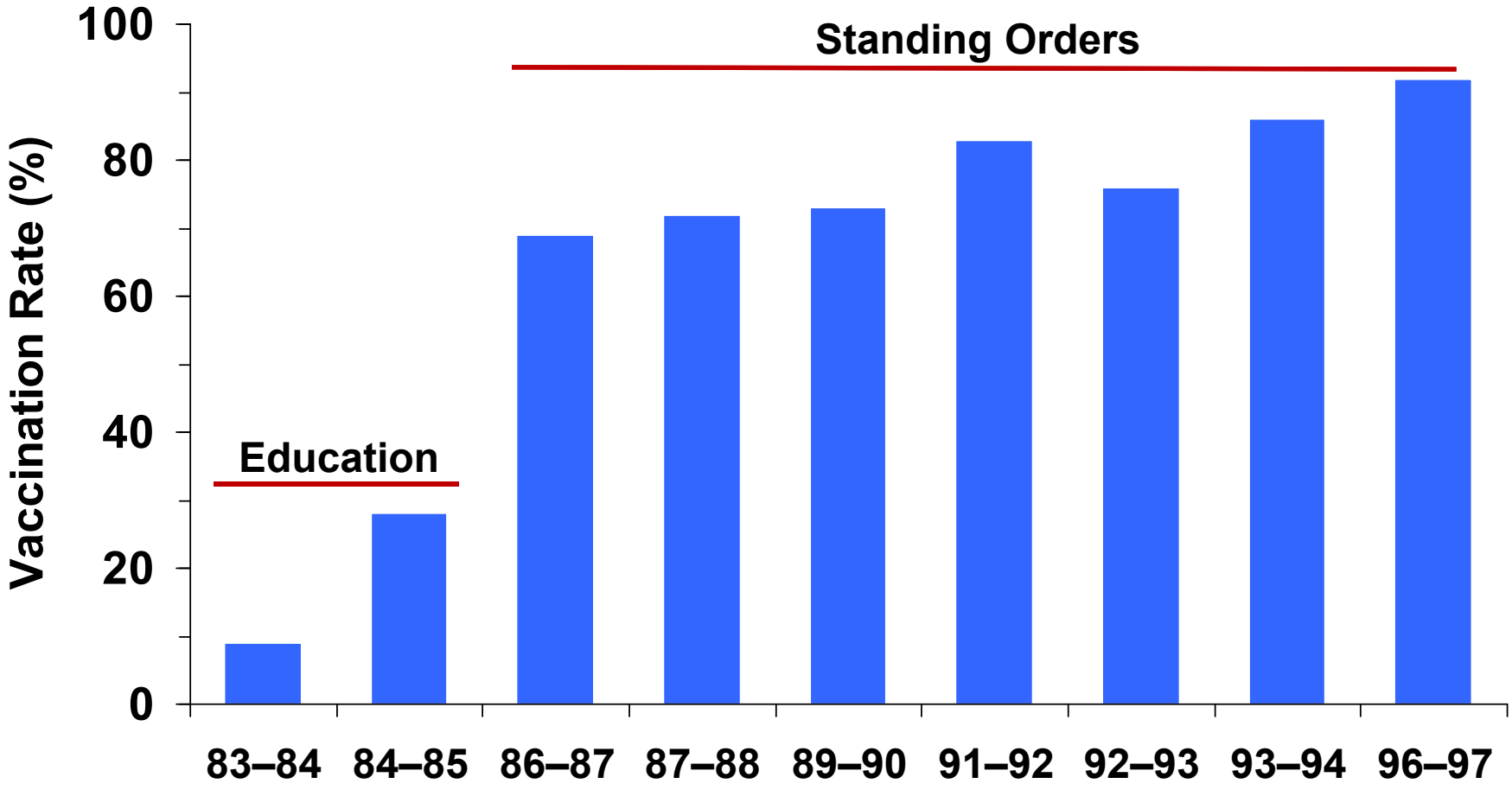
Technical content reviewed by the Centers for Disease Control and Prevention. www.immunize.org/catg.d/p3074.pdf • Item #P3074 (9/13)

Immunization Action Coalition • 1573 Selby Ave. • St. Paul, MN 55104 • (651) 647-9009 • www.immunize.org • www.vaccineinformation.org

- **Nonphysicians offer and administer vaccinations**
  - **No direct MD involvement at the time of the visit**
- **Established with physician-approved policies and protocols**
- **Less than on-half of primary care physicians consistently use SOPs for influenza vaccination**

Immunization Action Coalition. Available at: http://www.immunize.org/catg.d/p3074.pdf . Accessed July 17, 2014; Zimmerman RK et al. *Am J Prev Med*. 2011;40(2):144-8.

Standing Orders Increase Influenza Vaccination Rates



Nichol KL. *Am J Med.* 1998;105:385-392.

Standing Orders for Administering Pneumococcal (PPSV23 and PCV13) Vaccine to Adults

Purpose: To reduce morbidity and mortality from pneumococcal disease by vaccinating all adults who meet the criteria established by the Centers for Disease Control and Prevention's Advisory Committee on Immunization Practices.

Policy: Under these standing orders, eligible nurses and other healthcare professionals (e.g., pharmacists), where allowed by state law, may vaccinate adults who meet any of the criteria below.

Procedure

1. Identify adults in need of vaccination with pneumococcal polysaccharide vaccine (PPSV23) based on the following criteria:
   a. Age 65 years or older with no or unknown history of prior receipt of PPSV
   b. Age 64 years or younger with no or unknown history of prior receipt of PPSV and any of the following conditions:
      i. cigarette smoker
      ii. chronic cardiovascular disease (e.g., congestive heart failure, cardiomyopathies)
      iii. chronic pulmonary disease (e.g., chronic obstructive pulmonary disease, emphysema, asthma)
      iv. diabetes mellitus, alcoholism or chronic liver disease (cirrhosis),
      v. candidate for or recipient of cochlear implant; cerebrospinal fluid leak
      vi. functional or anatomic asplenia (e.g., sickle cell disease, splenectomy)
      vii. immunocompromising condition (e.g., HIV infection, congenital immunodeficiency, hematologic and solid tumors)
      viii. immunosuppressive therapy (e.g., alkylating agents, antimetabolites, long-term systemic corticosteroids, radiation therapy)
      ix. organ or bone marrow transplantation; chronic renal failure or nephrotic syndrome
2. Identify adults in need of an additional dose of PPSV23 if 5 or more years have elapsed since the previous dose of PPSV and the patient meets one of the following criteria:
   a. Age 65 years or older and received prior PPSV vaccination before age 65 years
   b. Age 64 years or younger and at highest risk for serious pneumococcal infection or likely to have a rapid decline in pneumococcal antibody levels (i.e., categories 1.vi.-ix. above)
3. Identify adults age 19 years and older in need of vaccination with pneumococcal conjugate vaccine (PCV13) who are at highest risk for serious pneumococcal infection or likely to have a rapid decline in pneumococcal antibody levels (i.e., categories 1.v.–1.ix. above).

Immunization Action Coalition. Available at: http://www.immunize.org/catg.d/p3075.pdf. Accessed July 17, 2014.

Recommended Adult Immunization Schedule—United States • 2014

Note: These recommendations must be read with the footnotes that follow containing number of doses, intervals between doses, and other important information.

Figure 1. Recommended adult immunization schedule, by vaccine and age group[1]

VACCINE ▼ AGE GROUP ▶	19–21 years	22–26 years	27–49 years	50–59 years	60–64 years	≥65 years
Influenza [2,*]	1 dose annually					
Tetanus, diphtheria, pertussis (Td/Tdap) [3,*]	Substitute 1-time dose of Tdap for Td booster; then boost with Td every 10 yrs					
Varicella [4,*]	2 doses					
Human papillomavirus (HPV) Female [5,*]	3 doses					
Human papillomavirus (HPV) Male [5,*]	3 doses					
Zoster [6]					1 dose	
Measles, mumps, rubella (MMR) [7,*]	1 or 2 doses					
Pneumococcal 13-valent conjugate (PCV13) [8,*]	1 dose					
Pneumococcal polysaccharide (PPSV23) [9,10]	1 or 2 doses					1 dose
Meningococcal [11,*]	1 or more doses					
Hepatitis A [12,*]	2 doses					
Hepatitis B [13,*]	3 doses					
Haemophilus influenzae type b (Hib) [14,*]	1 or 3 doses					

*Covered by the Vaccine Injury Compensation Program

For all persons in this category who meet the age requirements and who lack documentation of vaccination or have no evidence of previous infection; zoster vaccine recommended regardless of prior episode of zoster

Recommended if some other risk factor is present (e.g., on the basis of medical, occupational, lifestyle, or other indication)

No recommendation

Report all clinically significant postvaccination reactions to the Vaccine Adverse Event Reporting System (VAERS). Reporting forms and instructions on filing a VAERS report are available at www.vaers.hhs.gov or by telephone, 800-822-7967.
Information on how to file a Vaccine Injury Compensation Program claim is available at www.hrsa.gov/vaccinecompensation or by telephone, 800-338-2382. To file a claim for vaccine injury, contact the U.S. Court of Federal Claims, 717 Madison Place, NW, Washington, DC 20005; telephone, 202-357-6400.
Additional information about the vaccines in this schedule, extent of available data, and contraindications for vaccination is also available at www.cdc.gov/vaccines or from the CDC-INFO Contact Center at 800-CDC-INFO (800-232-4636) in English and Spanish, 8:00 a.m. – 8:00 p.m. Eastern Time, Monday – Friday, excluding holidays.
Use of trade names and commercial sources is for identification only and does not imply endorsement by the U.S. Department of Health and Human Services.

The recommendations in this schedule were approved by the Centers for Disease Control and Prevention's (CDC) Advisory Committee on Immunization Practices (ACIP), American Academy of Family Physicians (AAFP), American College of Physicians (ACP), American College of Obstetricians and Gynecologists (ACOG), and American College of Nurse-Midwives (ACNM).

U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

Recommended Adult Immunization Schedule—United States • 2014

Note: These recommendations must be read with the footnotes that follow containing number of doses, intervals between doses, and other important information.

Figure 2. Vaccines that might be indicated for adults based on medical and other indications[1]

VACCINE ▼ INDICATION ▶	Pregnancy	Immunocompromising conditions (excluding human immunodeficiency virus [HIV])[4,6,7,8,15]	HIV infection CD4+ T lymphocyte count[4,7,8,15] <200 cells/µL	HIV infection CD4+ T lymphocyte count[4,7,8,15] ≥200 cells/µL	Men who have sex with men (MSM)	Kidney failure, end-stage renal disease, receipt of hemodialysis	Heart disease, chronic lung disease, chronic alcoholism	Asplenia (including elective splenectomy and persistent complement component deficiencies)[8,14]	Chronic liver disease	Diabetes	Health care personnel
Influenza[2,*]	1 dose IIV annually				1 dose IIV or LAIV annually	1 dose IIV annually					1 dose IIV or LAIV annually
Tetanus, diphtheria, pertussis (Td/Tdap)[3,*]	1 dose Tdap each pregnancy	Substitute 1-time dose of Tdap for Td booster; then boost with Td every 10 yrs									
Varicella[4,*]	Contraindicated			2 doses							
Human papillomavirus (HPV) Female[5,*]	3 doses through age 26 yrs					3 doses through age 26 yrs					
Human papillomavirus (HPV) Male[5,*]	3 doses through age 26 yrs					3 doses through age 21 yrs					
Zoster[6]	Contraindicated			1 dose							
Measles, mumps, rubella (MMR)[7,*]	Contraindicated			1 or 2 doses							
Pneumococcal 13-valent conjugate (PCV13)[8,*]	1 dose										
Pneumococcal polysaccharide (PPSV23)[9,10]	1 or 2 doses										
Meningococcal[11,*]	1 or more doses										
Hepatitis A[12,*]	2 doses										
Hepatitis B[13,*]	3 doses										
Haemophilus influenzae type b (Hib)[14,*]	post-HSCT recipients only	1 or 3 doses									

*Covered by the Vaccine Injury Compensation Program

- For all persons in this category who meet the age requirements and who lack documentation of vaccination or have no evidence of previous infection; zoster vaccine recommended regardless of prior episode of zoster
- Recommended if some other risk factor is present (e.g., on the basis of medical, occupational, lifestyle, or other indications)
- No recommendation

These schedules indicate the recommended age groups and medical indications for which administration of currently licensed vaccines is commonly indicated for adults ages 19 years and older, as of February 1, 2014. For all vaccines being recommended on the Adult Immunization Schedule: a vaccine series does not need to be restarted, regardless of the time that has elapsed between doses. Licensed combination vaccines may be used whenever any components of the combination are indicated and when the vaccine's other components are not contraindicated. For detailed recommendations on all vaccines, including those used primarily for travelers or that are issued during the year, consult the manufacturers' package inserts and the complete statements from the Advisory Committee on Immunization Practices (www.cdc.gov/vaccines/hcp/acip-recs/index.html). Use of trade names and commercial sources is for identification only and does not imply endorsement by the U.S. Department of Health and Human Services.

The recommendations in this schedule were approved by the Centers for Disease Control and Prevention's (CDC) Advisory Committee on Immunization Practices (ACIP), the American Academy of Family Physicians (AAFP), American College of Physicians (ACP), American College of Obstetricians and Gynecologists (ACOG), and American College of Nurse-Midwives (ACNM).

U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

Case Presentation

- **A 66-year old man who smokes socially presents as a new patient after relocating. When asked about vaccination, he states that he doesn't trust the safety of vaccines and never gets sick. How do you recommend educating him on the importance of vaccination?**

Sources for Educational Materials

- Centers for Disease Control and Prevention Vaccine Schedules
  http://www.cdc.gov/vaccines/schedules/index.html
- Ohio Department of Health
  http://www.odh.ohio.gov/odhprograms/dis/immunization/immindex1.aspx
  - Vaccine information
  - Patient education
- National Foundation for Infectious Diseases
  http://nfid.org/
- Immunization Action Coalition
  http://www.immunize.org/

Cleveland Clinic

Every life deserves world class care.