

# 2011 Immunization Update for Pharmacists

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# Objectives

- Discuss the gap between current rates and healthy Maine goals for influenza and pneumonia vaccination.
- Discuss the influenza vaccines for 2011.
- Identify risk groups for complications from influenza/pneumonia infection.
- Recognize the expanded indications for influenza, pneumonia, and DTP vaccination.
- Apply ACIP and CDC recommendations for influenza, pneumonia, herpes zoster, and DTP vaccination.
- Recognize the prevalence and clinical features of herpes zoster including long-term complications.
- Identify the new storage and administration labeling for the herpes zoster vaccine.

# Classification of Vaccines

- Live attenuated:
  - Measles, mumps, rubella, varicella, zoster, intranasal influenza
- Inactivated:
  - hepatitis A, hepatitis B, influenza, pneumonia, diphtheria, tetanus

# Influenza

- Highly infectious viral illness
- Influenza/pneumonia - 8<sup>th</sup> leading cause of death in the US
- >90% of deaths among persons  $\geq 65$  years old

*\*Epidemiology and Prevention of Vaccine-Preventable Diseases, 12th Edition*

# Influenza Virus Strains

- Influenza A virus
  - Moderate to severe illness
  - All age groups
  - Humans and other animals
- Influenza B virus
  - Milder disease
  - Primarily affects children
  - Humans only
- Influenza C virus
  - Rarely reported in humans
  - No epidemics

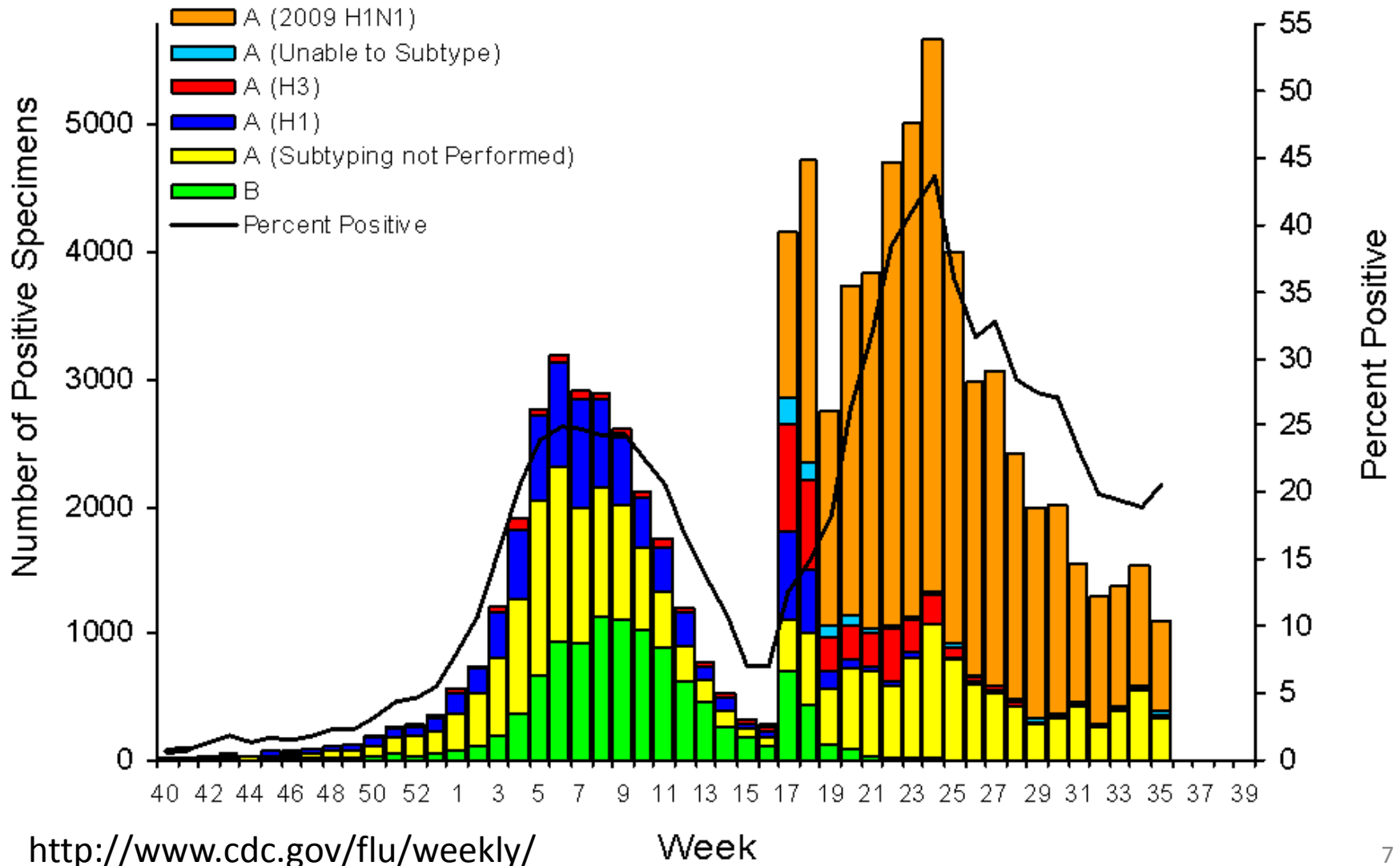


Seasonal influenza vaccine contains 2 type-A and 1 type-B

# Influenza Antigenic Changes

- Antigenic Drift
  - Minor changes
  - May result in epidemic
- Antigenic Shift
  - Major changes
  - May result in pandemic

# Influenza Positive Tests Reported to CDC by U.S. WHO/NREVSS Collaborating Laboratories, National Summary, 2008-09

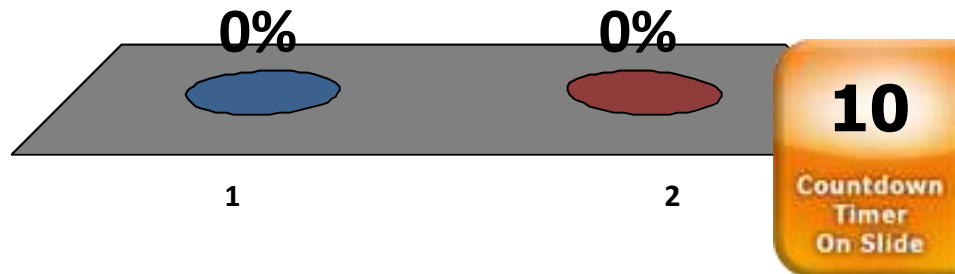


# Influenza Vaccination

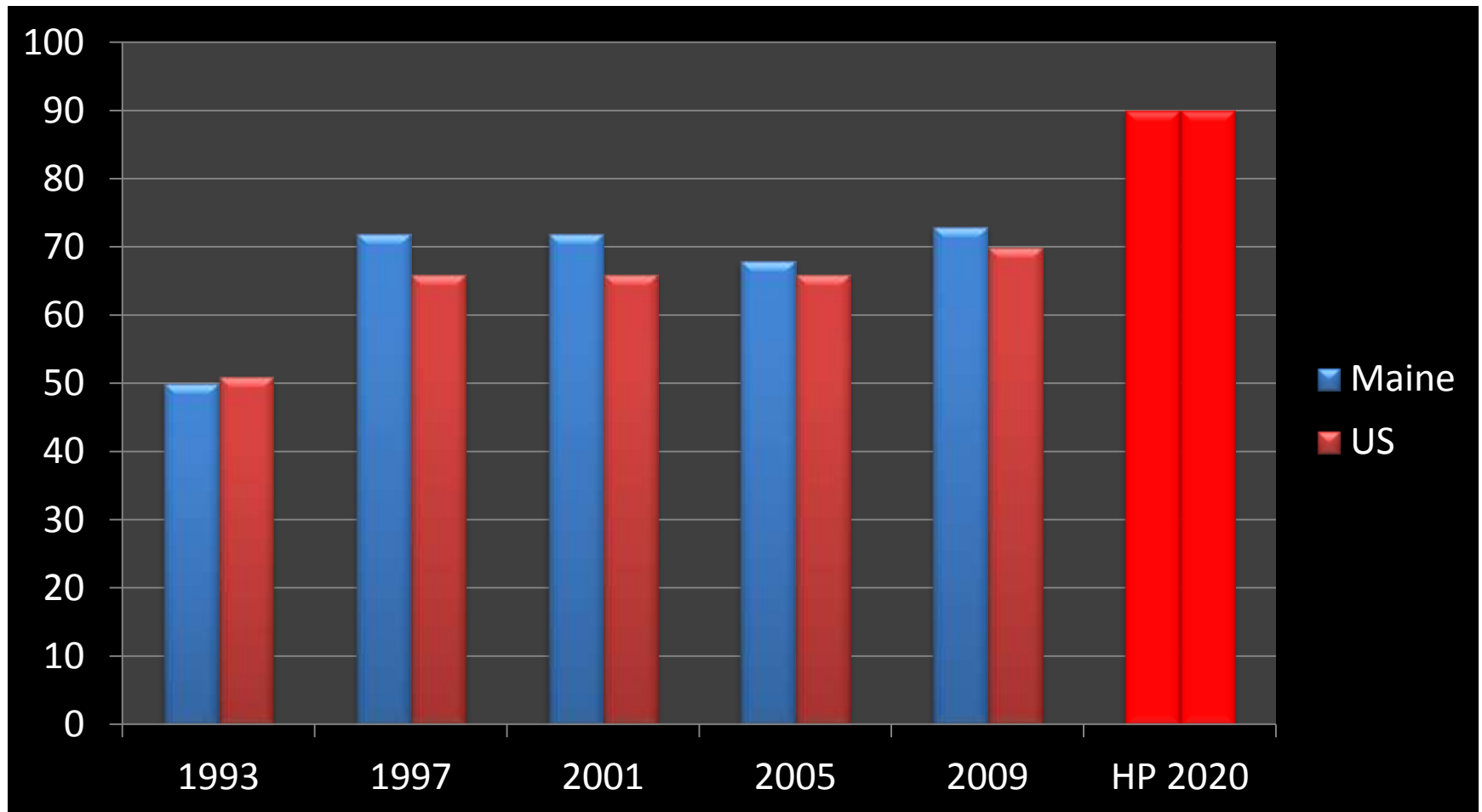


# Did you get a flu vaccine last year?

- 1. Yes
- 2. No



# Proportion Of Adults Aged 65 And Older Who Received A Flu Shot Within The Past Year



# Maine Immunization Law

- **Administration of influenza vaccines.** A pharmacist licensed in this State who meets the qualifications...may administer topically or by injection or by inhalation all forms of influenza vaccines, including intranasal influenza vaccines, to a person 9 years of age or older without a prescription.

# 2010-11 ACIP/CDC/WHO Recommendations

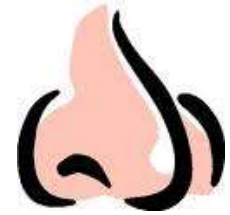
- World Health Organization: the global H1N1 pandemic is over.
- Routine influenza vaccination is recommended for all persons aged  $\geq 6$  months.
- The 2010--11 trivalent vaccines will contain A/California/7/2009 (H1N1)-like, A/Perth/16/2009 (H3N2)-like, and B/Brisbane/60/2008-like antigens.
- Persons aged  $\geq 65$  years can be administered any of the standard-dose TIV preparations or Fluzone High-Dose.
- The CDC also recommends that flu vaccine be administered to eligible recipients every year as soon as the vaccine becomes available.

Vaccine	Trade Name	Manufacturer	Presentation	Mercury (mcg/0.5 ml)	Age Group	No. of doses	Route
TIV	Fluzone	Sanofi Pasteur	0.25 mL syringe	0	6–35 mos	1 or 2	IM
			0.5 mL syringe	0	≥36 mos	1 or 2	IM
			0.5 mL vial	0	≥36 mos	1 or 2	IM
			5.0 mL MD vial	25	≥6 mos	1 or 2	IM
TIV	Fluvirin	Novartis Vaccine	5.0 mL MD vial	25	≥4 yrs	1 or 2	IM
			0.5 mL syringe	<1.0	≥4 yrs	1 or 2	IM
TIV	Agriflu	Novartis Vaccine	0.5 mL syringe	0	≥18 yrs	1	IM
TIV	Fluarix	GlaxoSmith Kline	0.5 mL syringe	0	≥3 yrs	1 or 2	IM
TIV	FluLaval	ID Biomedical	5.0 mL MD vial	25	≥18 yrs	1	IM
TIV High Dose	Fluzone High Dose	Sanofi Pasteur	0.5 mL syringe	0	≥65 yrs	1	IM
LAIV	FluMist	Med-Immune	0.2 mL sprayer	0	2–49 yrs	1 or 2	Intra-nasal
TIV ID	Intanza	Sanofi Pasteur	0.1 ml syringe	0	18-59 yrs	1	ID

Live Attenuated Influenza Vaccine  
(LAIV)  
Flumist<sup>®</sup>

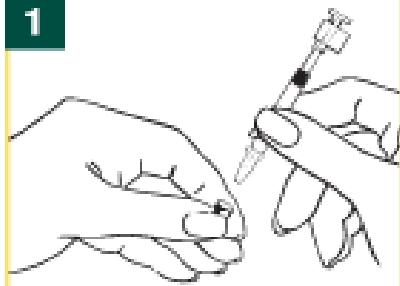
# Live Attenuated Influenza Vaccine

- Indication
  - Healthy people 2 through 49 years of age
- Contraindications
  - **Pregnant women**
  - **People who have long-term health problems with:**
    - heart disease
    - kidney or liver disease
    - lung disease
    - metabolic disease, such as diabetes
    - asthma
    - anemia, and other blood disorders
  - **Anyone with a weakened immune system.**

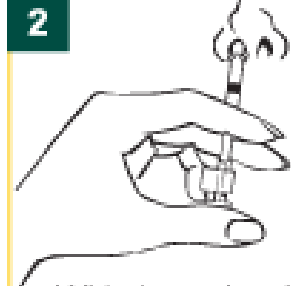


**I pick my nose!**

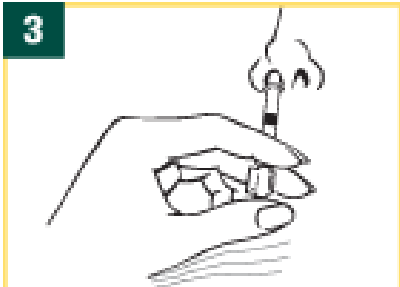
# LAIV Administration



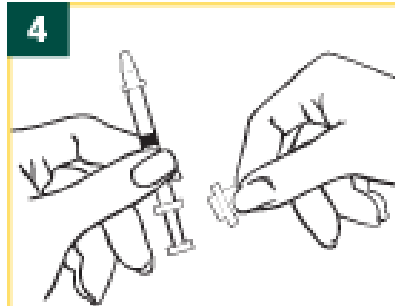
Remove rubber tip protector.



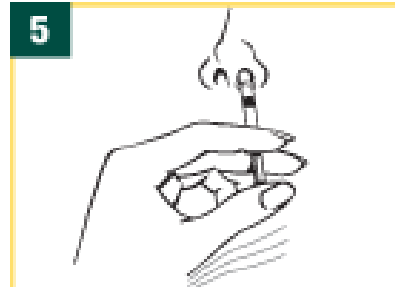
With the patient in an upright position, head tilted back, place the tip just inside the nostril to ensure FluMist is delivered into the nose.



With a single motion, depress plunger **as rapidly as possible** until the dose-divider clip prevents you from going further.



Pinch and remove dose-divider clip from plunger.



Place the tip just inside the other nostril and with a single motion, depress plunger **as rapidly as possible** to deliver remaining vaccine.

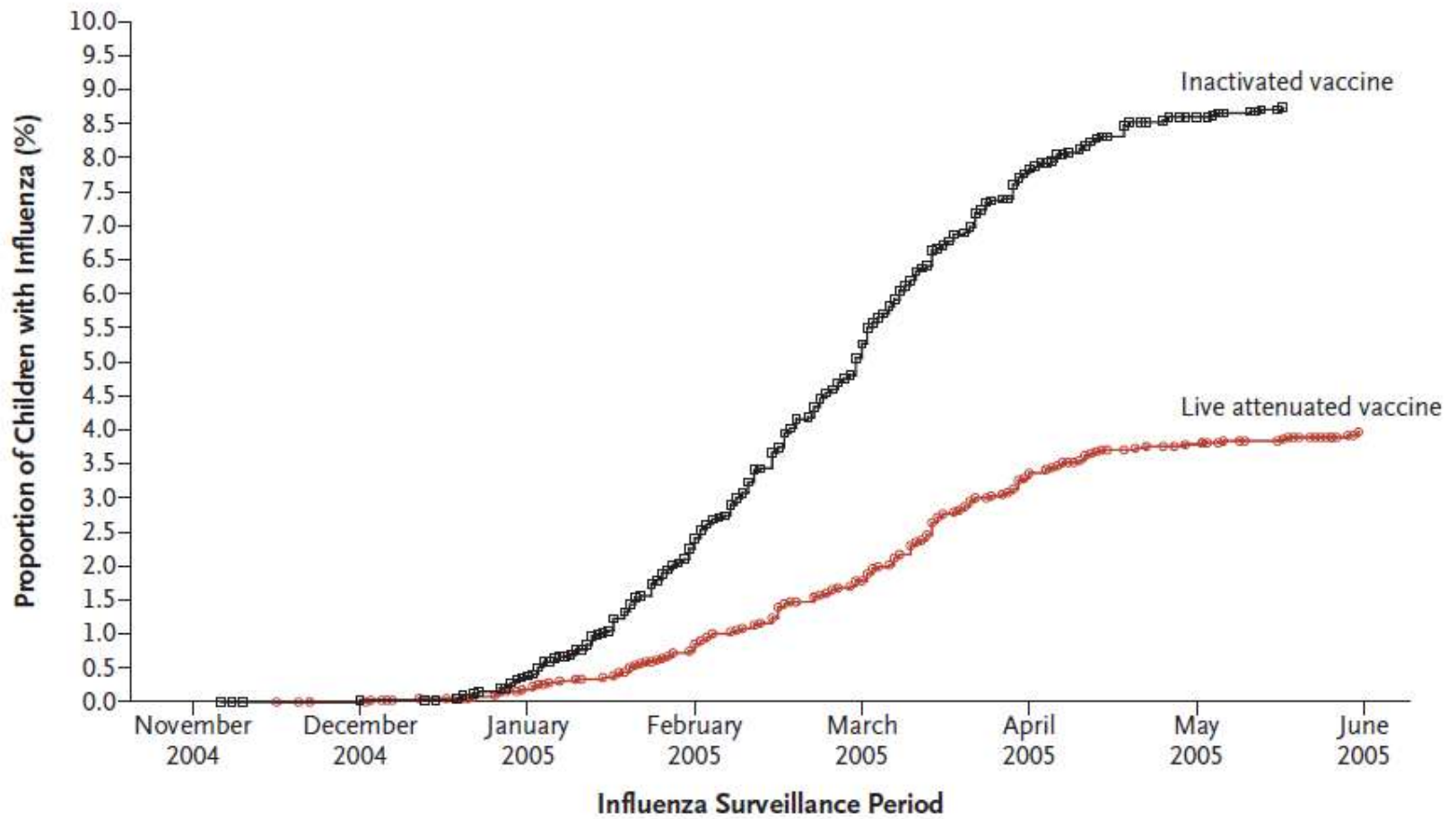
# Live Attenuated versus Inactivated Influenza Vaccine in Infants and Young Children

*N Engl J Med* 2007;356:685-96.

- Children 6 to 59 months of age, without a recent episode of wheezing illness or severe asthma.
- Randomized, double-blind study with either trivalent live attenuated influenza vaccine or trivalent inactivated vaccine.
- 7852 children completed the study and were monitored with culture throughout the 04-05 influenza season.

# Live Attenuated versus Inactivated Influenza Vaccine in Infants and Young Children

N Engl J Med 2007;356:685-96.



**Figure 1.** Kaplan–Meier Curves for the Time to the First Culture-Confirmed Report of Influenza in the Two Vaccine Groups.

# Medically Significant Wheezing, Serious Adverse Events, and Rates of Hospitalization According to Age Group

Age	Event	Live Vaccine	Inactivated Vaccine
		no. / total no. (%)	
<b>6-11 mos.</b>	Wheezing	93/684 (13.6)	71/683 (10.4)
	Any serious AE	44/684 (6.4)	23/683 (3.4)
	Hospitalization	42/684 (6.1)	18/683 (2.6)
<b>12-59 mos.</b>	Wheezing	272/3495 (7.8)	255/3490 (7.3)
	Any serious AE	92/3495 (2.6)	105/3490 (3.0)
	Hospitalization	88/3495 (2.5)	101/3490 (2.9)
<b>6-59 mos.</b>	Wheezing	365/4179 (8.7)	326/4173 (7.8)
	Any serious AE	136/4179 (3.3)	128/4173 (3.1)
	Hospitalization	130/4179 (3.1)	119/4173 (2.9)

*N Engl J Med 2007;356:685-96.*

High-Dose Trivalent Inactivated  
Vaccine (HD TIV)  
Fluzone HD<sup>®</sup>

# Randomized, Double-Blind Controlled Phase 3 Trial Comparing the Immunogenicity of High-Dose and Standard-Dose Influenza Vaccine in Adults 65 Years of Age and Older

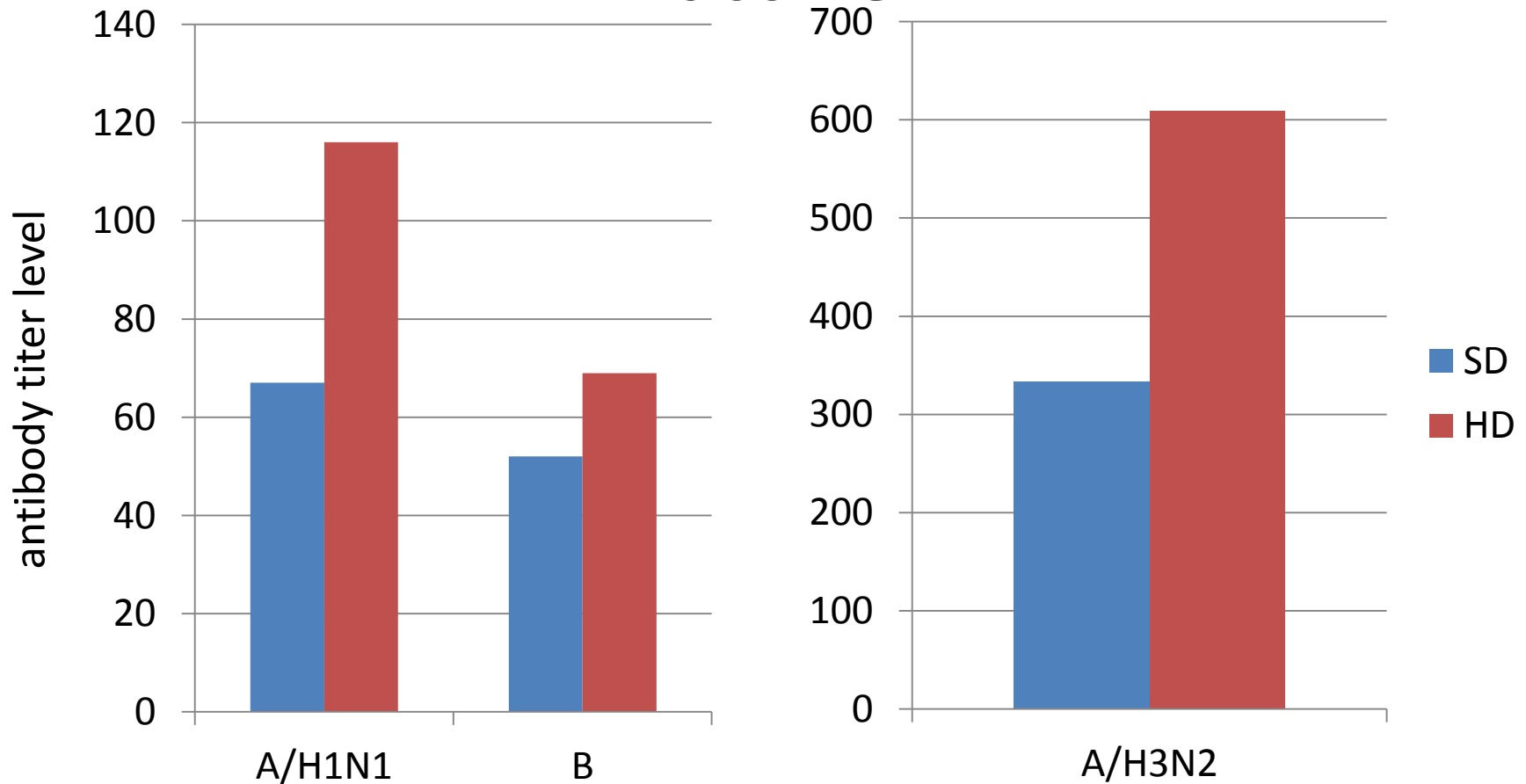
**Ann R. Falsey,<sup>1,2</sup> John J. Treanor,<sup>2</sup> Nadia Tornieporth,<sup>3</sup> Jose Capellan,<sup>5</sup> and Geoffrey J. Gorse<sup>4</sup>**

<sup>1</sup>Department of Medicine, Rochester General Hospital and <sup>2</sup>University of Rochester School of Medicine, Rochester, New York; <sup>3</sup>sanofi pasteur, Swiftwater, Pennsylvania; <sup>4</sup>Saint Louis Department of Veterans Affairs Medical Center and Saint Louis University, Saint Louis, Missouri; <sup>5</sup>sanofi pasteur, Toronto, Canada

- **Methods:**
  - Multicenter, randomized, double-blind controlled study
  - HD vaccine (60 mcg of hemagglutinin per strain):  
N=2,575
  - SD vaccine (15 mcg of hemagglutinin per strain):  
N=1,262

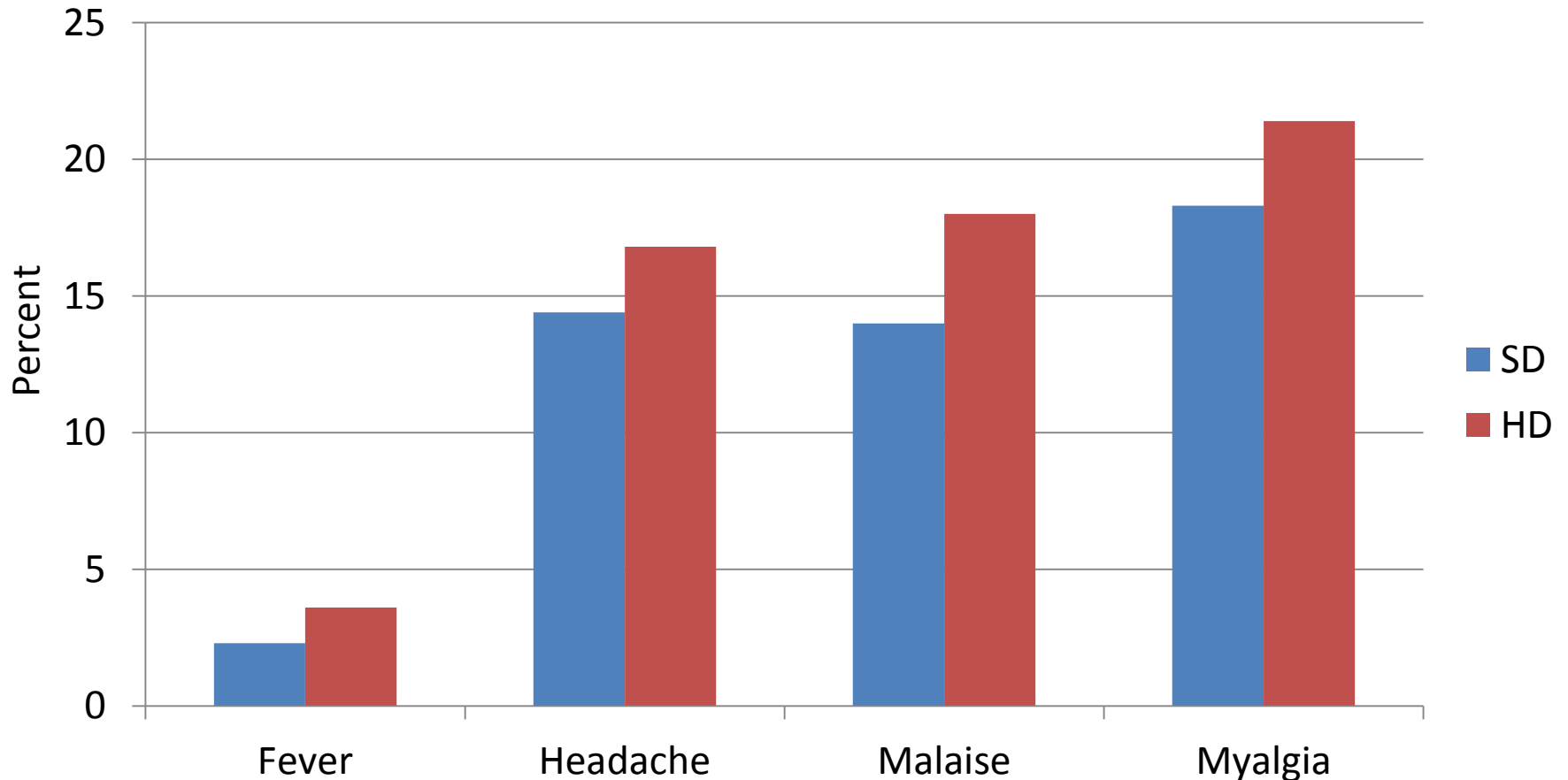
J Infect Dis. 2009;200(2):E172-80

# Comparison of responses to high-dose (HD) and standard-dose (SD) influenza vaccine



J Infect Dis. 2009;200(2):172-80

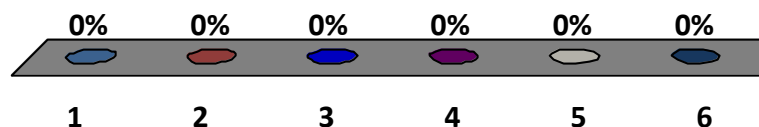
# Comparison of systemic side effects to HD and SD influenza vaccine



J Infect Dis. 2009;200(2):172-80

A 30-year-old healthy male requests an annual flu shot. He has no allergies. His wife is currently pregnant. Which flu vaccine is appropriate?

1. TIV SD influenza shot 0.25 ml IM
2. TIV SD influenza shot 0.5 ml IM
3. TIV HD influenza shot 0.5 ml IM
4. Flumist nasal spray 0.1 ml in each nostril
5. Either 1 or 2
6. Either 2 or 3
- ✓ 7. Either 2 or 4

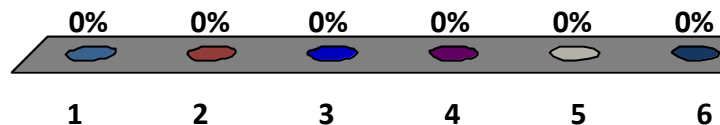


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A 30-year-old pregnant female requests an annual flu shot. She has no allergies. Which flu vaccine is appropriate?

1. TIV SD influenza shot 0.25 ml IM
- ✓ 2. TIV SD influenza shot 0.5 ml IM
3. TIV HD influenza shot 0.5 ml IM
4. Flumist nasal spray 0.1 ml in each nostril
5. Either 1 or 2
6. Either 2 or 3
7. Either 2 or 4



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Countdown  
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# Intradermal Influenza Vaccine

# Intradermal vs Traditional IM needle Length



*Shorter needle length (1.5mm Intanza vs 16mm IM)*



*Shorter needle length (1.5mm Intanza vs 16mm IM vs 25mm IM needles all available in Australia)*

# 30 Gauge Needle and Less Volume

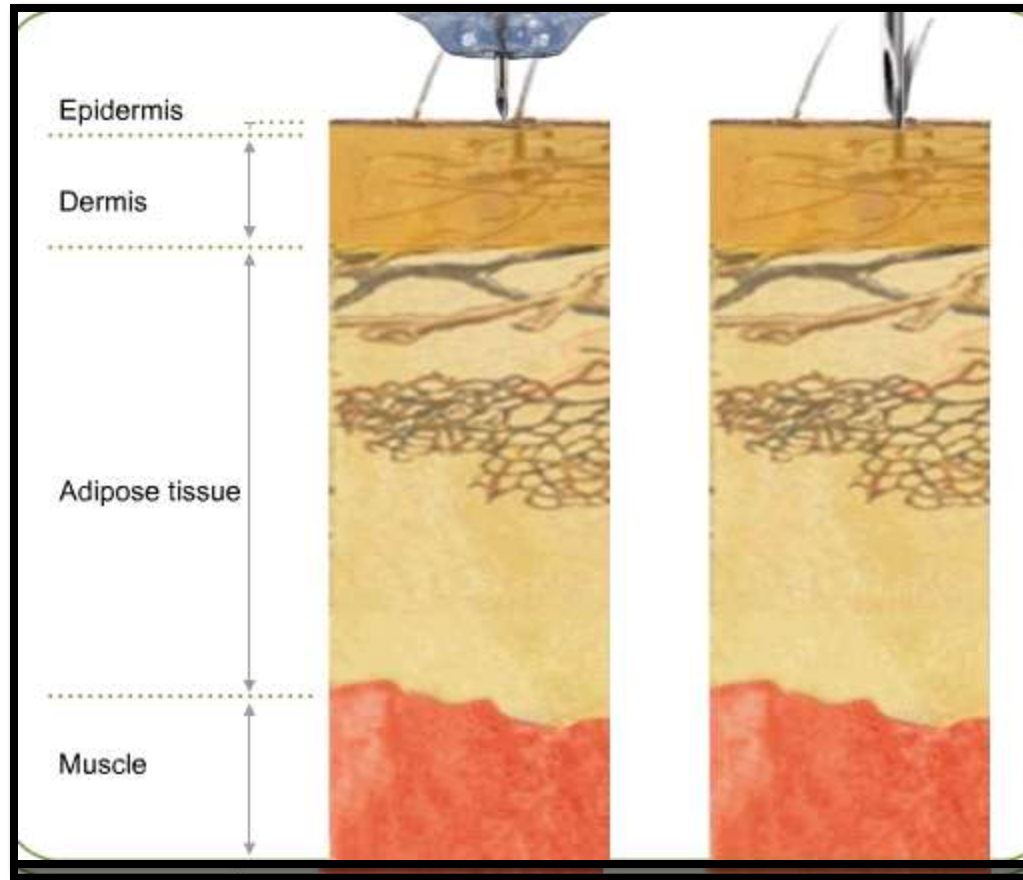


*Smaller, finer needle gauge (30 gauge Intanza vs 25 gauge IM)*



*Less volume (0.1mL Intanza vs 0.5mL IM)*

# Intradermal versus Traditional IM Injections



# Intradermal Influenza Vaccine Administered Using a New Microinjection System Produces Superior Immunogenicity in Elderly Adults: A Randomized Controlled Trial

**David Holland,<sup>1</sup> Robert Booy,<sup>4</sup> Ferdinandus De Looze,<sup>5</sup> Peter Eizenberg,<sup>8</sup> James McDonald,<sup>9</sup> Jeff Karrasch,<sup>6</sup> Maureen McKeirnan,<sup>7</sup> Hatem Salem,<sup>10</sup> Graham Mills,<sup>2</sup> Jim Reid,<sup>3</sup> Françoise Weber,<sup>11</sup> and Melanie Saville<sup>11</sup>**

<sup>1</sup>Centre for Clinical Research and Effective Practice, Middlemore Hospital, Auckland, <sup>2</sup>Waikato Hospital, Hamilton, and <sup>3</sup>University of Otago Medical School, Dunedin, New Zealand; <sup>4</sup>National Centre for Immunisation Research and Surveillance, Children's Hospital at Westmead, Westmead, New South Wales, <sup>5</sup>Inala Health Centre General Practice, Inala, <sup>6</sup>Peninsula Clinical Research Centre, Kippa-Ring, and <sup>7</sup>Brisbane South Clinical Research Unit, Carina Heights, Queensland, <sup>8</sup>Doctors of Ivanhoe, Ivanhoe, <sup>9</sup>Emeritus Research Centre, Malvern, and <sup>10</sup>Eastern Clinical Research Unit, Monash University, Box Hill, Victoria, Australia; and <sup>11</sup>Sanofi Pasteur, Lyon, France

- **Methods:**

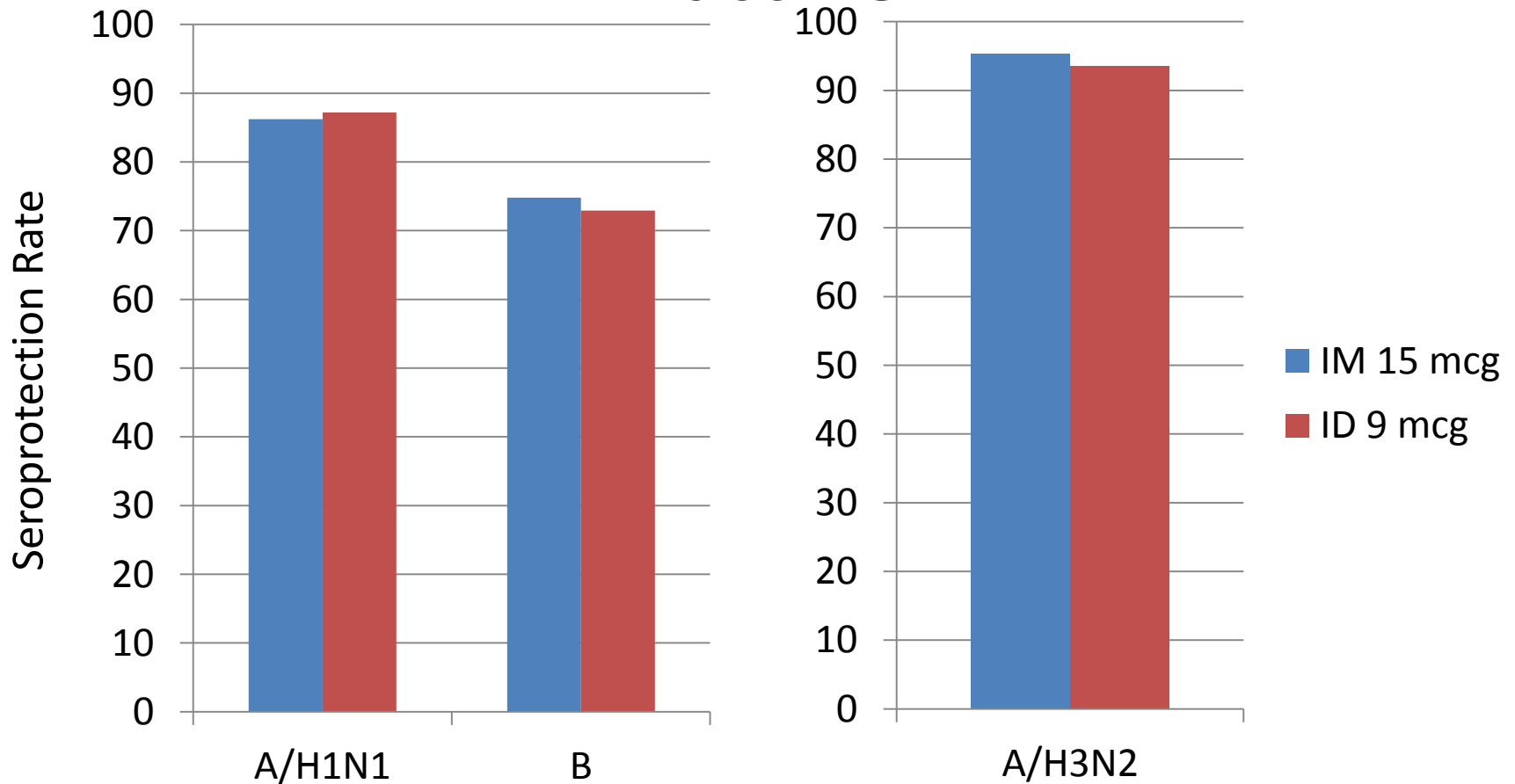
- Multicenter, randomized, double-blind controlled study

- ID vaccine (9 mcg of hemagglutinin per strain)

N=1,803     Human Vaccines. 2010;6:346-54.

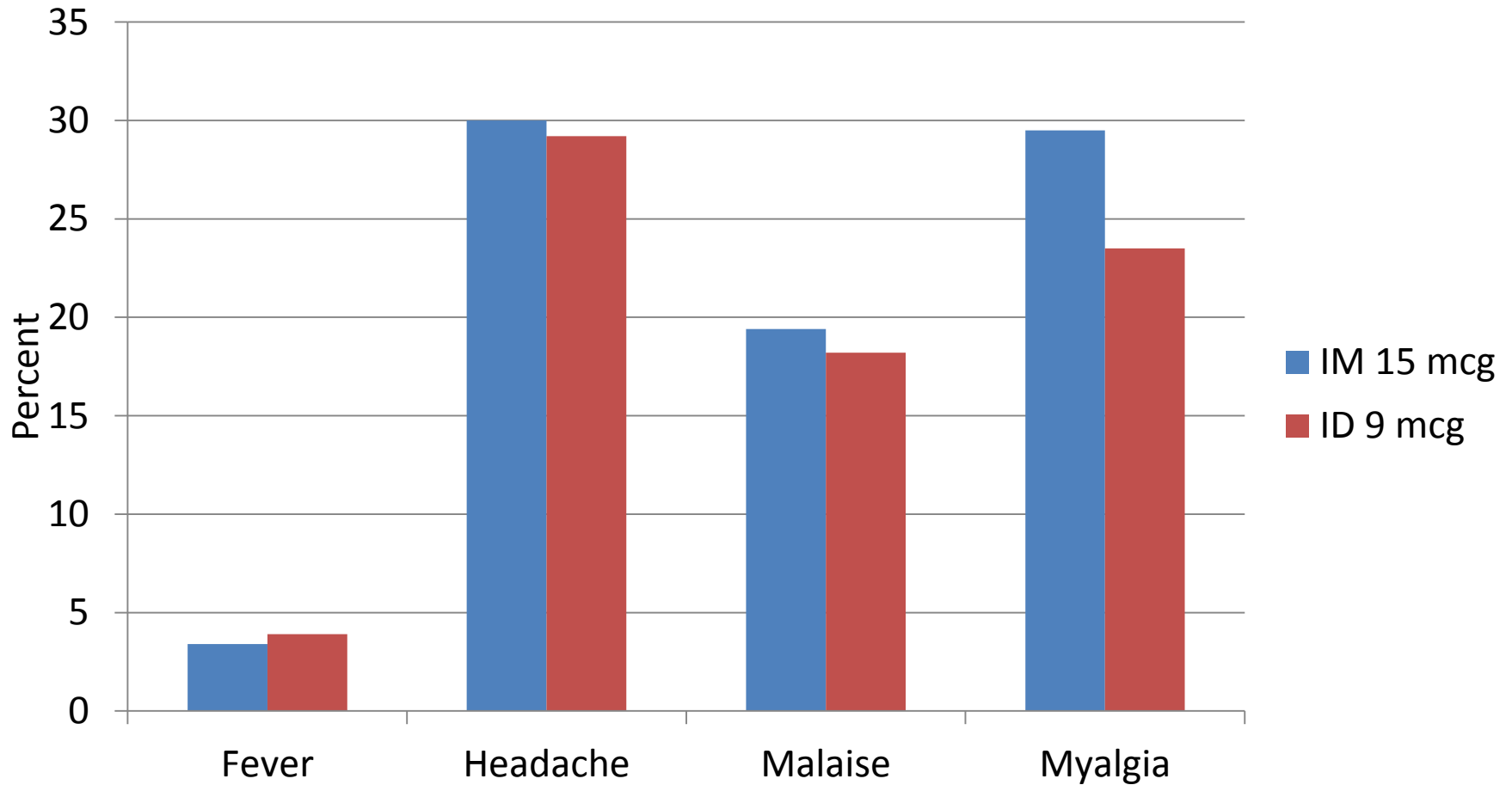
- IM vaccine (15 mcg of hemagglutinin per strain):

# Comparison of responses to Intradermal (ID) and Intramuscular (IM) influenza vaccine



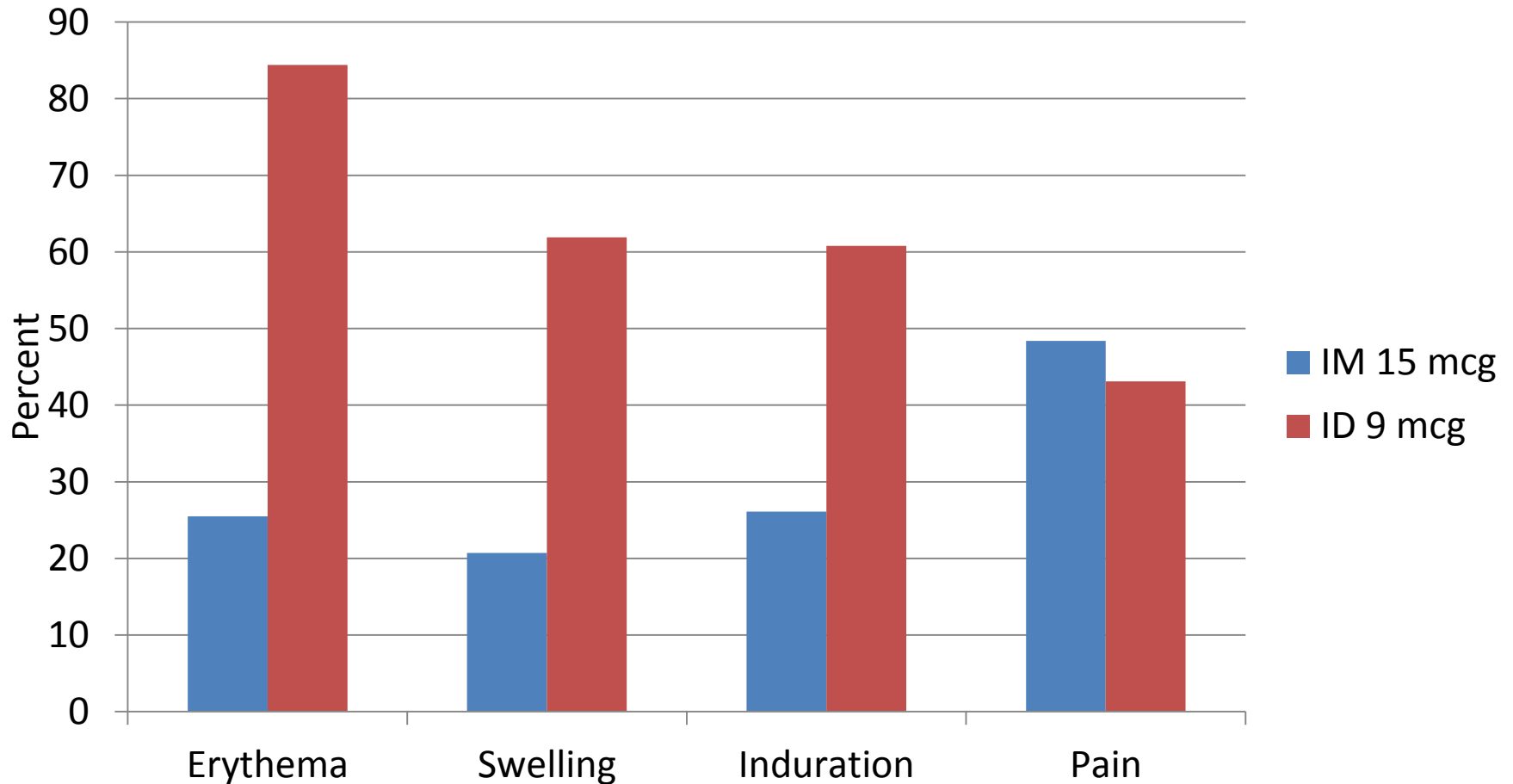
Human Vaccines. 2010;6:346-54.

# Comparison of systemic side effects to ID and IM influenza vaccine



Human Vaccines. 2010;6:346-54.

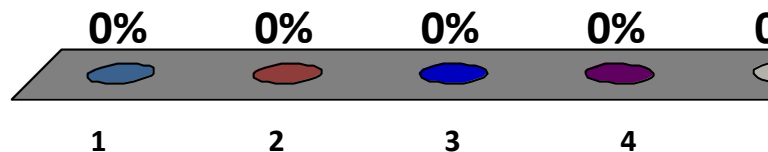
# Comparison of local side effects to ID and IM influenza vaccine



Human Vaccines. 2010;6:346-54.

1. Which formulation of the influenza vaccine causes the highest rate of wheezing, especially in young children?

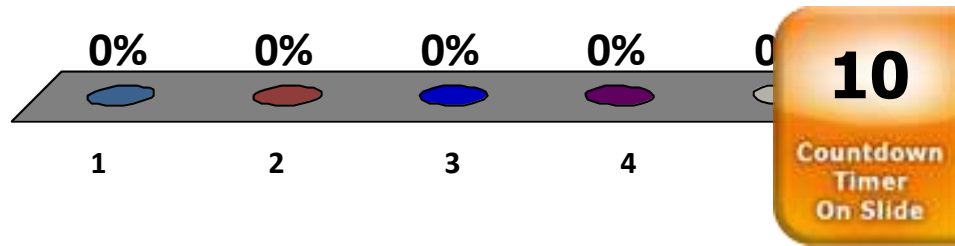
1. Standard Dose Influenza Injection
2. Intranasal Influenza Spray
3. High Dose Influenza Injection
4. Intradermal Influenza Injection
5. Not sure



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2. Which side effect is more common with the intradermal influenza vaccine than the IM influenza vaccine?

1. Injection site pain
2. Headache
3. Fever
4. Injection site swelling
5. Malaise



# Pneumonia Vaccine





# Pneumonia Vaccines

- Pneumococcal Conjugate Vaccine
  - Formally PCV7, now PCV13
  - Single dose vials; no thimerosal
  - Indicated for infants and young children
- Pneumococcal Polysaccharide Vaccine
  - PPSV 23 or Pneumovax
  - Indicated for adults

# Pneumococcal Polysaccharide Vaccine Recommendations

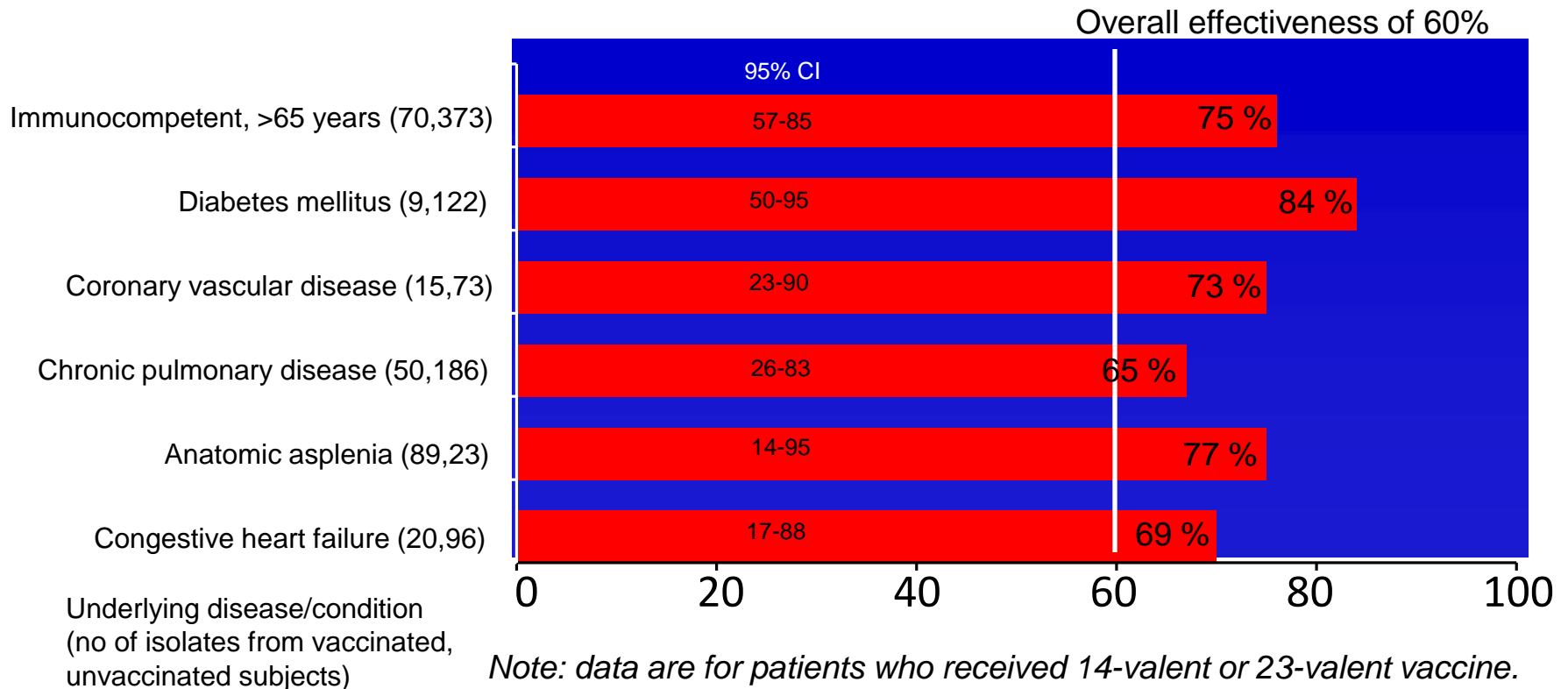
- Adults 65 years of age or older
- Persons 2 years of age or older with
  - Chronic illness (diabetes, heart disease, lung disease)
  - Asplenia
  - Immunocompromised
  - HIV infection
  - Cochlear implant
  - Smokers

# Pneumococcal Polysaccharide Vaccine Revaccination

- Single revaccination dose:
  - Persons vaccinated at < 65 years of age AND
  - $\geq 5$  years after first dose.

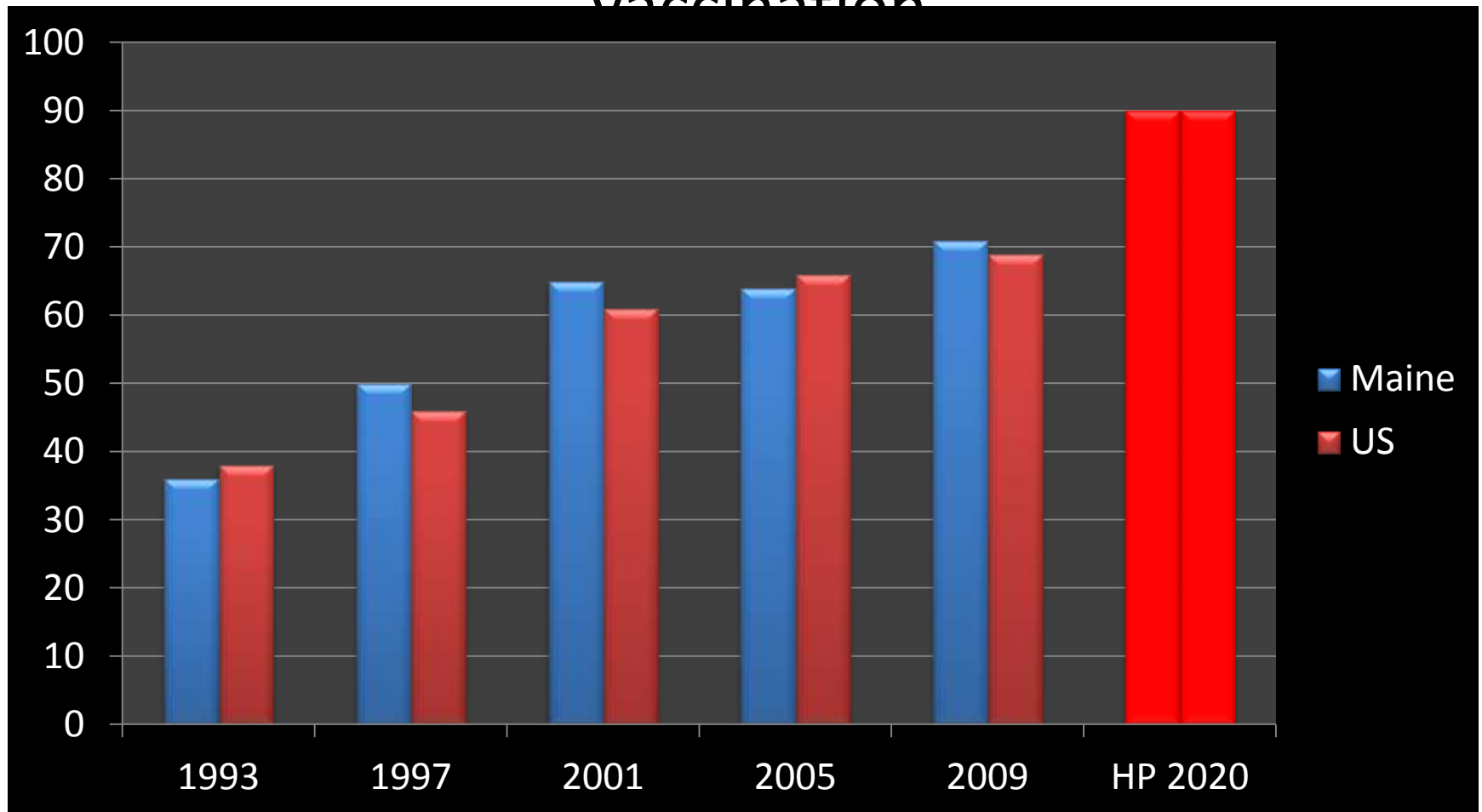
# PNEUMOCOCCAL VACCINES: CLINICAL EFFECTIVENESS

- *Estimation of effectiveness of pneumococcal vaccination in preventing invasive pneumococcal disease caused by vaccine serotypes*
- *US Centers for Disease Control study in 2837 patients (≥ 5 years old) by underlying illness, 1978–1992*



*Note: data are for patients who received 14-valent or 23-valent vaccine. Overall effectiveness for patients receiving 23-valent vaccine was 60%.*

# Proportion Of Adults Aged 65 And Older Who Report Ever Having Had A Pneumonia Vaccination



# Pneumonia/Influenza Vaccine Coadministration

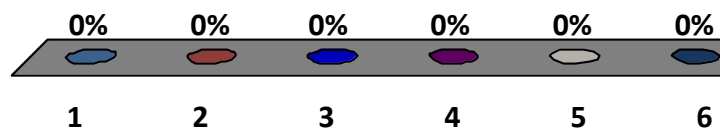
- Pneumonia and influenza vaccines may be administered on the same day.
- Use separate syringes. Do not mix!
- Inject IM into separate deltoids.

# Maine Immunization Law

- A pharmacist immunizer...may administer pneumonia vaccine to a person according to a **valid prescription** when the person has an existing primary care physician or
- When the person does not have an existing relationship with a primary care physician, the pharmacist may proceed to administer according to a **treatment protocol** established by an authorized practitioner

JB is a 40-year-old man with diabetes. He has no allergies. His current meds include metformin 500 mg PO BID and lisinopril 20 mg PO QD. Which vaccine is appropriate for him?

1. Pneumovax 0.5 ml IM
2. TIV SD influenza shot 0.5 ml IM
3. TIV HD influenza shot 0.5 ml IM
4. Flumist nasal spray 0.1 ml in each nostril
- ✓ 5. Both 1 and 2
6. Both 2 and 3
7. Both 2 and 4

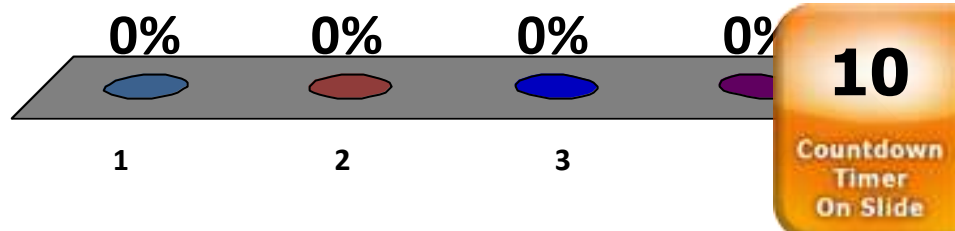


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Countdown  
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3. Which of the following statements about the administration of influenza and pneumonia vaccines is true?

1. Same day, opposite arm, separate syringe
2. Same day, same arm, mixed in 1 syringe
3. Must be separated by at least 7 days
4. Must be separated by at least 4 weeks



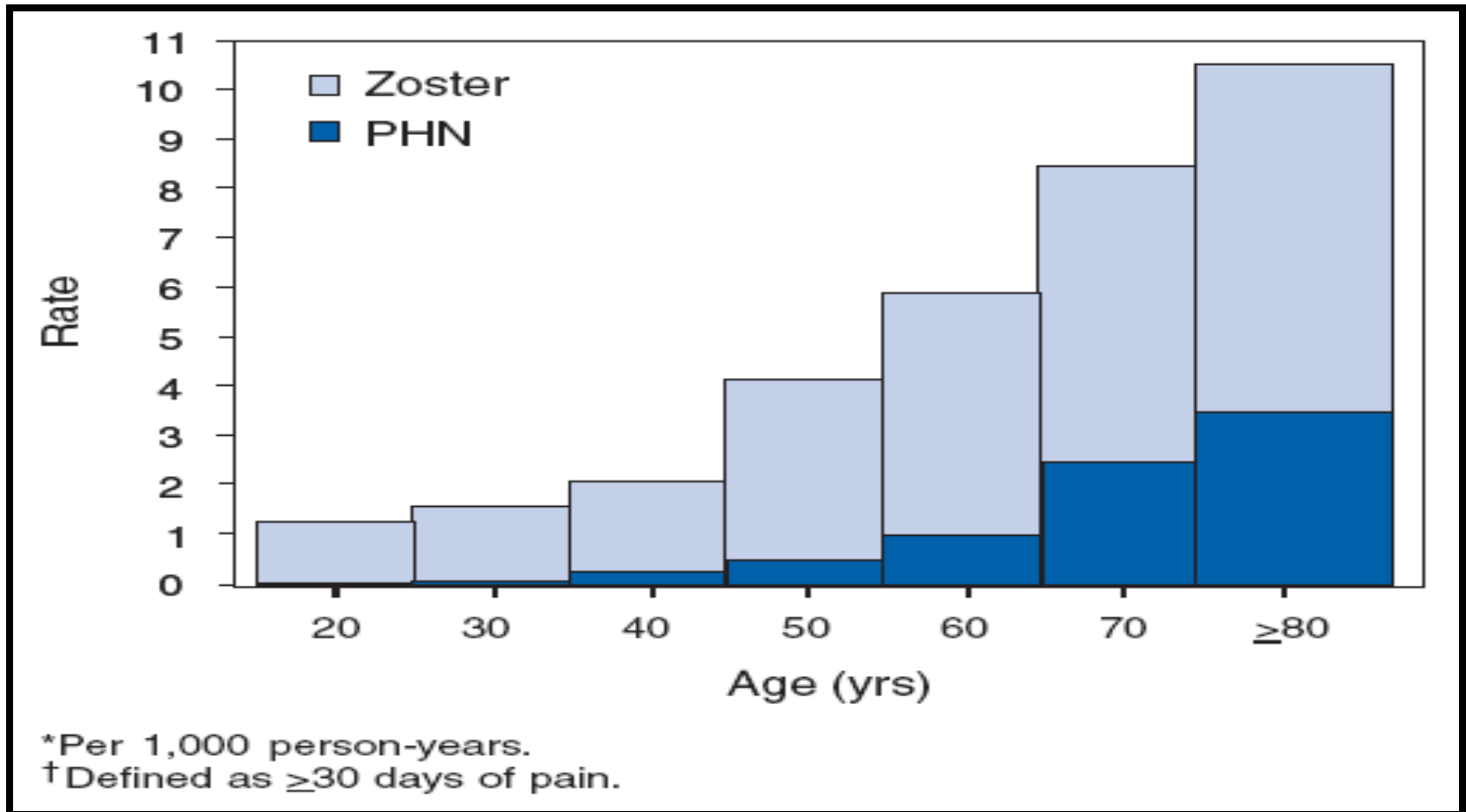
# ZOSTER VACCINE



# Epidemiology of Zoster

- More than 90% of the US adult population is at risk for Zoster.
- Approximately 1 million new cases of zoster occur in the United States annually.
- Approximately one in three persons in the general population will develop zoster during their lifetime.
- In excess of 60% of people older than 60 years, especially those with diminished immunity due to diabetes and cancers, are

# Rate of herpes zoster and postherpetic neuralgia† by age in the United States



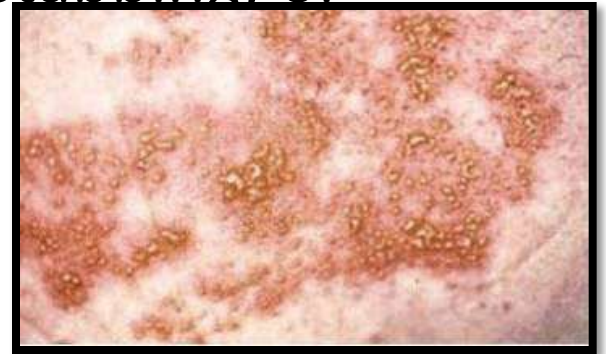
# Herpes Zoster Presentation

- Pain:

- Persistent - burning, throbbing, stabbing, or shooting

- Rash:

- Unilateral
- Coalescing clusters of clear vesicles



- Duration:

- Lesions usually dry and crust in 1 to 2 weeks

- Neuropathic pain that persists more than 30 days after the rash has healed is consistent with PHN

[http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5705a1.htm?s\\_cid=rr5705a1\\_e#fig1](http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5705a1.htm?s_cid=rr5705a1_e#fig1)

ZOSTAVAX® (Zoster Vaccine Live)

# PREVENTION OF ZOSTER POSTHERPETIC NEUR



# Zoster Vaccine Indication

- ACIP recommends routine vaccination of all persons aged >60 years with 1 dose of zoster vaccine.
- **NEW LABELING:** “ZOSTAVAX is a live attenuated virus vaccine indicated for prevention of herpes zoster (shingles) in individuals **50 years of age and older.**”
- Persons who report a previous episode of zoster and persons with chronic medical conditions (e.g., chronic renal failure, diabetes mellitus, rheumatoid arthritis, and chronic pulmonary disease) can be vaccinated unless those conditions are contraindications or precautions.
- Zoster vaccination is not indicated to treat acute zoster, to prevent persons with acute zoster from developing PHN, or

to treat ongoing PHN.

Zostavax [package insert]. Whitehouse Station, NJ: Merck; April 2011.

Recommendations of the Advisory Committee on Immunization Practices (ACIP) is not

necessary to ask patients about their history of varicella

(chickenpox) or to conduct serologic testing for varicella

# Vaccine Contraindications

- **Allergy to neomycin** or any vaccine component
- **Pregnancy**
- **Immunocompromised** status
  - AIDS or other clinical manifestations of HIV, including persons with CD4+ T-lymphocyte values  $\leq 200$  per  $\text{mm}^3$
  - malignant neoplasms affecting the bone marrow
  - chemotherapy or radiation within the last 3 months

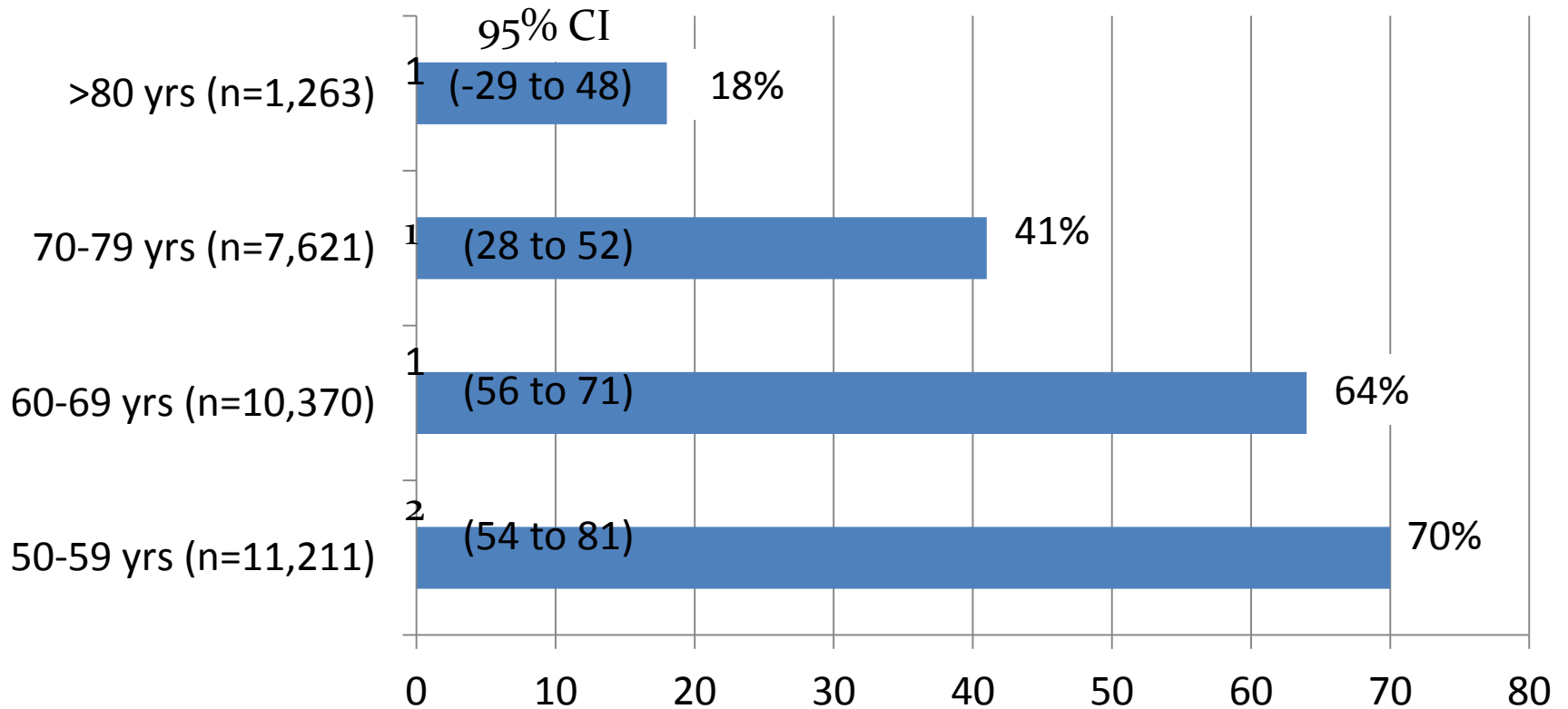
# Zostavax<sup>®</sup> Efficacy and Safety Trial (ZEST)\*

- Study Population
  - 22,439 adults 50 to 59 years of age.
  - Immunocompromised patients were excluded.
- Study Design
  - Randomized, double-blind, placebo-controlled trial.
  - Single dose of live, varicella zoster vaccine.
  - Primary outcome: confirmed zoster cases during 2 years of follow-up

Zostavax<sup>®</sup> [package insert]. Whitehouse Station, NJ: Merck; April 2011.

# ZEST & Shingles Prevention Study (SPS) Results

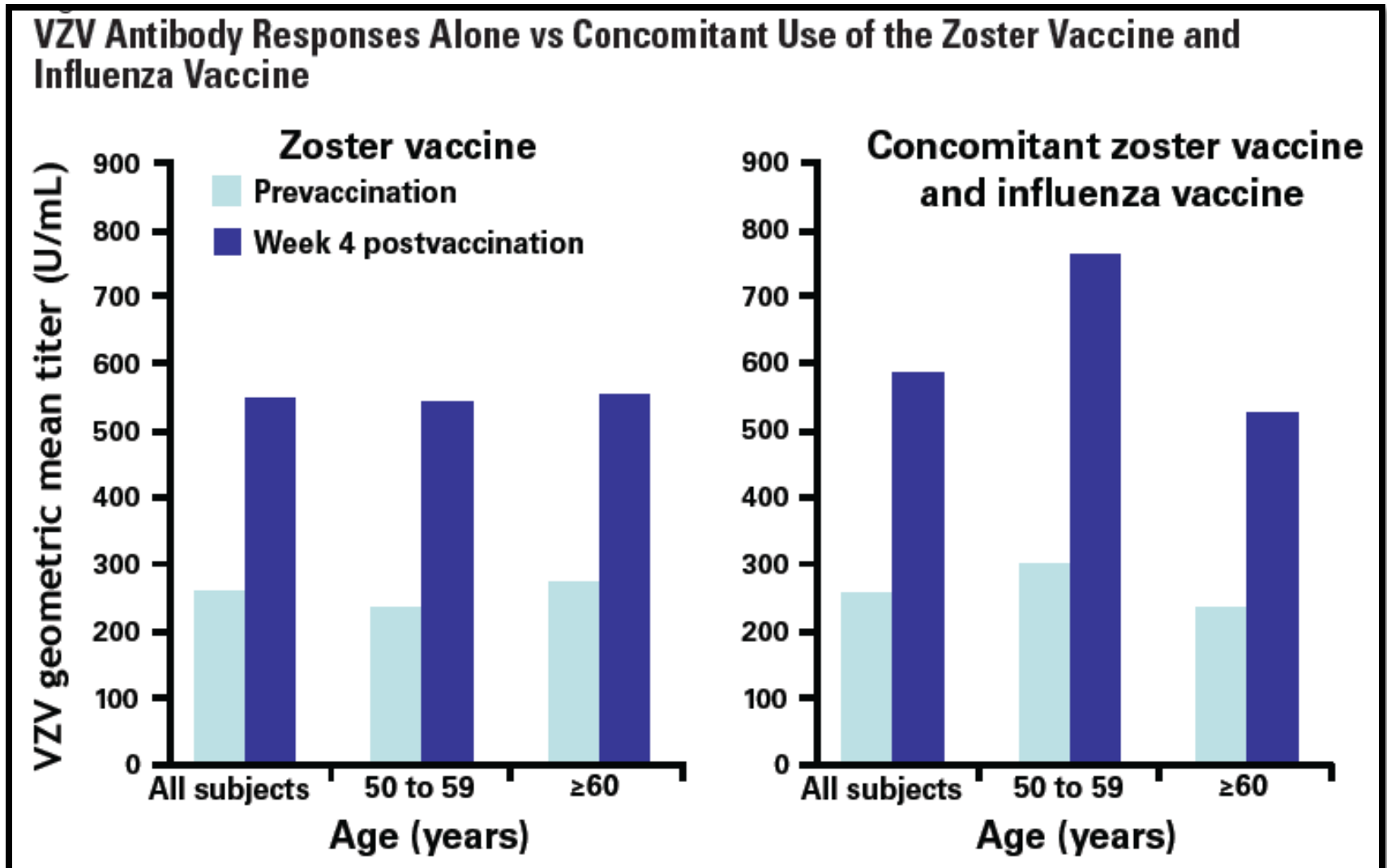
## Vaccine Efficacy (%)



1. Oxman et al. New England Journal of Medicine. 2005. 352 (22): 2271

2. Zostavax<sup>®</sup> [package insert]. Whitehouse Station, NJ: Merck; April 2011.

Kerzner B, et al. J Am Geriatr Soc. 2007;55:1499-1507.





Merck letter to healthcare providers January 25, 2010

- ZOSTAVAX and PNEUMOVAX<sup>®</sup> 23 should not be given concomitantly because concomitant use resulted in reduced immunogenicity of ZOSTAVAX
  - Randomized, double-blind trial with 473 adults
  - Waiting 4 weeks between vaccinations is recommended
- **Merck is not recommending revaccination for patients who previously received Zostavax and**

<http://www.vaccine.gov/documents/322-MerckLetterZostavax-Pneumovax.pdf>

# Storage and Handling

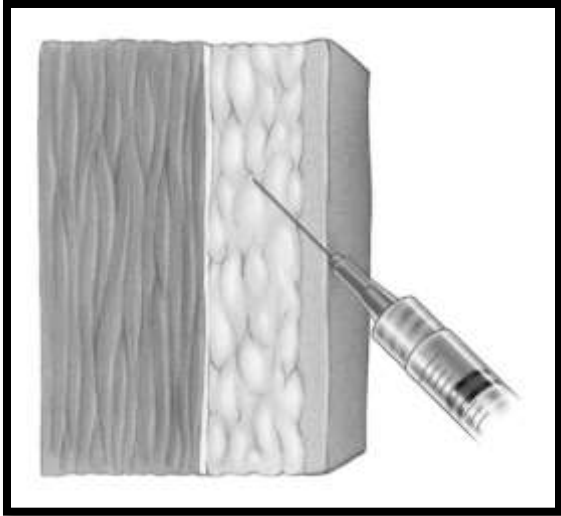
- zoster vaccine must be stored frozen at an average temperature of  $\leq 5^{\circ}\text{F}$  ( $\leq -15^{\circ}\text{C}$ ) until it is reconstituted for injection. Diluent may be stored at room temp.
- Any freezer that has a separate sealed freezer door and reliably maintains an average temperature of  $\leq 5^{\circ}\text{F}$  ( $\leq -15^{\circ}\text{C}$ ) is acceptable for storing zoster vaccine.
- The vaccine must be discarded if not used within 30 minutes after reconstitution.

Zostavax<sup>®</sup> [package insert]. Whitehouse Station, NJ: Merck; April 2011.

- New labeling: Zostavax may be stored and/or

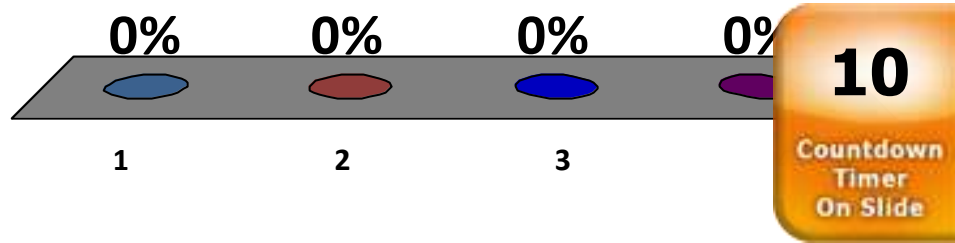
# Administration

- Zostavax: 0.65-mL dose (reconstituted)
- SQ – upper, outer triceps
- 5/8 inch, 25 gauge needle



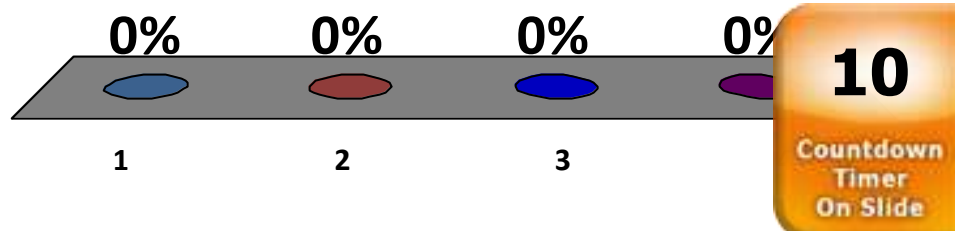
4. Which of the following statements about the administration of influenza and zoster vaccines is true?

1. Same day, opposite arm, separate syringe
2. Same day, same arm, mixed in 1 syringe
3. Must be separated by at least 7 days
4. Must be separated by at least 4 weeks



5. Which of the following statements about the administration of pneumonia and zoster vaccines is true?

1. Same day, opposite arm, separate syringe
2. Same day, same arm, mixed in 1 syringe
3. Must be separated by at least 7 days
4. Must be separated by at least 4 weeks

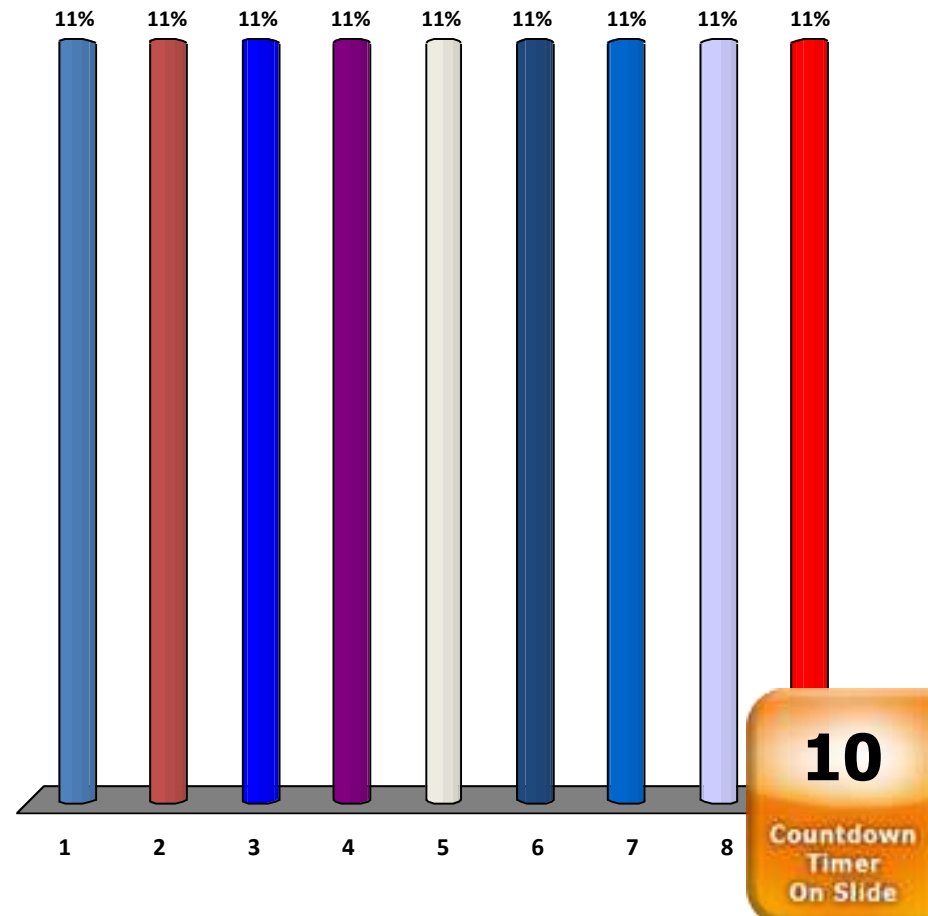


# Maine Immunization Law

- A pharmacist immunizer...may administer shingles or herpes zoster vaccine to a person according to a **valid prescription** when the person has an existing primary care physician or
- When the person does not have an existing relationship with a primary care physician, the pharmacist may proceed to administer according to a **treatment protocol** established by an authorized practitioner

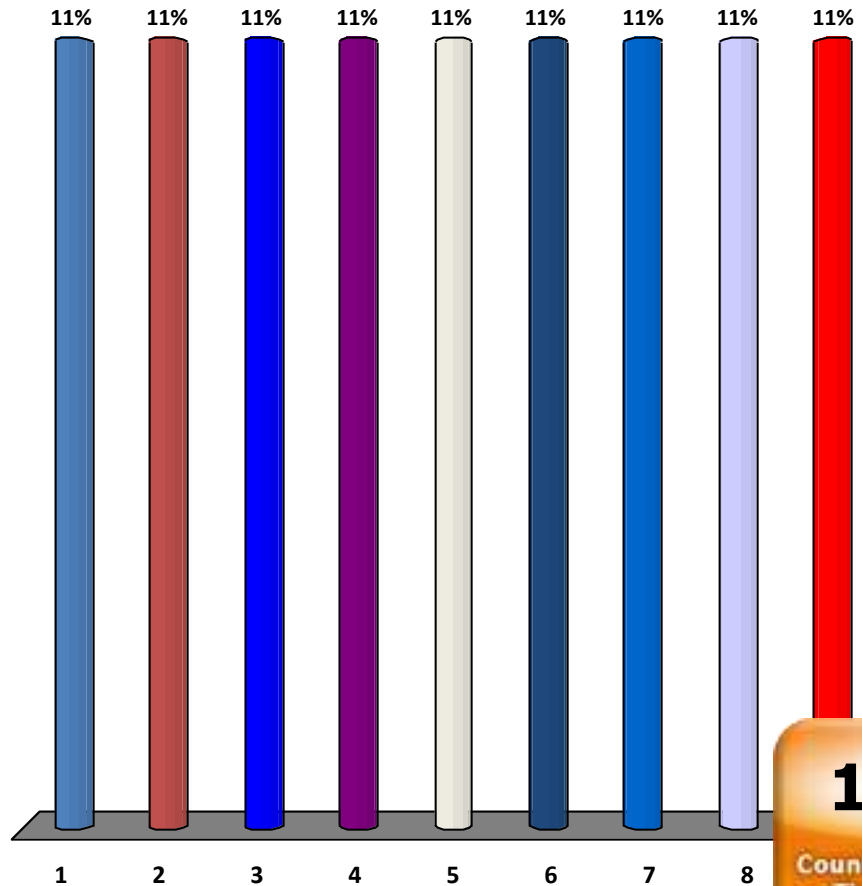
KL is a 62-year-old man with heart disease. He has no allergies. His meds include metoprolol, simvastatin, and NTG SL. Which vaccine is appropriate for him?

1. Pneumovax 0.5 ml IM
2. TIV SD influenza shot 0.5 ml IM
3. TIV HD influenza shot 0.5 ml IM
4. Flumist nasal spray 0.1 ml in each nostril
5. Zostavax 0.65 ml SQ
6. Both 1 and 2
7. 1, 2 and 5
8. 1, 3 and 5
9. 1, 4 and 5



RR is a 70-year-old woman with COPD. She has no allergies. Her meds include albuterol, Pulmicort and Spiriva. She has an 80-pack-year history of smoking. She quit smoking 5 years ago. Her last pneumonia shot was 8 years ago. Which vaccine is appropriate for her?

1. Pneumovax 0.5 ml IM
2. TIV SD influenza shot 0.25 ml IM
3. TIV HD influenza shot 0.5 ml IM
4. Flumist nasal spray 0.1 ml in each nostril
5. Zostavax 0.65 ml SQ
6. Both 1 and 2
7. 1, 2 and 5
- ✓ 8. 1, 3 and 5
9. 1, 4 and 5



10

Countdown  
Timer  
On Slide

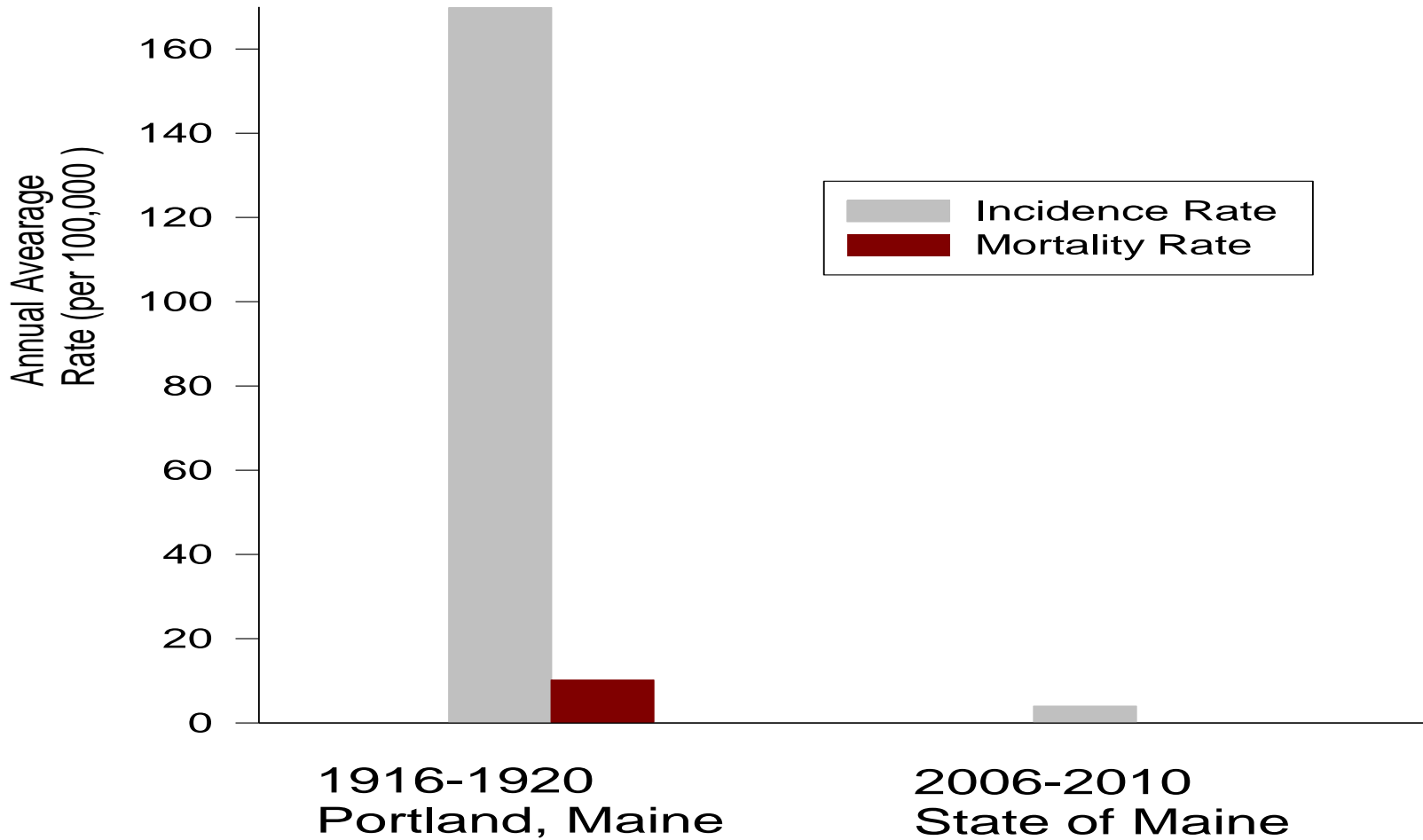
# Pertussis- containing Vaccine

# Comparison of 20<sup>th</sup> Century and current US Morbidity of VPDs

<b>Diseases</b>	<b>20<sup>th</sup> Century Annual Morbidity</b>	<b>2010 Reported Cases</b>	<b>Percent Decrease</b>
Smallpox	29,005	0	100%
Polio (paralytic)	16,316	0	100%
Measles	530,217	61	>99%
Mumps	162,344	2,528	98%
Pertussis	200,752	21,291	89%
Diphtheria	21,053	0	100%
Rubella	47,745	6	>99%
Congenital Rubella Syndrome	152	0	100%
Tetanus	580	8	99%
Haemophilus influenzae	20,000	270	99%

# Pertussis Morbidity & Mortality in Maine

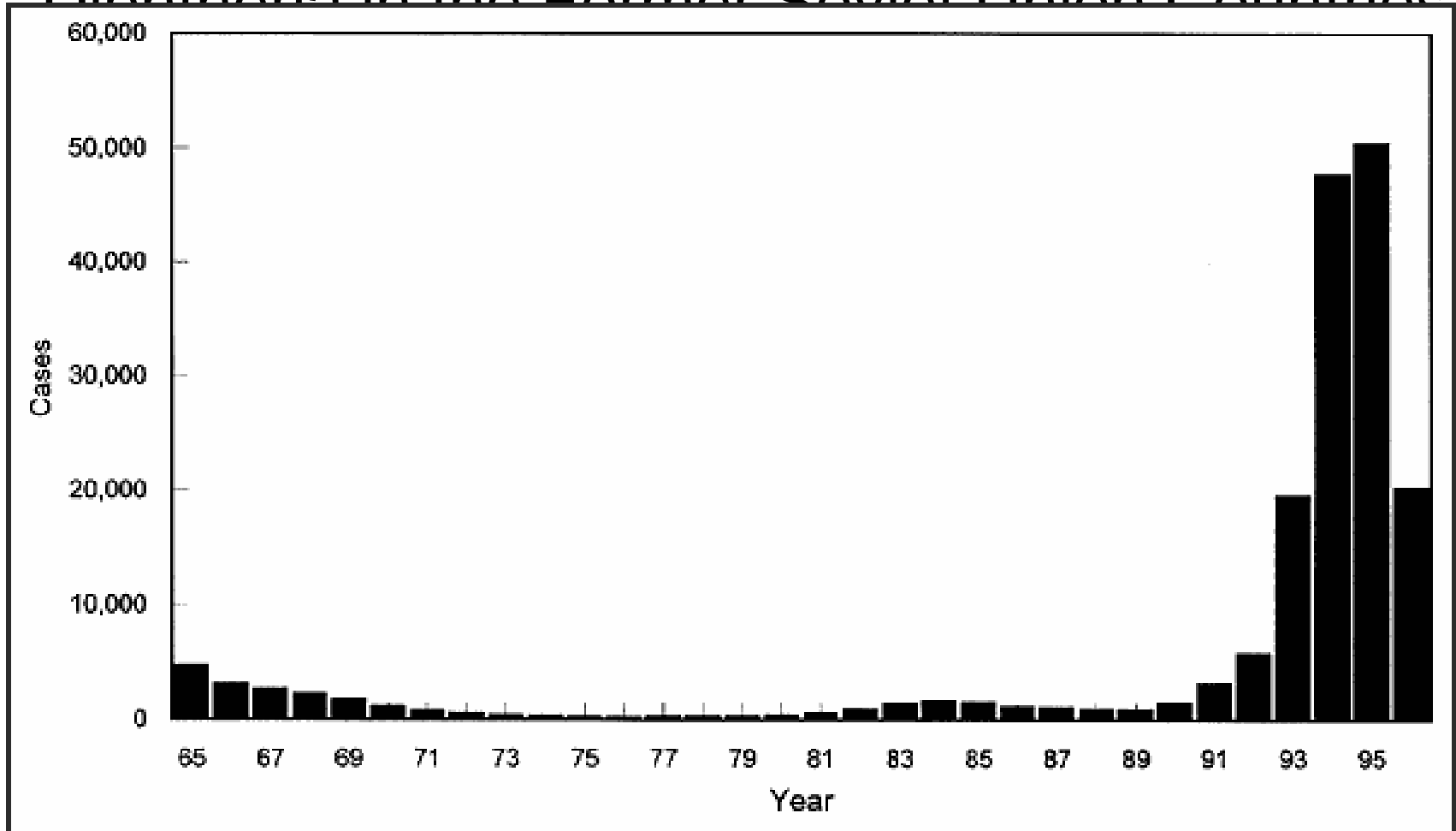
## Early 20<sup>th</sup> century, Portland, ME vs. contemporary Maine



***Why Do We Keep Vaccinating?***

# Reemergence of a Pandemic

Diphtheria in the Former Soviet Union Countries



# California Pertussis Outbreak – 2010

- 9,477 confirmed, probable and suspect cases of pertussis (rate = 24.2 cases/100,000); 514 in 2011
- 663 were hospitalized (63% were infants <6 months of age)
- Ten deaths reported of infants < 3 months of age
  - 9 (90%) were unvaccinated infants <2 months

# Pertussis

- **Highly contagious respiratory infection, commonly known as whooping cough**
- **Caused by a bacterium, *Bordetella pertussis*, and primarily mediated by toxins**

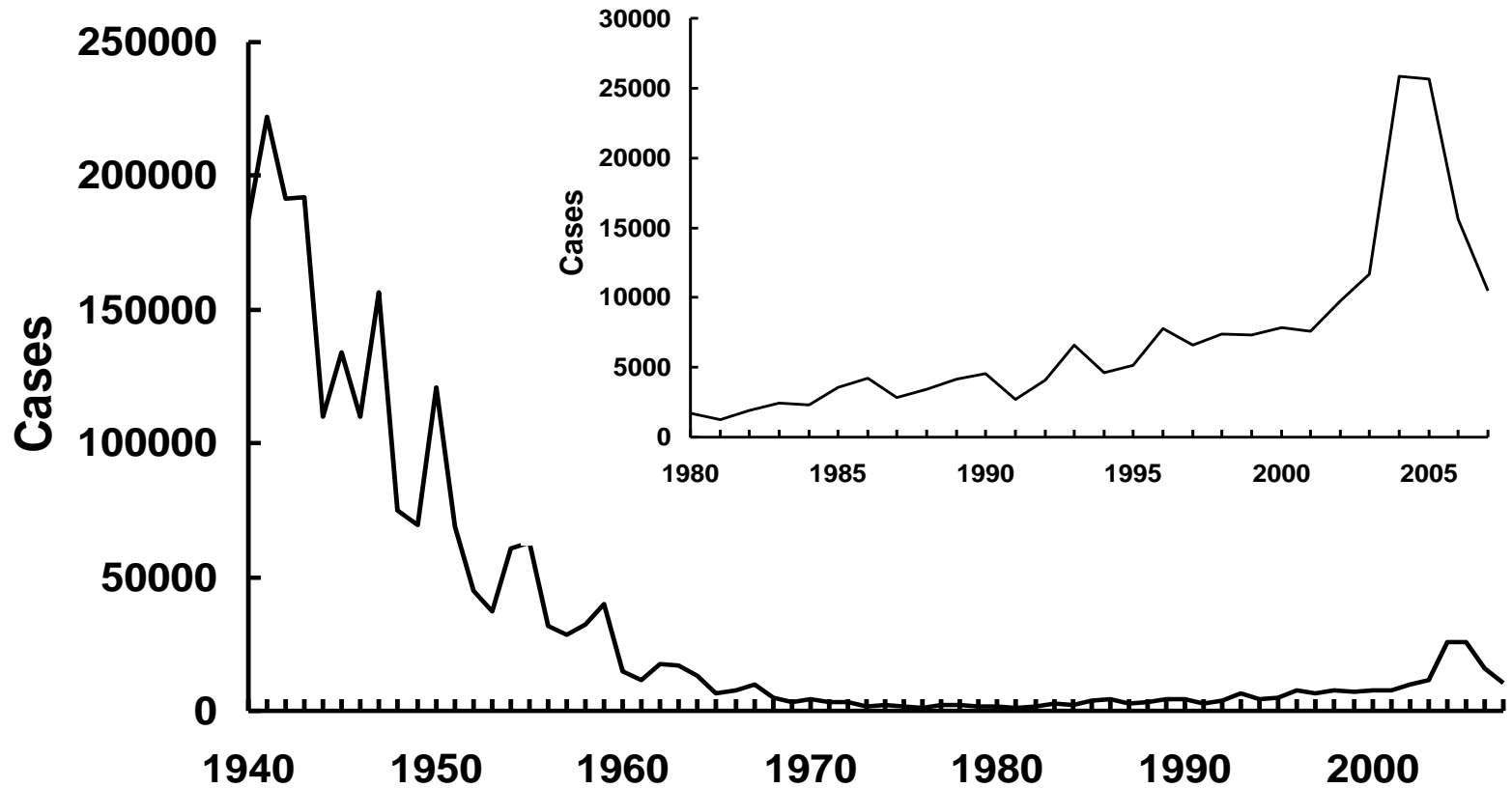
# Pertussis Clinical Features

- Incubation period            7-10 days (range 4-21 days)
- Catarrhal stage            1-2 weeks
- Paroxysmal cough  
stage                            1-6 weeks
- Contagious period            Catarrhal stage & first two weeks  
of cough onset
- Convalescence            Weeks to months

# Pertussis among Adolescents & Adults

- Disease often milder
- Infection may be asymptomatic, or may present as classic pertussis
- Persons with mild disease may transmit the infection
- Older persons often source of infection for children

# Pertussis—United States, 1940-2007



# Source of Pertussis Transmission to Infants

- **Household members responsible for 75 - 83 %**
- **Parents and siblings were common sources**
  - **Parents (53%)**
  - **Siblings (16-20%)**
  - **Aunts/uncles (10%)**
  - **Friends/cousins/others (10-24%)**
  - **Grandparents (2%)**
  - **Caretakers (2%)**

# Pertussis-Containing Vaccines

- **DTaP (pediatric)**
  - approved for children 6 weeks through 6 years
  - 80-90% effectiveness after 3 doses
- **Tdap (adolescent and adult)**
  - approved for persons 10 through 64 years (Boostrix) and 11 through 64 years (Adacel)
  - every 10 year one booster
  - one booster reduces the risk of pertussis by 60% -

# Adolescent and Adult Pertussis Vaccination

- **Primary objective**
  - protect the vaccinated adolescent or adult
- **Secondary objective**
  - reduce reservoir of *B. pertussis*
  - potentially reduce incidence of pertussis in other age groups and settings

# DTaP Adverse Reactions

- **Local reactions (pain, redness, swelling) 20%-40%**
- **Temp of 101 degree or higher 3%-5%**
- **More severe adverse reactions not common not common**
- **Local reactions and more common following 4th and 5th doses**

# Contraindications

- **Severe allergic reaction to vax component or prior dose**
- **Encephalopathy, not due to another identifiable cause, occurring within 7 days of vaccination**

# DTaP Precautions\*

- **Moderate or severe acute illness**
- **Temperature >105°F (40.5°C) or higher within 48 hours with no other identifiable cause**
- **Collapse or shock-like state (hypotonic hyporesponsive episode) within 48 hours**
- **Persistent, inconsolable crying lasting >3 hours, occurring within 48 hours**
- **Convulsions with or without fever occurring within 3 days**

\*may consider use in outbreaks

# **New Tdap Recommendations\***

## **Ages 7 through 10 years**

**Those who are “not fully immunized” against pertussis and for whom no contraindication to pertussis vaccine exists, should receive a single dose of Tdap**

### **“Not fully immunized”**

- fewer than 4 doses of DTaP**
- 4 doses of DTaP and last dose was prior to age 4 years**
- with unknown vaccination status**

**\*off-label recommendation. *MMWR* 2011; 60 (No. 1):13-15**

# New Tdap Recommendations\* Ages 7 through 10 years

Those never vaccinated against tetanus, Diphtheria, or pertussis or who have unknown vaccination status should receive a series of three vaccinations containing tetanus and diphtheria toxoids. The first of these three should be Tdap.

\*off-label recommendation. *MMWR* 2011; 60 (No. 1):13-15

# New Tdap Recommendations for Adolescents

- **Persons 11-18 years of age who have not received Tdap should receive a single dose followed by Td booster doses every 10 years**
- **Adolescents should preferably receive Tdap at the 11 -12 year-old preventive healthcare visit**

# New Tdap

## Recommendations

- Tdap can be administered regardless of the interval since the last tetanus and diphtheria toxoid-containing vaccine
- While longer intervals between Td and Tdap vaccination could decrease the occurrence of local reactions, the benefits of protection against pertussis outweigh the potential risk for adverse events

# Cocooning Strategy to Protect Infants from Pertussis

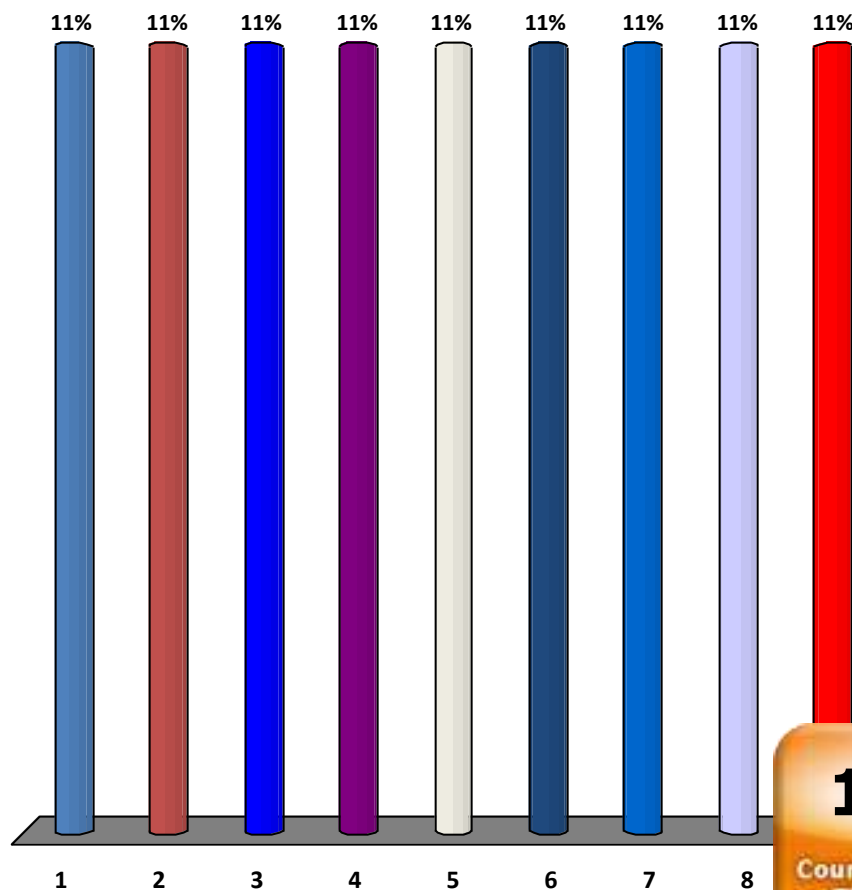
- Vaccinate **anyone** (including 65Y and older\*) in contact with infants under 12 months age
- Women of childbearing age (before or postpartum - even if breastfeeding)
- Tdap is not contraindicated during pregnancy; however, if there is no risk of acquiring or transmitting pertussis during pregnancy ACIP recommends deferring until postpartum

ACIP provisional recommendations  
Use of Tdap - Health Care Professionals  
(April 4, 2011)

- **HCP regardless of age should receive a single dose of Tdap as soon as feasible regardless of time of last Td dose**
- **Tdap is not currently licensed for multiple administrations**
- **Hospitals & ambulatory care facilities should provide Tdap for HCP**

AB is a 52-year-old woman with hypertension. She has no allergies. Her meds include amlodipine 10 mg PO QD. She smokes 1 PPD. Her young grandchildren live with her. Which vaccine is appropriate for her?

1. Pneumovax 0.5 ml IM
2. TIV SD influenza shot 0.5 ml IM
3. TIV HD influenza shot 0.5 ml IM
4. Flumist nasal spray 0.1 ml in each nostril
5. Zostavax 0.65 ml SQ
6. Tdap 0.5 ml IM
7. Both 1 and 2
8. 1, 3 and 5
9. 1, 2, 5, and 6



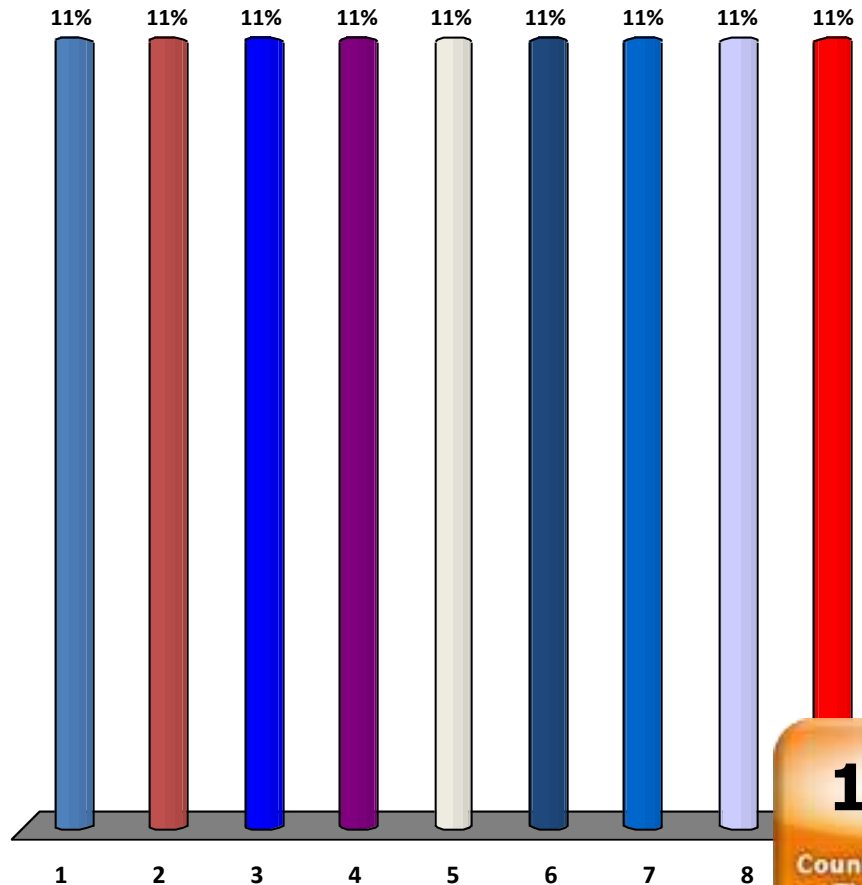
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KM is a 70-year-old woman with rheumatoid arthritis and osteoporosis. She has no allergies. Her meds include MTX 10 mg Qweek and alendronate 70 mg qweek. She frequently cares for her young grandchildren. Which vaccine is appropriate for her?

1. Pneumovax 0.5 ml IM
2. Tdap 0.5 ml IM
3. TIV HD Flu shot 0.5 ml IM
4. Flumist nasal spray 0.1 ml in each nostril
5. Zostavax 0.65 ml SQ
6. Both 1 and 3
- ✓ 7. 1, 2 and 3
8. 1, 3 and 5
9. 1, 4 and 5



10

Countdown  
Timer  
On Slide

**QUESTIONS???**



College of Pharmacy