

A man and a woman are sitting in a red rowing boat on a calm lake. The man is on the right, holding a wooden oar, and the woman is on the left, facing him. They appear to be in conversation. The background features a dense forest of evergreen trees and a range of rugged, snow-capped mountains under a clear sky. The water is dark and reflects the surrounding landscape.

# Talking Immunization with your Adult Patients

## Practical Strategies for Overcoming Barriers

Jointly provided by Center for Independent  
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# Call-to-Action: Recognizing the Burden of Vaccine- Preventable Diseases

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# Impact of Vaccines

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- **Vaccines are one of the most important tools we have to protect the health of our nation's citizens.**
- **In last 100 years, the lifespan of Americans has doubled; largely as a result of vaccines and sanitation**



# Burden of Vaccine-Preventable Diseases

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## Each Year

- 226,000 hospitalizations due to influenza
  - As many as 49,000 deaths
- 32,000 cases of invasive pneumococcal disease
  - Approximately 3,000 deaths
- Over 1 million people suffer from chronic hepatitis B
- Over 1 million people develop shingles
- 17,000 cancers in women and 9,000 cancers in men are caused by HPV



# Economic Burden

Disease	Probability of hospitalization	No. of hospitalization days	Cost per hospitalization	Cost per outpatient visit
<b>Pertussis</b>	<b>0.65–30%</b>	<b>16.7</b>	<b>\$102,584</b>	<b>\$100–\$173</b>
<b>Measles</b>	<b>11–100%</b>	<b>1.3–10.9</b>	<b>\$4,032– \$46,060</b>	<b>\$88–\$526</b>
<b>Hepatitis B</b>	<b>0.001–100%</b>	<b>3.9–11</b>	<b>\$15,662– \$27,051</b>	<b>\$214–\$599</b>
<b>Pneumococcal Disease</b>	<b>0–100%</b>	<b>6.4–16.8</b>	<b>\$3,798– \$25,848</b>	<b>\$86–\$272</b>



# Immunization: Return on Investment

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## For each birth cohort vaccinated:

- 42,000 lives saved
- 20 million cases of disease prevented
- 13.6 billion dollars saved in direct costs
- 69 billion dollars saved total (with indirect cost)
- For each dollar spent, \$10.20 saved



# Threats to Vaccines

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- **Falling rates**
- **Success of past vaccines**
  - Lack of awareness of disease that is prevented
- **Effects of anti-vaccine movement**
  - Fear, mistrust, ignorance



# Consequences of Lapse on Immunization: Outbreaks

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- **California (2010)**

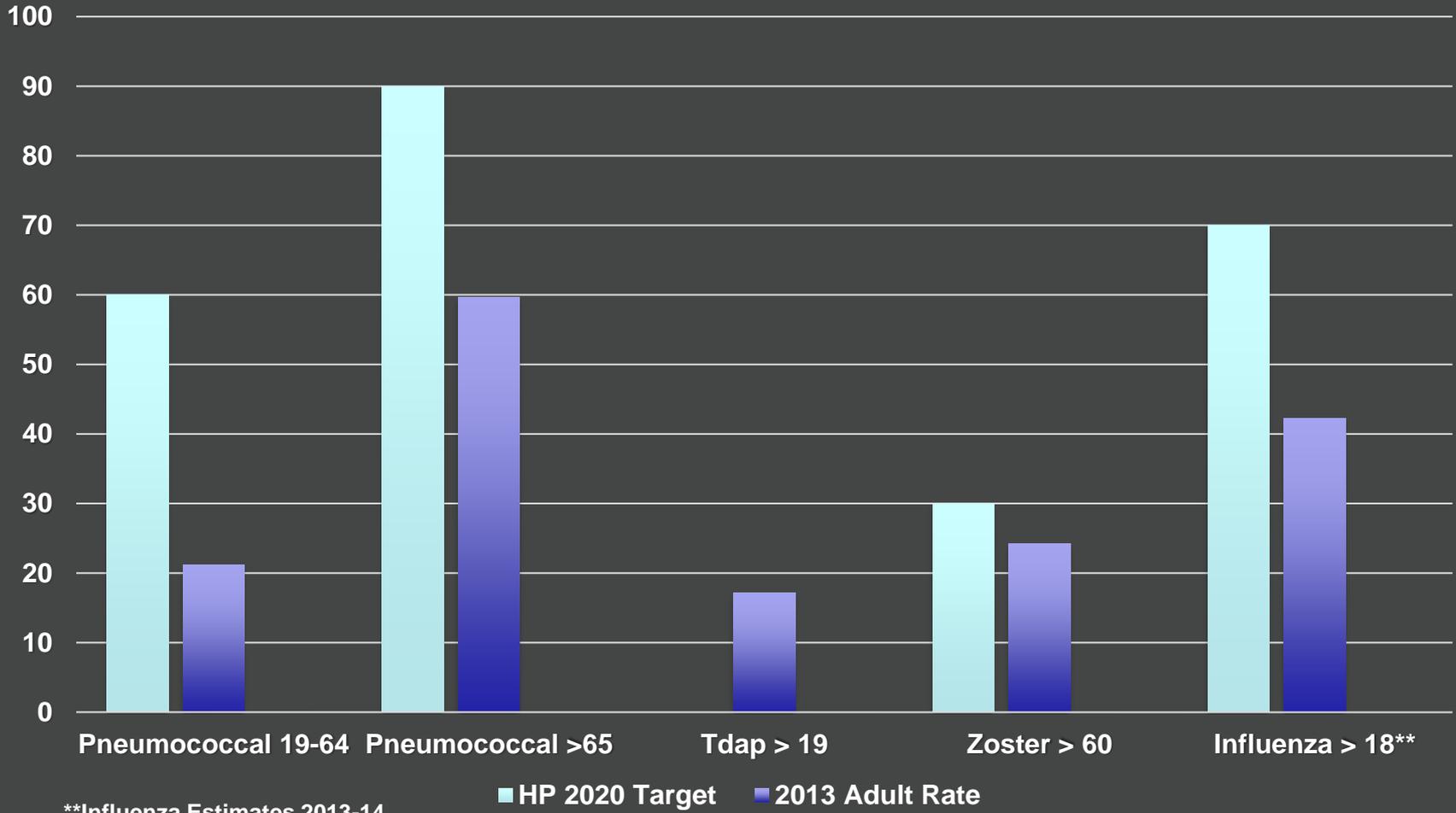
- 9,143 cases of pertussis (including ten infant deaths) were reported throughout California. Most cases reported in 63 years.
- Measles outbreak source

- **Ohio (2010-2014)**

- In 2010, there were 964 cases of pertussis reported by Columbus and Franklin Counties. Most cases reported in 25 years.
- In 2014, there have been 377 cases of measles (10 hospitalized) since March.
- In 2014, there have been 460 cases of mumps (many linked to OSU) since Jan.



# 2013 Adult Immunization Coverage, US



MMWR. Feb 6, 2015. <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6404a6.htm#Tab2>

Healthy People 2020 Objectives on Immunization and Infectious Disease. [www.Healthypeople.gov/2020/](http://www.Healthypeople.gov/2020/).



# Vaccine-Preventable Diseases

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## Issues with Adult Vaccination

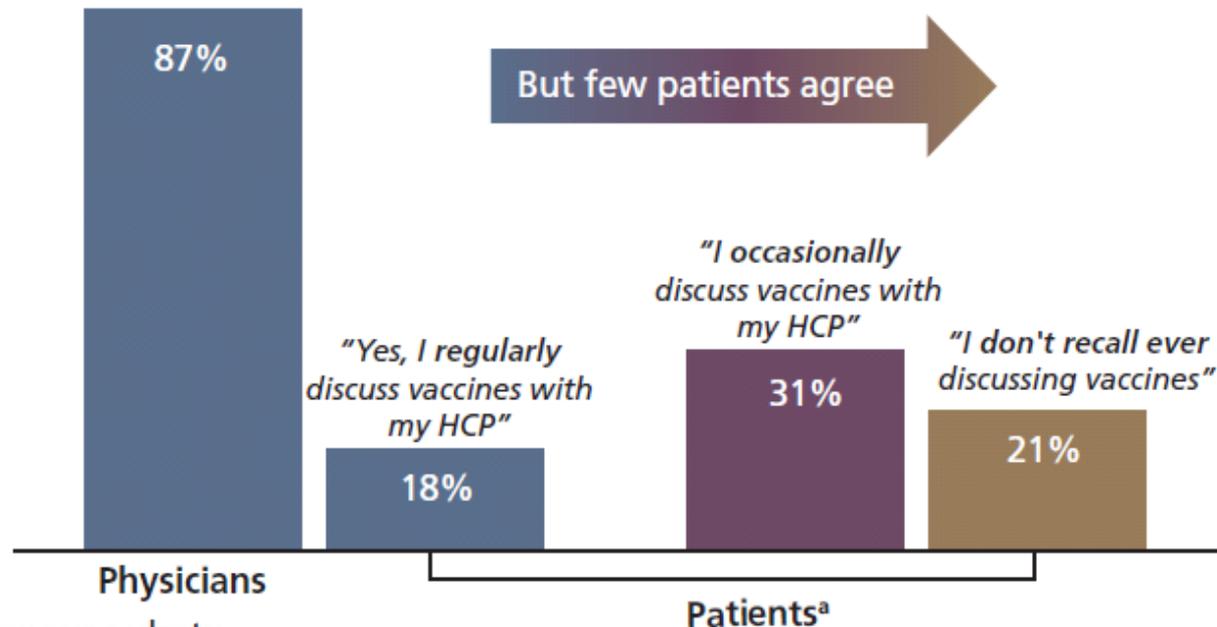
- **Busy Practice**
- **Costly Inventory**
- **Storage and Handling Concerns**
- **Frequently Changing Practice Guidelines**
- **Lack of System-wide Documentation**
- **Inconsistent Reimbursement**
- **Patient Objections/Myths**



# Physician-Patient Miscommunication

## Recent Survey Indicates Miscommunication Between Physicians and Patients

Most physicians say *"I talk to all of my patients about vaccines"*



Survey respondents:  
Consumers, N = 1,013; physicians, N = 300 PCPs.

<sup>a</sup>An additional 26% say they only ever discuss influenza vaccine.



# The Communications Breakdown

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## Recommendation

*"You need to get this vaccine."*

OR

*"I want you to get this vaccine."*



**Vaccine-Motivated Patient**

## Not a Recommendation

*"Do you want this vaccine?"*

OR

*"Think about getting the vaccine."*



**Vaccine-Ambivalent Patient**

# Best Practices in Vaccine-Preventable Diseases: Pneumococcal Disease

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Professor and Chair  
Department of Pharmacy Practice  
Samford University  
McWhorter School of Pharmacy  
Birmingham, AL





# Jane William

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42-year-old woman with asthma and HTN who presents for a preventive health visit. Her asthma is controlled on montelukast and an inhaled steroid. She received influenza vaccination in October. Which of the following is the best assessment/ recommendation for pneumococcal immunization of Jane?

1. AVERAGE RISK: NO pneumococcal immunization
2. INTERMEDIATE RISK: PCV13 only
3. INTERMEDIATE RISK: PPSV23 only
4. HIGH RISK: PPSV23 today, PCV13 1 yr.
5. HIGH RISK: PCV13 today, PPSV23 1 yr.



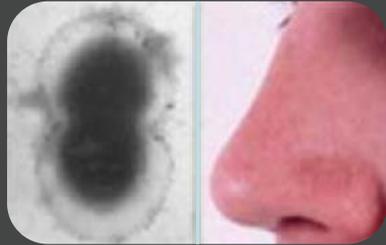
# Jon William

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[Jane's father] is a healthy 67-year-old man who comes in for a wellness visit. He smokes 3 cigars a week and has no medical conditions. He received high-dose influenza vaccine from his local pharmacy in September. Which of the following is the best assessment/recommendation for pneumococcal immunization of Jon?

1. AVERAGE RISK: NO pneumococcal immunization
2. INTERMEDIATE RISK: PCV13 only
3. INTERMEDIATE RISK: PPSV23 only
4. HIGH RISK: PPSV23 today, PCV13 1 yr.
5. HIGH RISK: PCV13 today, PPSV23 1 yr.

# Pneumococcal Disease Pathogenesis and Burden in Adults Aged $\geq 50$ Years



*Streptococcus pneumoniae*



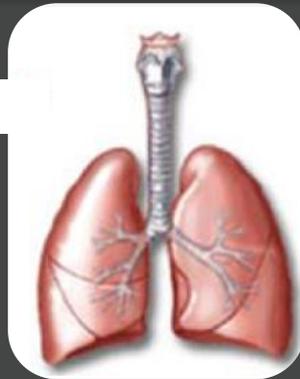
Nasopharyngeal colonization



Asymptomatic  
colonization

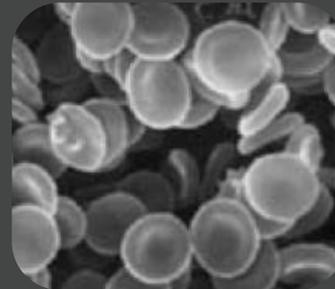


Autoinoculation



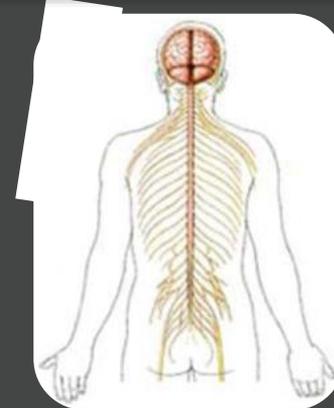
**Pneumonia**

302,000 cases (inpatient)  
140,000 cases (outpatient)



**Bacteremia**

7,000 cases



**Meningitis**

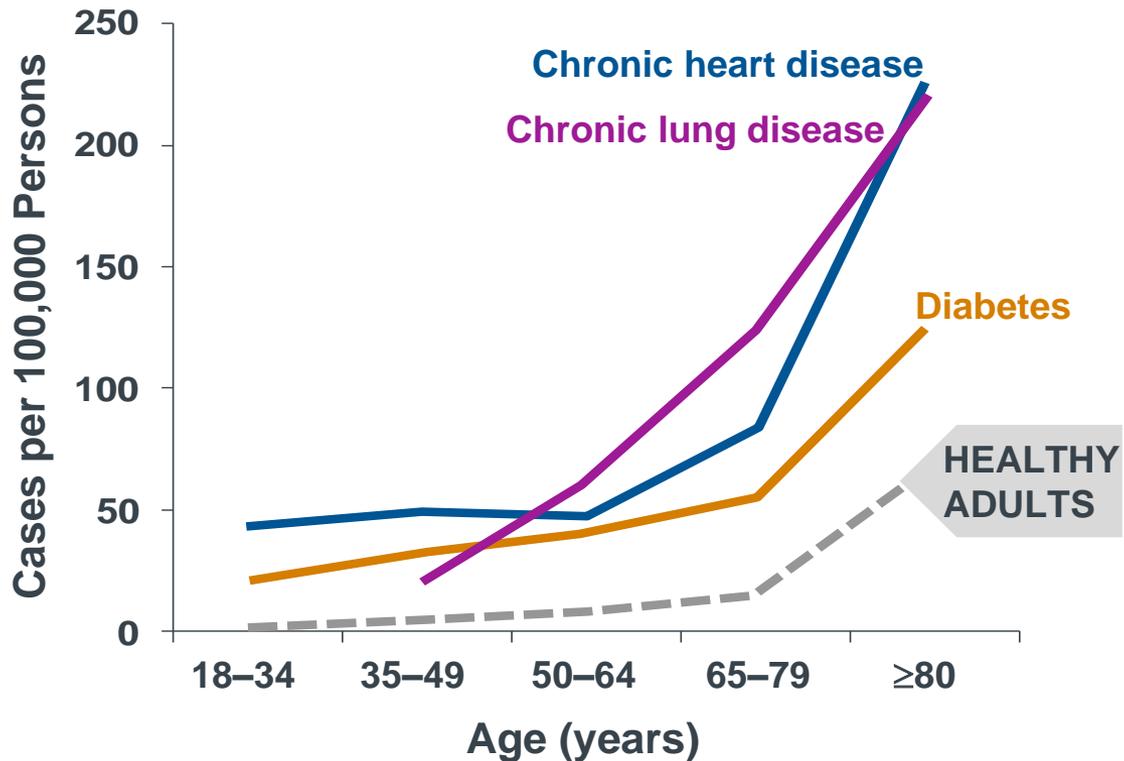
1,700 cases

1. Henriques-Normark B, et al. *Cold Spring Harb Perspect Med.* 2013;3:a010215.
2. Huang SS, et al. *Vaccine.* 2011;29:3398–3412.



# The Incidence Rate of Pneumococcal Disease Increases With Age and Certain Chronic Conditions

## Incidence Rate of IPD — United States, 1999–2000



### Diabetes mellitus

**3X** the risk of IPD compared to healthy adults

### Chronic heart disease

**6X** the risk of IPD compared to healthy adults

### Chronic lung disease

**6X** the risk of IPD compared to healthy adults



# Pneumococcal Vaccines

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- **PPSV23**

- Purified capsular polysaccharide → ‘traditional’ PNC vaccine
- Contains 23 types—cause ~88% bacteremic pneumococcal disease
- 60%–70% effectiveness vs. invasive disease
  - Challenge to assess prevention of PNC pneumonia.
- Immunity lasts at least 5 years following 1 dose
- FDA-approved for all persons  $\geq 2$  years at increased risk for pneumococcal disease
- Local reactions – only common adverse event

- **PCV13**

- Conjugate vaccine—more immunogenic
- Replaced PCV7 for childhood immunization [6 wk–6 yr] in 2010
- 2011 FDA-approved for adults  $>50$  years: prevent pneumonia, IPD
  - Based on immunogenicity and safety studies
- 2012 ACIP recommends PCV: IPD prevention, highest-risk adults
  - Highest risk based on anatomic and immunocompromised
  - Best practice: give BEFORE PPSV23
- 2014 ACIP recommends PCV/PPS combination strategy in aged 65+
- Local reactions – only common adverse event

**In 2013, 38% of IPD among adults aged  $\geq 65$  years was caused by serotypes unique to PPSV23**



# PPSV23 Vaccine Effectiveness

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- What is the evidence in preventing IPD and pneumonia?
  - Meta-analysis including 18 RCTs (64,852 participants)

Event	No. of RCTs	Event with Vaccine (n/N)	Event with Control (n/N)	OR (95% CI)
IPD	11	15/18634	63/17855	0.26 (0.14 to 0.45)
IPD (vaccine types only)	5	14/13889	140/17334	0.18 (0.10 to 0.31)
Pneumonia (all causes)	16	978/22643	1547/25091	0.72 (0.56 to 0.93)
Definitive pneumococcal pneumonia	10	15/18132	60/17351	0.26 (0.15 to 0.46)
Definitive pneumococcal pneumonia (vaccine types only)	4	3/15583	30/14978	0.13 (0.05 to 0.38)

Protective vaccine efficacy for definitive pneumococcal pneumonia : 74% (95% CI, 54%–85%)



# PCV13 Adult Vaccine Effectiveness

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## CAPiTA

- Placebo Controlled RCT PCV13 unimmunized adults 65+ years
  - Netherlands
    - No routine pneumococcal vaccine in adults
    - PCV7 in Dutch infants since 6/2006 -> PCV10 in March 2011
- 84,000+ participants PCV13 vs. Placebo
  - Enrolled 9/2008–1/2010, follow-up thru 8/2013
- Outcomes:
  - **Primary:** Reduced 1<sup>st</sup> bacteremic CAP with vaccine-type PNC
  - **Secondary:** Reduced 1<sup>st</sup> nonbacteremic CAP
- Serologic and urinary Ag used to identify PNC infection
- Considered by ACIP Pneumococcal group 2014
- DID NOT address sequential PCV13/PPSV23 immunization



# Pneumococcal Immunization I

## PPSV23 ALONE for INCREASED RISK

All cigarette smokers  $\geq 19$  yo

Chronic conditions  $\geq 19$  yo: Diabetes  
Lung disease: asthma, COPD  
Cardiovascular disease  
Liver disease  
Kidney disease  
(except ESRD, nephrotic – HIGHEST risk)

- REVACCINATION **ONCE** after age 65 [PLUS 5 years after initial dose] for those vaccinated prior to age 65
- **Adults 65 years and older: now in highest risk group.**



# Pneumococcal Immunization II

## SEQUENTIAL PCV13 + PPSV23: **HIGHEST RISK**

### Immunocompromised:

#### 1. Disease:

- Cancer: solid tumors, hematologic malignancies, myeloma, etc.
- HIV
- INHERITED and OTHER immune deficiency (CVID, etc.)
- End-stage kidney disease (ESRD), nephrotic syndrome

#### 2. Iatrogenic:

- MEDS: Steroids (20+ mg/d), biologic immunomodulators, others
- TRANSPLANTS: solid organ, bone marrow, stem cell

#### 3. Asplenia:

- ANATOMIC: splenectomy (best if immunized prior to)
- FUNCTIONAL: hemoglobinopathy, sickle cell, other

### Anatomic:

- CSF leak, cochlear implant, splenectomy

Age: **Adults 65 and older**



# New Recommendation (ACIP June 2015)

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## Pneumococcal vaccination for those $\geq 65$ years of age

- For those who have yet to receive any pneumococcal vaccine:
  - Administer PCV13 followed by PPSV23 in  $\geq 1$  year
- For those who were previously vaccinated with PPSV23:
  - Administer PCV13  $\geq 1$  year from PPSV23 vaccination

# Best Practices in Vaccine-Preventable Diseases: Pertussis

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# Case Study

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**PN, 65-yo male presents with a three-week h/o nonproductive cough which occurs more frequently at night. He reports that initially he had “a cold” (coryza, sneezing, mild cough) but has never had a fever. OTC dextromethorphan has not provided relief. He tries to keep a cough drop in his mouth at bedtime. Humidified air and hot showers provide some temporary relief. The cough has gotten worse, and last evening he vomited after a severe coughing episode.**



# Pertussis Pathology

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## *Bordetella pertussis*

- Gram-negative
- Produces at least 6 antigenic and biologically active products
- Considered primarily a toxin-mediated disease
- Requires special media for isolation/culture
  - Properly conducted nasopharyngeal swab
- Attaches and paralyzes cilia





# Pertussis

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**“*Bordetella pertussis* is the most poorly-controlled bacterial vaccine-preventable disease in the U.S., with peaks in disease occurring every 3–5 years...Notable peaks in disease occurred in 2004 (25,827 cases, 27 deaths), 2010 (27,550 cases, 27 deaths), and most recently in 2012 when more than 41,000 cases and 18 deaths were reported, the largest number of cases in the U.S. since 1959.”**

– Source: Centers for Disease Control and Prevention.

<http://www.cdc.gov/nndss/script/casedef.aspx?CondYrID=950&DatePub=1/1/2014>



# Pertussis

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- **Reservoir**
  - Adolescents and adults are important sources of infection for infants
- **Transmission**
  - Person-to-person through contact with respiratory droplets generated by coughing and sneezing
- **Highly communicable**
  - Patients are most infectious during the catarrhal and early paroxysmal phases of illness and can remain infectious for  $\geq 6$  weeks or for 5 days after initiating appropriate antimicrobial therapy.

# Disease Progression:

Weeks

0 1 2 3 4 5 6 7 8 9 10 11 12



## Stage 1 Catarrhal Stage

*May last 1 to 2 weeks*

- Symptoms: runny nose, low-grade fever, mild, occasional cough - Highly contagious

## Stage 2 - Paroxysmal Stage

*Lasts from 1-6 weeks; may extend to 10 weeks*

Symptoms: fits of numerous, rapid coughs followed by "whoop" sound; vomiting and exhaustion after coughing fits (called paroxysms)

## Stage 3 - Convalescent Stage

*Lasts about 2-3 weeks; susceptible to other respiratory infections for many*

Recovery is gradual. Coughing lessens but fits of coughing may return.



# Pertussis Treatment

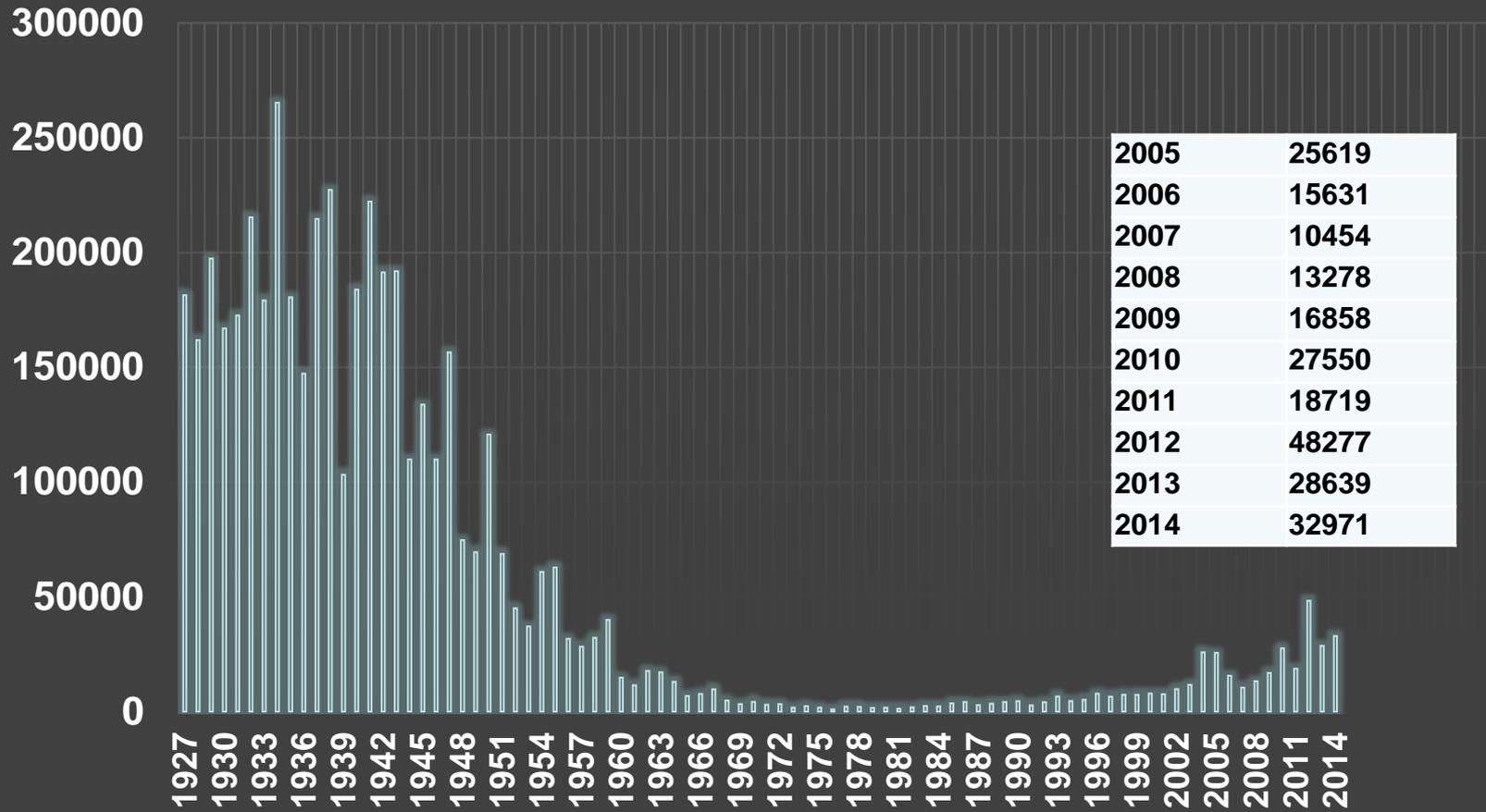
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- Treatment should occur as early as possible.
- Treat prior to test results if clinical history is strongly suggestive or if patient is at risk of severe or complicated disease.
- Treatment with
  - azithromycin (5 day course)
  - clarithromycin (7 day course)
  - erythromycin (14 day course)
  - \*alternatively trimethoprim-sulfamethoxazole (14-day course).
- All household contacts should be treated even if asymptomatic within 21 days of exposure.
- Treat high-risk non-household contacts. Consult current recommendations for specific populations.



# Burden of Disease

## Pertussis Cases, United States, 1927-2014





# Vaccines

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- **DTaP**
  - 5 doses for children 2 months through 6 years of age
- **Tdap**
  - 1 dose for those 11 years and older (Preferably at 11 or 12 years of age)
  - 1 dose for pregnant women during each pregnancy, preferably administered at 27 to 36 weeks gestation.



# Tdap Vaccine

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- **Contraindications:**
  - **Serious (e.g. anaphylaxis) ADR to a previous dose OR encephalopathy within 7 days following a previous pertussis-antigen dose.**
- **Precaution:**
  - **Defer vaccination in patients with unstable or progressive neurologic conditions.**
- **Safety**
  - **Most common ADEs are injection site related (Nearly  $\frac{3}{4}$  of patients)**
    - **Pain, erythema, swelling**
  - **Systemic effects include headache and fatigue**
  - **Fever is relatively uncommon (1:10) compared to older DTwP (9:10).**



# Special Considerations

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- **DTaP and Tdap vaccines are covered under the VFC program for children up to 18 years of age.**
- **Medicare Part D covered by most plans**
- **ACA requires ACIP-recommended vaccines be covered under newly issued plans/policies**

# Best Practices in Vaccine-Preventable Diseases: Herpes Zoster

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Program Director, Med-Peds Residency  
UAMS College of Medicine  
Little Rock, AR





# Jon William

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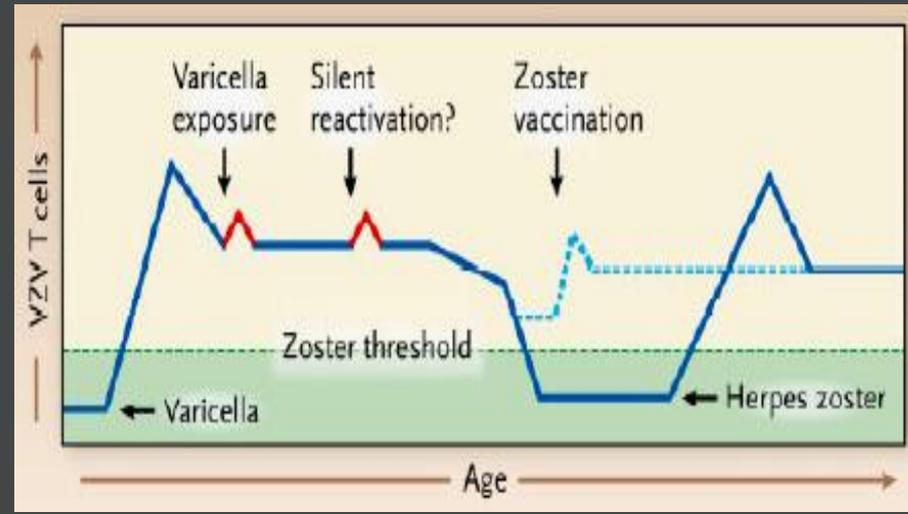
Healthy 67-year-old man who returns for wellness visit. He smokes 3 cigars a week and had an episode of shingles 5 months ago. He received high-dose influenza vaccine from his local pharmacy in September and pneumococcal vaccine 1 year ago. Which of the following is the most correct regarding zoster immunization for Jon?

1. No Zoster vaccination; he had previous shingles
2. No Zoster vaccination today—cannot administer with PPSV23
3. Zoster vaccine today
4. Zoster vaccine today and booster vaccination in 5–10 years



# Zoster

- Most who have varicella have Ab for life
  - Zoster occurs when cell-mediated immunity (CMI) surveillance declines
  - Reactivation or varicella exposure re-stimulates CMI
  - Cycle can repeat multiple times
- Lifetime risk of Zoster ~33%
  - By age 85: risk ~50%
  - PHN= most common AE
    - Up to 1/3 patients with Zoster
    - More common
      - >70 years with Zoster
      - Immunocompromised
- Vaccination stimulates CMI



PHN, postherpetic neuralgia.  
Arvin A. *N Engl J Med.* 2005;352:2266-77.  
<http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5705a1.htm>



# Zoster Pathophysiology

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- **Reactivation of a latent Varicella zoster virus**
  - Promptly or decades after chickenpox
- **Trigger factors**
  - Reduced immunocompetence
  - Trauma
  - Normal aging
- **Estimated 1 million cases annually in the US**
- **Adults at greatest risk:**
  - Immunocompromised conditions (e.g., malignancy, HIV)
  - Taking immunosuppressive medications (e.g., steroids, rheumatoid arthritis meds)

# Herpes Zoster (Shingles)

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# Complications of Zoster

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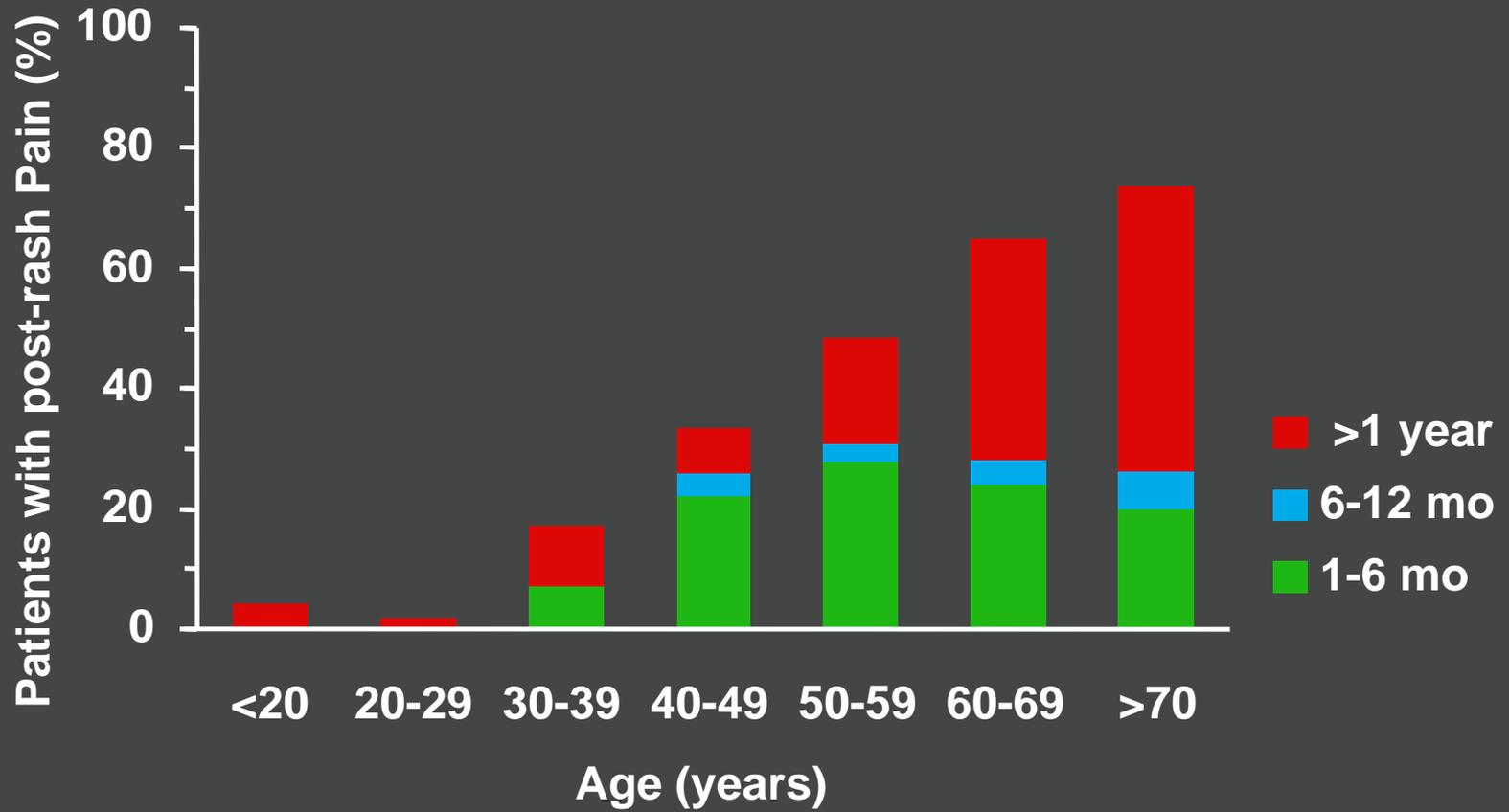
- Scarring and keloid formation; secondary skin infection of skin lesions
- Visceral zoster and encephalitis
- Corneal damage and blindness
- Pneumonia (viral or bacterial)
- Postherpetic neuralgia (PHN)
  - Pain in the dermatome of rash after rash heals
  - Criteria: 90 (or 120) days after rash onset
  - Pain can last months to years
  - As people get older, more likely to develop PHN and the pain is more likely to be severe

Dworkin RH, Portenoy RK. *Pain*. 1996;67:241-51.

Centers for Disease Control and Prevention. Shingles (Herpes Zoster). Available at:

[www.cdc.gov/shingles/about/overview.html](http://www.cdc.gov/shingles/about/overview.html)

# Duration of Pain after Rash Heals Increases With Age





# Zoster

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## Vaccine Efficacy Trial:

- 38,546 Veterans: Median age: 69 years
  - 60–69 years: 20,747 [Efficacy greatest in this group]
  - $\geq 70$  years: 17,799 (46%)
  - $\geq 80$  years: ~2,500 (6.5%)
  - Excluded: Immunocompromised, prior zoster, <60 yrs.
- Vaccine group had [vs. placebo]:
  - 51% fewer episodes of zoster
  - Less severe disease
  - 66% less postherpetic neuralgia
- No significant safety issues were identified

# Zoster



- Vaccinate **HEALTHY** adults 60+ years old
- ACIP: *NOT IMMUNOCOMPROMISED*
  - FDA-approved from age 50 differs from ACIP recommendation
  - Regardless of prior Zoster [arbitrary CDC opinion: wait 1 year]
  - No need to test/vaccinate vs. varicella first
- Contraindications
  - Pregnancy
  - Anaphylactic hypersensitivity to neomycin, gelatin
  - No need to defer for ‘at-risk contacts’– transmission risk low
  - No need to defer if recent transfusion, Ab-containing products
- Adverse events
  - Occasional mild varicella-like rash at vaccine site
- Frozen vaccine: Give w/in 60 minutes, 0.65 mL SQ deltoid
- Duration of protection: At least 4 years. No booster.



# Zoster: Special Populations

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- **Prior to Immune Suppression**
  - American College of Rheumatology recommends Zoster vaccine [2008] in age 50+ years
  - Recommend off IS x4 weeks after vaccine
  - Poster ACR 2014:
    - Zoster vaccine in 57 patients on biologics SQ, IV
    - NO disseminated Zoster
    - Study ongoing...
- **HIV**
  - No recommendation for vaccination
  - Studies of vaccination in immune-reconstituted HIV patients are underway
- **No Publication Data:**
  - Revaccination, vaccination before age 50 years



# Zoster: Special Consideration

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- **Simultaneous administration of pneumococcal vaccine**
  - One study showed the average titer against varicella zoster virus (VZV) was lower in persons who received zoster and PPSV at the same visit compared to persons who received these vaccines 4 weeks apart
  - However, a large study was subsequently conducted that showed that zoster vaccine was equally effective at preventing herpes zoster whether it was administered simultaneously with PPSV or 4 weeks earlier
  - CDC continues to recommend that HZV and PPSV be administered at the same visit if the person is eligible for both vaccines.

# General Practice Recommendations

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**Associate Professor**

**Departments of Medicine and Pediatrics**

**Georgetown University**

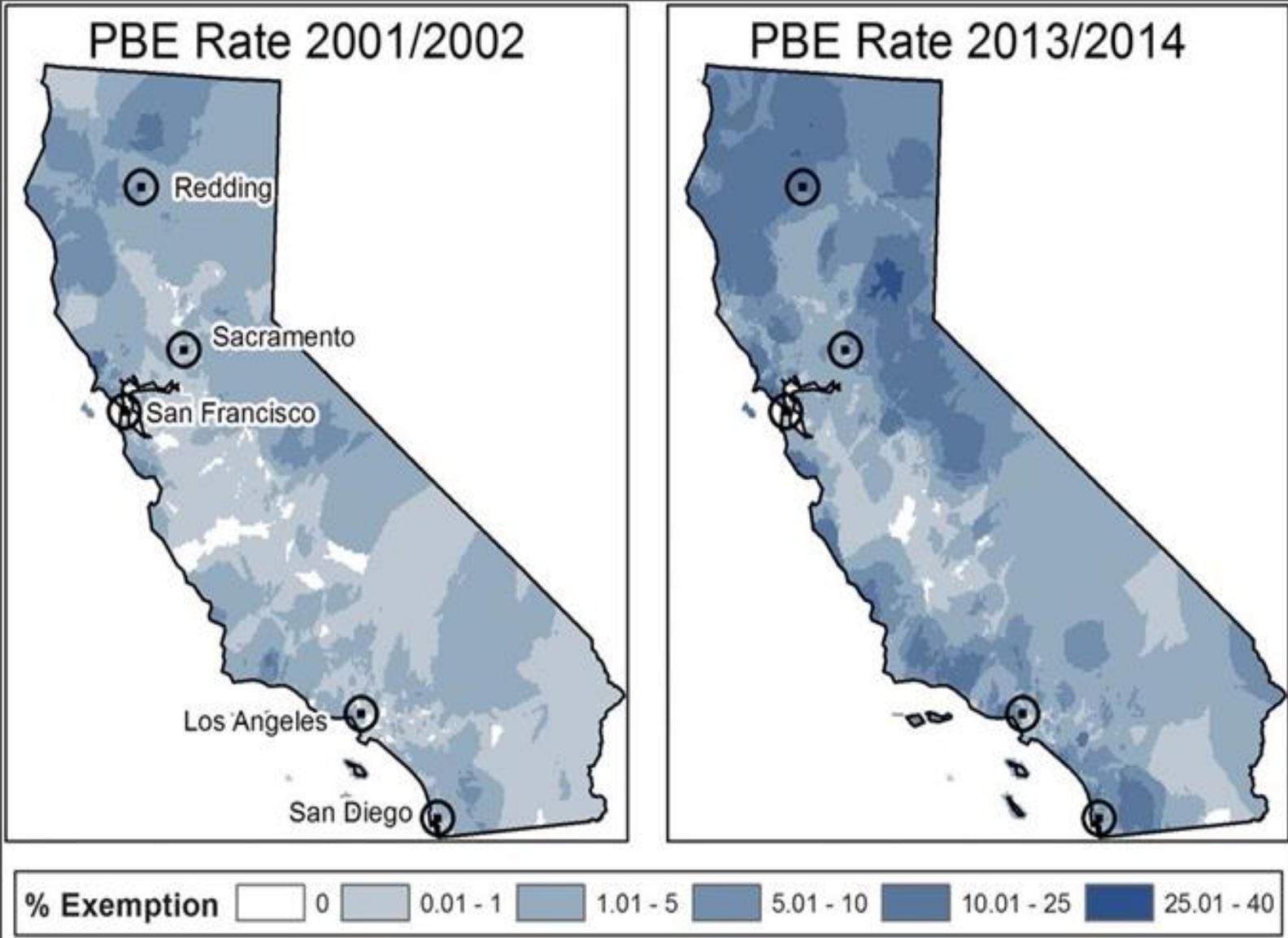
**Medstar Georgetown University Hospital**

**Washington, DC**





# Swimming Upstream in CA



# Vaccine Storage and Handling



## Key Messages:

-  The vaccine cold chain is a temperature-controlled environment used to maintain and distribute vaccines in optimal condition.
-  Monitor the temperature of your storage unit(s) regularly to assure that appropriate conditions are maintained.
-  Take immediate corrective action when a storage unit temperature is outside the recommended range (Troubleshooting).
-  Call the vaccine manufacturer for guidance.
-  If you are a VFC provider or have other vaccines purchased with public funds, contact your immunization program .
-  Vaccine appearance is NOT a reliable indicator that vaccines have been stored under appropriate conditions.
-  Vaccine exposed to inappropriate temperatures that is inadvertently administered generally should be repeated. Contact your immunization program , vaccine manufacturer(s), or both for guidance.

## Vaccine Storage & Handling Toolkit

May 2014

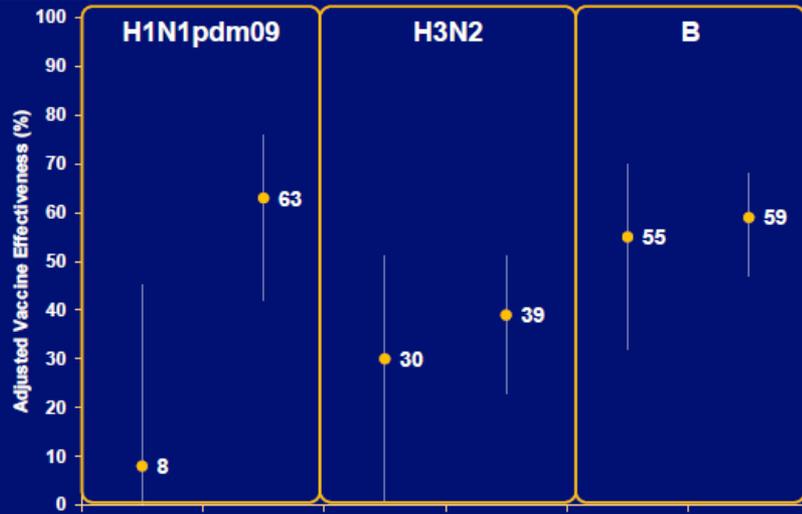


U.S. Department of Health and Human Services  
Centers for Disease Control and Prevention



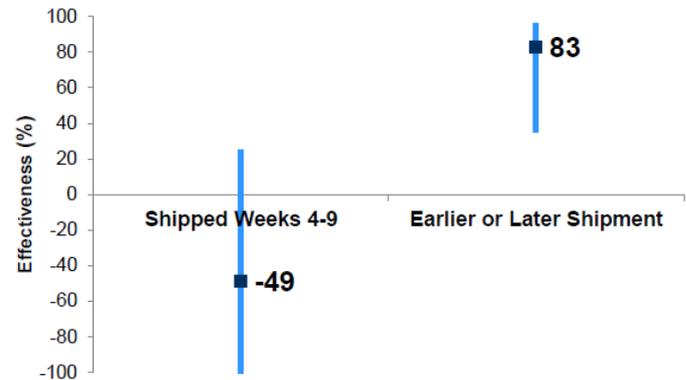
# Vaccine Storage Example

LAIV and IIV vaccine effectiveness among 2-18 yrs over 3 seasons, by influenza type/subtype



	LAIV	IIV	LAIV	IIV	LAIV	IIV
Total, Flu +	184	188	493	596	472	544
Vaccinated, Flu +	24	28	48	151	33	105

MedImmune Study:  
Adjusted LAIV H1N1 Effectiveness by Shipment Group



➤ Not explained by any other study covariates



# Real Life Handling Issue

## Overall Summary

- ◆ Moderate/high effectiveness in children observed in 2010-11, 2011-12, 2012-13, 2013-14 for A/H3N2 and B strains and for all matched strains in prior studies
- ◆ Low effectiveness observed for A/California H1N1pdm09 strain in US in 2010-2011 (trivalent formulation) and 2013-2014 (quadrivalent formulation)
  - Issue is specific for A/California H1N1pdm09 LAIV
  - Issue may be US-specific as LAIV appeared effective in Canada in 2013-14
- ◆ Low effectiveness of A/California LAIV not explained by
  - Manufacturing, poor stability under recommended storage (36-46°F), antigenic mismatch, prior vaccination, pre-existing immunity, or vaccine strain interference
- ◆ A/California H1N1pdm09 strain has unique HA stalk sequence not seen in any previous LAIV strain that makes HA less stable
  - Reduces viral fitness and makes strain more vulnerable to heat degradation
- ◆ Vaccine shipping when outdoor temperatures are >80°F correlates with reduced effectiveness for A/California LAIV but not other LAIV strains
- ◆ Will replace A/California LAIV with an antigenically matched strain with a more stable HA protein and add HA stability criterion to future strain selection processes





# Timing and Spacing of Doses

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- **Doses inside the minimum interval do not count!**
  - 4-day grace period for all minimum intervals except for rabies vaccine
  - Some states have more stringent requirements: follow those if so
- **Increasing the interval potentially delays complete protection; but never need to restart a series**
  - Case in point: HPV vaccine
  - Exception: Oral typhoid vaccine



# Combination Vaccines

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- **Reduce the number of injections**
- **Potentially improve coverage and compliance**
- **Potentially reduce costs for both providers and patients**
- **Downside: Difficult to isolate which antigen may have caused side effect in the event one occurs**
- **Accurate documentation is a must!**



# Immunosuppression and Vaccines

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- Live vaccines should be administered  $\geq 4$  weeks prior to planned immunosuppression.
- Inactivated vaccines should be administered  $\geq 2$  weeks prior to planned immunosuppression.
- Specialists and primary care providers share responsibility for immunizing immunosuppressed patients and their family members.

2013 IDSA Clinical Practice Guideline for  
Vaccination of the Immunocompromised Host

Lorry G. Rubin,<sup>1</sup> Myron J. Levin,<sup>2</sup> Per Ljungman,<sup>3,4</sup> E. Graham Davies,<sup>5</sup> Robin Avery,<sup>6</sup> Marcie Tomblyn,<sup>7</sup> Athos Bousvaros,<sup>8</sup> Shireesha Dhanireddy,<sup>9</sup> Lillian Sung,<sup>10</sup> Harry Keyserling,<sup>11</sup> and Insoo Kang<sup>12</sup>



# ACIP June 2015 meeting

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- **Agreed with IDSA Except:**
  - **Anti-B cell antibodies to vaccine**
    - **Wait for 6 months**
  - **Solid organ transplantation rejection meds to vaccine**
    - **Wait 2 months**
  - **Hematopoietic cell transplants are a separate case (2011 guidelines apply)**



# TAKE HOME POINTS

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Per CDC:

**ASSESS** vaccination status of all patients in every clinical encounter

Strongly **RECOMMEND** vaccines that patients need

**ADMINISTER** needed vaccines or **REFER** to a provider who can vaccinate

**DOCUMENT** vaccines received by your patients

A man and a woman are sitting in a red rowing boat on a calm lake. The man is on the right, holding a wooden oar, and the woman is on the left, facing him. They appear to be in conversation. The background features a dense forest of evergreen trees and a range of rugged, snow-capped mountains under a clear sky. The water is dark and reflects the surrounding landscape.

# Talking Immunization with your Adult Patients

## Practical Strategies for Overcoming Barriers

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