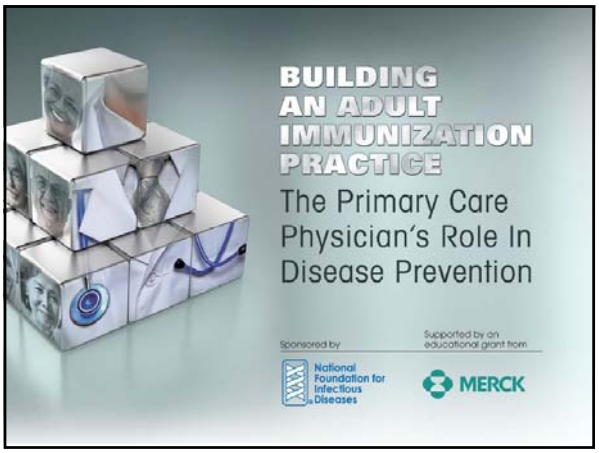
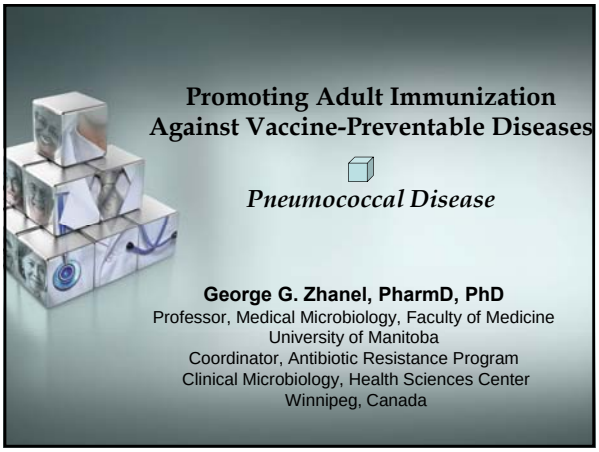
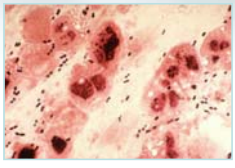
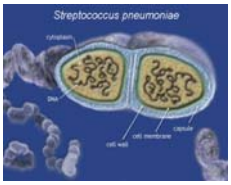




Streptococcus pneumoniae

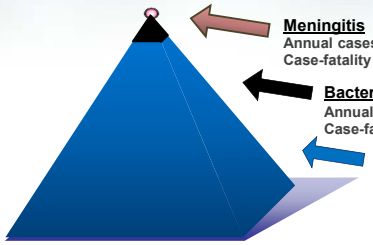
- Gram-positive, diplococci
- Normal inhabitant of the human upper respiratory tract
- Most common cause of respiratory tract infections (community-acquired pneumonia [CAP], sinusitis, and otitis media)
- Leading cause of invasive bacterial diseases in children and adults





Lynch J, Zhanel GG. *Curr Opin Pulmon Med*. 2010;16:217-225.

Pneumococcal Disease: Major Clinical Syndromes



Meningitis
Annual cases: 3,000
Case-fatality rate: 30%

Bacteremia
Annual cases: 50,000
Case-fatality rate: 20%

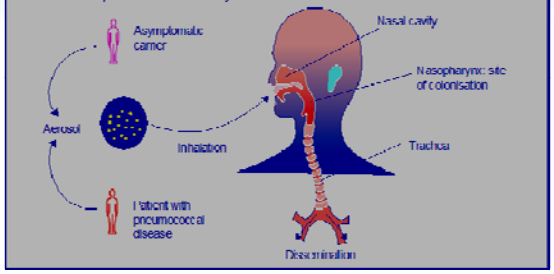
Pneumonia
Annual cases: 500,000
Case-fatality rate: 5–7%

Less severe diseases (sinusitis, otitis media): Millions of cases annually

1.CDC. The Pink Book. 10th ed. Washington DC: Public Health Foundation, 2007.
2.CDC. *MMWR Morb Mortal Wkly Rep.* 2005;54(RR-5):1–11.

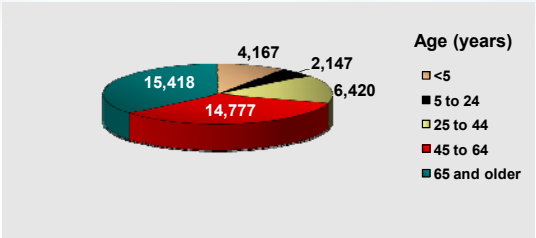
Streptococcus pneumoniae: Asymptomatic Nasopharyngeal Colonization

Nasopharyngeal carriage may occur in up to 60% of healthy pre-school children and up to 30% of healthy older children and adults



Ghaffar F, et al. *Pediatr Infect Dis J.* 1999;18:638-646.

Estimated Number of Cases of Invasive Pneumococcal Disease (IPD)* in the US, 2008



*IPD, Bacteremia and meningitis
Moore MR. Presented at 47th Annual Meeting of IDSA; October 29-November 1, 2009. Philadelphia, PA. Abstract #722.

Streptococcus pneumoniae: Vaccine History

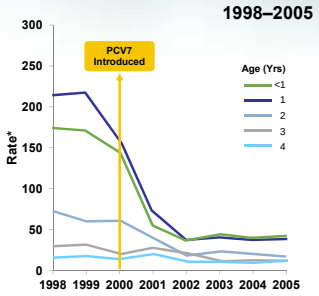
Year	Name	FDA Approved	Vaccine Type	Retail
1977	Pneumovax–14	≥ 2 yrs old	Polysaccharide	
1983	Pneumovax–23			$ 45
2000	Prevnar–7	6 weeks–6 years	Polysaccharide-protein conjugate	
2010	Prevnar–13*			$ 115

*Prevnar – 13 FDA licensed for use in adults 50 years and older in December 2011; FDA approved indication differs from ACIP recommendations for use at this time

Centers for Disease Control. Pink Book. Available at: http://www.cdc.gov/vaccines/pubs/pinkbook/downloads/pneumo.pdf.

Invasive Pneumococcal Disease in Children 5 Years After Conjugate Vaccine (PCV7) Introduction

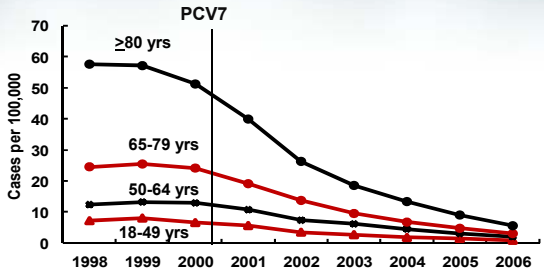
- The overall incidence of IPD among children aged <5 years declined from 99 cases/100,000 during 1998–1999 to 23 cases/100,000 in 2005



* PCV7 – 4,6B,9V,14,18C,19F,23F

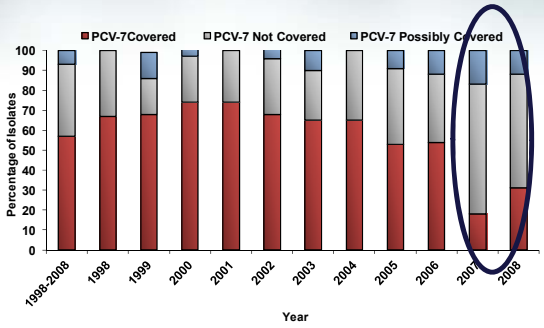
CDC. MMWR. 2008;57(6):144-148.

Rates of Pneumococcal Conjugate Vaccine (PCV7-type) Invasive Pneumococcal Disease among Adults, US 1998/99-2006



Centers for Disease Control. Available at: http://www.cdc.gov/vaccines/pubs/pinkbook/downloads/pneumo.pdf.

PCV-7 Vaccine Coverage (1998–2008, n=1,071)



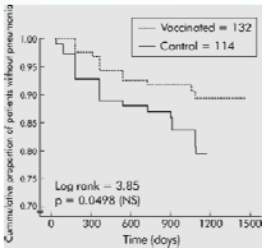
Efficacy of Pneumovax (PPV23)

- PPV23 studies have yielded contradictory conclusions in nonbacteremic pneumococcal pneumonia
- 50–80% effectiveness for prevention of IPD among immunocompetent elderly and adults with various underlying illnesses

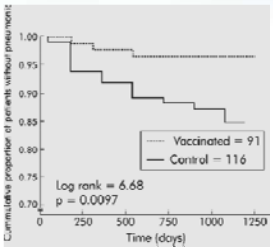
CDC. *MMWR*. 2010;59:1102-1106.
Alfagame I, et al. *Thorax*. 2006;61:189-195.

Effectiveness of PPV23 Vaccine
(Patients with Chronic Obstructive Pulmonary Disease [COPD])

Severe COPD without Pneumonia



Patients <65 Years without Pneumonia



Alfagame I et. al. *Thorax*. 2006;61:189-195.

Effectiveness of Pneumococcal Vaccine

- Vaccine strains account for 88% of bacteremic pneumococcal disease
- 75% efficacy against invasive disease
- 30% efficacy against pneumonia

File TM, et al. *Infect Dis Clin Pract*. 2012;20:3-9.

Effectiveness of PPV23 Vaccine

- Vaccine strains account for 88% of bacteremic pneumococcal disease
- Immunity cross-reacts with types causing additional 8% of disease
- 60% to 70% efficacy against invasive disease
- Duration of immunity at least 6 years

ACIP. *MMWR*. 1997:46:4-10.

Adult PPV23 Vaccine: Recommendations

- Adults 65 years of age and older
- Adults 19–64 with:
  - chronic illness (heart, lung, liver, diabetes, alcoholism)
  - asthma
  - cigarette smoking
  - immunocompromised
    - (includes functional or anatomic asplenia)

ACIP. *MMWR*. 2010:59(34):1102-1106.

Adult Pneumococcal Vaccine: Revaccination Recommendations

- Routine revaccination of immunocompetent persons is NOT recommended
- Revaccination is recommended for all persons at high risk
- Revaccinate once–at 5 years after first dose if given between 19–64 years

ACIP. *MMWR*. 2010:59(34):1102-1106.

Pneumococcal Vaccine Revaccination

- Revaccination per CDC recommendations
  - One-time revaccination 5 years after the first dose is recommended for persons 19 through 64 years of age with chronic renal failure or nephrotic syndrome; functional or anatomic asplenia (e.g., sickle cell disease or splenectomy); and for persons with immunocompromising conditions.
  - Persons who received PPSV 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 PPSV at or after age 65 years

ACIP. *MMWR*. 2010:59(34):1102-1106.

Pneumococcal Vaccine Revaccination: Examples

- A 35 y/o immunocompetent male is a smoker and receives 1st dose of pneumococcal vaccine. When should he receive revaccination?
- A 35 y/o male with splenectomy receives 1st dose of pneumococcal vaccine. When should he receive revaccination?
- A 65 y/o male receives 1st dose of pneumococcal vaccine. When should he receive revaccination?

OPTIONS:

A. In 5 years
B. Age 65
C. No revaccination indicated

Pneumococcal Polysaccharide Vaccine: Contraindications and Precautions

- Severe allergic reaction to a vaccine component or following a prior dose
- Moderate or severe acute illness

Pneumovax 23 Prescribing Information. Merck & Co. Whitehouse Station, New Jersey. October 2011.

Pneumococcal Polysaccharide Vaccine: Adverse Reactions

- **Local reactions** **30% – 50%**
  (pain, redness)
- **Systemic reactions** **<1%**
  (fever, malaise)
- **Severe adverse reactions** **Rare**

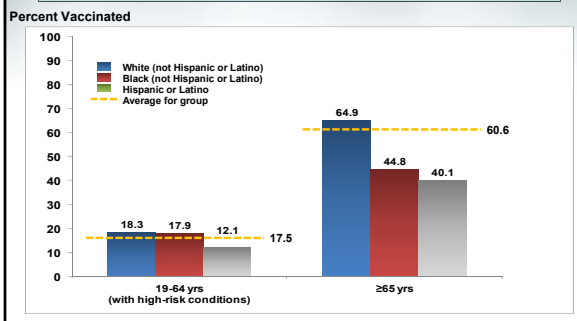
ACIP. *MMWR*. 1997:46:4-10.

Clinical Problem with Pneumococcal Disease

Pneumococcal disease remains a substantial cause of morbidity and mortality in the US even in the era of routine pediatric and adult vaccination

Huang SS, et al. *Vaccine*. 2011:29:3398-3412.

Pneumococcal Vaccination Rates in US Adults, 2009



DATA SOURCE: CDC/NCHS, National Health Interview Survey, 2009. Estimates are based on household interviews of a sample of the civilian non-institutionalized population. Data available at: http://www.cdc.gov/vaccines/stats-surv/nhis/2009-nhis.htm.

Summary

- Pneumococcal disease results in significant clinical and economic burden
- Current vaccines are effective in preventing invasive pneumococcal disease
- Despite proven efficacy and safety of vaccines, less than 20% of at-risk adults under 65 years of age are vaccinated

Promoting Adult Immunization Against Vaccine-Preventable Diseases

Influenza

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Summa Health System
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Professor, Internal Medicine; Master Teacher
Chair, Infectious Disease Section
Northeast Ohio Medical University
Rootstown, OH

Influenza-Burden of Illness

- **~36,000 deaths annually in US from influenza**
  - Plus many more hospitalizations, exacerbations of chronic illnesses
  - More than 90% seasonal influenza in people >65 years of age
- **Leading cause of vaccine-preventable death among adults in US**
- **Multiple effective vaccines available in US**

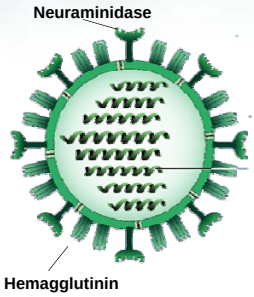
Centers for Disease Control and Prevention. Seasonal Influenza (flu). Available at: http://www.cdc.gov/flu/about/disease/us_flu-related_deaths.htm.

Influenza Vaccine: Benefit

- **Based on risk-benefit considerations The reception of and the administration of influenza vaccines are one of the most beneficial health promoting interventions available to us and our patients**
- **Influenza vaccines prevent illness and death, and are safe. Effectiveness*:**
  - Adults < 65:
    - Healthy: Reduced influenza-related hospitalization by 90%
    - Pts with DM: 54% reduction in hospitalizations, and a 58% reduction in deaths
  - Adults > 65:
    - Reduced influenza-related hospitalizations 27-70%, Reduced deaths up to 80%

***Morbidity Mortality Weekly Report 2010; 59: 1-61.**

Influenza



- Influenza A genome encodes 2 major surface glycoproteins
  - 16 HA subtypes
  - 9 NA subtypes
  - All may be found in avian population
  - Three (H1, H2, H3) in humans
- Hallmark of influenza virus is ability to undergo constant change

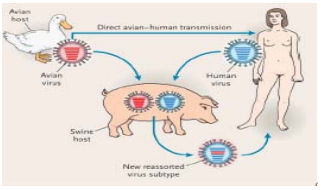
Clinical Consequences

- Increased work/school absenteeism
- Fever, cough, myalgia
- Laryngotracheobronchitis
- Pneumonia
  - 2nd bacterial; Primary Viral; ARDS
- Unexplained fever
- Less common:
  - Myositis, Reye Syndrome, others…
- Hospitalization
- Death due to pneumonia or decompensation of concomitant chronic illnesses

Cate TR. *Am J Med.* 1987;82: 15-19.

'Recent' Pandemic Influenza

- **Requirements for Pandemic**
  - 1) Novel virus; 2) disease in humans; 3) spread person to person
  - Prior Pandemics: 1918/19 H1N1; 1957 H2N2 (Asian); 1968 H3N2 (HK)
- **1995-2008 H5N1 'Bird Flu'**
  - Scattered transmission to humans, few deaths
  - If this were to be THE coming pandemic- why not yet?
- **2009-10 H1N1 Re-assortment: Bird + Swine + Human**
  - NA Swine; NA avian;
  - NA & Eurasian swine
- **2011- Others (rare)**
  - **'Variant strains'**
    - 'Swine' H3N2
    - H1N2



2009-10 H1N1 Influenza A

- **Higher rate of Gastrointestinal (GI) symptoms**
  - **Approx 50%**
- **Higher rate of 2nd person-to-person spread**
  - **20-30% compared to 10-20% for seasonal flu**
- **Most cases mild, but many severe cases**
  - **Age >60 years less likely infected**
  - **Most deaths in ages 20-50 years**
    - **FLAARDS (Flu A Assoc ARDS)**
  - "The pandemic's impact is better gauged by the number of life-years lost because of the younger age of victims compared with seasonal flu. If you look at years of personal life lost, it's much higher, and that's the point we have to get across. A death in an otherwise healthy 24-year-old, to me, is a major defeat for society."

    Michael Osterholm, PhD, MPH, Director of the University of Minnesota's Center for Infectious Disease Research and Policy in Minneapolis, MN

Viboud C, et al. *PLoS Current*. 2010;RRN1153.

US Influenza Vaccines

- **TIV: 'Killed', injectable "All comers" 6 months and older [$25]**
- **TIV Intradermal [$25–30]**
  - Approved May 2011 for 18–64 years [smaller needle]
- **LAIV: Live-attenuated, cold-adapted nasal [$23–30]**
  - Indicated only for healthy people 2–50 years
- **High-Dose TIV for 65+ population* [$30]** [1st available 2010–11]
  - Same production process as TIV; higher Ag dose
  - Seroconversion, seroprotection rates ≥ TIV for A, B strains
    - Superiority criteria for A, Non-inferiority for B strain
  - Local reactions more frequent but classified as mild
  - 'Real world' efficacy data not published to date

TIV, trivalent inactivated vaccine
***Falsey AR et.al. *J Infect Dis.* 2009;200:172-180.**

[Estimated cost; Akron, OH 2012]

Influenza

Seasonal vaccine changes annually

- Egg-based vaccine production: ~9 months
- Strain choice (Feb) reflects Antigenic drift
  [Prior season + Southern Hemisphere]
- US Vaccination season: Vaccine available to 'disease passed'…
- Since 1977 the predominant strain types [Disease & Vaccines]
  - A H1N1, A H3N2, B
- 2011-12 Vaccine strains: No change from 2010–11 vaccine
  - Influenza A/California/7/09 (H1N1)–like virus
  - Influenza A/Perth/16/2009 (H3N2)–like virus
  - Influenza B/Brisbane/60/2008–like virus
- Unusual for all 3 strains to not change
  - Annual vaccination still needed if vaccinated in 2010–11 (waning immunity)

Centers for Disease Control and Prevention. ACIP Presentation Slides February 2011 Meeting. Available at: http://www.cdc.gov/vaccines/recs/acip/slides-feb11.htm#flu.

Influenza Vaccine Priorities

- **ALL 6+ MONTHS WANTING TO PREVENT INFLUENZA**
- **HEALTHCARE WORKERS**
  - High risk for disease (symptomatic and asymptomatic)
  - High risk for transmission
  - If sick, not available to provide healthcare…
- **PATIENTS @ Highest Risk (severe illness/spread)**
  - Pregnant women
  - Newborns and children
  - Elderly
  - "Medical Comorbidities"
  - Household contacts of high–risk
  - Long-term care, institutionalized, crowded living conditions

Centers for Disease Control and Prevention. Inactivated Influenza Vaccine 2011-12. Available at: http://www.cdc.gov/vaccines/pubs/vis/downloads/vis-flu.pdf.

Influenza 'Nuts and Bolts'[1]

- **Vaccination season: Soon as available to ~April 1**
  - Vaccines approved by FDA for 6 manufacturers; June 2011- shipping
  - Late season vaccination important and underutilized
  - Most disease in mid-south in January-March
- **LAIV , TIV, HD-TIV: 1 dose for adults**
  - Kids <9 years, first vaccine season: 2 doses 4+ weeks apart
  - LAIV can be safely used in MOST healthcare settings as alternative to TIV[2]
- **Egg allergy no longer contraindication to influenza vaccines[3]**
  - Anaphylaxis is EXCEEDINGLY rare [<10 documented cases]
  - Balance risk/benefit of disease vs. vaccine
    - If vaccinated, should be observed ~30 minutes in office

1. Centers for Disease Control and Prevention. Inactivated Influenza Vaccine 2011-12. Available at: http://www.cdc.gov/vaccines/pubs/vis/downloads/vis-flu.pdf.
2. Talbot TR, et al. *Infect Control Hosp Epidemiol.* 2010;31:987-995.
3. Fryhofer SA. *Ann Inern Med.* 2012; 156: 243-5.

Adverse Effects

- Local reactions: soreness at vaccination site
  - Mild, rarely interfered with ability to conduct usual activities
- In placebo-controlled trials, no association with higher rates for systemic symptoms
  - Fever, malaise, myalgia, headache
- CANNOT get influenza from trivalent inactivated vaccine (TIV)
- Rare AEs

CDC. *MMWR.* 2009;58:1-52.

Adverse Effects: Rare or Not Associated

- Immediate hypersensitivity: 1 per 500,000
- Guillain-Barré Syndrome:
  - In general population annual incidence 10-20/million
  - Except for possibly associated with 1976 vaccine, no compelling evidence of association with influenza vaccine (including 2009 H1N1)
- Oculare spiratory Syndrome
  - In one placebo-controlled trial, 2%
  - Red eyes, cough, wheezing, chest tightness within 2–24 hours; resolve within 24 hours; If no evidence of hypersensitivity can receive subsequent TIV
- AUTISM: Absolutely NO ASSOCIATION!!!

CDC. *MMWR*. 2009;58:1-52.

Influenza Immunization Coverage of Adults in US

Population Group	Coverage (%)
Persons with an age indication:	
Aged 50 to 64 years	36.0
Aged ≥65 years	65.6
Persons with high risk conditions:	
Aged 18 to 49 years	25.5
Aged 50 to 64 years	46.1
Aged 18 to 64 years	35.3
Persons without high risk conditions:	
Aged 18 to 49 years	15.3
Aged 50 to 64 years	31.8
Pregnant women	13.4
Health care personnel	41.8†
Household contacts of persons at high risk, including children aged <5 years	
Aged 18 to 49 years	17.0

CDC. *MMWR*. 2008;57(RR07):1-60.

Influenza and Pregnancy

- Pregnant woman at high risk for severe complications and death
  - Cellular immune response diminished
- Maternal influenza associated with increased*
  - Maternal hospitalization
  - Fetal malformation
  - Other illnesses
- Prevention is best approach
- Newborns are at high risk for severe complications
  - Several reports of 2nd MRSA infection
  - No approved vaccine for infants <6 months of age
  - All care givers need to be free from possible transmission to this vulnerable population

*Zaman K et al. *N Engl J Med*. 2008;359:1555-1564.

Healthcare Workers

- **High risk**
  - High risk for disease [Symptomatic, Asymptomatic]
  - High risk for transmission of disease
  - Work absence/inefficiency due to illness
- **Mandatory vaccination programs**
  - Supported by a number of org: IDSA, AAP, ACP
  - State legislation varied acceptance/success…
  - Growing acceptance by healthcare systems
- **Evidence of adverse impact of low vaccine rates**

IDSA=Infectious Diseases Society of America; AAP= American Academy of Pediatrics; ACP= American College of Physicians
National Influenza Vaccine Summit. Prevent Influenza. Available at: http://www.preventinfluenza.org/profs_workers.asp.

Benefits/Obligations of Influenza Vaccine for Healthcare Providers

- As HCW we all have an obligation to protect our patients
  - Transmission may occur without illness
    - May be asymptomatic carriers
    - Infectious prior to onset of symptoms
  - Studies show reduced transmission after vaccination
- Protection form acute illness
  - For H1N1 greatest morbidity and mortality is in 'healthy' individuals aged 20–50
- Protection of family members (especially if very young or with medical conditions)
- Mandatory immunization of all HCW being proposed

Adult Vaccination Rates= POOR!

Population	Vaccine
Influenza	
High risk 19–49 years	33.4 %
[All] 50–64 years	40.1 %
≥ 65 years	65.6 %
HCW [19–64 years]	52.9 %
PPS-23	
High risk 19–49 years	17.5 %
≥ 65 years	60.6 %
Tetanus/Pertussis [19–64 years, since 2005]	**50.8 %**
Shingles [Zoster] age 60+	**10.0 %**
Hepatitis B Vaccine [High risk 19–49 years]	**41.8 %**
HPV Vaccine [women 19–26 years]	**17.1 %**

Centers for Disease Control and Prevention. 2009 Adult Vaccination Coverage, NHIS. Available at: http://www.cdc.gov/vaccines/stats-surv/nhis/2009-nhis.htm.

Summary

- Vaccines are some of the most effective and cost-effective preventive interventions
  - Have had significant impact on public health in last century
- Advances in scientific knowledge have led to major increases in the number of diseases which are vaccine-preventable
- Advances of vaccines are threatened by refusals due to irrational beliefs
- Responsible healthcare providers must increase education of public and encourage usage
- PRACTICE WHAT WE PREACH
  - Support Mandatory Influenza vaccination for HCWs
- “BE VACCINE CHAMPIONS”

Promoting Adult Immunization Against Vaccine-Preventable Diseases

Pertussis

Michael D. Hogue, PharmD, FAPhA
Associate Professor and Chair
Department of Pharmacy Practice
Samford University McWhorter School of Pharmacy
Birmingham, AL

Patient Case

- **65 year old women**
  - No chronic illnesses
  - Annual flu vaccination (due today for current season)
  - Tells you that she is about to become a new grandmother to twins!
    - 6-month-old adoptees from Belarus
- **The nurse administers the flu vaccine–but are there other vaccines recommended for this patient?**
  - Note: the patient does not have an immunization record, nor does she recall the last time she received a vaccine other than her annual flu shot.

Very Briefly

Hepatitis A vaccine is recommended for all previously unvaccinated persons who anticipate close personal contact (e.g. household contacts or regular babysitting) with an international adoptee from a country of high or intermediate endemicity during the first 60 days following arrival of the adoptee in the United States.

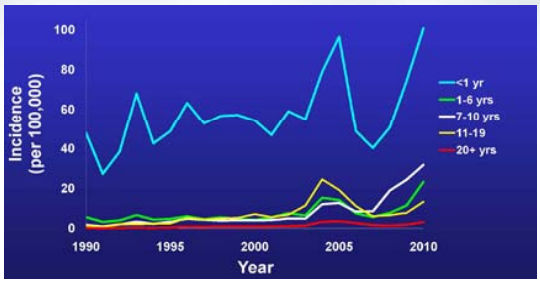
CDC (ACIP). *MMWR.* 2009;58(36):1006-1007.

Pertussis

- 16,858 cases of pertussis in 2009
- 12 infant deaths in 2009
- California–2010–9,143 cases; 10 infant deaths (52–year high)

Centers for Disease Control and Prevention. Vaccines and Immunizations. Available at: www.cdc.gov/vaccines.

Reported Pertussis Incidence by Age Group, 1990–2010



Centers for Disease Control and Prevention. National Notifiable Diseases Surveillance System, 2010. Available at: http://www.cdc.gov/vaccines/recs/acip/downloads/mtg-slides-feb11/02-2-pertus-surveil.pdf.

Pertussis Vaccine

- **Adacel (Sanofi Pasteur)**
  - FDA Approved ages 11 to 64 years
- **Boostrix (GSK)**
  - FDA Approved for all persons age ≥10 years

Note: FDA indications are for a minimum 5 year interval between Tdap doses… but ACIP has a differing view.

ACIP Recommendations: Tdap Vaccine

- Single dose for persons 11 to 18 years of age who have completed the childhood series.
- Single dose for children 7 to 10 years of age and who are not fully vaccinated against pertussis.
- Single dose for adults19 years and older.
- Tdap should be administered regardless of interval since the last tetanus-containing vaccine, especially if the patient will have contact with children <12 months of age.

CDC. *MMWR.* 2011;60(1):13-15.

ACIP Recommendations: Tdap Vaccine

- **For adults who have no record of receipt of a primary tetanus-vaccine immunization series**
  - 3 doses of vaccine
    - Dose 1: Tdap
    - Dose 2 and 3: Td
- **Pregnancy and Tdap**
  - Women of childbearing age should receive a single dose of Tdap prior to becoming pregnant.
  - Tdap should be administered to mothers prior to discharge following birth if no previous dose of Tdap.
  - Pregnancy Category C

Kretsinger K et al. *MMWR.* 2006;55(RR-17):1-37.

Promoting Adult Immunization Against Vaccine-Preventable Diseases

Herpes Zoster

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Herpes Zoster (Shingles)

Zoster Pathophysiology

- Reactivation of a latent Varicella zoster virus
  - Promptly or decades after chickenpox
- Trigger factors
  - Reduced immunocompetence
  - Trauma
  - Normal aging
- Lifetime risk of 32% in the US
  - 50% of those who live to age 85
- Estimated 1 million cases annually in the U.S.

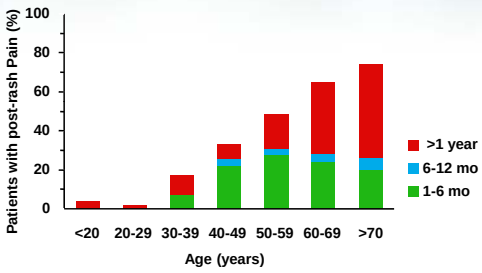
Centers for Disease Control and Prevention. Shingles (Herpes Zoster). Available at: www.cdc.gov/shingles/about/overview.html

Complications of Zoster

- **Scarring and keloid formation**
- **Visceral zoster and encephalitis**
- **Corneal damage and blindness**
- **Postherpetic neuralgia (PHN)**
  - Pain in the dermatome of rash after rash heals
  - Criteria: 90 (or 120) days after rash onset

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

Duration of Pain after Rash Heals Increases With Age



de Moragas JM, Kierland RR. *AMA Arch Derm.* 1957;75:193-196.

Varicella Zoster Vaccines
(Live, attenuated virus vaccines)

	Chicken Pox	Shingles
	Varivax	Zostavax
Licensed	1995	2006
Approved Age	≥2 years	≥50 years
Doses	Two	One
Strength (pfu)	1,350	19,400

Zostavax Clinical Trial

- Compared to the placebo, the vaccine group had:
  - 51% fewer episodes of zoster
  - less severe disease
  - 66% less postherpetic neuralgia
- No significant safety issues were identified

Oxman MN, et al. *N Engl J Med.* 2005;352:2271-84.

Screening for Zostavax

- Born in the US before 1980–assume to have had chickenpox*
- Screening for antibody not necessary or recommended before Zostavax
- But… if done and IgG negative–give 2 doses of Varivax

*except HCW, pregnant, immunocompromised

Harpaz R, et al. *MMWR.* 2008;57(RR-5):1-30.

Zostavax Contraindications

- Allergic reaction to a vaccine component (neomycin) or following a prior dose
- Pregnancy or planned pregnancy within 4 weeks
- Immunosuppression (including steroids), immune modulators, and HIV
- Antiviral therapy against herpes viruses

Harpaz R, et al. *MMWR.* 2008;57(RR-5):1-30.

Zostavax Side Effects

- Mild local and systemic reactions: 40–50%
  - Pain / tenderness
  - Erythema
  - Headache
- Almost all resolve in 4 days

Harpaz R, et al. *MMWR.* 2008;57(RR-5):1-30.

ACIP Recommendations for Zostavax

- Single dose for adults 60 years of age
- Even if previously had shingles
- Can give with Td, Tdap, or pneumococcal polysaccharide vaccine (per CDC)
- Can give to persons receiving blood products

Harpaz R, et al. *MMWR.* 2008;57(RR-5):1-30.

Increasing Immunization Rates in Your Practice

Don't Neglect the Other Adult Vaccines

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History of MMR

- The first measles vaccines (an inactivated and a live virus product) became available in 1963, both of which were largely replaced by a further attenuated live virus vaccine that was licensed in 1968
- The mumps vaccine: 1967
- The rubella vaccine: 1969
- These three vaccines were combined in 1971 to form the measles–mumps–rubella (MMR) vaccine

Measles, Mumps, Rubella Vaccine

- **You do NOT need the measles, mumps, rubella vaccine (MMR) if you:**
  - Are immune to MMR
  - Are a man born before 1957
  - Are a woman born before 1957 who is sure she is not having more children
  - Already had two doses of MMR *or* one dose of MMR plus a second dose of measles vaccine.
  - You already had one dose of MMR *and* are not at high risk of measles exposure

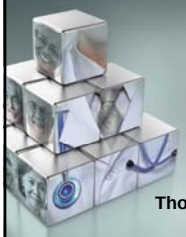
You SHOULD get the MEASLES vaccine if you are not among the listed, and:

- You are a college student, trade school student, or other student beyond high school
- You work in a hospital or other medical facility
- You travel internationally
- You are a woman of childbearing age

Mumps

- All adults born during or after 1957 should have documentation of one dose
- Adults at higher risk, such as university students, health care personnel, and international travelers, and persons with potential mumps outbreak exposure should have documentation of two doses of mumps vaccine or other proof of immunity to mumps

Increasing Immunization Rates in Your Practice



Adult Immunization: Role of the Clinician

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Professor, Internal Medicine; Master Teacher
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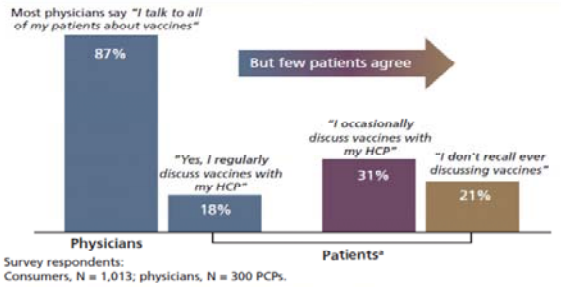
Threats to Vaccines

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

GA Poland and Jacobsen RM. *N Engl J Med.* 2011;364:97-99.

Physician-Patient Miscommunication

Recent Survey Indicates Miscommunication Between Physicians and Patients



Source: NFID Survey

INFLUENZA VACCINE

Reduction in Hospitalizations for Cardiac disease and Strokes
(Nichols et al. *NEJM* 348, April 3, 2003)

- Observational studies of large cohorts (140,000; 146,000), '98–'99 AND '99–'00, 3 HMOs, ≥ age 65
- Vaccination against influenza associated with reduction in hospitalization for:
  - Cardiac disease (19% both seasons)
  - Cerebrovascular disease (16%; 23%)
  - Pneumonia and influenza (32%; 29%)
  - All cause death (48%; 50%)
- Possible mechanisms: infections cause alterations in clotting factors, platelet aggregation, amount of inflammatory-response cytokines which enhance thrombosis

The Wars of the World: Saving Lives through Vaccination

Without the safe and effective vaccines that we too often take for granted now, more than 300 million who lived full and rewarding lives during the 20th century would have died prematurely of a vaccine-preventable disease. Compare this with the 160 million estimated to have been killed in all wars combined during the same century. Stated another way, vaccines saved twice as many lives as were lost in war during the most destructive 100 years in human history.

DW Kimberlin. *Inf Dis News*. Aug 1, 2011.

Increasing Immunization Rates in Your Practice

Utilizing a Multidisciplinary Approach in Adult Immunization

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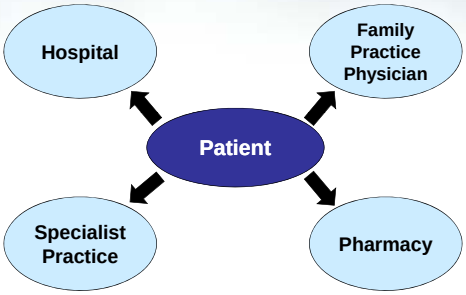
Opportunities for Immunization



Immunization Collaborative Practice

- Standing orders improve vaccination rates
  - CDC recommends broad, inclusive standing orders
- Documentation is important
  - Communication, reimbursement, cost–effectiveness
  - Utilize immunization registries

Increasing Immunization Rates in Your Practice

Quality Improvement and Meeting the Managed Care Requirements in Adult Immunization

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Quality Improvement & Immunization

- Immunization rates can be a 'target' indicator of quality preventive care
  - Measurement feasible in paper, electronic 'worlds'
  - Multiple steps afford opportunity for improvement
  - State registries may be a start
    - But maturity of registries is variable
    - How are data entered?
    - Carrot or stick for entry of data?

QI Project Method 1

- MUST have a champion
  - Buy in at all levels of practice
- Start small-scale
  - 10-20 chart 'snapshot' audit
  - Not looking for scientific sample
  - Where does the practice stand
    - Set a realistic goal [internal or external–HP 2010?]
    - If snapshot meets goal, is the goal high enough?
    - If goal is high enough and met–are data sufficient?
- What are the barriers to reaching goal?
- Prioritize perceived barriers

QI Project Method 2

- **Plan**
  - What is highest priority issue 'low hanging fruit'?
  - How can this be attacked?
- **Do**
  - Implement the intervention for fixed period of time
  - Rapid turn-around best [2–3 months or less]
- **Study**
  - Repeat small scale audit
  - What was the impact of intervention?
- **Act**
  - OK, intervention A achieved ___. What is next step to get us to goal….

QI Project Method 3

- Report data internally
- Repeat cycles until goal is achieved then move to another metric or revise goal and push to achieve the new goal

Increasing Immunization Rates in Your Practice

The Medical Home: Utilizing a Combination of Interventions in Improving Adult Immunization

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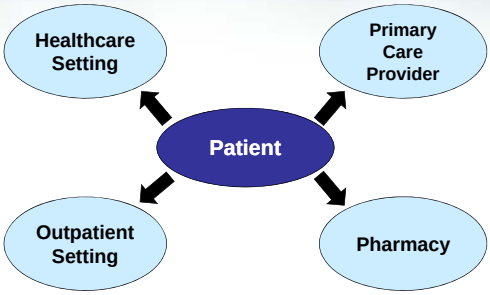
Opportunities for Immunization



Interventions When Implemented Alone

Intervention (*Enhance Access*)	Recommendation	Example
↑ access in healthcare settings	Insufficient evidence	Longer hours, more clinics, "drop-in"
↓ out-of pocket expenses	Insufficient evidence	Insurance, ↓ co-payments

CDC. *MMWR*. 2005;54(RR-5). (Task Force on Community Preventive Services).

Interventions When Implemented Alone

Intervention (Provider/System-Based)	Recommendation	Example
Provider reminders	**Recommended**	Chart related reminders, computer based
Provider education	Insufficient evidence	Written materials, videos, CME, computer based
Standing orders	Insufficient evidence	Protocol based vaccinations
Provider assessment/ feedback	Insufficient evidence	Retrospective chart review

CDC. *MMWR*. 2005;54(RR-5). (Task Force on Community Preventive Services).

Interventions When Implemented Alone

Intervention (↑Community/ Client Demand)	Recommendation	Example
Client reminders	Insufficient evidence	Phone, letters, postcards
Client education	Insufficient evidence	Clinic discussion, handouts
Community–wide education	Insufficient evidence	Radio, papers, TV, posters
Vaccination requirements	Insufficient evidence	Child care, school, LTCF, work

CDC. *MMWR*. 2005;54(RR-5). (Task Force on Community Preventive Services).

Combination Interventions Recommended

- One or both interventions to enhance access:
  - Expanded access in HC settings
  - Reducing client out–of–pocket costs

PLUS

- One or more provider–or system–based interventions:
  - Standing orders
  - Provider reminders
  - Assessment/feedback

AND/OR

- One or more to increase client demand:
  - Client reminders, client education

CDC. *MMWR*. 2005;54(RR-5). (Task Force on Community Preventive Services).

Increasing Immunization Rates in Your Practice

Role of the Pharmacist in Adult Immunization

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Adult Immunization Role of the Pharmacist

- Ability to identify high–risk patients
- Public trust & acceptance–Gallup Poll
- Practice guided by nationally adopted guidelines (ACIP)
- Knowledgeable vaccine resource
- 150,000 trained pharmacists to date

Pharmacist Authority to Administer Immunizations