

# The Importance of Adult Vaccines

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## Disclosure: Gregory A. Poland, MD, MACP, FIDSA

	Consultant	Other
Avianax, LLC	X	
Dynavax Technologies Corporation	X	
EMD Serono, Inc.	X	
Emergent BioSolutions™	X	
Liquidia Technologies	X	
Merck & Co., Inc.		X (Chair eDMC)
Novartis Vaccines and Diagnostics	X	
PaxVax, Inc.	X	
Theraclone Sciences	X	

- This educational tool will not include reference(s) to unlabeled or unapproved uses of drugs or devices



# Acknowledgement Statement and Disclosures

- This educational tool was developed by the Partnership for Adult Vaccination and Education (PAVE) and supported by an educational grant from GlaxoSmithKline
- The planning staff from the PAVE partners have nothing to disclose
- Developed by:



- Supported by:



# The Importance of Adult Vaccines: Key Points

- Vaccines save lives and prevent hospitalizations, disease, and disabilities
- Vaccines are safe and effective
- Vaccine recommendations in the US are evidence-based and reliable
- Vaccines are underutilized and important to use across the lifespan (“not just for kids”)
- Healthcare provider (HCP) recommendation is the single most important determinative factor in whether a patient receives a vaccine or not



# Impact of Vaccines During the 20th Century and Into the 21st Century

Disease	Reported Cases (Year)	Reported Cases (2009)	% Decrease in Reported Cases
Diphtheria	5796 (1950)	0	100%
Tetanus	486 (1950)	18	96%
Pertussis	120,718 (1950)	16,858	86%
Measles	319,124 (1950)	71	≥99%
Mumps	152,209 (1968)	1991	99%
Rubella	46,975 (1966)	3	99%
Hepatitis A*	32,859 (1966)	1987	94%
Hepatitis B*	26,611 (1985)	3405	87%



\*Underreporting estimated at a factor of 4.3 for hepatitis A and 2.8 for hepatitis B; thus, actual number of cases likely substantially higher than reported numbers of cases.  
 CDC. The Pink Book: slide sets. In: *Epidemiology and Prevention of Vaccine-Preventable Diseases. The Pink Book*; 2011. Available at: <http://www.cdc.gov/vaccines/pubs/pinkbook/pink-slides.htm>. Accessed July 11, 2011.

# Burden of Selected Vaccine-Preventable Diseases (VPDs)<sup>1</sup>

VPD	Burden
Influenza	200,000 excess hospitalizations annually (>40% in the elderly) ~24,000 excess deaths annually (~90% elderly)
Invasive Pneumococcal Disease (IPD)	~50,000 cases of bacteremia each year <ul style="list-style-type: none"> <li>• Higher rates in elderly and persons with comorbidities</li> <li>• Case fatality rates ~20% (up to 60% in the elderly)</li> </ul>
Hepatitis B	78,000 new infections annually (highest in young adults) <ul style="list-style-type: none"> <li>• 1 million with chronic hepatitis B virus infections</li> <li>• Complications include cirrhosis and hepatocellular carcinoma (80% of cases)</li> </ul>
Human Papillomavirus (HPV)	6.2 million new infections each year 2 HPV strains cause 70% of cervical cancer
Shingles	500,000 to 1 million cases annually; lifetime risk ~32% Shingles and postherpetic neuralgia increase with age
Pertussis	48,129 cases of pertussis in 2012 <sup>2</sup> Most severe in infants *Source often older child or adult



1. CDC. The Pink Book: slide sets. In: *Epidemiology and Prevention of Vaccine-Preventable Diseases. The Pink Book*; 2011. Available at: <http://www.cdc.gov/vaccines/pubs/pinkbook/pink-slides.htm>. Accessed July 11, 2011.  
 2. CDC. ACIP Presentation Slides: June 2013 Meeting. ACIP Pertussis Vaccines Working Group Presentation. Available at: <http://www.cdc.gov/vaccines/acip/meetings/downloads/slides-jun-2013/02-Pertussis-Acosta.pdf>. Accessed November 12, 2013.

# Recommended Adult Vaccines by Age Group

Vaccine	19-21 Years Old	22-26 Years Old	27-49 Years Old	50-59 Years Old	60-64 Years Old	≥65 Years Old
Influenza <sup>2,*</sup>	1 dose annually					
Tetanus, diphtheria, pertussis (Td/Tdap) <sup>3,*</sup>	Substitute 1-time dose of Tdap for Td booster; then boost with Td every 10 years					
Varicella <sup>4,*</sup>	2 doses					
HPV female <sup>5,*</sup>	3 doses					
HPV male <sup>5,*</sup>	3 doses					
Zoster <sup>6</sup>					1 dose	
MMR <sup>7,*</sup>	1 or 2 doses					
Pneumococcal polysaccharide (PPSV23) <sup>8,9</sup>				1 or 2 doses		1 dose
Pneumococcal 13-valent conjugate (PCV13) <sup>10,*</sup>	1 dose					
Meningococcal <sup>11,*</sup>	1 or more doses					
Hepatitis A <sup>12,*</sup>	2 doses					
Hepatitis B <sup>13,*</sup>	3 doses					

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

Recommended if some other risk factor is present (eg, on the basis of medical, occupational, lifestyle, or other indications)

No recommendation



HPV=human papillomavirus. MMR=measles, mumps, rubella.  
 \*Covered by the Vaccine Injury Compensation Program.  
 Please see full reference for additional important footnote information.  
 CDC. Recommended adult immunization schedule—United States—2013. Available at: <http://www.cdc.gov/vaccines/schedules/downloads/adult/adult-schedule.pdf>.  
 Accessed November 12, 2013.

# Recommended Adult Vaccines by Condition

Vaccine	Pregnancy	Immunocompromising Conditions (Excluding Human Immunodeficiency Virus [HIV]) <sup>1,4,7,10,15</sup>	HIV Infection <sup>4,7,10,14,15</sup> CD4+ T Lymphocyte Count	Men Who Have Sex With Men (MSM)	Heart Disease, Chronic Lung Disease, Chronic Alcoholism	Asplenia <sup>10,14</sup> (including Elective Splenectomy and Persistent Complement Deficiencies)	Chronic Liver Disease	Kidney Failure, End-Stage Renal Disease, Receipt of Hemodialysis	Diabetes	Healthcare Personnel
Influenza <sup>2,*</sup>		1 dose IV annually	<200 cells/ $\mu$ L	≥200 cells/ $\mu$ L	1 dose IV or LAIV annually					1 dose IV or LAIV annually
Td/Tdap <sup>3,*</sup>	1 dose Tdap each pregnancy	Substitute 1-time dose of Tdap for Td booster; then boost with Td every 10 years								
Varicella <sup>4,*</sup>		Contraindicated								2 doses
HPV female <sup>5,*</sup>		3 doses through age 26 years								3 doses through age 26 years
HPV male <sup>5,*</sup>		3 doses through age 26 years								3 doses through age 21 years
Zoster <sup>6</sup>		Contraindicated								1 dose
MMR <sup>7,*</sup>		Contraindicated								1 or 2 doses
Pneumococcal polysaccharide (PPSV23) <sup>8,9</sup>										1 or 2 doses
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 Accessed November 12, 2013.

## Baseline Vaccination Rates vs Healthy People 2020 Goals: Gaps Persist

Vaccine and Target Group	Baseline Rate (Year)	Healthy People 2020 Goal
<b>Influenza vaccine</b>		
Noninstitutionalized adults 18 to 64 years old	25% (2008)	80%
Noninstitutionalized high-risk adults 18 to 64 years old	39% (2008)	90%
Noninstitutionalized adults 65 years old and older	67% (2008)	90%
Institutionalized adults 18 years old and older	62% (2006)	90%
Healthcare personnel	45% (2008)	90%
Pregnant women	28% (2008)	80%
<b>Pneumococcal vaccine</b>		
Adults 65 years old and older	60% (2008)	90%
High-risk adults under 65 years old	17% (2008)	60%
Institutionalized adults	66% (2006)	90%
<b>Zoster vaccine</b>		
Adults 60 years old and older	7% (2008)	30%
<b>Hepatitis B vaccine</b>		
Healthcare personnel	64% (2008)	90%



USDHHS. Healthy People 2020. Available at: <http://www.healthypeople.gov/2020/default.aspx>. Accessed July 12, 2011.

## Impact of Influenza: United States

- Average of ~24,000 deaths/year from 1976-2007<sup>1</sup>
- Together with pneumonia, influenza was the 8th leading cause of death in the United States, and the 6th leading cause of death among older adults in 2007<sup>2</sup>
- >200,000 excess hospitalizations/year<sup>1</sup>



1. CDC. The Pink Book: slide sets. In: *Epidemiology and Prevention of Vaccine-Preventable Diseases. The Pink Book*; 2012. Available at: <http://www.cdc.gov/vaccines/pubs/pinkbook/downloads/11-llu.pdf>. Accessed November 12, 2013.

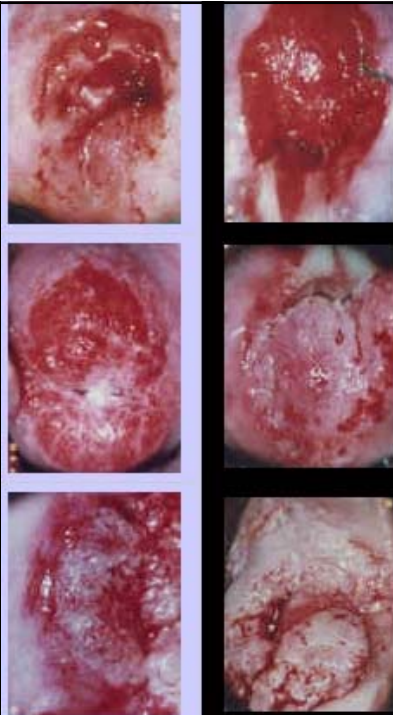
2. Healthy States Initiative. Increasing vaccination rates in adults: legislator policy brief. Available at: <http://www.healthystates.csg.org/NR/rdonlyres/E921A0B1-CBD5-4A29-8C93-8612CA6E2E77/0/IncreasingVacLPB.pdf>. Accessed July 11, 2011.

# Pneumococcus Epidemiology

- Annual burden of disease in the US:
  - 500,000 cases of pneumonia<sup>1</sup>
  - 50,000 cases of bacteremia<sup>2</sup>
  - 3000 cases of meningitis<sup>2</sup>
  - 5000-20,000 deaths
- World-wide increase in drug-resistant strains



1. CDC. *MMWR Recomm Rep*. 1996;45(RR-1 suppl):1-20.  
2. CDC. Pneumococcal disease. In: *Epidemiology and Prevention of Vaccine-Preventable Diseases: The Pink Book*; 2011. Available at: <http://www.cdc.gov/vaccines/pubs/pinkbook/downloads/pneumo.pdf>. Accessed July 11, 2011.



## Human Papillomavirus Infection

International Network on Control of Gynaecological Cancers.  
Unaided Visual Inspection of the Cervix "Clinical Downstaging" Picture Atlas. Available at: [http://www.gfmer.ch/Books/Cervical\\_cancer\\_modules/Unaided\\_visual\\_inspection\\_atlas.htm](http://www.gfmer.ch/Books/Cervical_cancer_modules/Unaided_visual_inspection_atlas.htm). Accessed July 22, 2011.

# HPV in the United States

- Each year in the US:
  - 360,000 new cases of genital warts<sup>1</sup>
  - 2 million new cases of low to high grade cervical dysplasia<sup>2</sup>
  - 11,000 new cases of cervical cancer<sup>3</sup>
  - 3800 deaths due to cervical cancer<sup>3</sup>



1. CDC. Genital HPV Infection Fact Sheet. Available at: <http://www.cdc.gov/std/hpv/stdfact-hpv.htm>. Accessed November 12, 2013.  
 2. Schiffman M, Solomon D. *Arch Pathol Lab Med*. 2003;127(8):946-949.  
 3. CDC. Human papillomavirus. In: *Epidemiology and Prevention of Vaccine-Preventable Diseases: The Pink Book*; 2011. Available at: <http://www.cdc.gov/vaccines/pubs/pinkbook/downloads/hpv.pdf>. Accessed July 11, 2011.

# Reported Cases of Tetanus, Diphtheria, and Pertussis in the United States

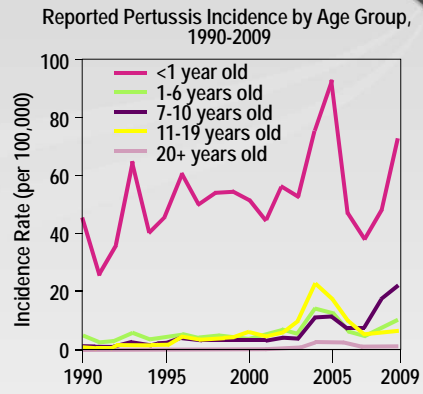
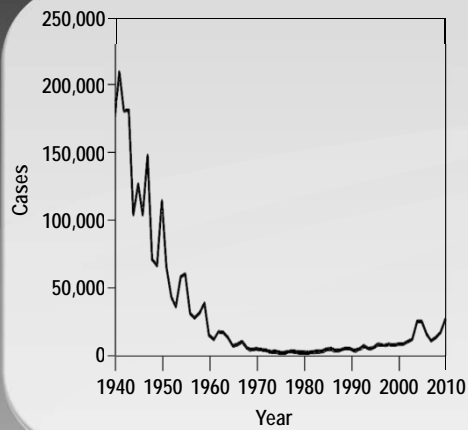
Disease	Annual Number of Cases		
	20 <sup>th</sup> Century <sup>1</sup>	2005 <sup>2</sup>	2009
Tetanus	~1314	27	18 <sup>3</sup>
Diphtheria	~175,885	0	Only 5 cases reported since 2000 <sup>4</sup>
Pertussis	~142,271	25,616	16,858 <sup>5</sup>

48,129 cases of pertussis in 2012<sup>6</sup>



1. CDC. *MMWR Morb Mortal Wkly Rep*. 1999;48(12):243-248.  
 2. CDC. *MMWR Morb Mortal Wkly Rep*. 2006;55(32):880-881.  
 3. CDC. Tetanus. In: *Epidemiology and Prevention of Vaccine-Preventable Diseases*; 2011. Available at: <http://www.cdc.gov/vaccines/pubs/pinkbook/downloads/tetanus.pdf>. Accessed July 11, 2011.  
 4. CDC. Diphtheria. In: *Epidemiology and Prevention of Vaccine-Preventable Diseases: The Pink Book*; 2011. Available at: <http://www.cdc.gov/vaccines/pubs/pinkbook/downloads/dip.pdf>. Accessed July 11, 2011.  
 5. CDC. *MMWR Morb Mortal Wkly Rep*. 2011;60(1):13-15.  
 6. CDC. ACIP Presentation Slides: June 2013 Meeting. ACIP Pertussis Vaccines Working Group Presentation. Available at: <http://www.cdc.gov/vaccines/acip/meetings/downloads/slides-jun-2013/02-Pertussis-Acosta.pdf>. Accessed November 12, 2013.

# Pertussis—United States, 1940-2010



CDC. The Pink Book: slide sets. In: *Epidemiology and Prevention of Vaccine-Preventable Diseases. The Pink Book*. 2012. Available at: <http://www.cdc.gov/vaccines/pubs/pinkbook/downloads/15-Pert.pdf>. Accessed November 12, 2013.  
CDC. ACIP Presentation Slides: June 2011 Meeting. ACIP Pertussis Vaccines Working Group Presentation. Available at: <http://www.cdc.gov/vaccines/recs/acip/downloads/mtg-slides-jun1105-1-pertuss-intro.pdf>. Accessed July 21, 2011.



## Shingles

CDC. Photos of shingles. Available at: <http://www.cdc.gov/shingles/about/photos.html>. Accessed July 29, 2011.



## Incidence of Herpes Zoster (Shingles)

- Estimated 1 million cases in the US annually<sup>1</sup>
- Lifetime risk ~32% (50% of those living to age 85)<sup>1</sup>
- Postherpetic Neuralgia (PHN) in 1/3 of patients with shingles



1. CDC. Varicella. In: *Epidemiology and Prevention of Vaccine-Preventable Diseases. The Pink Book*; 2011. Available at: <http://www.cdc.gov/vaccines/pubs/pinkbook/downloads/varicella.pdf>. Accessed July 11, 2011.

## Every Patient, Every Encounter

- Joint Statement of Medical Societies
- Primary and subspecialty physicians should conduct immunization review at appropriate adult medical visits
- Provide or refer patients for recommended immunizations
- Ensure appropriate documentation in the medical record and registries
- HCPs should be immunized consistent with CDC recommendations



CDC=Centers for Disease Control and Prevention  
ACP and IDSA. Joint Statement of Medical Societies Regarding Vaccination by Physicians.  
Available at: [http://www.acponline.org/clinical\\_information/resources/adult\\_immunization/acp\\_idsa\\_statement.pdf](http://www.acponline.org/clinical_information/resources/adult_immunization/acp_idsa_statement.pdf). Accessed July 12, 2011.