



**Influenza, Pneumonia, and Shingles, Oh My!**

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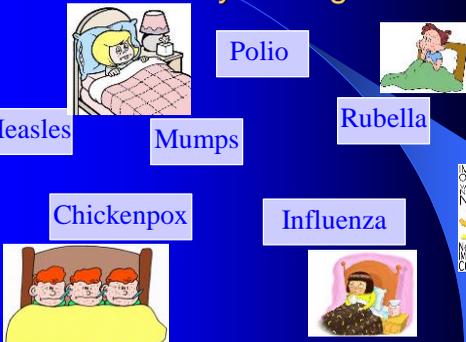
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Vaccines for Adults??  
I thought they were just for kids. . .



2

Just 60 years ago



Measles      Polio      Rubella  
Mumps  
Chickenpox      Influenza



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**The Really GREAT News:**

Vaccines have **dramatically** reduced morbidity and mortality from disease for people of all ages

**Immunization Works!**



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**Comparison of Cases Pre-Vaccine 2016**

Smallpox	29,005	0
Diphtheria	175,885	0
Measles	530,282	69
Mumps	162,344	5,311
Pertussis	200,752	15,737
Polio (paralytic)	16,316	0
Rubella	47,745	5
Congenital Rubella Syndrome	152	1
Tetanus	580	33
H. influenzae	20,000	22

*Thanks to vaccines!*

Data from CDC's MMWR, Jan 6, 2017

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## Adult Immunity

- By the time a child reaches adulthood, he/she should have received vaccinations for over 16 common childhood diseases
- Immunization boosters are needed for some diseases through adulthood
- New vaccines are constantly being developed that adults may need




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## 16 Diseases Children are Currently Protected Against

- Measles
- Mumps
- Rubella (German measles)
- Varicella (chickenpox)
- Hepatitis B
- Hepatitis A
- Polio
- Rotavirus
- Influenza
- Diphtheria
- Tetanus
- Pertussis (whooping cough)
- Haemophilus Influenzae Type B (bacterial meningitis)
- Pneumococcal Disease
- Human Papilloma Virus
- Meningococcal Meningitis

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## Doesn't Immunity Last Forever?



- Boosters
- Influenza, new strains
- Adults who *were never vaccinated* as children
- New vaccines
- With age, people become more susceptible to serious disease caused by common infections like flu and pneumonia



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## Vaccines Adults May Need:

- Influenza
- Tdap booster
- Tetanus diphtheria booster (Td)
- Pneumococcal: two vaccines
- Hepatitis B
- Hepatitis A
- Measles Mumps Rubella (MMR)
- Varicella (chickenpox)
- Herpes Zoster (Shingles)
- Human Papilloma Virus
- Special vaccines



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### Adult Immunization Schedule 2018

**Figure 1. Recommended immunization schedule for adults aged 19 years or older by age group, United States, 2018**  
This figure should be reviewed with the accompanying text on the right. The figure and the text describe indications for each vaccine, their preferred administration, timing for administration of two initial doses.

Vaccine	19-21 years	22-26 years	27-49 years	50-64 years	≥65 years
Influenza <sup>a</sup>			1 dose annually		
Tdap <sup>a</sup> or Td <sup>b</sup>			1 dose Tdap, then Td booster every 10 yrs		
MMR <sup>a</sup>			1 or 2 doses depending on indication (if born in 1957 or later)		
VAR <sup>a</sup>			2 doses		
RZV <sup>a</sup> (preferred) or ZVL <sup>a</sup>				2 doses RZV (preferred) or 1 dose ZVL	
HPV-Female <sup>a</sup>	2 or 3 doses depending on age at series initiation				
HPV-Male <sup>a</sup>	2 or 3 doses depending on age at series initiation				
PCV13 <sup>a</sup>				1 dose	
PPSV23 <sup>a</sup>			1 or 2 doses depending on indication		1 dose
HepA <sup>a</sup>			2 or 3 doses depending on vaccine		
HepB <sup>a</sup>			3 doses		
MenACWY <sup>a</sup>			1 or 2 doses depending on indication, then booster every 5 yrs if risk remains		
MenB <sup>a</sup>			2 or 3 doses depending on vaccine		
Hib <sup>a</sup>			1 or 3 doses depending on indication		

**Legend:**  
 Recommended for adults who meet the age requirement, lack documentation of vaccination, or lack evidence of past infection  
 Recommended for adults with other indications  
 No recommendation



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**Figure 2. Recommended immunization schedule for adults aged 19 years or older by medical condition and other indications, United States, 2018**  
This figure should be reviewed with the accompanying text on the right. The figure and the text describe indications for each vaccine, their preferred administration, timing for administration of two initial doses.

Vaccine	Pregnant <sup>a</sup>	Immunocompromised (including HIV infection) <sup>a</sup>	RV infection (due to recent birth) <sup>a</sup>	Asplenia, complement deficiency <sup>a</sup>	End-stage renal disease, on hemodialysis <sup>a</sup>	Heart or lung disease, alcoholism <sup>a</sup>	Chronic liver disease <sup>a</sup>	Diabetes <sup>a</sup>	Health care personnel <sup>a</sup>	Men who have sex with men <sup>a</sup>
Influenza <sup>a</sup>										
Tdap <sup>a</sup> or Td <sup>b</sup>	3 doses, 1 day each, postpartum									
MMR <sup>a</sup>	contraindicated									
VAR <sup>a</sup>	contraindicated									
RZV <sup>a</sup> (preferred) or ZVL <sup>a</sup>	contraindicated									
HPV-Female <sup>a</sup>										2 or 3 doses through age 26 yrs
HPV-Male <sup>a</sup>										2 or 3 doses through age 26 yrs
PCV13 <sup>a</sup>										1 dose
PPSV23 <sup>a</sup>										1, 2, or 3 doses depending on indication
HepA <sup>a</sup>										2 or 3 doses depending on vaccine
HepB <sup>a</sup>										3 doses
MenACWY <sup>a</sup>										1 or 2 doses depending on indication, then booster every 5 yrs if risk remains
MenB <sup>a</sup>										2 or 3 doses depending on vaccine
Hib <sup>a</sup>										3 doses MCT or 4 doses 1 dose

**Legend:**  
 Recommended for adults who meet the age requirement, lack documentation of vaccination, or lack evidence of past infection  
 Recommended for adults with other indications  
 Contraindicated  
 No recommendation

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## Let's look closer at these Adult Vaccines

- Influenza
- Pneumococcal Pneumonia
- Herpes Zoster (Shingles)
- Tdap

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## Cost Burden of 4 Adult Vaccine-Preventable Diseases in Persons Age 65 Years and Older, United States, 2013

Vaccine-Preventable Disease	Estimated # of CASES	Estimated COSTS (Medical & Indirect) (in millions)
Influenza	4,019,759	8,312.8
Pneumococcal	440,187	3,787.1
Zoster	555,989	3,017.4
Pertussis	207,241	212.5
		<b>\$15,329.8</b>

Additional **\$11.2 billion** in costs if ages 50 – 64 years included

McLaughlin, JM, Tan L., et al. *J Primary Prevent* (2015) 36:259 – 273. Slide courtesy of LJ Tan

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## Cost Burden of Adult Vaccine-Preventable Diseases, 50 years and older, 2015

**Unvaccinated individuals are responsible for almost 80 percent of the financial burden!**

Ozawa et al. 2016. *Health Affairs* 35(11): 2124–2132. Slide courtesy of LJ Tan

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## How do I know which vaccines a patient has had? And when?

- NMSIIS
  - Online database that tracks vaccines administered in New Mexico (All ages)
- Immunization cards
- EMRs
- Since 2013, in NM, all vaccines administered must be entered into NMSIIS

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## Influenza: Who needs to get the vaccine?

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## Influenza Vaccine Recommendations

Recommended every year for EVERYONE >6 months who is not medically contraindicated

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Influenza is contagious to those who are not immune...



Albuquerque Journal, Feb. 3, 2009

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Influenza, How bad is it?

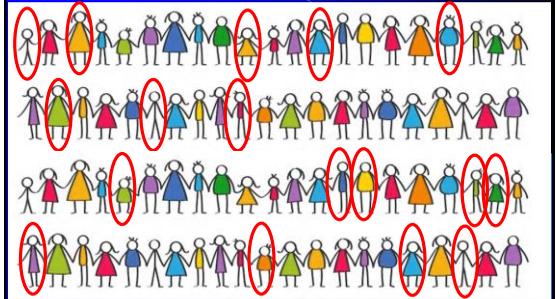
Is it a cold or flu?



Signs and Symptoms	Influenza	Cold
Symptom onset	Abrupt	Gradual
Fever	Usual	Rare
Aches	Usual	Slight
Chills	Fairly common	Uncommon
Fatigue, weakness	Usual	Sometimes
Sneezing	Sometimes	Common
Stuffy nose	Sometimes	Common
Sore throat	Sometimes	Common
Chest discomfort, cough	Common	Mild to moderate
Headache	Common	Rare

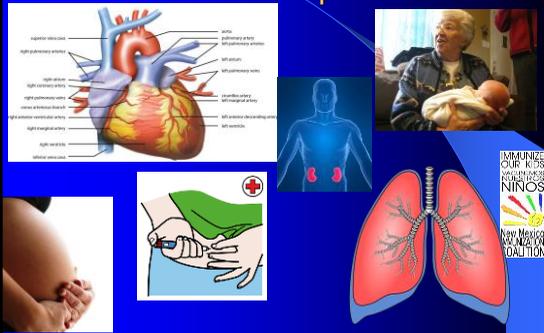
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Annual US Influenza Impact  
(regular seasonal)



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Conditions that increase the risk of influenza complications:



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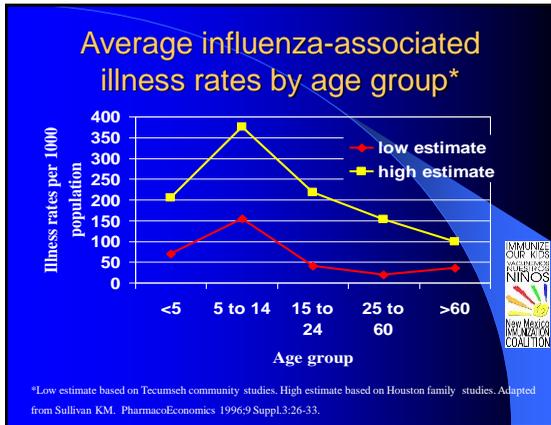
Impact of influenza on pregnant women<sup>1</sup>

- Up to 4X increased risk of hospitalization, especially in third trimester, and for those with co-morbid conditions\*
- Up to 8X increased risk for influenza-associated complications, including death, particularly for those with co-morbid conditions\*\*
- Increased risk for influenza-associated complications among postpartum women
- Risk highest during the first postpartum week

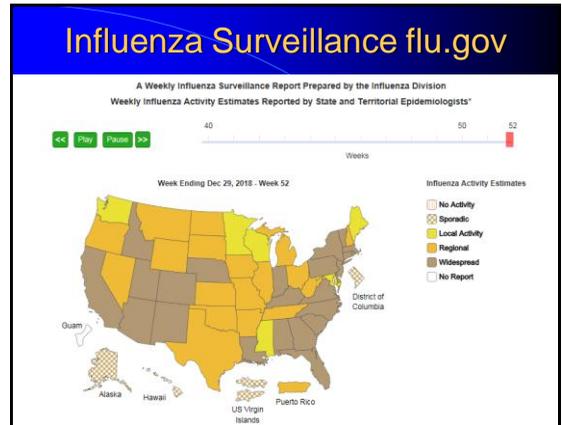
\* Chronic cardiac disease, chronic pulmonary disease, diabetes mellitus, chronic renal disease, malignancies, and immunosuppressive disorders  
 \*\* Preexisting diabetes mellitus, pulmonary disease that included asthma, heart disease, renal disease, and anemia  
 1. Remington, S.A., et al. 2012. American Journal of Obstetrics & Gynecology; 207(3):S3 - S8.

Slide courtesy of LJ Tan

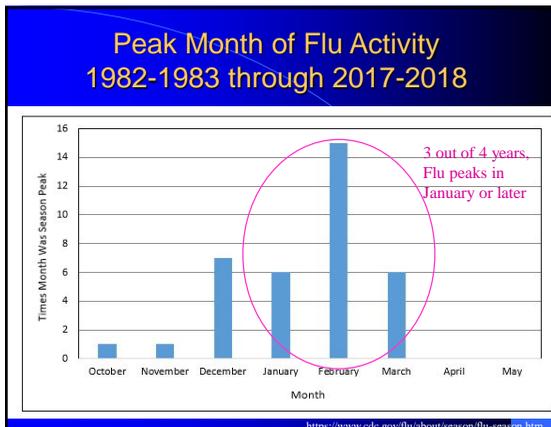
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### Influenza Vaccine many choices

Stay informed of the current vaccine options so you can counsel your patients about what are the available vaccines for their age and risk group

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### Vaccine Effectiveness

- Influenza vaccine effectiveness varies annually based on
  - Antigenic match
  - Age and health of person being vaccinated. About 60-70% in younger adults and about 30% in adults 65 years and older against medically-attended influenza with a good match<sup>1</sup>
- Can also prevent the cascading effect in frail seniors
- Vaccine Preventable Disability<sup>2</sup>!

1. CDC. MMWR 2013; 62(RR07):1-43.  
2. McElhaney et al. 2016. Eur Geriatr Med; 7:171-75.

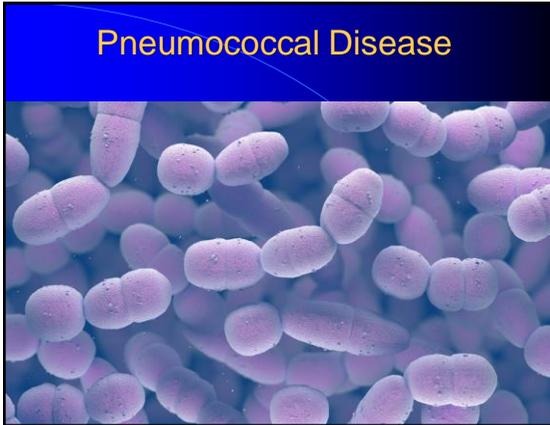
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### Burden of Influenza Disease Among U.S. Adults

- Influenza<sup>1</sup>
  - 3,000 to 49,000 total related deaths per year
  - ~90% of deaths are among adults 65 years and older

1. Ramirez et al. 2017. [Published online ahead of print July 28, 2017]. Clin Infect Dis. doi:10.1093/cid/ciw647.

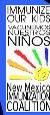
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## Pneumococcal Disease

- Accounts for more deaths than any other vaccine-preventable bacterial disease
- Can lead to pneumonia, bacteremia and meningitis
- Treatment of pneumococcal disease is growing more difficult due to resistance to antibiotics
- **Prevention through immunizations is best**



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## Burden of Vaccine-preventable Disease Among U.S. Adults

- Invasive pneumococcal disease (IPD)<sup>1</sup>
  - 30,400 total cases and 3,690 total deaths in 2016
  - 81% of all IPD deaths in adults 50 and older
  - 649/100K patients hospitalized annually with community acquired pneumonia (CAP); 6.5% mortality<sup>2</sup>



1. CDC. 2016. Active Bacterial Core Surveillance Report, Emerging Infections Program Network, Streptococcus pneumoniae, 2016.

Slide courtesy of LJ Tan

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## Vaccine Effectiveness in the Adult Population

- Vaccine effectiveness (VE) varies by vaccine type, the disease outcome, and the age or health of the person vaccinated
  - 45% against vaccine-type pneumococcal pneumonia, and 75% against vaccine-type invasive pneumococcal disease among adults age  $\geq 65$  years<sup>1</sup>



1 Bonten MJ, et al. NEJM 2015;372:1114-25.

Slide courtesy of LJ Tan

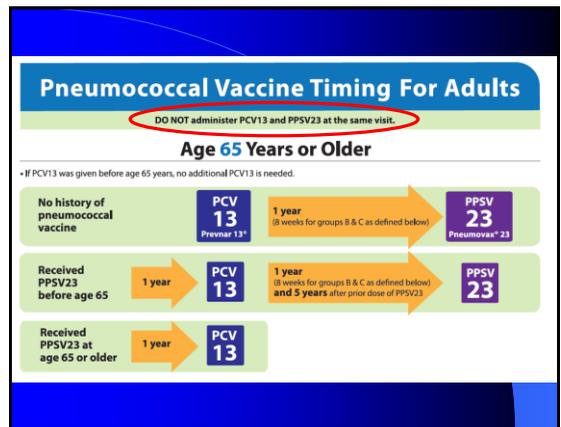
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## Pneumococcal Vaccine

- PCV13 (Prevnar)
- PPSV23 (Pneumovax)
- Over 65 years old
- 19-64 with risk factors
- Covered by Medicare Part B




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### Age 19-64 Years With Underlying Condition(s)

- Prior doses count toward doses recommended below and do not need to be repeated.
- If PPSV23 given previously – wait one year before giving PCV13
  - for group B, wait at least five years before giving a second dose of PPSV23
- No more than two doses of PPSV23 recommended before 65th birthday and one dose thereafter.

**A. Smoker, Long-term facility resident, or Chronic conditions:**

- heart disease (including hypertension)
- lung disease (including asthma)
- liver disease (including cirrhosis)
- diabetes
- alcoholism

8 weeks

5 years

**B. Immunocompromised (including HIV infection), Chronic renal failure, Nephrotic syndrome, or Asplenia**

8 weeks

**C. CSF leaks or Cochlear implants**

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## Pneumococcal Polysaccharide Vaccine (PPSV23-Pneumovax)

- Protects against 23 types of pneumococcal bacteria
- Protection develops within 2-3 weeks of getting the shot for most healthy adults
- Elders, children under 2 and people with some long-term illnesses might not respond as well or at all

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## Pneumococcal Conjugate Vaccine (PCV13-Prevnar)

- Protects against 13 types of pneumococcal bacteria
- Better immune response than PPSV23

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## Pneumococcal Vaccine Who should get it?

- All adults 65 years or older
- Children younger than 2 (PCV13)
- Anyone over age 2 who has long-term health problems
- Anyone over age 2 who has a compromised immune response or is taking any drug or treatment that lowers the body's resistance to infection

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## Herpes Zoster (Shingles)

About 1 million cases of zoster annually in U.S.

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## Herpes Zoster (Shingles)

- Shingles is reactivation of chickenpox, so if a person had chickenpox, they are at risk for shingles (almost everyone born before 1980 had chickenpox)
- About 20-30% of the population will have shingles in their lifetime. For people over 85 years old, the risk increases to 50%

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## Herpes Zoster (Shingles)

- Painful skin rash caused by the varicella zoster virus
- After you have chickenpox, the virus stays in your body and can reactivate and cause shingles later in life
- Shingles is PAINFUL!
- Post Herpetic Neuralgia syndrome (about 20%)
- Can cause chickenpox in non-immune people



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## Herpes Zoster Vaccine

- Two vaccines:
  - Zostavax licensed 2006
  - Shingrix licensed 2017
- Boosts immunity against Varicella virus
- Shingrix is now preferred
  - Better protection
- Shingrix needs 2 doses, 6 months apart



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## Shingrix

- Recommended for people 50 years and over
- Immune response is over 90%
- Not a treatment if already suffering from Shingles or post herpetic neuralgia



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## Shingles Vaccine

- Covered by Medicare Part D
- Should be covered by private insurance for those younger than 65
- Revaccinate with Shingrix if received Zostavax previously
- Currently delays in getting Shingrix, but should be more readily available by summer of 2019



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## RZV Zoster Vaccine: Shingrix®

- Storage: Store vaccine AND diluent in the refrigerator between 2°C and 8°C (36°F and 46°F)
- Preparation: Reconstitute the vaccine with the diluent (adjuvanted) supplied by the manufacturer just before administering
- Schedule: 2 doses, 2 to 6 months apart
- Route: IM Injection
  - Site: deltoid or the thigh may be used if necessary
  - Needle gauge: 22–25 gauge
  - Needle length: varies by age/weight
- May administer during the same clinical visit as other needed vaccines.
  - Administer in a separate limb from other vaccines, if possible



MMWR 2018;67(3):103–108

Slide courtesy of LJ Tan

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## ACIP Zoster Recommendations

- Persons 50 years of age and older should be vaccinated with zoster vaccine
- Administer 2 doses of Shingrix® to immunocompetent persons
  - Regardless of previous history of vaccination with varicella-containing vaccines – Varivax® or Zostavax®
  - Separate Shingrix® and varicella-containing vaccines by at least 8 weeks
- Shingrix® is preferred to Zostavax® for persons 60 years and older

MMWR 2018;67(3):103–108 Slide courtesy of LJ Tan

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## RZV (Shingrix®) Adverse Reactions

Local reactions	49%
Local reactions – Grade 3	9.4%
Systemic reactions (headache, malaise, fatigue)	45-78%
Systemic reactions (headache, malaise, fatigue) – Grade 3	11%

MMWR 2018;67(3):103–108 Slide courtesy of LJ Tan

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## Adverse Reactions after Shingrix®

- Educate patients regarding:
  - Potential adverse reactions, including injection site and systemic reactions
  - The need for a second dose—even if s/he has an adverse reaction
- Offer comfort measures and strategies

MMWR 2018;67(3):103–108 Slide courtesy of LJ Tan

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## Shingrix® Vaccine Administration Errors (reported to VAERS)

- Wrong route: Subcutaneous route rather than IM
- Wrong age: Administered to persons less than 50 years of age
- Wrong vaccine: Shingrix® instead of varicella (Varivax®) vaccine
- Improper storage: Administered after frozen storage
- Wrong preparation: Administered the adjuvanted diluent only
- Wrong schedule: Interval violations between doses of Shingrix® or a previous dose of varicella-containing vaccine
- Other errors we have heard about:
  - Staff unaware of the need for a second dose
  - Staff thinks Zostavax® can count toward completing the 2-dose Shingrix® series

MMWR 2018;67(3):103–108 Slide courtesy of LJ Tan

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## Tetanus

MMWR 2018;67(3):103–108 Slide courtesy of LJ Tan

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## Tetanus Diphtheria Booster

- All adults need a Td booster every 10 years
- Adults with a deep wound or dirty abrasion may need a Td booster if it has been >5 years since their last booster
- Since 1980, >70% of tetanus cases have been in adults older than 40
- About 30 cases each year

MMWR 2018;67(3):103–108 Slide courtesy of LJ Tan

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## A few words about Pertussis (Whooping Cough)



It's not just a problem for children...

Child with paroxysmal cough of pertussis  
Photograph courtesy of the WHO



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## Common Symptoms of Adolescent or Adult Pertussis

- Cough 97%  $\geq$  3 weeks, 52%  $\geq$  9 weeks
- Spasms or coughing fits  $\geq$  3 weeks in 73%
- Whoop in 69%
- Vomiting after coughing in 65%
- Teens missed average 5 days of school; Adults missed average 7 days of work
- Average 14 days of disrupted sleep

De Serres et al. *J Infect Dis.* 2000;182:174-9.

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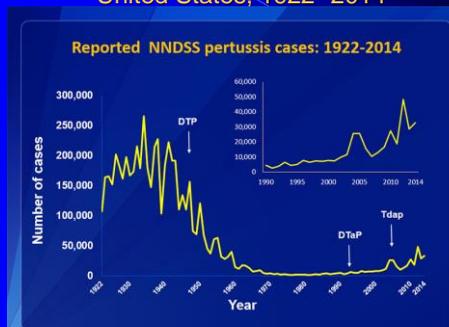
## Pertussis in Adults

- Accounts for up to 7% of cough illnesses per year
- Disease is milder in adults than in children and is often not recognized
- Adults are the major source of infection for children



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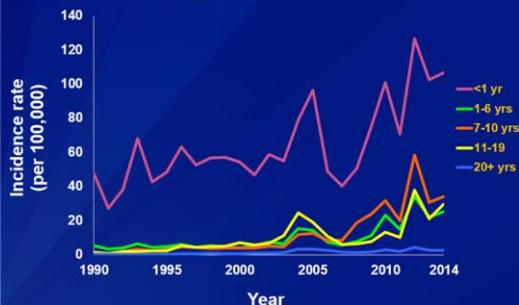
## Reported Pertussis Cases by Year United States, 1922 -2014



SOURCE: CDC, National Notifiable Diseases Surveillance System and Supplemental Pertussis Surveillance System and 1922-1948, passive reports to the Public Health Service.

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## Reported pertussis incidence by age group: 1990-2014



SOURCE: CDC, National Notifiable Diseases Surveillance System and Supplemental Pertussis Surveillance System.

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## Tdap Vaccine can protect Teens and Adults from Pertussis

\*\*Important side benefit: we protect the most vulnerable too—by immunizing teens and adults we protect infants who are too young to receive vaccine or who have not completed all of the series and are therefore not yet fully immune



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## Who should get Tdap:

- Teens 11-12 years of age should receive a single dose of Tdap instead of Td
- Teens 13-18 years who have not received Td should receive a single dose of Tdap as their catch-up booster instead of Td



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## Who should get Tdap:

- Adults (19+) who are in need of a Td booster (every 10 years) should receive a single dose of Tdap
- Anyone who will be around an infant should get Tdap to protect not only themselves, but the vulnerable baby
- Healthcare Workers
- Pregnant women, **one dose during each pregnancy**



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## Burden of Vaccine-preventable Disease Among U.S. Adults

- Pertussis<sup>1</sup>
  - 15,808 total reported cases 2017
  - 3,429 among adults 20 years of age & older



1. CDC. 2017 Final Pertussis Surveillance Report. <http://www.cdc.gov/ncez/nndss/diseases/pertussis-surv-report-2017.pdf>.

Slide courtesy of LJ Tan

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## So how are we doing in terms of vaccinating Adults?

- Not so great—LOTS of room for improvement
  - Influenza, age  $\geq 65$  ~65%
  - Pneumococcal Pneumonia, age  $\geq 65$  ~64%
  - Pneumococcal Pneumonia high risk, ages 19-64 ~23%
  - Zoster, age  $\geq 60$  ~31%
  - Tetanus, age  $\geq 65$  ~57%



Williams, W.W. et al. *MMWR* Surveillance Summary 2017;66(11):1-28

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## How do we increase Adult Vaccine uptake?

- Assess patient's vaccine status at every visit
- Educate the patient and make a strong recommendation from the health care provider!
- Vaccinate at the same visit and document
- Standing Orders
- Reminder Recalls
- Reduce patient's out of pocket costs for vaccines



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## Vaccines Benefit Everyone

- Save lives
- Save money
- Keep us healthy
- Protect those who can't be immunized through "herd immunity"



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## For more information:

New Mexico Immunization Coalition  
505-272-3032

[Apentler@unm.edu](mailto:Apentler@unm.edu)

<http://hsc.unm.edu/programs/nmimmunization>

New Mexico Department of Health  
Immunization Program

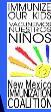
505-827-0219

<http://www.immunizeNM.org>

Centers for Disease Control and Prevention

<http://www.cdc.gov/vaccines/>

800-CDC-INFO



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## Thank you!

## Any Questions?



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