



Vaccine Preventable Diseases Among Adults

Stephanie Borchardt, MPH, PhD
Wisconsin Immunization Program
Division of Public Health
Wisconsin Department of Health Services
May 18, 2017



At a Glance

- Burden of vaccine preventable diseases
- Vaccines recommended for adults (age- and risk-indicated)
- Statewide vaccination rates for adults
- What the Wisconsin Immunization Registry can do for you
- Adult Immunization Standards
- Case studies



Abbreviations

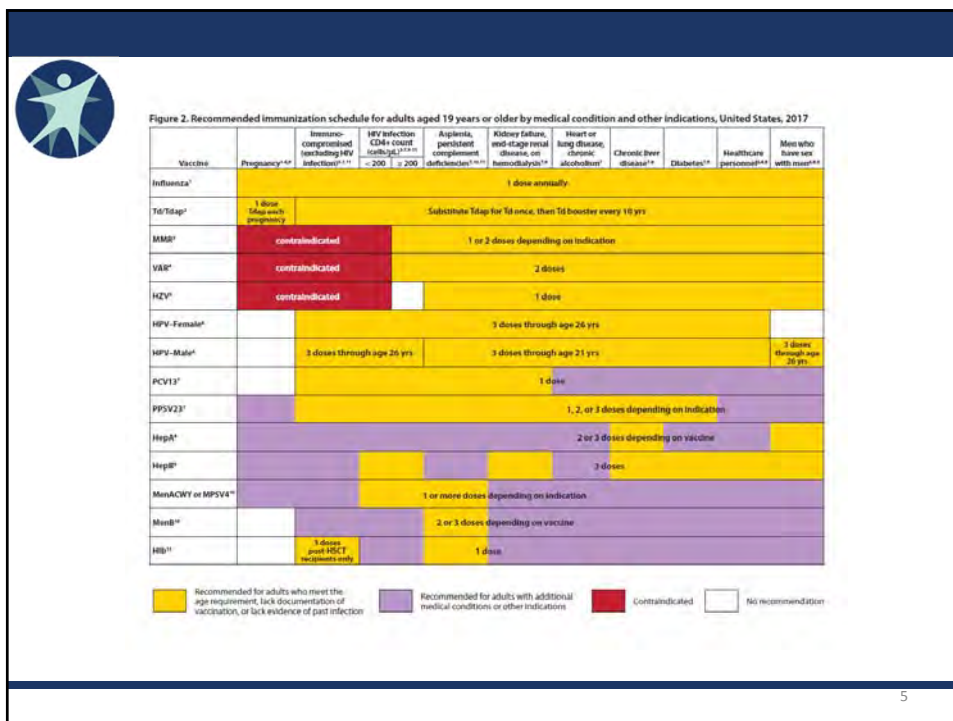
- WIR: Wisconsin Immunization Registry
- ACIP: Advisory Committee on Immunization Practices
- HPV: human papillomavirus vaccine
- Td: tetanus-diphtheria vaccine
- Tdap: tetanus-diphtheria-acellular pertussis vaccine
- PPSV23: pneumococcal polysaccharide vaccine
- PCV13: pneumococcal conjugate vaccine



Figure 1. Recommended immunization schedule for adults aged 19 years or older by age group, United States, 2017

Vaccine	19-21 years	22-26 years	27-59 years	60-64 years	≥ 65 years
Influenza ^a	1 dose annually				
Td/Tdap ^b	Substitute Tdap for Td once, then Td booster every 10 yrs.				
MMR ^c	1 or 2 doses depending on indication				
VAR ^d	2 doses				
HZV ^e					1 dose
HPV-Female ^f	3 doses				
HPV-Male ^f	3 doses				
PCV13 ^g					1 dose
PPSV23 ^g	1 or 2 doses depending on indication				1 dose
HepA ^h	2 or 3 doses depending on vaccine				
HepB ^h	3 doses				
MenACWY or MPSV4 ^h	1 or more doses depending on indication				
MenB ^h	2 or 3 doses depending on vaccine				
Hib ⁱ	1 or 3 doses depending on indication				

Recommended for adults who meet the age requirement, lack documentation of vaccination, or lack evidence of past infection
 Recommended for adults with additional medical conditions or other indications
 No recommendation



Pertussis Disease Burden

- Pertussis incidence gradually increasing since early 1980s
- Pertussis
 - ~28,000 cases per year for 2013 and 2014
 - ~9,000 among adults

CDC. Notifiable Diseases and Mortality Tables. MMWR 2013. 61(51&52): ND-719 –ND 732.



Tdap/Td Vaccines

- Tdap
 - Adacel (sanofi pasteur) is licensed for use in persons aged 10 through 64 years.
 - Boostrix (GlaxoSmithKline) is licensed for use in persons aged ≥ 10 years.
- Td
 - Tenivac (Sanofi Pasteur) is licensed for use in persons aged ≥ 7 years.
 - Td vaccine (Grifols) is licensed for use in persons aged ≥ 7 years.

7



Tdap/Td Recommendations

- All adults who have not previously received Tdap should receive one dose; boost with Td every 10 years thereafter.
- Adults aged ≥ 65 years: Providers should not miss an opportunity to vaccinate persons aged 65 years and older with Tdap; either Boostrix or Adacel may be used.
- Wound management: Tdap is preferred over Td for wound management among persons aged ≥ 11 years who have not received Tdap previously.

8



Tdap and Pregnancy

- Pregnant women should receive a dose of Tdap during *each* pregnancy, preferably during weeks 27 through 36, to maximize maternal antibody response and passive antibody transfer to the infant.
- Tdap will provide some protection against pertussis during early months following birth and before the infant is able to receive the primary pertussis vaccine series.
- All family members and caregivers (e.g., babysitters or grandparents) of infants should receive Tdap vaccine, optimally at least two weeks before the birth of the infant.

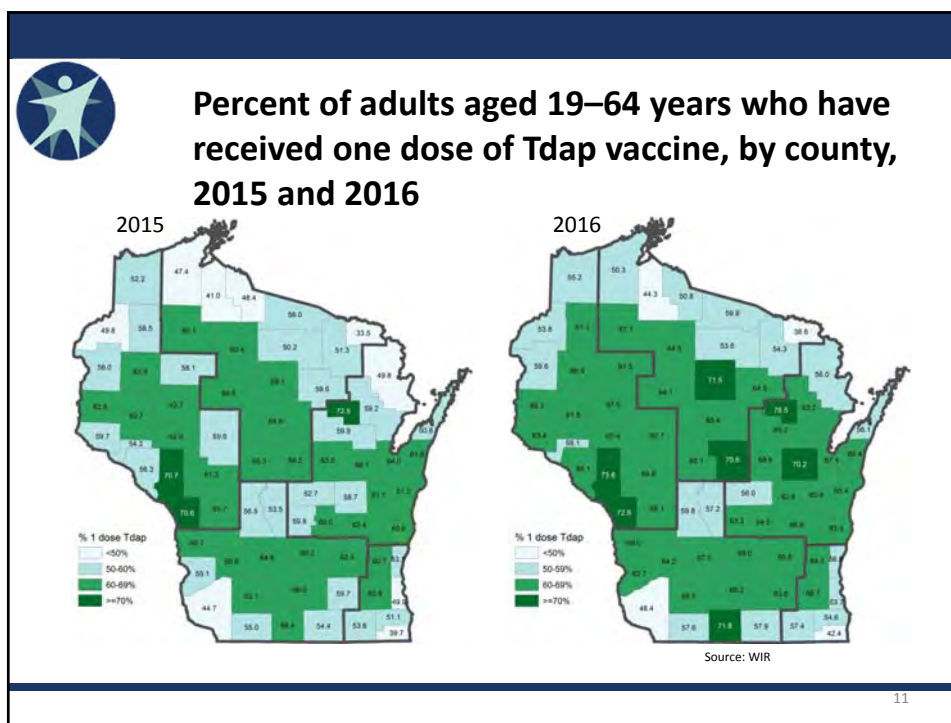
9



Impact of Vaccination - Tdap

- In general, Tdap protects 70% of those who receive it but protection wanes over time.
- About 30% to 40% remain fully protected against pertussis four years after receiving Tdap.

10



Hepatitis B Disease Burden

- Hepatitis B
 - 3,050 acute cases reported in 2013
 - 19,800 estimated cases
- Progression from acute to chronic infection
 - 5% in the general adult population
 - 40% of hemodialysis patients
 - 20% of patients with immune deficiencies
- Chronic infection may result in cirrhosis or liver cancer

CDC. Viral Hepatitis Surveillance United States, 2013. National Center for HIV/AIDS, Viral Hepatitis, STD& TB Prevention/Division of Viral Hepatitis.

12



Hepatitis B Vaccines

- Recombivax HB (Merck) is licensed for use among all ages.
- Engerix-B (GlaxoSmithKline) is licensed for use among all ages.
- Twinrix, hepatitis A/hepatitis B combination (GlaxoSmithKline) is licensed for use in persons aged ≥ 18 years.

13



Hepatitis B Recommendations

- All unvaccinated adults at risk for HBV infection and all adults requesting protection from HBV infection
- Persons at risk
 - Percutaneous or mucosal exposure to blood
 - End-stage renal disease (including predialysis, hemodialysis, peritoneal dialysis and home dialysis)
 - Diabetes mellitus (type 1 or type 2)

14



Diabetic Patients

- At risk for serious complications from illness
 - Influenza can raise blood glucose to dangerously high level
 - Higher rates of hepatitis B than general population
 - Increased risk of death from pneumonia, bacteremia and meningitis
- Diabetics aged 19 to 59 years should be vaccinated as soon as possible after diagnosis
- Diabetics aged ≥ 60 years at discretion of treating physician

15



Impact of Vaccination – Hepatitis B

- Up to 90% effectiveness after completing 3-dose series
- Effectiveness estimated to be lower in persons with diabetes with increasing age
 - 90%, age <40 years
 - 80%, 41 to 59 years
 - 65%, 60 to 69 years
 - <40%, ≥ 70 years

CDC. Use of hepatitis B vaccine for adults with diabetes mellitus. MMWR 2011;60:1709-1711.

16



Post-Vaccination Serologic Testing (PVST)

Testing for antibody to hepatitis B surface antigen 1-2 months after completion of the hepatitis B vaccine series

17



PVST Recommendation

- Not routinely recommended following vaccination of most adults
- Recommended for:
 - Chronic hemodialysis patients
 - Other immunocompromised persons
 - Persons with HIV infection
 - Sex partners of hepatitis B surface antigen-positive persons
 - Health care personnel who have contact with patients or blood

18



Influenza Disease Burden

- Influenza disease burden varies from year to year
 - Millions of cases and average of 226,000 hospitalizations annually with >75% among adults¹
 - 3,000-49,000 deaths annually, >90% among adults^{2,3}
- Many factors increase risk of severe illness, including chronic medical conditions, pregnancy and obesity
- During 2009 H1N1 pandemic, higher risk of hospitalization among AN/AI populations reported⁴

1. Thompson WW, et al. Influenza-Associated Hospitalizations in the United States. JAMA 2004; 292: 1333-1340
 2. CDC. Estimates of deaths associated with seasonal influenza—United States, 1976-2007. MMWR. 2010;59(33):1057-1062.
 3. Molinari, et al. The annual impact of seasonal influenza in the US: Measuring disease burden and costs. Vaccine 2007;25 :5086–5096.
 4. Centers for Disease Control and Prevention Deaths related to 2009 pandemic influenza A (H1N1) among American Indian/Alaska Natives—12 states, 2009. MMWR Morb Mortal Wkly Rep. 2009;58(48):1341–1344.

19



Influenza Vaccine

Vaccine	Trade name	Manufacturer	Age group*
IIV4	Fluzone	Sanofi Pasteur	≥6 months
IIV4	FluLaval	ID Biomedical Corporation of Quebec (distributed by GlaxoSmithKline)	≥6 months
IIV4	Fluarix	GlaxoSmithKline	≥3 years
IIV3	Fluvirin	Seqirus	≥4 years
IIV3	Afluria	Seqirus	≥9 years via needle; 18-64 years via jet injector
IIV4	Fluzone Intradermal	Sanofi Pasteur	18-64 years
IIV3	Fluzone High-Dose	Sanofi Pasteur	≥65 years
RIV3	FluBlok	Protein Sciences	≥18 years
ccIIV4	Flucelvax	Seqirus	≥4 years
IIV3	Fluad	Seqirus	≥65 years

*Age group varies by presentation

20

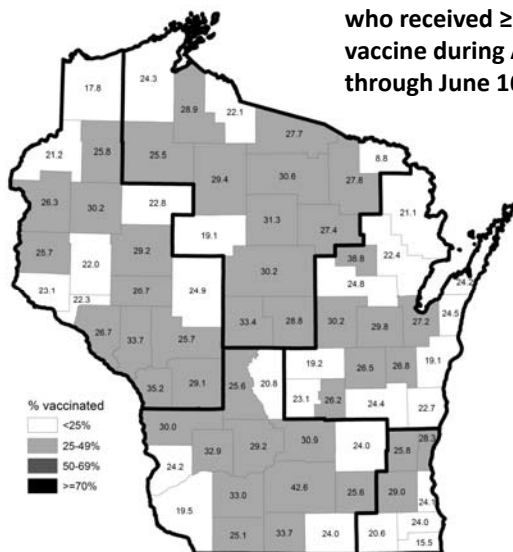


Influenza Recommendations

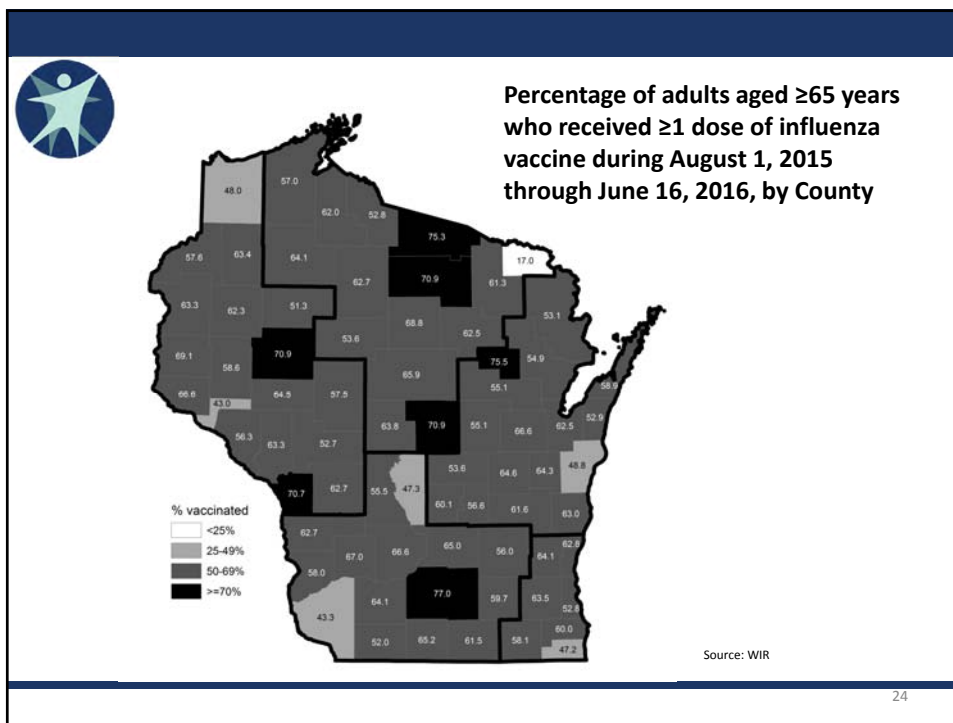
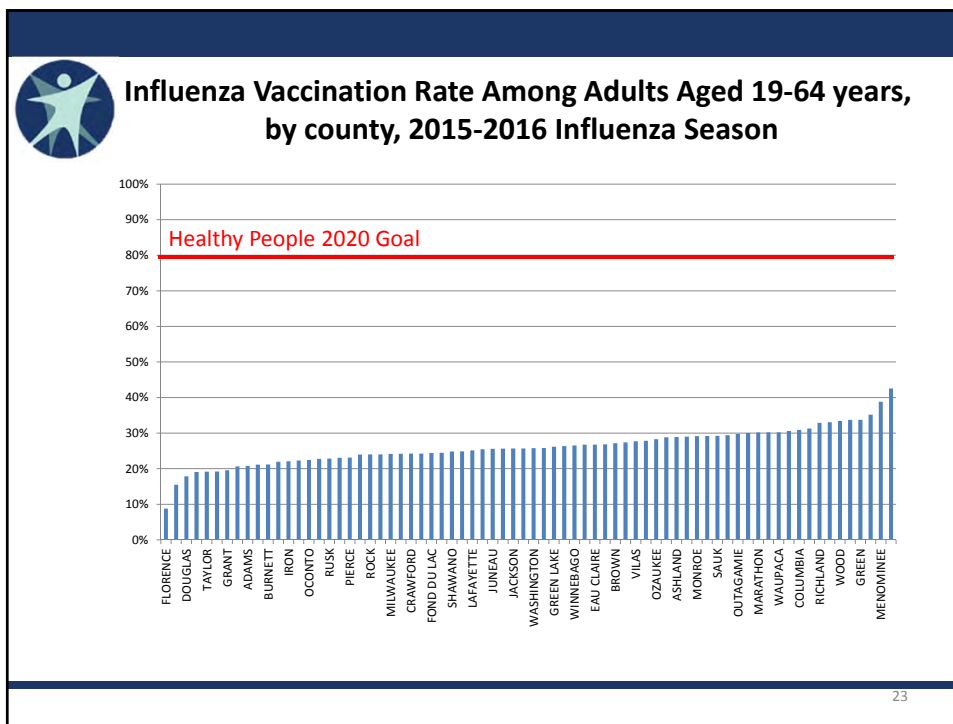
Influenza vaccine should be offered to all adults as soon as it is available and should continue to be offered as long as influenza viruses are circulating.

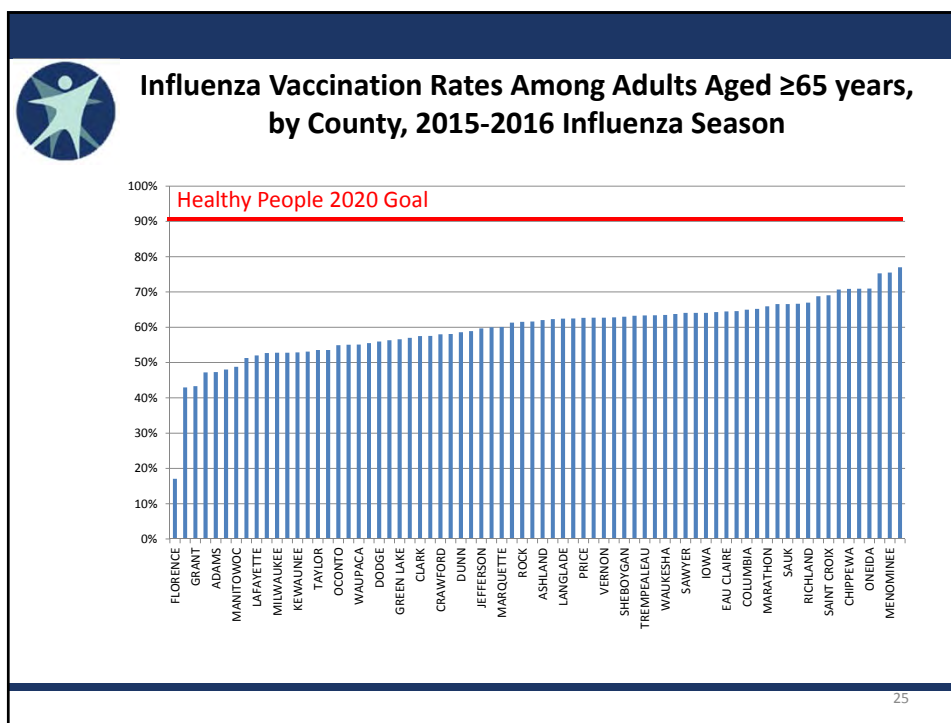


Percentage of adults aged 19-64 years who received ≥ 1 dose of influenza vaccine during August 1, 2015 through June 16, 2016, by County



Source: WIR





Impact of Vaccination - Influenza

- Effectiveness varies based on antigenic match and age and health status of person vaccinated
 - ~60% to 70% effective in younger adults when good match¹
 - ~30% in adults ≥65 years against medically attended influenza when good match
- 2015-16 season effectiveness:
 - 47% effective against medically attended, lab-confirmed influenza

1.CDC. Prevention and Control of Seasonal Influenza: Recommendations of the ACIP—U.S., 2014-15 Influenza Season. MMWR 2014; 63(32); 691-697.
2.Presented at May 2016 NAHIS meeting.

26



Pneumococcal Disease Burden

- Invasive pneumococcal disease (IPD)
 - 33,900 total cases and 3,700 total deaths in 2013
 - 89% of IPD cases and nearly all IPD deaths among adults
- Pneumococci account for up to 36% of adult community-acquired pneumonia
- Case-fatality rate is 5%-7% and may be much higher among elderly persons

CDC. Active Bacterial Core Surveillance. <http://www.cdc.gov/abcs/reports-findings/survreports/spneu13.pdf>

27



Pneumococcal (PPSV23 and PCV13) Vaccines

- Pneumovax 23 (Merck)
- Prevnar 13 (Wyeth)

28



PPSV23 and PCV13 Recommendations

- Adults aged ≥ 19 years with immunocompromising conditions, functional or anatomic asplenia, cerebral spinal fluid leaks, or cochlear implants and who have not previously received PCV13 or PPSV23 should receive a dose of PCV13 first, followed by a dose of PPSV23 at least eight weeks later
- All adults aged ≥ 65 years should routinely receive a dose of PCV13 and PPSV23 in series

29



Underlying Medical Conditions or Other Indications for PPSV23

Risk group	Underlying medical condition	One dose recommended	Revaccination 5 years after first dose
Immunocompetent persons	Chronic heart disease ^a	Y	
	Chronic lung disease ^b	Y	
	Diabetes mellitus	Y	
	Cerebrospinal fluid leak	Y	
	Cochlear implant	Y	
	Alcoholism	Y	
	Chronic liver disease, cirrhosis	Y	
Persons with functional or anatomic asplenia	Cigarette smoking	Y	
	Sickle cell disease/other hemoglobinopathy	Y	Y
	Congenital or acquired asplenia	Y	Y
Immunocompromised persons	Splenic dysfunction	Y	Y
	HIV infection	Y	Y
	Chronic renal failure	Y	Y
	Nephrotic syndrome	Y	Y
	Leukemia	Y	Y
	Lymphoma	Y	Y
	Hodgkin disease	Y	Y
	Generalized malignancy	Y	Y
	Solid organ transplant	Y	Y
	Multiple myeloma	Y	Y
	Congenital or acquired immunodeficiency ^c	Y	Y
Iatrogenic immunosuppression ^d	Y	Y	

^aIncluding congestive heart failure and cardiomyopathies, excluding hypertension
^bIncluding chronic obstructive pulmonary disease, emphysema, and asthma
^cIncludes B- (humoral) or T-lymphocyte deficiency, complement deficiencies and phagocytic disorders (excluding chronic granulomatous disease)
^dDiseases requiring treatment with immunosuppressive drugs, including long-term systemic corticosteroids and radiation therapy

30



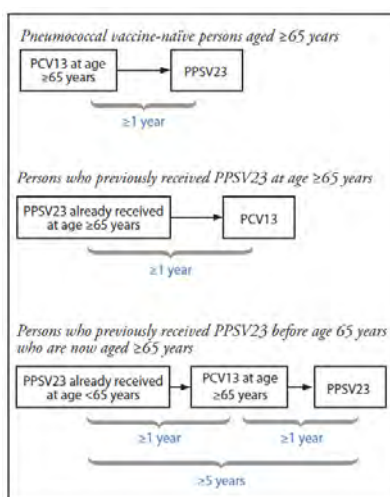
PCV13 and PPSV23 In Series

- Adults aged ≥ 65 years who have not previously received pneumococcal vaccine or whose previous vaccination history is unknown, should receive a dose of PCV13 first, followed by a dose of PPSV23, ideally one year later.
- Adults aged ≥ 65 years who have previously received ≥ 1 dose of PPSV23 also should receive a dose of PCV13 if they have not yet received it. A dose of PCV13 should be given ≥ 1 year after receipt of the most recent PPSV23 dose.
- Adults who received PCV13 at age 64 years or younger do not need any additional doses of PCV13 at age ≥ 65 years.

31



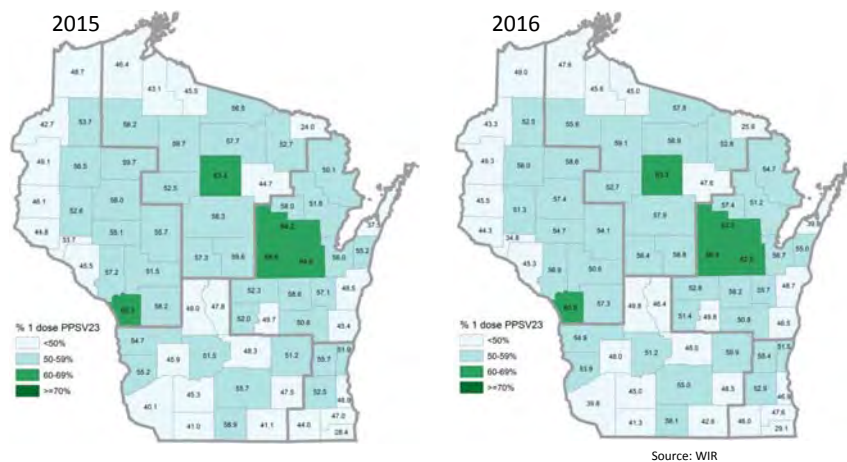
Intervals for Use of PCV13 and PPSV23



32



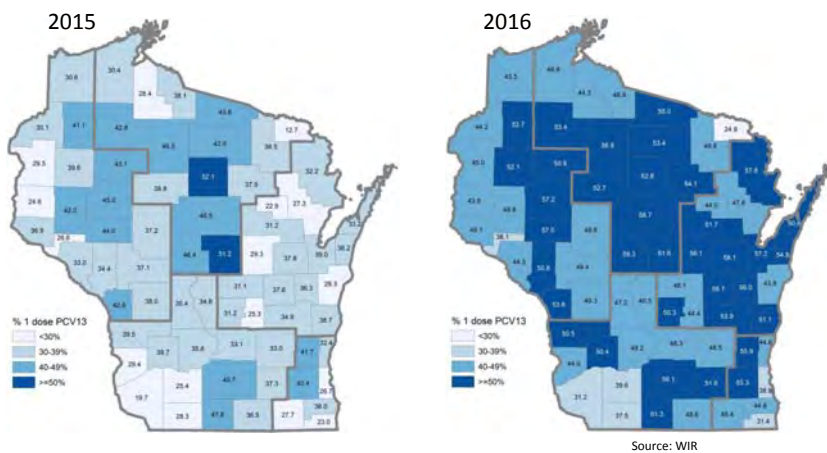
Percent of adults aged ≥ 65 years who have received one dose of PPSV23 on or after their 65th birthday, by county, 2015 and 2016



33



Percent of adults aged ≥ 65 years who have received one dose of PCV13 on or after their 65th birthday, by county, 2015 and 2016



34



Impact of Vaccination - Pneumococcal

- PCV13: 45% efficacy against vaccine-type pneumococcal pneumonia, and 75% efficacy against vaccine-type invasive pneumococcal disease among adults aged ≥ 65 years

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

35



Zoster Disease Burden

- Zoster (also known as shingles)
 - About 1 million cases annually in U.S.
- Lifetime risk of zoster is at least 32%
 - 50% of persons living until age 85 years will develop zoster
- Increasing age and cellular immunosuppression most important risk factors

CDC. Prevention of Herpes Zoster. MMWR 2008. 57(RR-5): 1-30.

36



Zoster Vaccine

- Zostavax (Merck)

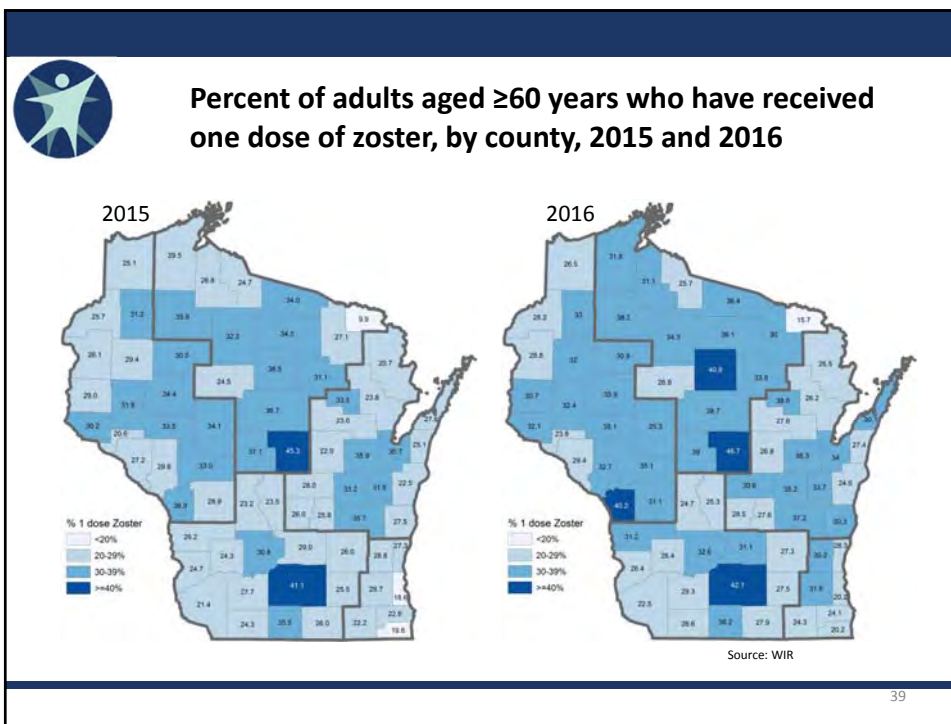
37



Zoster Vaccine Recommendation

- Administer a single dose of Zostavax to adults aged ≥ 60 years whether or not they report a prior episode of herpes zoster

38



Impact of Vaccination - Zoster

- Zoster vaccine effectiveness: 51% against shingles, 66% against post-herpetic neuralgia (PHN), and almost 80% against most prolonged and extreme cases of PHN

Oxman MN, et al. NEJM 2005;352:2271-84.

40



Key Adult Immunization Facts

- Challenges
 - Vaccine coverage among adults is unacceptably low.
 - There is limited patient awareness about the need for vaccines among adults.
 - Adult vaccinations are less integrated into clinical practice.
 - Insurance coverage varies by provider type.
- Opportunities
 - Most patients are willing to get vaccinated when medical providers recommend them.
 - Primary care providers believe that immunizations are an important part of the services they provide to patients.
 - Systematic offering and recommendations from clinicians result in a higher uptake.

41



Adult Immunization Practice Standards

- Stresses that all providers, including those who don't provide vaccine services, have a role in ensuring patients are up-to-date on vaccines
- Acknowledges that:
 - Adult patients may see many different health care providers, some of whom do not stock some or all vaccines
 - Adults may get vaccinated in a medical home, at work, or retail setting
- Aim is to avoid missed opportunities and keep adult patients protected from vaccine-preventable diseases

<http://www.publichealthreports.org/>

42



Key Components of Standards

- Call to action for health care professionals:
 - **Assess** immunization status of all patients in every clinical encounter.
 - Strongly **Recommend** vaccines that patients need
 - **Administer** needed vaccines or **Refer** to a provider who can immunize.
 - **Document** vaccines received by patients, including entering immunizations in the WIR.



Even if you don't
vaccinate,
recommend vaccines
to your patients

43



Examples of Standards Implementation

- **Assessment**
 - Ask patients about their vaccinations during clinic visits.
 - For example, include a form at check-in and communicate with patients before seeing the provider about which vaccines might be needed.
- **Strongly recommend vaccines**
 - If you provide vaccines, be confident in your recommendation.
 - Encourage your staff to use the same vaccine messages when caring for patients.
 - Share a personal story with hesitant patients, such as your family or staff are up-to-date with their vaccines.

44



Examples of Standards Implementation

- **Administer needed vaccines or refer**
 - Develop standing orders or protocols for vaccine administration
 - Ensure practice is up-to-date with vaccine storage and handling
 - Develop relationships with pharmacies, health departments, and other vaccination providers to refer your patients for vaccines you don't stock
- **Document vaccine doses administered**
 - Document vaccine doses administered in electronic medical record and in WIR
 - Provide patients with vaccine documentation for their personal medical records, e.g., shot card
 - Follow up with patient or referring provider to document the vaccine given

45



Components of Successful Vaccination Programs

- Strategies shown to improve vaccine uptake in health care settings:
 - Patient education (e.g., email reminders from providers plus provider recommendations)
 - Use of standing orders
 - Use of reminder-recall systems
 - Efforts to remove administrative barriers
 - Provider and practice assessment of vaccination and feedback
 - Use of immunization registries



46



WIR

- In use since May 2000
- Lifespan immunization registry
- Use is not required by providers

47



WIR Public Access

- Intended for consumers/patients and their guardians to look up their immunization record
- Not intended for health care personnel to look up patient immunization records
- Available in English, Spanish and Hmong:
 - <https://www.dhswir.org/PR/clientSearch.do?language=en>

48



Summary

- Substantial burden of disease in adults for which vaccines are recommended
- Vaccination rates low overall among adults in Wisconsin
- Systematic offering of vaccines and provider recommendations can improve vaccination rates over time

51



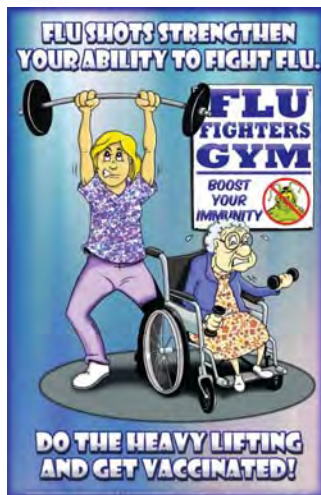
Resources

- Adult immunization schedule:
<http://www.cdc.gov/vaccines/schedules/hcp/adult.html>
- Adult Immunization Standards:
<http://www.publichealthreports.org/issueopen.cfm?articleID=3145>
- The Guide to Community Preventive Services: Increasing Appropriate Vaccination:
<http://www.thecommunityguide.org/vaccines/index.html>
- WIR Help Desk, DHSWIRHelp@dhs.wisconsin.gov or 608.266.9691

52



Educational Posters with Customized Imagery for LTCFs



Source: Ofstead and Associates

53



Questions

Stephanie Borchardt, PhD, MPH
Adult Immunization Coordinator
(608) 266-9923
stephanie.borchardt@wi.gov

Wisconsin Immunization Program
Bureau of Communicable Diseases
Division of Public Health
<http://dhs.wisconsin.gov/immunization>

54



Case Study #1 – Diabetic Patient

55



Case Study #2 – Long-term Care Patient



Case Study #3 – Health Care Personnel