



**Department
of Health**

Pediatric Immunization Update

Spring 2016

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NYSDOH

Bureau of Immunization

Keeping up with the Kids

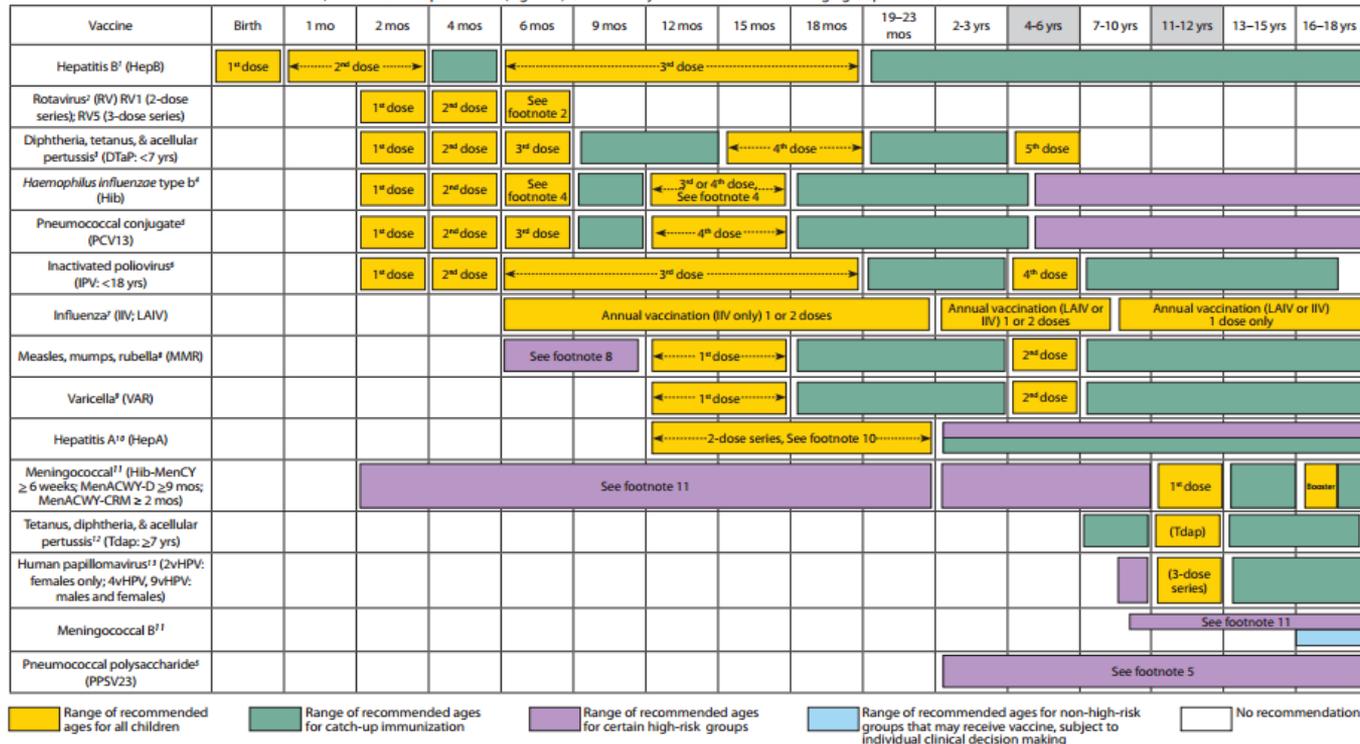
Overview

- 2016 Advisory Committee on Immunization Practices (ACIP) Immunization Schedules
- Influenza Update
- Measles and Mumps
- Varicella Reporting
- Pertussis Vaccine – Q & A's
- New York State Statistics

Figure 1. Recommended immunization schedule for persons aged 0 through 18 years – United States, 2016.

(FOR THOSE WHO FALL BEHIND OR START LATE, SEE THE CATCH-UP SCHEDULE [FIGURE 2]).

These recommendations must be read with the footnotes that follow. For those who fall behind or start late, provide catch-up vaccination at the earliest opportunity as indicated by the green bars in Figure 1. To determine minimum intervals between doses, see the catch-up schedule (Figure 2). School entry and adolescent vaccine age groups are shaded.



This schedule includes recommendations in effect as of January 1, 2016. Any dose not administered at the recommended age should be administered at a subsequent visit, when indicated and feasible. The use of a combination vaccine generally is preferred over separate injections of its equivalent component vaccines. Vaccination providers should consult the relevant Advisory Committee on Immunization Practices (ACIP) statement for detailed recommendations, available online at <http://www.cdc.gov/vaccines/hcp/acip-recs/index.html>. Clinically significant adverse events that follow vaccination should be reported to the Vaccine Adverse Event Reporting System (VAERS) online (<http://www.vaers.hhs.gov>) or by telephone (800-822-7967). Suspected cases of vaccine-preventable diseases should be reported to the state or local health department. Additional information, including precautions and contraindications for vaccination, is available from CDC online (<http://www.cdc.gov/vaccines/recs/vac-admin/contraindications.htm>) or by telephone (800-CDC-INFO [800-232-4636]).

This schedule is approved by the Advisory Committee on Immunization Practices (<http://www.cdc.gov/vaccines/acip>), the American Academy of Pediatrics (<http://www.aap.org>), the American Academy of Family Physicians (<http://www.aafp.org>), and the American College of Obstetricians and Gynecologists (<http://www.acog.org>).

NOTE: The above recommendations must be read along with the footnotes of this schedule.



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FIGURE 3. Catch-up immunization schedule for persons aged 4 months through 18 years who start late or who are more than 1 month behind —United States, 2016.

The figure below provides catch-up schedules and minimum intervals between doses for children whose vaccinations have been delayed. A vaccine series does not need to be restarted, regardless of the time that has elapsed between doses. Use the section appropriate for the child's age. Always use this table in conjunction with Figure 1 and the footnotes that follow.

Children age 4 months through 6 years					
Vaccine	Minimum Age for Dose 1	Minimum Interval Between Doses			
		Dose 1 to Dose 2	Dose 2 to Dose 3	Dose 3 to Dose 4	Dose 4 to Dose 5
Hepatitis B ¹	Birth	4 weeks	8 weeks and at least 16 weeks after first dose. Minimum age for the final dose is 24 weeks.		
Rotavirus ²	6 weeks	4 weeks	4 weeks ²		
Diphtheria, tetanus, and acellular pertussis ³	6 weeks	4 weeks	4 weeks	6 months	6 months ³
<i>Haemophilus influenzae</i> type b ⁴	6 weeks	4 weeks if first dose was administered before the 1 st birthday. 8 weeks (as final dose) if first dose was administered at age 12 through 14 months. No further doses needed if first dose was administered at age 15 months or older.	4 weeks ⁴ If current age is younger than 12 months and first dose was administered at younger than age 7 months, and at least 1 previous dose was PRP-T (ActHib, Pentacel) or unknown. 8 weeks and age 12 through 59 months (as final dose) ⁴ • If current age is younger than 12 months and first dose was administered at age 7 through 11 months (wait until at least 12 months old); OR • If current age is 12 through 59 months and first dose was administered before the 1 st birthday, and second dose administered at younger than 15 months; OR • If both doses were PRP-OMP (PedvaxHIB; Comvax) and were administered before the 1 st birthday (wait until at least 12 months old). No further doses needed If previous dose was administered at age 15 months or older.	8 weeks (as final dose) This dose only necessary for children age 12 through 59 months who received 3 doses before the 1 st birthday.	
Pneumococcal ⁵	6 weeks	4 weeks if first dose administered before the 1 st birthday. 8 weeks (as final dose for healthy children) if first dose was administered at the 1 st birthday or after. No further doses needed for healthy children if first dose administered at age 24 months or older.	4 weeks if current age is younger than 12 months and previous dose given at <7 months old. 8 weeks (as final dose for healthy children) if previous dose given between 7-11 months (wait until at least 12 months old); OR If current age is 12 months or older and at least 1 dose was given before age 12 months. No further doses needed for healthy children if previous dose administered at age 24 months or older.	8 weeks (as final dose) This dose only necessary for children aged 12 through 59 months who received 3 doses before age 12 months or for children at high risk who received 3 doses at any age.	
Inactivated poliovirus ⁶	6 weeks	4 weeks ⁶	4 weeks ⁶	6 months ⁶ (minimum age 4 years for final dose).	
Measles, mumps, rubella ⁷	12 months	4 weeks			
Varicella ⁸	12 months	3 months			
Hepatitis A ⁹	12 months	6 months			
Meningococcal ¹⁰ (Hib-MenCY ≥ 6 weeks; MenACWY-D ≥ 9 mos; MenACWY-CRM ≥ 2 mos)	6 weeks	8 weeks ¹¹	See footnote 11	See footnote 11	
Children and adolescents age 7 through 18 years					
Meningococcal ¹¹ (Hib-MenCY ≥ 6 weeks; MenACWY-D ≥ 9 mos; MenACWY-CRM ≥ 2 mos)	Not Applicable (N/A)	8 weeks ¹¹			
Tetanus, diphtheria, tetanus, diphtheria, and acellular pertussis ¹²	7 years ¹²	4 weeks	4 weeks if first dose of DTaP/DT was administered before the 1 st birthday. 6 months (as final dose) if first dose of DTaP/DT or Tdap/Td was administered at or after the 1 st birthday.	6 months if first dose of DTaP/DT was administered before the 1 st birthday.	
Human papillomavirus ¹³	9 years		Routine dosing intervals are recommended. ¹³		
Hepatitis A ⁹	N/A	6 months			
Hepatitis B ¹	N/A	4 weeks	8 weeks and at least 16 weeks after first dose.		
Inactivated poliovirus ⁶	N/A	4 weeks	4 weeks ⁶	6 months ⁶	
Measles, mumps, rubella ⁷	N/A	4 weeks			
Varicella ⁸	N/A	3 months if younger than age 13 years. 4 weeks if age 13 years or older.			

NOTE: The above recommendations must be read along with the footnotes of this schedule.

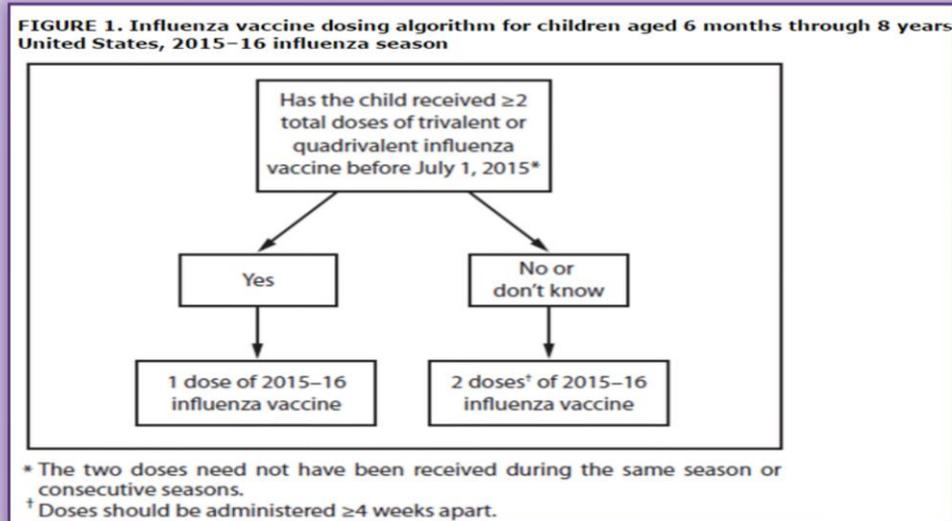
Influenza Update

Impact of Influenza on Pediatric Patients in NYS

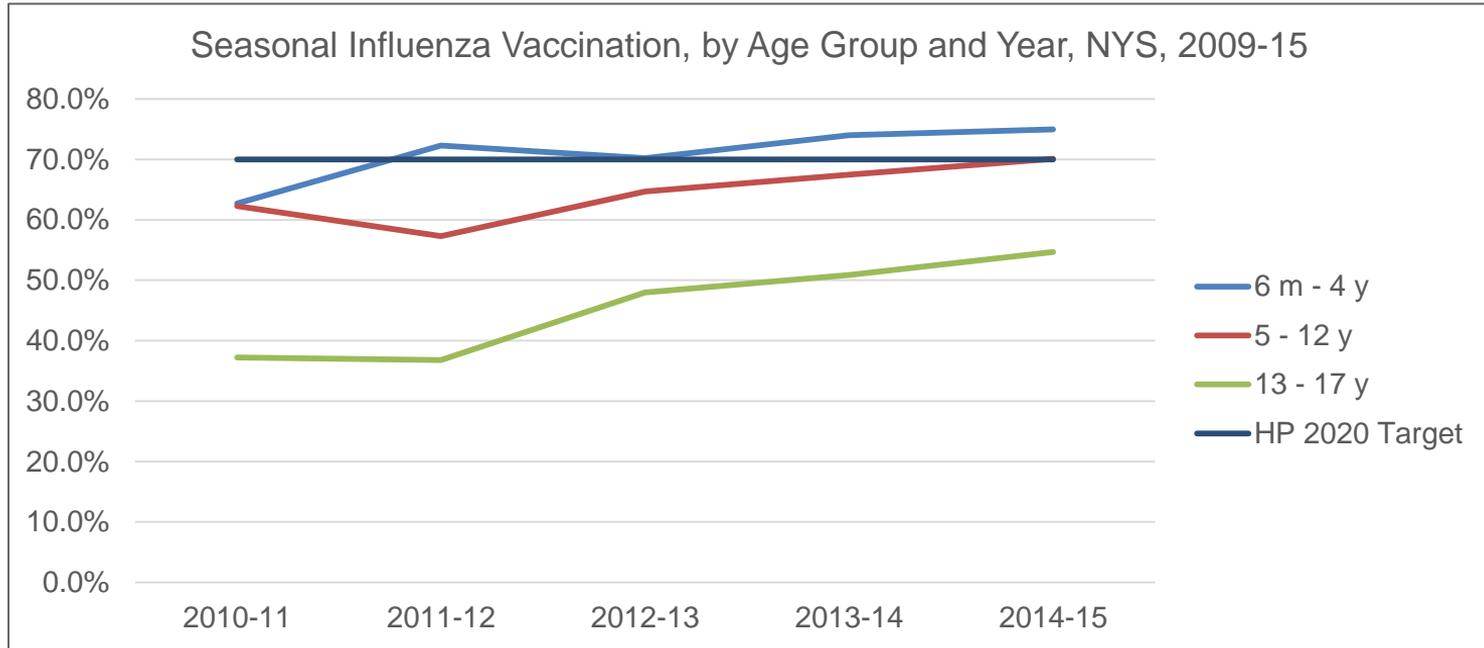
- 3 influenza-associated pediatric deaths in New York State this season
- Flu associated deaths in the United States are nationally notifiable
- All deaths in NYS are laboratory-confirmed
- Healthy People 2020 target is 70% flu vaccination coverage

Influenza Vaccine

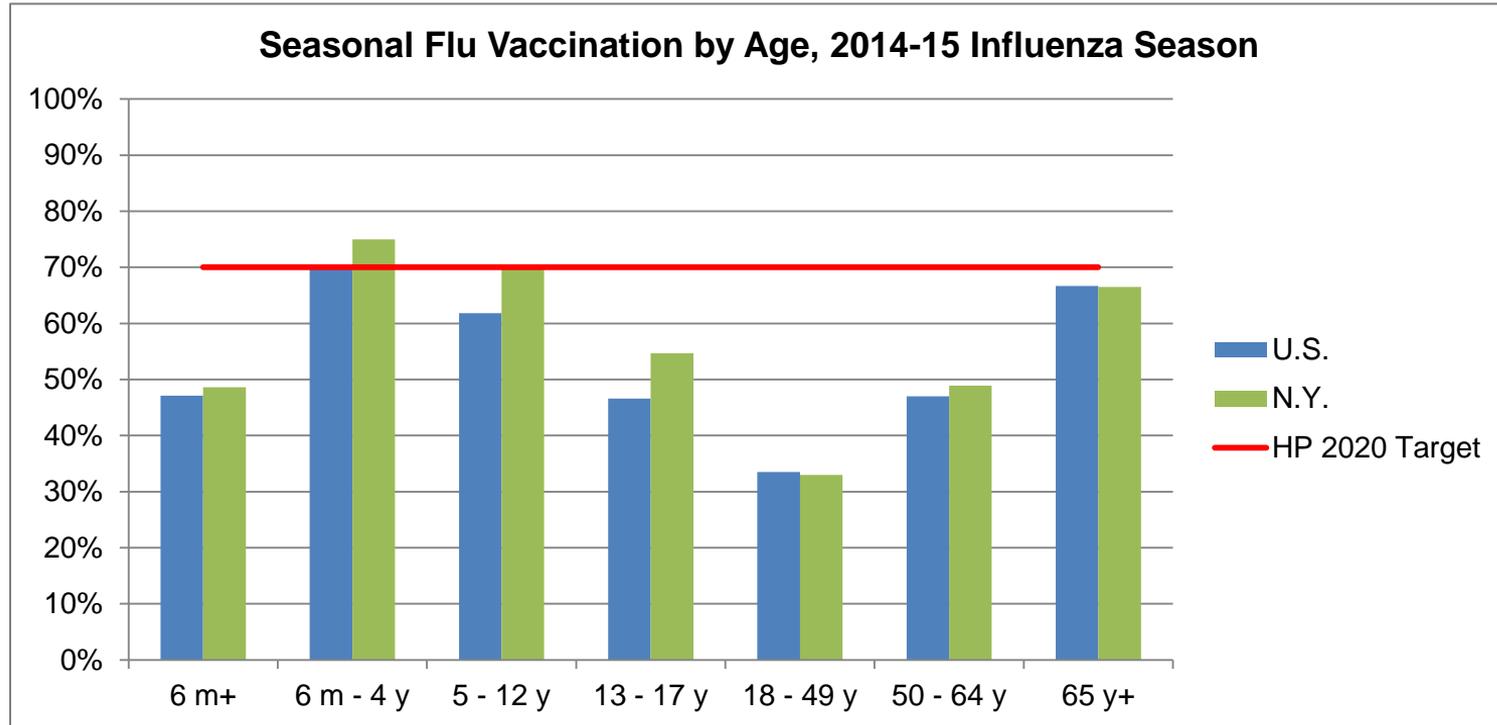
- Recommend that all persons 6+ months of age and older receive annual flu vaccine
- Children 2 or older without contraindications or precautions can receive either the injection or live nasal spray
- Some children age 6 months-8 years of age should receive 2 doses of flu vaccine 28 days apart



Pediatric Flu Vaccination Coverage Rates in NYS



Seasonal Flu Vaccination Coverage in NYS Compared to the United States



Keeping an Eye on Measles and Mumps

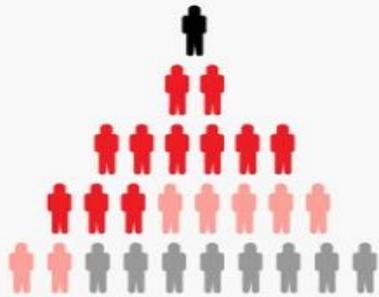
Measles

Number of measles cases by year
since 2010

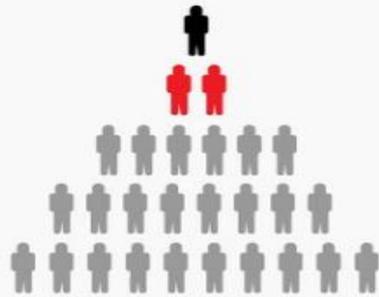
Year	Cases
2010	63
2011	220
2012	55
2013	187
2014	667
2015*	189
2016**	10



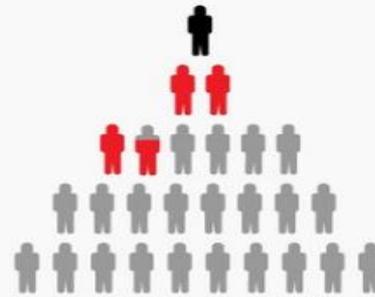
<http://www.cdc.gov/measles/cases-outbreaks.html>



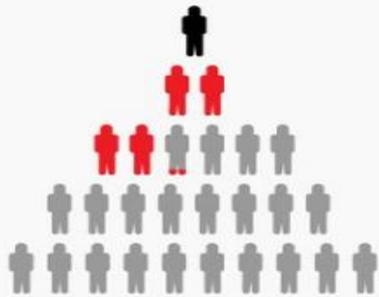
MEASLES
11-18



EBOLA
2



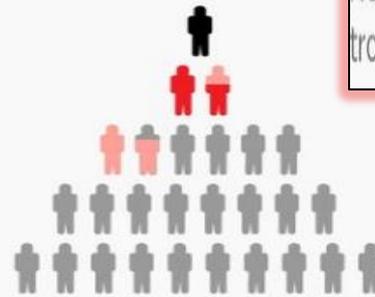
HIV
3.6-3.7



CHIKUNGUNYA
4.1



SEASONAL FLU
1.3



NOROVIRUS
1.6-3.7

*An estimate based
on Réunion Island in 2006

SOURCES: Travel Medicine, PLOS One, JAMA Pediatrics, MDPI, NCBI, New England Journal of Medicine, "The Spread and Control of Norovirus Outbreaks Among Hospitals in a Region"

Mumps

- Numerous outbreaks currently on college campuses
- Vaccine is approximately 88% effective (66%-95%) with 2 doses

Year	Cases
2010	2,612
2011	370
2012	229
2013	584
2014	1,223
2015*	1,057
2016**	467

Mumps Clinical Features

- Incubation period 12 to 25 days
- Nonspecific prodrome of myalgia, malaise, headache, low-grade fever
- Parotitis in 9%-94%
- 15%-27% of infections asymptomatic in prevaccine era



Mumps Images

Childhood Mumps



Mumps is a contagious disease caused by a virus that leads to painful swelling of the parotid glands (salivary glands). Mumps most commonly occurs in children ages 2-12 who have not been vaccinated. Symptoms can include fever, headache, and painful, swollen glands in the face, neck and jaw.



Varicella Outbreak Reporting

Created by Kathy Sen, RN BSN
Vaccine Preventable Disease Surveillance Officer
Bureau of Immunization
NYSDOH

Varicella (Chickenpox)

Clinical Description

- An illness with acute onset of diffuse (generalized) maculopapulovesicular rash without other apparent cause.
- In vaccinated persons who develop varicella more than 42 days after vaccination (breakthrough disease), the disease is usually mild with fewer than 50 skin lesions and shorter duration of illness.
- The rash may also be atypical in appearance (maculopapular with few or no vesicles).



Varicella

- Varicella zoster virus (VZV) – herpesvirus group
- Transmitted through airborne droplets or direct contact with fluid filled lesions
- Incubation 14-16 days (range 10-21)
- Mild prodrome – fever, malaise 1-2 days before rash onset
- Rash is generalized and itchy: macules – papules – vesicles
- Lesions appear in 2 to 4 successive crops over 5-6 days
- First appears on head, then chest and back, then peripherally

Varicella

- Unvaccinated healthy children have 200-500 lesions on average
- Vaccinated: rash is often *maculopapular* with *few or no vesicles* with fewer lesions and shorter duration of rash illness
- Communicable from 1-2 days before rash onset, until at least 5 days after rash onset, or until rash is all scabbed
- Antivirals may lessen the severity of disease but a patient is considered infectious for at least 5 days after rash onset even if all lesions have scabbed/dried

Varicella

- Complications: secondary infections of lesions, pneumonia and CNS complications may occur
- Necrotizing fasciitis has occurred in those with varicella lesions infected with Group A Strep
- Approximately 1 in 3 individuals will experience shingles (herpes zoster) in their lifetime after infection with chickenpox



Varicella Immunity

- Documentation of age-appropriate vaccination:
 - Preschool-aged children 12 months of age or older: one dose
 - School-aged children, adolescents, and adults: two doses
- Laboratory evidence of immunity or laboratory confirmation of disease
- Birth in the United States before 1980
 - Lab-confirmed chickenpox has occurred in adults with presumptive immunity – they were born in the US prior to 1980
 - *For healthcare personnel and pregnant women, birth before 1980 should not be considered evidence of immunity.*
 - Persons born outside the United States should meet one of the other criteria for varicella immunity.



Varicella Immunity continued

- A healthcare provider diagnosis or verification of varicella disease:
 - Verification of history or diagnosis of typical disease can be done by any healthcare provider
 - For persons reporting a history of, or presenting with atypical and/or mild cases, assessment by a physician is recommended and one of the following should be sought:
 - An epidemiologic link to a typical varicella case
 - Evidence of laboratory confirmation if laboratory testing was performed at the time of acute disease
 - When such documentation is lacking, a person should not be considered as having a valid history of disease, because other diseases may mimic mild or atypical varicella.
- History of herpes zoster based on healthcare provider diagnosis



Varicella Control

- PEP with *varicella vaccine* is > 90% effective if given within 3 days of exposure
- Vaccine administered within 5 days of exposure is about 70% effective in preventing disease and 100% effective in modifying disease
- Children who are vaccinated with a first or second dose of varicella vaccine during an outbreak may immediately return to school
- VariZIG can be given in pregnancy, to susceptible immunocompromised individuals & to newborns whose mothers have s/s of disease around the time of delivery
 - Give ASAP after exposure or within 10 days at the latest

Varicella - Testing

Collecting **viral specimens** for submission to Wadsworth

- Unroof a vesicle, rub the base of the skin of a lesion to collect epithelial cells using polyester swab and **viral media**
- If late in the illness, a scab can be collected and sent in a sterile tube –scabs are teeming with virus
- **PCR is the most reliable method** for confirmation
- Contact the LHD to obtain authorization to have a specimen sent to Wadsworth Lab

IgG serology can be collected within 10 days of symptom onset and convalescent serum 14 days after the acute phase serum

- IgM testing is unreliable

Pertussis Trends

Pertussis

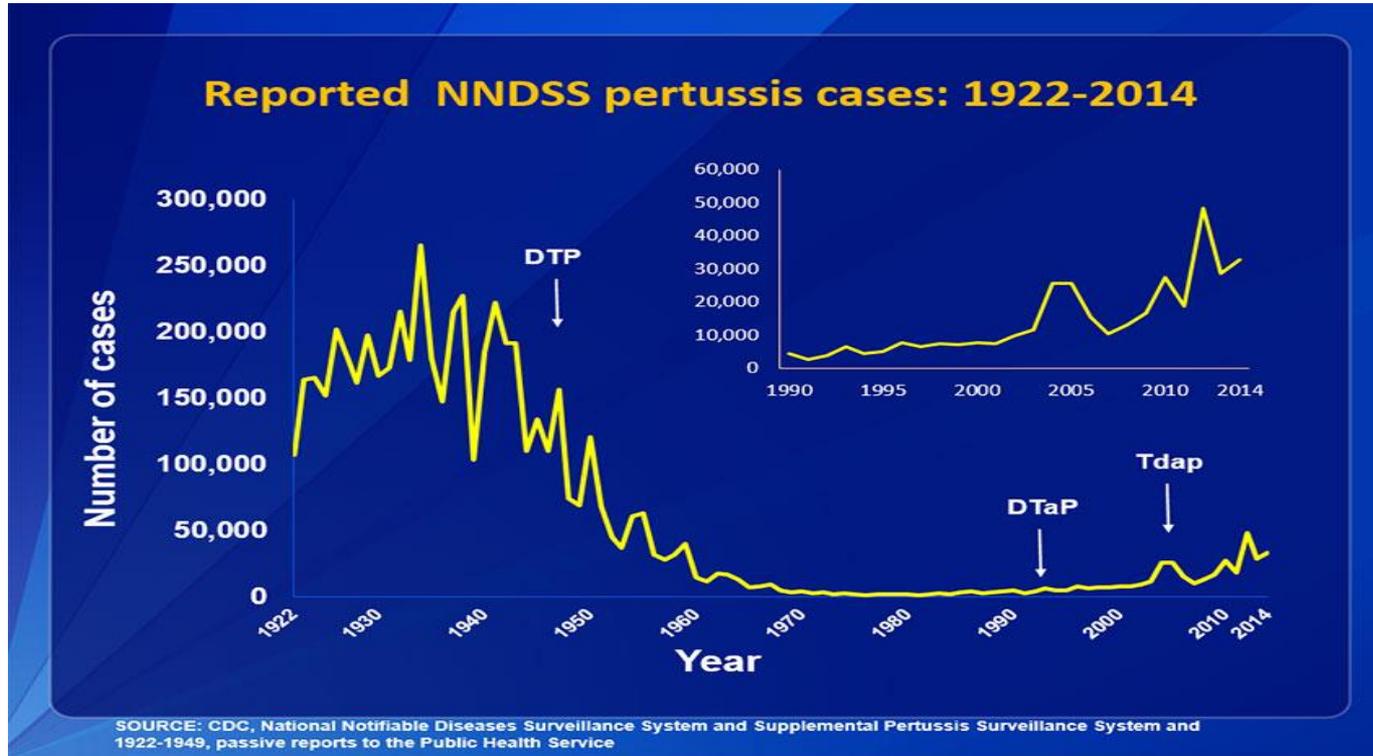
- Caused by bacterium *Bordetella pertussis*
- 20th century most common childhood disease & major cause of childhood mortality
- Immunity following *B. pertussis* infection is not permanent
- Bacteria attach to cilia of respiratory epithelial cells
 - Paralyzes cilia causing inflammation and difficulty clearing respiratory secretions
- Incubation period 7-10 days (range 4-21 days)
- Insidious onset with illness lasting weeks to months

Pertussis Complications

- Paroxysmal attacks
 - ✓ Long inspiratory effort with a high-pitch “whoop”
 - ✓ Infants & young children appear very ill and distressed
 - ✓ Infants < 6 months of age may not have strength to have a “whoop”
- Secondary bacterial pneumonia — most common
- Neurologic complications — seizures, encephalopathy more common among infants
- Death



National Trends 1922-2014



Pertussis is Deadly

- Not a seasonal disease
- Does not discriminate
- It is on the rise
- Waning immunity in adults=increase in pediatric infections
- Alternative vaccine schedules do not maximize protection
- Infants less than 12 months of age are at risk
- Preterm infants are even more vulnerable
 - Majority of annual deaths from pertussis are infants < 3 months of age



Reasons for Outbreaks of Pertussis

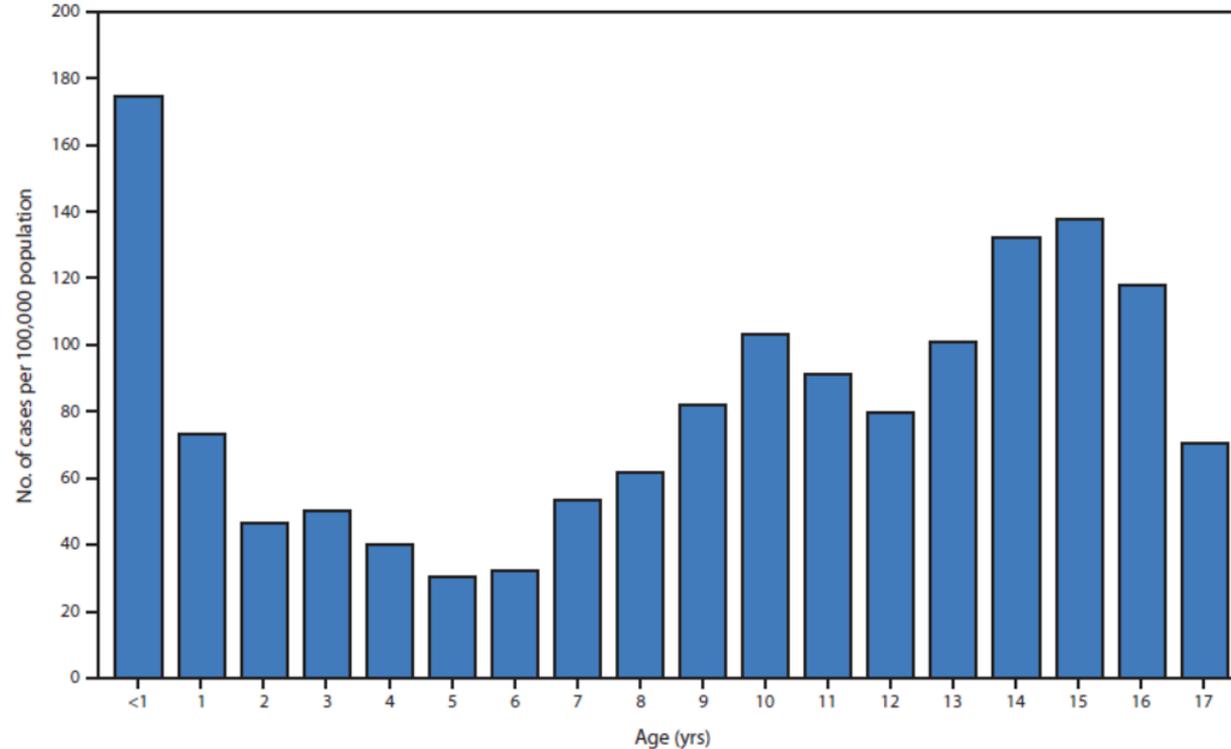
- Pertussis is very contagious
- People with pertussis can be contagious for up to 3 weeks
- Pertussis can be difficult to recognize and diagnose
- People are contagious until completing 5 full days of antibiotic therapy
- Waning Immunity



DTaP Vaccine Effectiveness

- 2014 California Pertussis Epidemic
- 9,935 cases reported
- Disease incidence high among older children and adolescents
- 2.2% of the adolescent cases never received any form of pertussis containing vaccine*
- 87% of the adolescents had received Tdap vaccine*
 - Those with complete/known vaccination history*

FIGURE. Incidence of pediatric pertussis, by age — California, 2014*



* Reported to the California Department of Public Health as of November 26, 2014.

Alternate Text: The figure above is a bar chart showing incidence of pediatric pertussis, by age, in California during 2014. Disease incidence was also high among older children and adolescents, peaking at 137.8 cases per 100,000 among adolescents aged 15 years.



Tdap Vaccine Effectiveness

- Tdap Vaccine is recommended as a booster for ages 11-12
- Required for 12 year olds entering 6th grade in NYS
- Waning Immunity:
 - Protection fades over time
 - CDC states 7/10 adults/adolescents are protected after vaccination
 - Decrease in effectiveness each following year

What are the recommendations for use of Tdap in children ages 7 through 10 years?

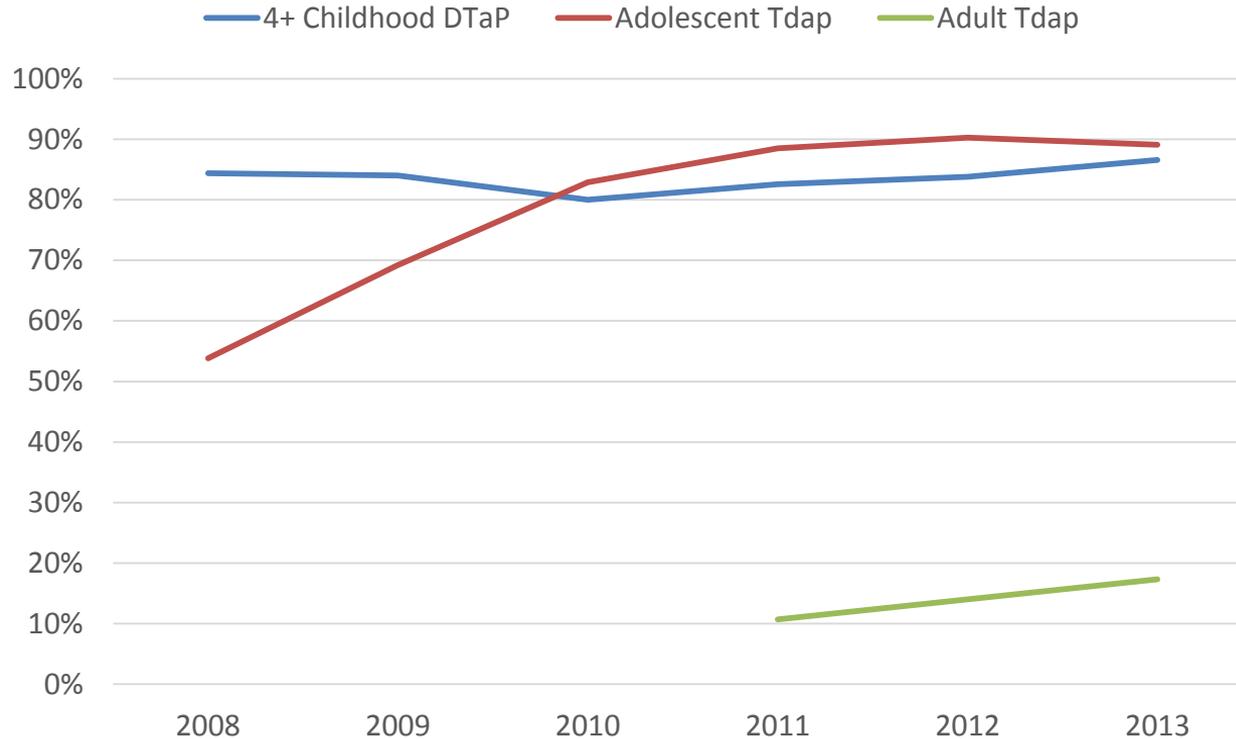
- Children ages 7 through 10 years who are not fully immunized against pertussis (i.e., did not complete a series of pertussis-containing vaccine before their seventh birthday) should receive a single dose of Tdap
- Tdap can be given to 7-10 year olds as part of the catch up schedule (i.e. if not fully immunized for pertussis)
- When Tdap is given as part of the catch up schedule, for further catch up doses for individuals >7 years old, Td should be used (i.e. Tdap is only given as a single dose at present)

<http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6001a4.htm>



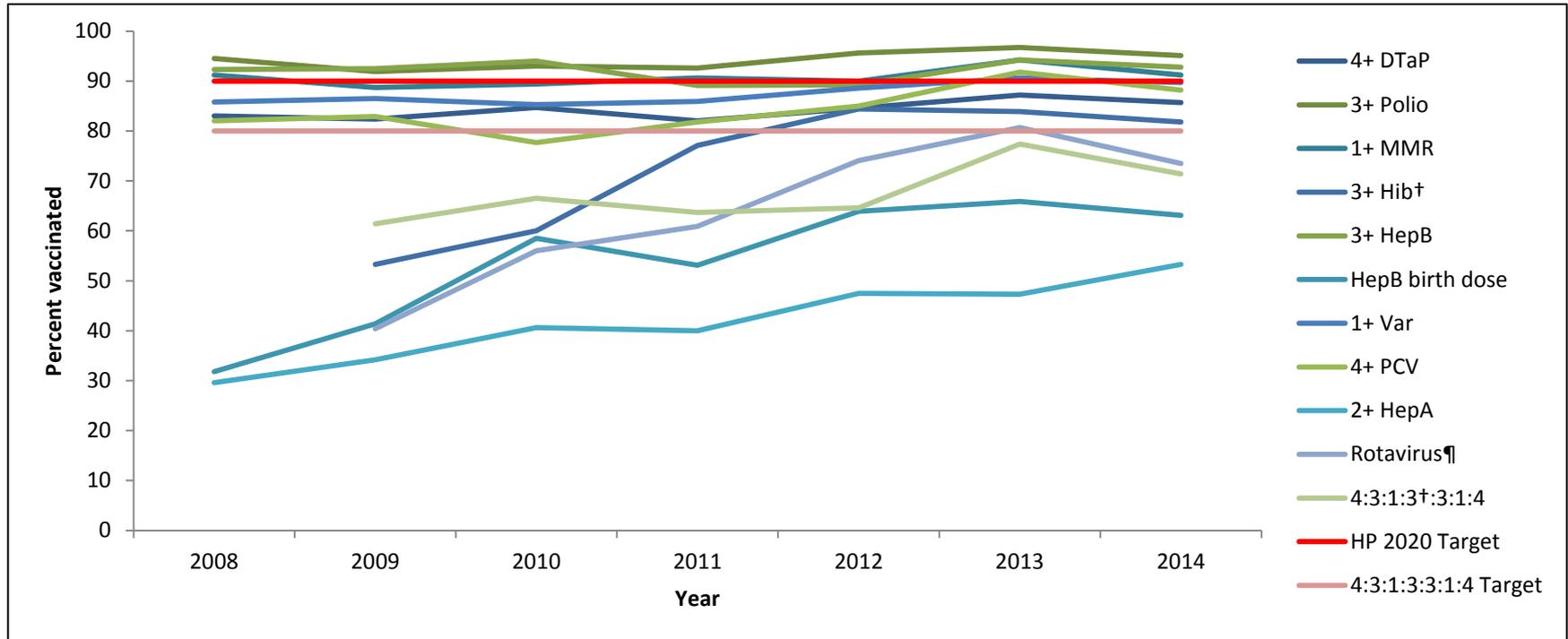
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How are we doing with DTaP and Tdap vaccine coverage?

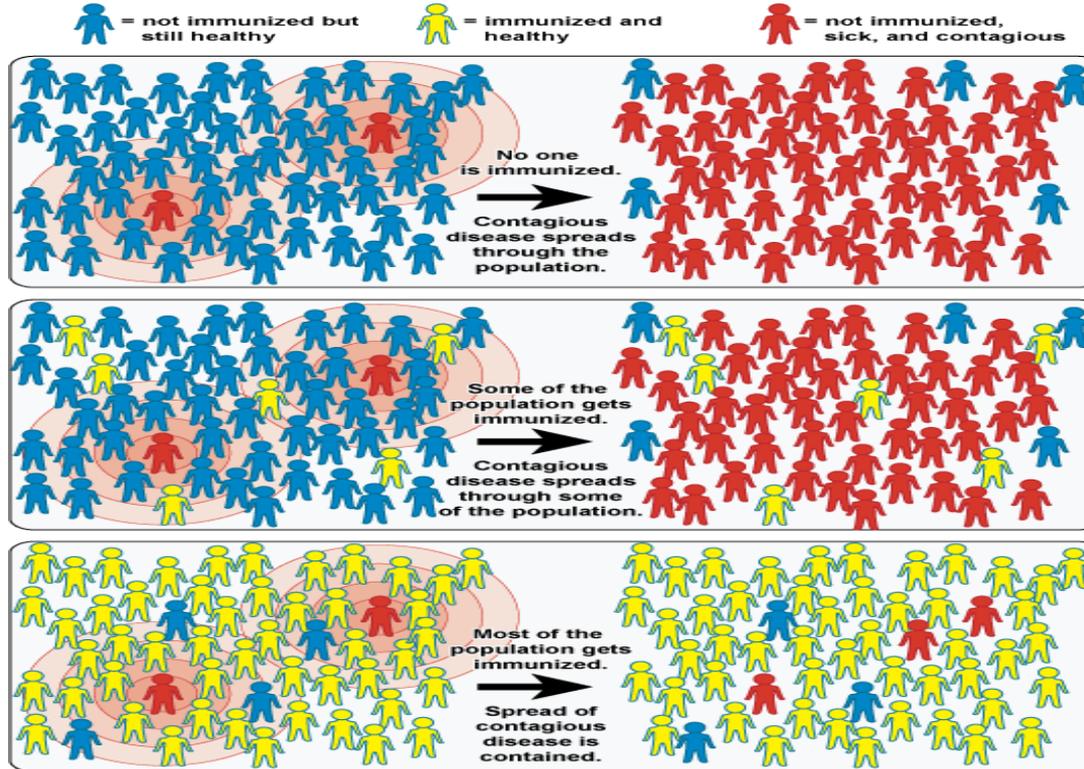


How are the Rates in New York State?

NYS Vaccination Coverage – Children 19-35 months National Immunization Survey



Community Immunity



Break Down Barriers!

- American Academy of Pediatrics asserts that health care professionals are the most trusted source of health information
- Understand the myths & misconceptions
- Allow time to talk with patients
- Be nonjudgmental & factual
- Think outside of the box
 - Creative solutions to common barriers
 - Reminder & recall notices
 - Reduce missed opportunities



In Summary

- Immunizations are an essential component of preventive care
- Protecting people from vaccine preventable diseases is universal
- Health care professionals can communicate facts and are required to educate patients
- Vaccines work best for communities when everyone eligible to be immunized, is immunized
 - Herd Immunity
- Best practice for health care professional is to follow standards of care

Questions?

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Adult & Adolescent Immunization Coordinator

New York State Department of Health

immunize@health.ny.gov

518.473.4437

Resources

- New York State Department of Health, Immunization resources: <http://www.health.ny.gov/prevention/immunization/>
- Centers for Disease Control and Prevention: <http://www.cdc.gov/vaccines/>
- ACIP meeting: www.cdc.gov/vaccines/acip/meetings/meetings-info.html
- NYS Department of Health Outbreak Control Guidelines for VPD https://www.health.ny.gov/prevention/immunization/providers/outbreak_control_guidelines.htm
- For additional questions or comments, please contact the New York State Department of Health Bureau of Immunization at 518-473-4437 or email immunize@health.ny.gov.



Resources

- For VFC questions go to: nyvfc@health.ny.gov
- For NYSIIS questions go to: NYSIIS@health.ny.gov
- Ask the Experts: <http://www.immunize.org/askexperts/>
- Immunization Action Coalition: <http://www.immunize.org/>
- CDC Pink Book:
<http://www.cdc.gov/vaccines/pubs/pinkbook/index.html>

