

## Impact of 2-Dose Vaccination on Varicella Epidemiology: Connecticut — 2005–2008

Routine vaccination of children with 1 dose of varicella vaccine led to a dramatic decrease in varicella (chickenpox) incidence and varicella-related morbidity and mortality in the United States (1). By 2005, evidence suggested that the limits of control had been reached with the 1-dose childhood vaccination program (1-4). Consequently, in 2006, the Advisory Committee on Immunization Practices (ACIP) revised the varicella vaccine guidelines to include routine 2-dose vaccination for children by school entry with catch-up vaccination for those who had received a single dose (1). The initial impact on varicella epidemiology of the routine 2-dose recommendation is unknown.

In Connecticut, chickenpox has been a notifiable disease since 2001. Health care providers, licensed child daycare centers directors, and schools are required to report cases of chickenpox. Any report is accepted; laboratory confirmation is not required. Since 2000, the state has had child daycare and school entry requirements for 1 varicella vaccine dose or history of disease.

Surveillance data were analyzed to assess the initial impact of the ACIP's 2006 routine 2-dose varicella vaccination recommendation. Reports for 2005, the last year before the new recommendations, and 2008, the most recent year with complete data, were analyzed for age-specific incidence. Cases from 2008 were also analyzed for vaccination status and history of chickenpox. Potentially preventable cases were defined as those cases that were not up to date according to the 2006 ACIP varicella vaccination guidelines.

During 2001-2006, varicella incidence remained stable at approximately 50 cases per 100,000 population. In 2007, the rate began to decline. In 2008, the rate was 24.5 cases per 100,000 population and preliminary figures for 2009 show a further drop to 13.9 cases/100,000 (Figure 1). During 2005–2008, the rate decreased markedly among children aged 1–14 years, but increased

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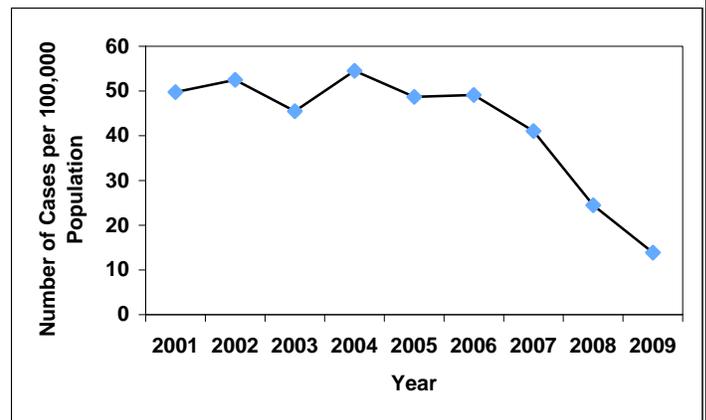
slightly among infants, older adolescents, and adults (Table 1, page 18). The incidence and number of cases remain highest in children aged <15 years.

The proportion of cases hospitalized (1%) and the proportion reporting a previous history of varicella (9%) in 2008 did not change compared to 2005. However, 13% of cases reported a history of having received 2 doses of vaccine in 2008 compared with <1% in 2005.

The majority (59%) of varicella cases in 2008 were potentially preventable by full adherence to the 2-dose ACIP guidelines; of these, 81% were among persons aged 5–14 years who either had only one dose (93%) or had never been vaccinated (7%).

**Reported by:** J. Kattan MD, MPH, L. Sosa MD, H. Bohnwagner MPH, Connecticut Department of Public Health; J. Hadler MD, MPH, Connecticut Emerging Infections Program.

**Figure 1. Varicella incidence in Connecticut, 2001–2009\***



\* 2009 data is preliminary

**Table 1. Changes in varicella incidence by age, Connecticut, 2005 and 2008.**

Age Group	2005		2008	
	No. Cases	Incidence*	No. Cases	Incidence*
<1	36	86.9	49	115.4
1–4	252	148.6	178	105.2
5–9	951	422.2	324	148.0
10–14	404	163.8	209	89.2
15–19	32	12.9	35	14.0
20–29	11	2.7	21	4.9
≥30	23	1.1	41	1.9
<b>Total</b>	<b>1709</b>	<b>48.7</b>	<b>857</b>	<b>24.5</b>

\* per 100,000 population.

#### Editorial Note:

Varicella incidence has declined rapidly in Connecticut coincident with the ACIP 2-dose varicella vaccination recommendation. Additionally, the majority of cases are among school-aged children and are potentially preventable. Thus, the 2-dose regimen can be expected to have further substantial impact on reducing varicella incidence.

Disease incidence paradoxically increased slightly among infants, older adolescents, and adults, groups not directly targeted by the new recommendations. The reasons for these increases are unclear, but may indicate that the number of children vaccinated with 2 doses is not yet sufficient to reduce spread in the community. Continued monitoring of these groups is needed to determine whether the observed increase persists.

Disease appears to be occurring among persons who have been vaccinated with 2 doses of varicella vaccine, a finding that was observed in studies comparing children vaccinated with 1 or 2 doses (5). It is unclear how many of these cases represent true varicella disease as laboratory confirmation is not required. This observation raises the question as to whether 2 doses will be sufficient to totally stop community-level varicella transmission. Further observation is needed to answer this question as the number of 2-dose recipients increases.

This analysis suggests that routine 2-dose vaccination is an effective varicella prevention

strategy. A regulatory change is currently pending in Connecticut to modify the school-based vaccination requirement from 1 to 2 varicella vaccine doses. This legislation is expected to help realize the full potential of the 2-dose varicella vaccination recommendation.

#### References

- Centers for Disease Control and Prevention. Prevention of varicella: recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR Recomm Rep* 2007;56(No. RR-04):1–40.
- Sosa LE, Hadler JL. Epidemiology of varicella in Connecticut, 2001–2005. *J Infect Dis* 2008;197(Suppl 2):S90–3.
- Tugwell BD, Lee LE, Gillette H, Lorber EM, Hedberg K, Cieslak PR. Chickenpox outbreak in a highly vaccinated school population. *Pediatrics* 2004;113:455–9.
- Lopez AS, Guris D, Zimmerman L, et al. One dose of varicella vaccine does not prevent school outbreaks: is it time for a second dose? *Pediatrics* 2006;117:e1070–7.
- Kuter B, Matthews H, Shinefield H, et al. Ten year follow-up of healthy children who received one or two injections of varicella vaccine. *Pediatr Infect Dis J* 2004;23:132–7.

#### Guillain-Barré Syndrome Removed from List of Reportable Diseases

Guillain-Barré syndrome (GBS) is a rare, potentially fatal, immune-mediated peripheral neuropathy. On October 1, 2009, GBS was added to the list of reportable diseases in Connecticut to facilitate surveillance for potential adverse events associated with the influenza A (H1N1) 2009 monovalent vaccine (H1N1 vaccine). The Connecticut Department of Public Health (DPH) has conducted active surveillance for GBS as part of a multicenter, Centers for Disease Control and Prevention (CDC)-based surveillance system (1).

Given that a sufficient quantity of data has been collected for analysis, and that H1N1 vaccine is no longer being widely administered in the state, pursuant to the requirements of Connecticut General Statute 19a- 2a and Section 19a-36-A7 of the Public Health Code, J. Robert Galvin, MD, MPH, MBA, Commissioner of the DPH hereby amends the list of reportable diseases and findings in accordance with Connecticut General statutes 19a-2a by removing GBS effective June 15, 2010.

#### Reference

- Centers for Disease Control and Prevention. Preliminary Results: Surveillance for Guillain-Barré Syndrome After Receipt of Influenza A (H1N1) 2009 Monovalent Vaccine - -- United States, 2009--2010. *MMWR* 2010;59(21):657-661

## Disease Statistics by County—2009, Connecticut

DISEASE	Fairfield	Hartford	Litchfield	Middlesex	New Haven	New London	Tolland	Windham	Unknown	Total
AIDS - see HIV/AIDS	---	---	---	---	---	---	---	---	---	---
Anthrax	0	0	0	0	0	0	0	0	0	0
Babesiosis	13	4	3	9	3	43	2	6	2	85
Botulism (includes infant)	0	0	0	0	0	0	0	0	0	0
Brucellosis	0	0	0	0	0	0	0	0	0	0
California group virus	0	0	0	0	0	0	0	0	0	0
Campylobacter	161	143	25	23	103	33	24	23	0	535
Cholera	0	0	0	0	0	0	0	0	0	0
Cryptosporidiosis	13	6	3	3	7	1	1	4	0	38
Cyclospora infection	4	0	2	3	7	2	0	0	0	18
Diphtheria	0	0	0	0	0	0	0	0	0	0
E.coli O157:H7 gastroenteritis	14	18	2	0	5	0	4	1	0	44
E.coli non-O157, Shiga-toxin producing	6	2	3	1	7	2	1	1	0	23
Eastern Equine Encephalitis (human)	0	0	0	0	0	0	0	0	0	0
Eastern Equine Encephalitis (horses)	0	0	0	0	0	0	0	1	0	1
Ehrlichiosis (HGE)/ Anaplasmosis (Confirmed)	7	3	7	0	3	0	2	0	0	22
Giardiasis	89	53	14	11	65	22	10	11	0	275
Group A streptococcal disease, invasive	19	24	6	2	25	7	0	6	0	89
Group B streptococcal disease, invasive	68	80	13	12	108	26	10	10	0	327
H. influenza type B disease, invasive	0	1	0	0	0	0	0	0	0	1
H. influenza disease, invasive, other serotypes	12	15	3	4	18	7	2	2	0	63
Hansen's disease (Leprosy)	1	0	0	0	0	0	0	0	0	1
Hemolytic-uremic syndrome	3	4	2	0	1	0	0	0	0	10
Hepatitis A	7	4	0	1	2	1	1	2	0	18
Hepatitis B (acute)	7	5	1	0	3	0	0	0	1	17
Hepatitis B (chronic)	124	113	6	13	125	58	15	6	6	466
Hepatitis C (acute)	10	17	2	3	11	6	1	3	1	54
Hepatitis C (chronic/resolved)	398	546	99	96	548	204	54	96	83	2,124
HIV/AIDS	164	153	9	14	155	25	9	9	0	538
Influenza associated deaths, children <18	0	1	0	0	1	0	0	0	0	2
Legionnaires disease	9	13	1	3	22	1	3	3	0	55
Listeriosis	9	4	1	2	8	2	0	0	0	26
Lyme disease	699	312	213	196	460	579	297	275	1,125	4,156
Malaria	2	2	0	0	2	1	0	0	0	7
Measles	0	0	0	0	0	0	0	0	0	0
Meningococcal disease	0	3	0	0	3	1	0	0	0	7

**Disease Statistics by County—2009, Connecticut (cont.)**

DISEASE	Fairfield	Hartford	Litchfield	Middlesex	New Haven	New London	Tolland	Windham	Unknown	Total
Mumps	0	1	0	0	0	0	0	0	0	1
Neonatal sepsis	8	8	2	0	8	0	1	0	0	27
Pertussis (confirmed & probable)	22	16	6	0	5	3	2	2	0	56
Plague	0	0	0	0	0	0	0	0	0	0
Pneumococcal disease, invasive	120	116	20	19	109	38	14	17	0	453
Poliomyelitis	0	0	0	0	0	0	0	0	0	0
Q Fever	0	0	0	0	0	0	0	0	0	0
<b>Rabies (human)</b>	0	0	0	0	0	0	0	0	0	0
<b>Rabies (animal)</b>	35	33	16	8	25	16	10	9	1	153
Reye Syndrome	0	0	0	0	0	0	0	0	0	0
Rheumatic Fever	0	0	0	0	0	0	0	0	0	0
Rocky Mountain Spotted Fever	0	0	0	0	0	0	0	0	0	0
Rubella	0	0	0	0	0	0	0	0	0	0
Salmonellosis	134	88	20	13	114	29	14	18	0	430
<b>Sexually Transmitted Diseases</b>										
<i>Chancroid</i>	0	0	0	0	0	0	0	0	0	0
<i>Chlamydia</i>	2,453	3,945	190	298	3,726	644	229	269	0	11,754
<i>Gonorrhea</i>	525	885	17	58	941	56	18	23	0	2,523
<i>Neonatal Herpes</i>	0	0	0	0	0	0	0	0	0	0
<i>Syphilis</i>	15	25	2	0	17	0	0	23	0	82
Shigellosis	15	7	3	2	13	2	1	0	0	43
Staphylococcus Aureus, Methicillin-resistant, invasive	180	276	44	33	320	56	27	28	0	964
Tetanus	0	0	0	0	0	0	0	0	0	0
Trichinosis	0	0	0	0	0	0	0	0	0	0
<b>Tuberculosis</b>										
<i>Pulmonary</i>	31	11	2	0	18	5	0	1	0	68
<i>Other</i>	10	18	0	0	9	0	0	0	0	37
Typhoid Fever	3	1	0	0	1	0	0	0	0	5
Varicella (confirmed & probable)	145	112	39	28	91	30	23	17	1	486
Vibrio infections	9	2	0	1	13	1	0	1	0	27
Yellow Fever	0	0	0	0	0	0	0	0	0	0
Yersiniosis	9	5	0	0	8	0	0	0	0	22
West Nile virus (fever & invasive)	0	0	0	0	0	0	0	0	0	0

J. Robert Galvin, MD, MPH, MBA  
Commissioner of Health

Matthew L. Cartter, MD, MPH  
State Epidemiologist

Lynn Sosa, MD  
Deputy State Epidemiologist

HIV/AIDS Surveillance (860) 509-7900  
Epidemiology (860) 509-7994  
Immunizations (860) 509-7929  
Pulmonary Diseases (860) 509-7722  
Sexually Transmitted Diseases (STD) (860) 509-7920

**Connecticut Epidemiologist**

Editor: Matthew L. Cartter, MD, MPH

Assistant Editor & Producer:  
Starr-Hope Ertel