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Seasonal and Pandemic 2009 H1N1 Influenza Immunization Rates Among Connecticut Hospital Health Care Personnel, 2009–2010

Health care personnel (HCP) are at increased risk of acquiring and spreading influenza due to their exposure to ill patients, who are often at highest risk of infection-related complications. Annual influenza vaccination of HCP has been recommended by the Centers for Disease Control and Prevention (CDC) since 1981. Before 2010, according to estimates from the National Health Interview Survey, overall influenza vaccination coverage among HCP never exceeded 49% in any season (*1*).

During the fall of 2008, the Connecticut Department of Public Health (DPH) conducted a survey to examine influenza immunization rates among HCP during the 2007–2008 influenza season. The survey was conducted face-to-face with staff from hospital infection control, occupational or employee health departments of acute care hospitals in Connecticut. The survey also described hospital efforts to increase uptake of the vaccine, including adoption of national recommendations (*2,3*).

During the summer of 2010, the survey was repeated via email to the same staff departments regarding the 2009–2010 influenza seasonal and pandemic H1N1 influenza immunization rates. HCP were defined as all medical and non-medical personnel in contact with patients, including volunteer and part-time staff; however, not all hospitals included volunteers in their HCP counts. Health care personnel who were ineligible to receive influenza vaccination, either due to medical or religious exemptions, were removed from the denominator when determining the overall immunization rate for each hospital. To determine the influenza immunization rate, the number of vaccinated HCP was divided by the total number of vaccine-eligible HCP, and each resulting hospital rate was included to determine the mean and median.

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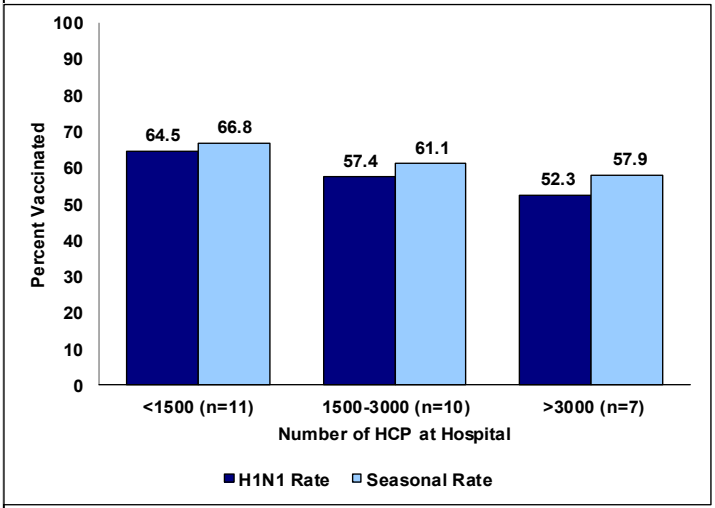
A total of 28 hospitals participated in the 2010 survey representing all of Connecticut's acute care hospitals (several hospitals with shared employee health departments combined their campuses for reporting purposes). The mean pandemic 2009 H1N1 immunization rate was 59%, with a median of 60%, and included 36,050 vaccinated hospital HCP. The mean 2009–2010 seasonal immunization rate was 63%, with a median of 64% (range 42%–90%). Overall, 38,848 hospital HCP were vaccinated. Seasonal influenza rates among HCP working in hospitals increased by a mean of 10.1 percentage points ($p=0.004$) from the 2007–2008 to the 2009–2010 season, ranging from a decrease of 7% to an increase of 32%. Of all the hospitals, 2 had decreased rates, 25 had increased rates, and one hospital did not report in 2008.

HCP influenza immunization rates increased as the number of HCP employed at the hospital decreased for both pandemic 2009 H1N1 and 2009–2010 seasonal influenza vaccines (Figure 1, page 30); seasonal influenza rates were consistently higher than pandemic 2009 H1N1 influenza rates. All hospitals reported educating employees regarding influenza illness and vaccine benefits, and offering vaccine annually to all eligible HCP on site and during all shifts. No hospitals reported mandating either pandemic 2009 H1N1 or seasonal influenza vaccination. Univariable analysis was performed to determine hospital characteristics related to higher mean 2009–2010 seasonal influenza immunization rates (Table 1, page 30). Following up with HCP that refuse vaccine, requiring a signed refusal form, and documenting and tracking reasons for vaccine refusal were statistically significant activities (one-tail t-test; $p \leq 0.05$).

Figure 1. Comparison of mean seasonal and pandemic 2009 H1N1 immunization rates among hospital healthcare personnel in Connecticut, 2009-2010 (N=28).



Reported by

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Editorial

Limitations to this report include inherent difficulties in defining who should be counted as HCP (the denominator for the immunization rate) which may have been compounded by the change in study design for the more recent survey. The t-test evaluated the statistical significance of hospital activities during the 2009–2010 influenza season only, when in reality past activities may have impacted rates.

The pandemic 2009 H1N1 influenza vaccination rate for Connecticut hospital HCP of 59% was above the national estimate of 51% (*1*). The 2009–2010 seasonal influenza immunization rate of 63% was below the national rate of 72%, but showed improvement since the previous survey (*1*). Recently, positions on mandatory vaccination have been endorsed by several professional groups, including the Infectious Diseases Society of America (IDSA), the American Academy of Pediatrics (AAP), and the Society for Healthcare Epidemiology of America (SHEA). Institutions that have implemented a mandatory policy have dramatically reduced employee absenteeism as well as healthcare associated influenza, thereby improving patient safety and reducing healthcare costs (*4*). Influenza immunization requirements are effective in increasing HCP vaccination rates, and should be considered as part of a multifaceted, comprehensive hospital program to prevent influenza among patients and staff.

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Table 1. Influenza immunization-related hospital activities.

Statement	Number (%) answering "yes"	*P*
Hospital documents and tracks reasons for refusal	15 (54)	0.03
Hospital follows up with HCP that refuse vaccine	5 (18)	0.04
Hospital requires HCP who refused seasonal influenza vaccine to sign a refusal form	17 (61)	0.05
Hospital uses computerized databases to track HCP influenza vaccination status	22 (79)	NS
Hospital tracks influenza vaccination coverage by ward / unit and provides feedback to staff	15 (54)	NS
Hospital required HCP who refused pandemic 2009 H1N1 influenza vaccine to sign a refusal form	7 (25)	NS
Hospital provides employee incentives for those accepting influenza vaccine	4 (14)	NS

Human Granulocytic Anaplasmosis - Connecticut, 2001-2010

Human granulocytic anaplasmosis is an intracellular bacterial infection transmitted to humans by *Ixodes scapularis* (deer tick or black-legged tick), the same tick that transmits Lyme disease (*1*). The agent, *Anaplasma phagocytophilum*, was previously referred to as *Ehrlichia phagocytophila* and *Ehrlichia equi* and is most common in the upper Midwestern and northeastern states.

The anaplasmosis national surveillance case definition (NSCD) (*2*) defines a confirmed case as a patient with clinically compatible illness characterized by acute onset of fever, plus one or more of the following: headache, myalgia, anemia, leukopenia, thrombocytopenia, or elevated hepatic transaminases; plus 1) a fourfold change in IgG-specific antibody titer to *A. phagocytophilum* antigen by indirect fluorescence assay (IFA) in paired serum samples, or 2) a positive polymerase chain reaction assay, or 3) immunostaining of antigen in a biopsy or autopsy sample, or 4) isolation from a clinical specimen in cell culture. A probable case is a patient who has a clinically compatible disease plus 1) elevated IgG or IgM antibody, or 2) microscopic identification of morulae in neutrophils or eosinophils. To interpret serologic evidence, the Centers for Disease Control and Prevention uses an IFA IgG cutoff of ≥1:64 and does not use IgM results because of low specificity.

During 2001-2010, the Department of Public Health (DPH) received 7,439 reports of positive tests for *A. phagocytophilum*. Supplemental reporting forms were sent to the ordering healthcare provider in an effort to collect clinical and demographic information. Clinical information is needed to determine the NSCD case classification. Of the reports received, 366 (5%) were classified as confirmed and 1,227 (16%) as probable cases. The average annual number of confirmed (Figure 1) and probable cases was 37 and 123 respectively. The remaining 5,846 (79%) reports contained information that did not satisfy the NSCD criteria or was insufficient for case classification.

Of the confirmed cases, the date of onset of illness was reported for 210 patients; 156 (74%) occurred during May through August. The ages of patients ranged from 2-88 years (mean = 54); the age specific rates for confirmed cases were highest among those ≥ 60 years of age (2.3 cases per 100,000 population), and lowest for children ≤ 9 years (0.2 cases per 100,000 population). Males accounted for 59% of cases.

Statewide, the average annual incidence was 1.0 case per 100,000 population. Windham County had the highest average county rate with 3.1 cases per 100,000 population (Figure 2). The lowest rates were reported from Hartford and New Haven counties (0.2 and 0.3 cases/100,000 population respectively).

Figure 1. Number of *Anaplasma phagocytophilum* cases-Connecticut, 2001-2010

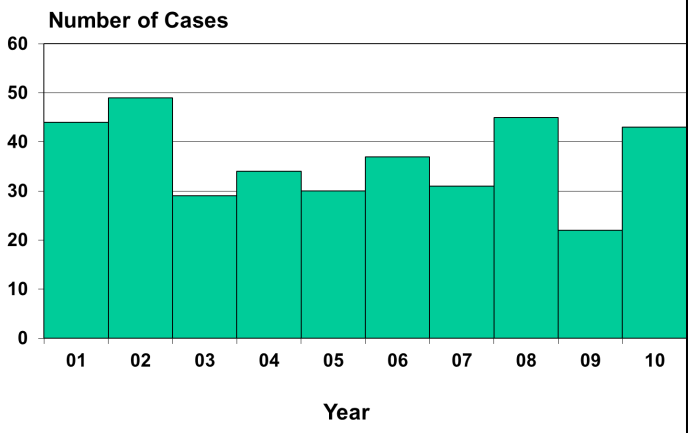
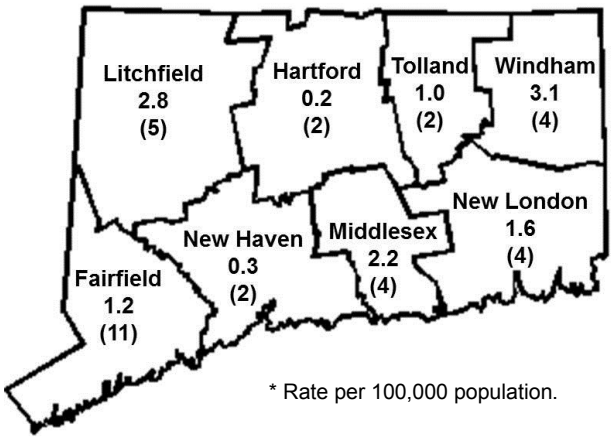


Figure 2. Average annual number of *Anaplasma phagocytophilum* (cases) and rate* by county - Connecticut, 2001-2010



* Rate per 100,000 population.

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Editorial

In Connecticut, surveillance for anaplasmosis has been ongoing for 17 years and has provided data necessary to describe the epidemiology of this disease. Onset of illness reflects the expected spring and summer seasonal pattern for exposure to *I. scapularis*. Anaplasmosis is most frequently diagnosed in adults, and especially in patients over 60 years of age; the age group most likely to be hospitalized if infected. During the past 10 years, incidence of anaplasmosis has remained relatively stable with yearly variation often seen with vector-borne diseases.

Abundant habitat for support of the tick vector and white-footed mice, the principal mammalian reservoir of *A. phagocytophilum*, near residential dwellings in wooded areas brings people in frequent contact with infected ticks. Measures for the prevention of anaplasmosis, as for other tick-borne diseases, includes environmental measures to reduce ticks in areas around homes where people recreate, and personal protective measures to avoid tick bites.

Surveillance provides trend information but underestimates the true incidence of the disease. Collection of laboratory, demographic, and clinical information necessary for case classification is often incomplete. During 2010 for example, 1,091 supplemental reporting forms were sent to providers. Of these, 667 (61%) were returned, which resulted in identification of 43 (6%) confirmed cases and 152 (23%) probable cases.

The organisms that cause babesiosis and Lyme disease are also transmitted by deer ticks increasing the importance of tick bite prevention. During 2010, 82 (2.3 per 100,000 population) confirmed cases of babesiosis and 1,964 (55.8 per 100,000 population) confirmed cases of Lyme disease were identified. Ticks can be infected and transmit more than one disease resulting in patients with co-infections.

An organism related to *A. phagocytophilum* with public health importance is *Ehrlichia chaffeensis*, which also causes intracellular infections (*3*). However, unlike *A. phagocytophilum*, which primarily infects granulocytes, *E. chaffeensis* primarily infects monocytes and is transmitted by the lone star tick, *Amblyomma americanum*. Oklahoma, Missouri, and Arkansas account for 35% of all reported cases but occasionally, ehrlichiosis cases may be reported in other parts of the United States, including northern states where the lone star tick is not commonly found.

Testing is readily available through commercial laboratories. Health care providers are urged to continue to include anaplasmosis in the differential diagnosis of acute febrile illnesses, especially during spring and summer months, and to report suspected cases to the DPH. For questions concerning anaplasmosis reporting or to order the most current version of the Reportable Disease Confidential Case Report Form PD-23, please contact the Epidemiology and Emerging Infections Program at (860) 509-7994. Electronic fillable PDFs are also available at www.ct.gov/dph. Select "Forms" from the top navigation bar, and the appropriate form under Reportable Disease Forms.

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