

Pandemic 2009 H1N1 Vaccination in Connecticut

In April 2009, a novel virus was identified as the source of what became the first influenza pandemic in over 40 years. Vaccine development was immediately begun with the goal of public distribution in the fall of 2009. In Connecticut, vaccine was distributed to both private and public healthcare providers. This report summarizes those vaccination efforts. Lessons learned from this vaccination campaign will be used to plan future influenza vaccination initiatives.

Pandemic 2009 H1N1 Vaccine Distribution

During the months leading up to the availability of the pandemic 2009 H1N1 vaccine, Connecticut registered healthcare providers (HCPs) who intended to administer the new vaccine. HCPs were notified of the registration process through professional organizations, press releases, and direct communication to existing immunization providers. Registration required HCPs to complete forms supplying information on the number of patients by age group, practice address, and provider type* and specialty†. The Department of Public Health (DPH) requested that only one HCPs register per practice site (i.e. physical location). HCPs were categorized into public or private sector using the provider type category. Public sector HCPs included local health departments (LHD) that were previously organized during pandemic influenza planning into 42 mass dispensing areas (MDA) with one lead health department per MDA. Private sector HCPs included all other provider type categories. DPH staff entered the registration information into the Centers for Disease Control and Prevention's (CDC) Vacman system. This allowed orders to be placed as the vaccine was made available.

Practice registration information was exported from Vacman into an Access database. DPH staff

* Provider type included College/University, CHC, hospital, LHD, school based health clinic, private practice, other (specify).
 † Specialty type included internal medicine, family practice, family planning, long term care facility, multi-specialty, OB/gyn, pediatrics, pharmacy, visiting nurses association, walk-in, other (specify).

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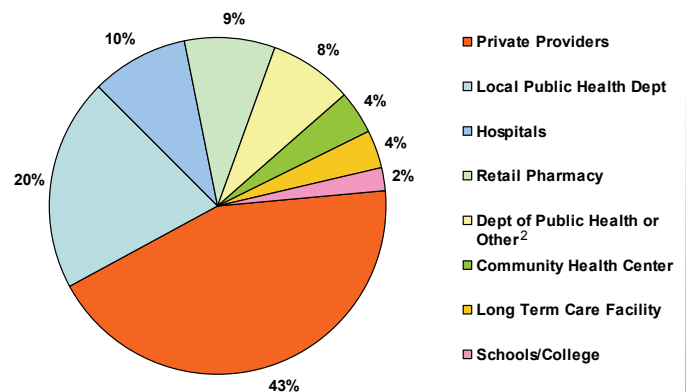
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used this data to prioritize initial vaccine shipments to those HCPs who would vaccinate the greatest number of high-risk individuals as recommended by the Advisory Committee on Immunization Practices (ACIP) (1). In addition, DPH staff matched information on HCPs practice type, specialty, and patient age demographics with the available 2009 H1N1 vaccine formulations indicated for those age groups served by the HCPs.

From September 2009 through February 2010, DPH staff registered over 1,800 HCPs sites, of which 1,324 sites received direct shipments of vaccine. Of the 1,183,020 doses shipped by the distributor to providers, 939,610 (79%) were allocated to private HCPs. Of these, 515,210 (55%) doses were shipped to "private" practice physicians (Figure 1). Public HCPs received 243,410 (21%) doses of vaccine.

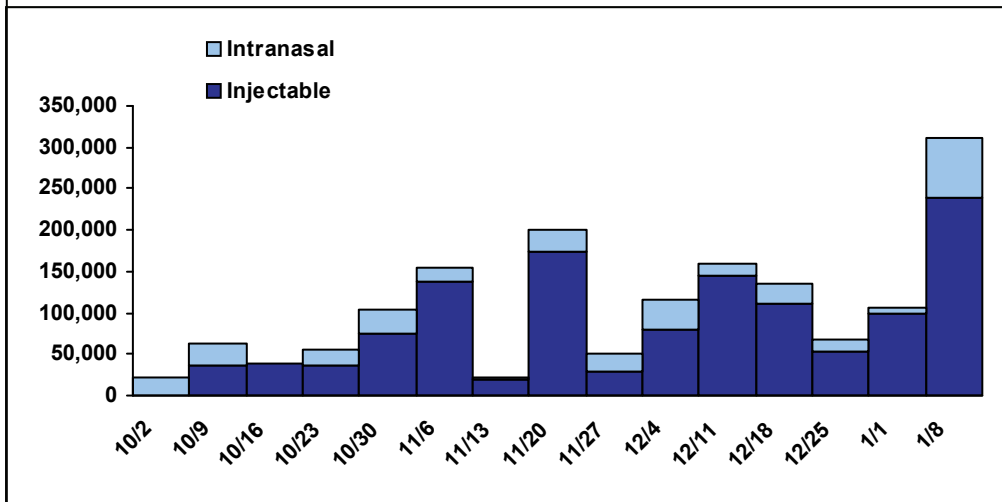
During the first week of October 2009, Connecticut received its first allocation of pandemic 2009 H1N1 vaccine from the CDC,

Figure 1. Percent of pandemic 2009 H1N1 vaccine doses shipped by provider type—Connecticut, October 2009–January 2010 (N = 1.18 million doses¹)



1. Includes doses direct-shipped by central vaccine distributor
2. Other such as Employee Health, Visiting Nurses Association, Emergency Medical Services, etc.

Figure 2. Doses of injectable versus intranasal pandemic 2009 H1N1 vaccine available by week—Connecticut, October 2009–January 2010 (N = 1.18 million doses¹)



reported as: 43.2% in children aged 6 months–17 years, 15.2% in persons ≥18 years of age, and 33.4% were persons in high-risk groups. Compared to national and regional rates, Connecticut was below the regional median estimate but above the U.S. median. New England, Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont), had the highest vaccination coverage overall when compared to other national regions.

1. Includes doses allocated by CDC to the State of Connecticut by week ending date

Healthcare Worker Vaccination

which included the live intranasal formulation only (Figure 2). On October 7, HCPs received their first vaccine shipment. A limited number of injectable vaccines were allocated the following week. Vaccine order requests outpaced vaccine availability until the third week of December 2009.

Measurement of Pandemic 2009 H1N1 Influenza Vaccination

Behavioral Risk Factor Surveillance System (BRFSS) and National 2009 H1N1 Flu Survey

Three data sources were used to examine who was vaccinated against the 2009 H1N1 virus in Connecticut. In an effort to provide state-specific estimates of the number of individuals who received the 2009 H1N1 vaccine, the CDC used two phone surveys to collect vaccination information. The BRFSS is an annual state-based telephone survey collecting information from approximately 400,000 randomly selected persons aged ≥18 years among the non-institutionalized U.S. population. The National 2009 H1N1 Flu Survey (NHFS) was conducted from October 2009–June 2010. The purpose of this survey was to collect information about vaccination coverage with the 2009 H1N1 and seasonal influenza vaccines. The CDC combined the BRFSS and NHFS data for average estimates.

Analysis of the combined BRFSS and NHFS survey results were published in the Morbidity and Mortality Weekly Report (2). Estimated Connecticut vaccination coverage rates were

Hospitals received 10% of all vaccine distributed to Connecticut. During June–July 2010, a survey was e-mailed to employee health representatives from all acute care hospitals in Connecticut with questions concerning the number of hospital healthcare personnel vaccinated against seasonal and pandemic 2009 H1N1 influenza. Responses from employee health departments at 28 hospitals represented hospital healthcare personnel from all of the acute care hospitals in Connecticut. The median vaccination rate against pandemic 2009 H1N1 for hospital healthcare personnel in all hospitals was 59.5%. The median vaccination rate against seasonal influenza was only slightly higher at 63.5%.

Vaccination by Public and Private Healthcare Providers

Public HCPs were required to submit patient report forms for each dose of vaccine administered, which included patient demographic and risk factor information. Vaccine billing information was also submitted to the DPH by public HCPs for reimbursement purposes. According to billing receipts, there were 188,985 vaccine doses administered by public HCPs, which is equivalent to 78% of the doses distributed to this group. Based on patient report forms scanned into a DPH database, full demographic and risk factor information was available for only 108,810 (58%) doses administered by public HCPs; this represents 103,580 unique persons. (Table 1). In total, 1,903 persons aged 6 months

through 9 years received a second dose of vaccine as recommended by the ACIP. The median age of those vaccinated was 19 years with the highest percentage of vaccinations in children aged 5–18 years (35%). Slightly more females than males were vaccinated. Nearly half of all administered vaccine was given to persons ≤18

years of age. In total, 69% of vaccine administered in this setting was given to persons in high-risk groups.

Private HCPs were required to report on a weekly basis to the DPH the number of doses of 2009 H1N1 vaccine that were administered by age group. There were 265,960 vaccine doses administered by private HCPs, which represents vaccine received by 230,413 persons. Among this group, 35,547 persons received a second dose of H1N1 vaccine; because these doses were reported by age group, it is not possible to determine what percent were in the age range for which a second dose was recommended.

These data also show that public HCPs vaccinated a higher proportion of children aged 5–18 years of age, while private HCPs vaccinated a higher proportion of children ≤5 years old (Table 2, page 8).

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Overall, these data provide a general picture of the population vaccinated against the pandemic 2009 H1N1 virus in Connecticut. Based on billing receipts from public HCPs and aggregate age reports submitted by private HCPs, 454,945 doses of vaccine were reportedly administered. Out of the reports where age was indicated, the largest proportion of vaccine from both public and private HCPs was administered to children between 5–18 years. Public HCPs data revealed that 69% of persons vaccinated were in one of the ACIP high-risk groups for pandemic 2009 H1N1 infection or complications from the virus. Until the fourth week of the vaccination effort, the live intranasal vaccine supply outpaced injectable vaccine supply. This posed challenges to vaccinating the high-risk individuals in the ACIP priority groups, many of whom were ineligible to receive the intranasal formulation.

A combined private and public HCPs vaccine administration system was effective in reaching high-risk populations. While it appears that most administered vaccine was given to children, the two HCPs groups complemented each other.

Table 1. Characteristics of persons receiving 2009 H1N1 vaccine from public HCPs (MDAs), Connecticut, 2009–2010.

Category/Characteristic	No.	(%)
Doses of vaccine administered	108,810	100
Doses administered to high-risk * population	75,372	69.3
Medical conditions**	27,821	25.6
Individuals living in a household with a child aged <6 months	8,648	7.9
Immunosuppression	2,538	2.3
Pregnant women	2,161	2.0
Number of individuals vaccinated	103,580	100
Race/Ethnicity		
White	71,762	69.3
Black	2,494	2.4
Asian	5,616	5.4
Native American	473	0.5
Hispanic	7,260	7.0
Other	923	0.9
Missing	15,052	14.5
Gender		
Male	45,429	43.9
Female	52,333	50.5
Missing	5,818	5.6
Age		
6-23 months	2,638	2.5
24-59 months	9,729	9.4
5-18 years	36,371	35.1
19-24 years	4,764	4.6
25-49 years	21,317	20.6
50-64 years	15,064	14.5
≥65 years	10,701	10.3
Missing	2,996	2.9
Children (6 months-9 years) who received >1 dose	1,903	1.8

* High-risk individuals included pregnant women, those living in a household with a child aged <6 months, individuals aged 25-64 years with immunosuppression or certain medical conditions; health care and emergency medical services personnel not included.

** Medical conditions included asthma, blood disorder, cancer, diabetes, heart disease, immune disorder, kidney disease, liver disease, lung disease, and neurological disease.

Table 2. Ages of persons receiving 2009 H1N1 vaccine by provider type, Connecticut 2009–2010

Category	Public HCPs		Private HCPs	
	No.	%	No.	%
Total	103,580	100	230,413	100
Age Group				
6-23 months	2,638	2.5	18,052	7.8
24-59 months	9,729	9.4	27,536	12.0
5-18 years	36,371	35.1	56,535	24.5
19-24 years	4,764	4.6	16,563	7.2
25-49 years	21,317	20.6	46,511	20.2
50-64 years	15,064	14.5	37,343	16.2
≥65 years	10,701	10.3	27,873	12.1
Missing	2,996	2.9		

Private HCPs vaccinated a larger percentage of younger children while public HCPs vaccinated a higher percentage of school-aged children. With new ACIP recommendations supporting annual influenza vaccination for all persons regardless of age (3), both groups will need to evaluate how to more effectively vaccinate all patients.

Although the hospital survey data show Connecticut vaccination rates for healthcare workers to be higher than the national estimate (37.1%), only 60% of hospital healthcare personnel were vaccinated against the 2009 H1N1 virus despite being a priority vaccination group (1,4). For future vaccination coverage, it is essential that hospitals and state and local health departments work together to develop strategies for improving influenza vaccination rates among healthcare workers.

There were several limitations to the data presented. Estimates of vaccine administration do not represent the entire vaccination period and might underestimate vaccination rates. In the hospital survey, hospitals sometimes used

different definitions of healthcare personnel, which might have affected the vaccination rate reported. DPH data on the number of doses administered and the demographics of those Connecticut residents receiving vaccine represents only a subset of individuals that actually received vaccine. Underreporting of doses administered might have been greater among private than public HCPs, since private sector payment was not contingent upon submission of receipts to DPH. Because of the described limitations, population-based estimates of vaccination coverage were not included in this analysis.

Using both private and public HCPs, a high proportion of people vaccinated against the 2009 H1N1 virus in Connecticut were in a high-risk group. HCPs in both settings will need to continue to work together to improve vaccination rates for all persons for seasonal influenza and during future influenza pandemics.

References

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