



Influenza Vaccination Coverage Among Children Aged 6--59 Months --- Six Immunization Information System Sentinel Sites, United States, 2006--07 Influenza Season

In June 2006, the Advisory Committee on Immunization Practices (ACIP) expanded its 2004 recommendation for routine influenza vaccination of children aged 6--23 months to include children aged 24--59 months. The 2006 ACIP recommendations also reemphasized that previously unvaccinated children aged <9 years should receive 2 doses of influenza vaccine administered at least 1 month apart to be fully vaccinated ([1](#)). In 2007, using data from six immunization information system (IIS)* sentinel sites, CDC conducted the first assessment of influenza vaccination coverage among children aged 6--59 months during the 2006--07 influenza season. The findings demonstrated that, at all six sites, <30% of children aged 6--23 months and <20% of children aged 24--59 months were fully vaccinated. Vaccination coverage data from national and state surveys for an influenza season generally are not available until the next influenza season. Rapid assessment of influenza vaccination coverage can help direct activities of state and local public health agencies aimed at increasing the number of children fully vaccinated against influenza.

IIS data are confidential, computerized records of vaccine administration collected from health-care providers, vital records, and billing systems. The sentinel sites are subsets of IIS in five states (Arizona, Michigan, Minnesota, Montana, and Oregon) and the District of Columbia. The sites have high rates (approximately 90%) of participation by health-care provider sites and enrollment of children and represent contiguous geographic counties, postal code areas, or census tracts for which IIS data are collected on $\geq 10,000$ children aged <6 years ([Table](#)). Databases at IIS sentinel sites incorporate certain procedures (e.g., routine comparisons of IIS records with provider data) to increase data completeness and accuracy (e.g., <5% multiple records for the same child).

Vaccination coverage was estimated for September 2006--March 2007 among children in two age groups: 6--23 months (for comparison with previous influenza seasons before the expanded ACIP recommendation) and 24--59 months. To assess vaccination coverage in these age groups, children were divided into two groups: 1) those vaccinated with at least 1 dose of influenza vaccine during September 2006--March 2007 and, within that group, 2) those who were fully vaccinated. Children were considered fully vaccinated if they had 1) received no dose of influenza vaccine before September 1, 2006, but then received 2 doses during September 1, 2006--March 31, 2007, or 2) received at least 1 dose of influenza vaccine before September 1, 2006 (e.g., during a previous influenza season), and then received at least 1 dose during September 1, 2006--March 31, 2007. To ensure that all children in the analysis had the same likelihood of being vaccinated during the period under study, analyses included only those children who were aged 6--23 months or 24--59 months during the entire period of September 2006--March 2007.

Vaccination coverage among children aged 6--23 months varied among the six sentinel sites (ranges: 13.9%--46.6% for children who received at least 1 dose and

3.0%--26.9% for children who were fully vaccinated). Compared with the 2005--06 season, vaccination coverage increased during 2006--07 by more than five percentage points among children aged 6--23 months who received at least 1 dose at two sites (Michigan, from 33.4% to 38.8%; Montana, from 6.6% to 13.9%). However, coverage with at least 1 dose during 2006--07 was either similar to coverage during 2005--06 or decreased at the other four sites ([Figure 1](#)).

The percentage of children aged 6--23 months who were fully vaccinated increased by nearly four percentage points at one site (Michigan, from 17.9% to 21.8%). However, the percentage of children who were fully vaccinated either was similar or decreased at the other five sites ([Figure 1](#)).

Vaccination coverage during 2006--07 among children aged 24--59 months also varied among sites (ranges: 6.2%--22.4% for children who received at least 1 dose and 1.9%--18.1% for children who were fully vaccinated) ([Figure 2](#)). At all six sites, the percentage of children aged 24--59 months who received at least 1 dose or who were fully vaccinated was lower than the percentage among children aged 6--23 months.

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Editorial Note:

Analysis of IIS sentinel site data for 2006--07 enables timely, population-based assessment of influenza vaccination coverage for the third season after the ACIP recommendation regarding children aged 6--23 months and the first season after expansion of that recommendation to include children aged 24--59 months. Results indicate that, although influenza vaccination coverage among children has increased at some sentinel sites, fewer than one third of children aged 6--23 months and fewer than one fifth of children aged 24--59 months were fully vaccinated at all of the sites during the 2006--07 season. In addition, the sentinel data revealed wide ranges in vaccination coverage among the sites.

The differences in influenza vaccination coverage among IIS sentinel sites might have been caused by varying degrees of vaccination promotion in the state or local area and varying proportions of health-care providers reporting administration of vaccine doses to IIS sites. Influenza vaccination coverage also can be influenced by media coverage regarding the importance of vaccination, the timing and severity of the influenza season (2), and the timing of vaccine availability. The lower coverage estimates among children aged 24--59 months were expected because the ACIP recommendation was not expanded to include that group until 2006.

IIS estimates of influenza vaccination coverage both among children with at least 1 vaccine dose and among children who were fully vaccinated were similar to state estimates from the National Immunization Survey (NIS) corresponding to five of the six IIS sites during the 2004--05 season and three of the six sites during the 2005--06 season ([3,4](#)). Although NIS is the gold standard for assessment of childhood vaccination coverage, because of the survey design, NIS does not routinely provide estimates below the county level or estimates soon after the latest influenza season. IIS data enable state immunization programs to assess coverage at the local level during or shortly after the latest season. In this assessment, IIS data for the influenza season evaluated were analyzed within 1 month of submission.

The findings in this report are subject to at least three limitations. First, although the sentinel sites have high rates of participation by health-care providers and enrollment of children, not all providers at each site report administration of influenza vaccine. Anecdotal evidence also suggests that even among providers who regularly report administration of other recommended childhood vaccines, some providers are not yet routinely reporting influenza vaccine doses. Incomplete reporting can result in underestimates of vaccination coverage. Second, although sentinel sites have the capability to collect racial/ethnic information, because these data are not yet routinely collected at all sentinel sites, vaccination coverage could not be analyzed by race/ethnicity. Finally, IIS sentinel-site coverage

estimates are not generalizable to the entire state or country and should be viewed as representative of their specific geographic areas only.

IIS data can help public health officials monitor vaccination coverage among children by tracking local data throughout the influenza season. Such tracking can alert local and state public health agencies to gaps in coverage during the influenza season, in time to recommend vaccination for those children who have not been fully vaccinated against influenza.

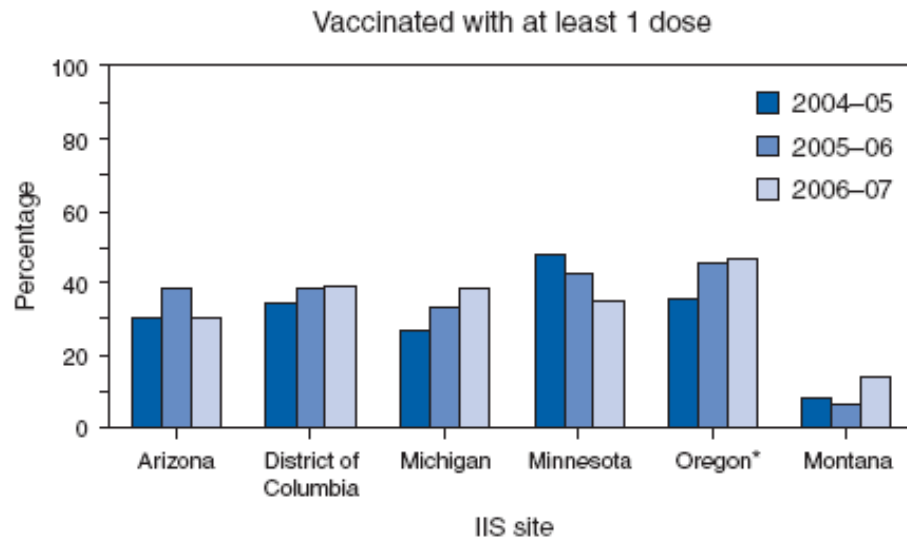
References

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2. Ma KK, Schaffner W, Colmenares C, Howser J, Jones J, Poehling KA. Influenza vaccinations of young children increased with media coverage in 2003. *Pediatrics* 2006;117:e157--63.
3. [CDC. Influenza vaccination coverage among children aged 6--23 months---six immunization information system sentinel sites, United States, 2005--06 influenza season. MMWR 2006;55:1329--30.](#)
4. [CDC. Influenza vaccination coverage among children aged 6--23 months---United States, 2005--06 influenza season. MMWR 2007;56:959--63.](#)

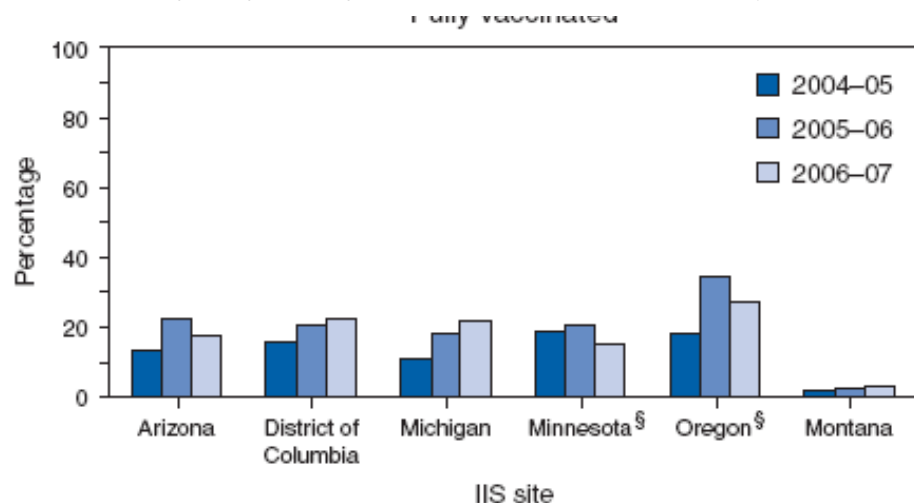
* An IIS is an immunization registry with added capabilities (e.g., vaccine management, adverse event reporting, lifespan vaccination histories, and linkages with electronic data sources). These systems are operated by immunization program grantees in 46 states, the District of Columbia, and five cities.

Figure 1

FIGURE 1. Influenza vaccination coverage among children aged 6--23 months — six immunization information system (IIS) sentinel sites, United States, 2004--05, 2005--06, and 2006--07 influenza seasons



Fully vaccinated[†]



SOURCE: GDG. Influenza vaccination coverage among children aged 6–23 months—six immunization information system sentinel sites, United States, 2005–06 influenza season. MMWR 2006;55:1329–30.

* 2005–06 estimate for Oregon site is 15 percentage points lower than previously reported.

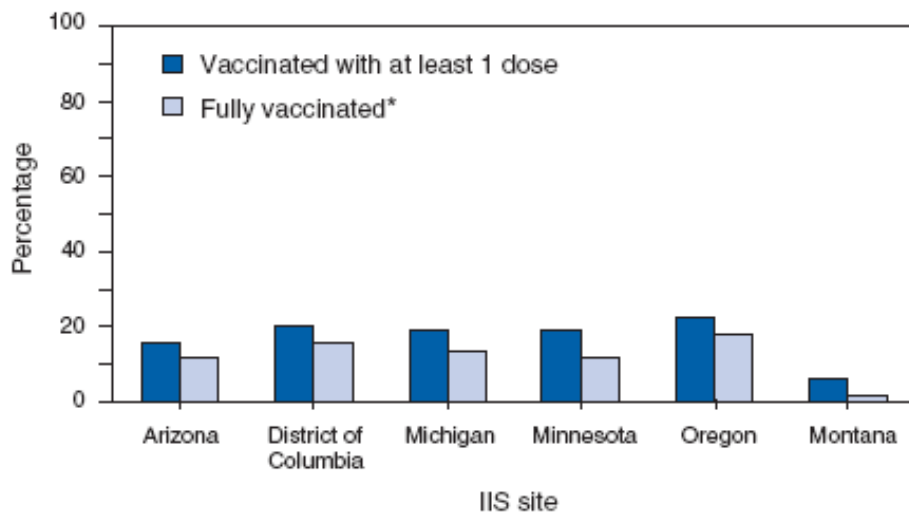
† Children were considered fully vaccinated if they had 1) received no dose of influenza vaccine before September 1, 2006, but then received 2 doses during September 1, 2006–March 31, 2007, or 2) received at least 1 dose of influenza vaccine before September 1, 2006, and then received at least 1 dose during September 1, 2006–March 31, 2007.

§ 2005–06 estimate for Minnesota site is 15 percentage points higher than previously reported, and 2005–06 estimate for Oregon site is 9 percentage points lower than previously reported.

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Figure 2

FIGURE 2. Influenza vaccination coverage among children aged 24–59 months — six immunization information system (IIS) sentinel sites, United States, 2006–07 influenza season



* Children were considered fully vaccinated if they had 1) received no dose of influenza vaccine before September 1, 2006, but then received 2 doses during September 1, 2006–March 31, 2007, or 2) received at least 1 dose of influenza vaccine before September 1, 2006, and then received at least 1 dose during September 1, 2006–March 31, 2007.

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Table

TABLE. Characteristics of six immunization information system (IIS) sentinel sites — United States, 2006–07 influenza season

Site	No. of children aged <6 years in sentinel area	% of all children aged <6 years enrolled in IIS at sentinel site	Participating health-care provider sites*	
			No.	(%)
Arizona (northern)	56,738	96	184	(97)
District of Columbia (southeastern)	19,180	99	39	(100)
Michigan (excluding Detroit)	545,936	93	1,531	(90)
Minnesota (southwestern)	14,577	96	44	(92)
Montana (southwestern)	38,927	100	78	(89)
Oregon (greater Portland area)	42,167	97	58	(96)

* Sites can represent multiple health-care providers.

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