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Usage of quadrivalent influenza vaccine among children in the United States, 2013–14

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Abstract

Annual influenza vaccination is recommended for everyone 6 months in the U.S. During the 2013–14 influenza season, in addition to trivalent influenza vaccines, quadrivalent vaccines were available, protecting against two influenza A and two influenza B viruses. We analyzed 1,976,443 immunization records from six sentinel sites to compare influenza vaccine usage among children age 6 months–18 years. A total of 983,401 (49.8%) influenza vaccine doses administered were trivalent and 920,333 (46.6%) were quadrivalent (unknown type: 72,709). Quadrivalent vaccine administration varied by age and was least frequent among those <2 years of age.

Keywords

Immunization information systems; Registries; Vaccine coverage; Vaccination; Influenza vaccines; Influenza; Human; Child; Preschool; Quadrivalent; Trivalent

Annual influenza vaccination is recommended in the U.S. for everyone 6 months [1,2]. Historically, trivalent influenza vaccines have been used. During the 2013–14 influenza season, quadrivalent influenza vaccines, which protect against two influenza A and two

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Conflicts of interest

The authors have no financial relationships relevant to this article.

Disclosure

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

influenza B viruses, were introduced in the U.S.; these comprise all live attenuated influenza vaccines (LAIV) and some inactivated vaccines. LAIV is indicated for healthy, nonpregnant persons aged 2–49 years, and some inactivated products are not recommended for all ages.

Quadrivalent influenza vaccine usage in the U.S. has not been previously reported. We analyzed records from immunization information system (IIS) sentinel sites to assess influenza vaccine usage during the 2013–14 influenza vaccination period. IIS are population-based sentinel systems that consolidate data from vaccination providers [3,4]. IIS sentinel sites are located in Michigan, Minnesota, North Dakota, New York City, Oregon (six contiguous Portland-area counties), and Wisconsin [5], containing approximately 10% of the U.S. population aged 6 months–18 years.

IIS were queried during July, 2014 for seasonal influenza vaccine doses administered during July 1, 2013 through June 30, 2014. Sites transmitted de-identified records to CDC, where records were classified as trivalent inactivated influenza vaccines (IIV3), quadrivalent inactivated influenza vaccines (IIV4), or quadrivalent LAIV4. Recombinant, whole-cell, and cell culture-derived influenza vaccines were grouped with records unable to be otherwise classified. We used Microsoft® Excel® 2010 (Microsoft Corp., Redmond, WA) and SAS® 9.3 (SAS Institute, Inc., Cary, NC) to perform all analyses.

A total of 1,976,443 doses of seasonal influenza vaccine doses were administered to children aged 6 months through 18 years. Among these, 983,401 (49.8%) were IIV3, 324,515 (16.4%) were IIV4, 595,818 (30.1%) were LAIV4, and 72,709 (3.7%) were an unknown or other type of seasonal influenza vaccine. IIV3 was the most commonly administered influenza vaccine type within every age group, with the exception of 5–8 year olds, for whom LAIV4 was slightly more frequently administered: 41.8% ($n = 197,440$ LAIV4 records) versus 40.8% ($n = 192,793$ IIV3 records) (Fig. 1). Within every age category, IIV4 was administered less frequently than IIV3 and LAIV4.

This is the first report comparing administration of quadrivalent and trivalent influenza vaccines in the U.S. Some quadrivalent vaccines were not widely available throughout the season. The single-dose presentation of Fluzone® Quadrivalent was approved by the U.S. Food and Drug Administration on June 7, 2013, and the multi-dose presentation was approved on December 11, 2013, limiting availability for immunization programs that pre-ordered vaccines [6]. Delayed availability of Fluzone® Quadrivalent would particularly impact children 6–23 months of age since Fluzone® was the sole influenza vaccine recommended for this age group.

The Advisory Committee on Immunization practices (ACIP) did not preferentially recommend any particular influenza vaccine for the 2013–14 season; however, on June 25, 2014, ACIP preferentially recommended LAIV for healthy children age 2–8 years (except in instances where LAIV is not available) [2]. Furthermore, the proportional usage of LAIV was increasing prior to this preferential recommendation [7]. LAIV is offered exclusively as a quadrivalent product during 2014–15 [2], and increased administration of LAIV4 would contribute to an increase in usage of quadrivalent influenza vaccines, particularly among children age 2–8 years.

Although the sentinel site population might not be nationally representative, the population-based data presented in this study establish a baseline for measuring uptake of quadrivalent influenza vaccines. Trivalent vaccines were administered slightly more frequently, although use of quadrivalent vaccines is expected to increase.

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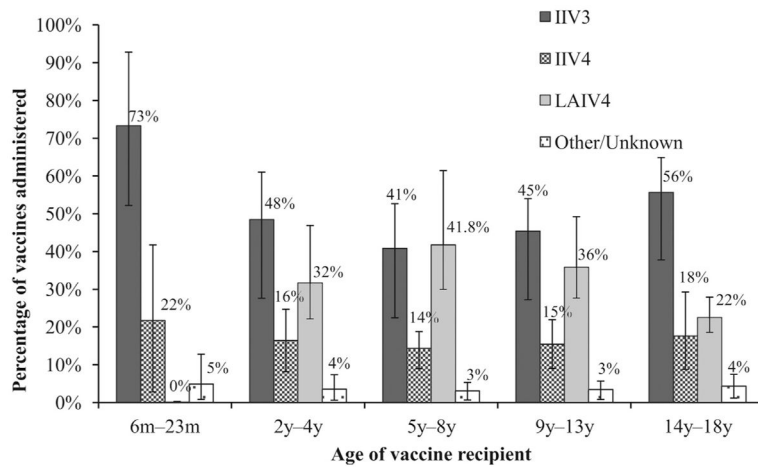


Fig. 1. Usage of trivalent and quadrivalent seasonal influenza vaccines by age – six sentinel sites, 2013–14 influenza vaccination period. Data obtained from Immunization Information System sentinel sites located in Michigan, Minnesota, North Dakota, New York City, Oregon, and Wisconsin. Products categorized as “Other/Unknown” include whole cell vaccines, cell culture-derived vaccine, recombinant vaccines, and vaccines that were unable to be otherwise categorized. Vertical lines depict inter-site ranges.