

Vaccination Coverage Levels Among Young Children in the Vaccine Safety Datalink

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Updated Abstract

Background

Routine assessment of childhood immunization levels in the United States is important to detect possible delays or drops in coverage.

Objectives

Assess vaccination coverage levels in Vaccine Safety Datalink (VSD)-enrolled children aged 19 months and 35 months during 2005, 2006, 2007 and 2008, and compare with National Immunization Survey (NIS) estimates.

Methods

Immunization data were extracted from automated files. Data were included for children who were enrolled in the VSD for at least one year immediately prior to the age of interest and who had at least one well-child visit during that enrollment period.

Results

Estimates were based on more than 69,000 children in each group. The percentage of VSD participants aged 19 months and 35 months who were up to date with the 4:3:1:3:3:1 vaccination series decreased from 2005 to 2008. Coverage with the series was 89.1% (+/- 0.2) among 35 month olds in 2005, but decreased to 88.2% (+/- 0.2) in 2008. Coverage with at least four doses of pneumococcal conjugate vaccine, the newest vaccine examined, increased annually, 88.8% of 35 month olds had received four doses in 2008. A 10% decrease in Hib coverage occurred among 19 month olds in 2008, after revising the up-to-date (UTD) definition based on temporary Advisory Committee on Immunization Practices (ACIP) recommendations, the estimate no longer differed from prior years. VSD coverage estimates among 35 month olds were consistently higher than NIS estimates.

Conclusions

Coverage with routine childhood vaccination series¹ decreased slightly over the four year study period. The Hib vaccine shortage did not affect coverage rates when a revised UTD definition was used. As expected, vaccine coverage among children in an insured population was higher than national estimates.

Contact

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Introduction

Background

- Childhood immunization levels in the United States have been assessed annually using the National Immunization Survey (NIS) since 1994.
- Important to constantly assess vaccination levels to monitor trends and assess impact of childhood immunization efforts.

Vaccine Safety Datalink (VSD)

- Partnership between the Centers for Disease Control and Prevention (CDC), America's Health Insurance Plans (AHIP) and eight managed care organizations (MCO).
- VSD sites include Group Health Cooperative (WA), Harvard Pilgrim (MA), HealthPartners (MN), Marshfield Clinic (WI), Kaiser Permanente Colorado, Kaiser Permanente of Northern California, Northwest Kaiser Permanente (OR), and Southern California Kaiser Permanente.

- Established in 1990 to conduct post-licensure vaccine safety studies.
- Provides comprehensive medical and immunization histories for more than 9.5 million people (2.3 million children) annually, representing roughly 3% of the population of the United States.
- No baseline vaccination coverage studies have been conducted within the VSD.

Objectives

- To describe vaccination coverage levels for children aged 19 months and 35 months in the VSD population in 2005, 2006, 2007, and 2008; and
- Descriptively compare the VSD coverage estimates to those reported by the National Immunization Survey.

Methods

Study Population

- All children who turned 19 months and/or 35 months at any time during the study period (January 2005 through December 2008) and met the enrollment criteria.

Enrollment Criteria

- ≥12 months continuous MCO enrollment prior to the age of interest, and
- ≥1 one well-child visit within their enrollment period.
- A separate criterion stipulating MCO enrollment since birth for 19 month olds was used for additional analyses (data not shown).

Analysis

- Coverage was assessed for children as they reached their 19th or 35th month of age. For each enrollment group (defined by age group and study year) the number of eligible children and percentage vaccinated was determined. Estimates assumed a binomial distribution; 95% confidence intervals were also obtained.
- VSD findings were compared to NIS estimates, which are based on a random-digit dialed, cross-sectional survey of 19-35 month old children.
- Data were extracted using the 2008 VSD Cycle files; analyses were performed with SAS 9.2.

Results

TABLE 1. Vaccination coverage among VSD children aged 19 months, 2005 through 2008

Vaccine	2005 (n=73,395)		2006 (n=74,617)		2007 (n=74,688)		2008 [*] (n=75,117)	
	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)
DTP/dTdap (≥4 doses)	84.97	(84.71, 85.22)	83.28	(83.01, 83.55)	81.79	(81.52, 82.06)	84.88	(84.60, 85.16)
Poliovirus (≥3 doses)	98.03	(97.89, 98.17)	95.65	(95.50, 95.79)	95.19	(95.04, 95.34)	94.97	(94.81, 95.13)
MMR (≥1 dose)	94.10	(93.93, 94.27)	93.60	(93.42, 93.77)	92.98	(92.80, 93.16)	91.56	(91.38, 91.76)
Hib (≥3 doses)	95.68	(95.53, 95.83)	95.19	(95.04, 95.35)	94.85	(94.70, 95.01)	95.44	(95.29, 95.59)
Hepatitis B (≥3 doses)	98.31	(98.17, 98.44)	98.04	(97.90, 98.18)	95.86	(95.72, 96.00)	95.82	(95.67, 95.96)
Varicella (≥1 dose)	91.61	(91.41, 91.81)	91.39	(91.18, 91.59)	91.55	(91.35, 91.74)	90.35	(90.14, 90.56)
PCV7 (≥3 doses)	95.11	(94.95, 95.26)	96.40	(96.28, 96.53)	96.25	(96.12, 96.38)	95.96	(95.82, 96.10)
PCV7 (≥4 doses)	68.76	(68.47, 70.09)	85.64	(85.29, 86.76)	87.14	(86.90, 87.37)	86.11	(85.87, 86.36)
Combined series								
4:3:1:3:3:1	82.70	(82.42, 82.97)	80.88	(80.60, 81.16)	79.11	(78.82, 79.36)	77.31	(77.01, 77.61)
4:3:1:3:3:1	80.88	(80.58, 81.15)	79.30	(79.02, 79.61)	77.90	(77.62, 78.21)	75.85	(75.54, 76.16)
4:3:1:3:3:1:4	63.36	(63.01, 63.71)	76.35	(76.05, 76.66)	75.79	(75.49, 76.09)	73.53	(73.21, 73.84)

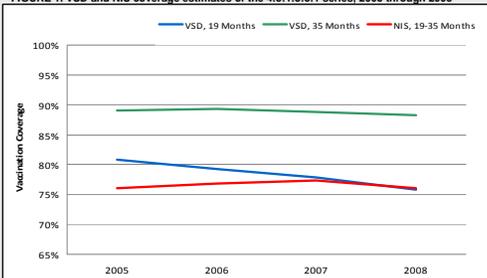
* In 2008, children receiving 2 doses of PedvaxHib[®] or Comvax[®] were considered up-to-date for the Hib and combined series estimates.

TABLE 2. Vaccination coverage among VSD children aged 35 months, 2005 through 2008

Vaccine	2005 (n=69,153)		2006 (n=78,523)		2007 (n=79,096)		2008 [*] (n=81,054)	
	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)
DTP/dTdap (≥4 doses)	94.49	(94.32, 94.66)	94.18	(94.02, 94.34)	93.50	(93.33, 93.67)	92.71	(92.53, 92.89)
Poliovirus (≥3 doses)	96.41	(96.28, 96.55)	96.19	(96.05, 96.32)	95.98	(95.85, 96.12)	95.58	(95.43, 95.72)
MMR (≥1 dose)	97.27	(97.15, 97.40)	97.11	(96.98, 97.23)	96.95	(96.83, 97.07)	96.59	(96.46, 96.71)
Hib (≥3 doses)	95.82	(95.67, 95.97)	95.72	(95.58, 95.86)	95.50	(95.35, 95.64)	95.83	(95.70, 95.96)
Hepatitis B (≥3 doses)	95.90	(95.75, 96.05)	96.33	(96.20, 96.46)	96.16	(96.02, 96.29)	95.84	(95.70, 95.98)
Varicella (≥1 dose)	94.69	(94.53, 94.86)	94.97	(94.82, 95.13)	95.24	(95.09, 95.39)	95.21	(95.06, 95.36)
PCV7 (≥3 doses)	90.52	(90.31, 90.74)	93.84	(93.67, 94.01)	95.13	(94.98, 95.28)	95.23	(95.08, 95.37)
PCV7 (≥4 doses)	71.91	(71.58, 72.25)	88.61	(88.28, 88.93)	87.63	(87.40, 87.86)	88.78	(88.56, 89.00)
Combined series								
4:3:1:3:3:1	91.27	(91.06, 91.48)	91.16	(90.97, 91.36)	90.26	(90.06, 90.47)	89.69	(89.48, 89.90)
4:3:1:3:3:1	89.06	(88.83, 89.29)	89.30	(89.08, 89.55)	88.80	(88.58, 89.02)	88.24	(88.01, 88.46)
4:3:1:3:3:1:4	68.28	(67.94, 68.63)	85.21	(84.88, 85.54)	82.75	(82.48, 83.01)	83.41	(83.15, 83.67)

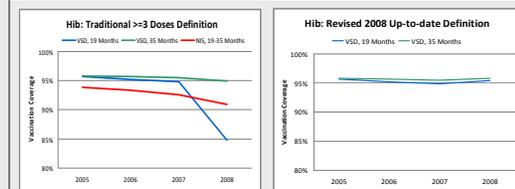
* In 2008, children receiving 2 doses of PedvaxHib[®] or Comvax[®] were considered up-to-date for the Hib and combined series estimates.

FIGURE 1. VSD and NIS coverage estimates of the 4:3:1:3:3:1 series, 2005 through 2008^{*}



* In 2008, children receiving 2 doses of PedvaxHib[®] or Comvax[®] were considered up-to-date.

2008 Hib Vaccine Shortage



- A recall of two Hib vaccines (PedvaxHib[®] and Comvax[®], Merck) resulted in revised ACIP recommendations in December 2007; deferral of the 12-15 month booster dose was recommended for all of 2008.
- The left graph depicts Hib vaccine coverage using the traditional ≥3 doses as up-to-date (UTD); this definition resulted in a 10% decrease in coverage among VSD 19 month olds from 2007 to 2008.
- The right graph depicts Hib vaccine coverage using a revised UTD definition based on ACIP shortage recommendations: children who received 2 doses of PedvaxHib[®] or Comvax[®] (both 2-dose primary series vaccines), were considered UTD; children receiving other Hib vaccines still needed 3 doses to be considered UTD.

Summary

- The 2008 estimate for coverage with the 4:3:1:3:3:1 series was 75.9% for VSD 19 month olds, 88.2% for VSD 35 month olds and 76.1% for NIS respondents.
- The proportion of 19 month olds in VSD with at least 4 doses of a DTP vaccine decreased from 85% in 2005 to 80.9% in 2008.
- The proportion of 19 month olds in VSD with at least 4 doses of a PCV7 vaccine increased from 69.8% in 2005 to 86.1% in 2008.
- After revising the UTD definition for 2008, 95% Hib coverage persisted.

Conclusions

- Routine childhood vaccination rates within the VSD are high, but a gradual decline in coverage over the study period was discovered; the trend was most apparent for DTP vaccines, but poliovirus and MMR vaccines also contributed.
- PCV7 uptake increased greatly over the study period, as supply issues stabilized.
- VSD estimates for 35 month olds are consistently higher than NIS estimates; recent VSD 19 month estimates are comparable to NIS estimates.
- The 2008 Hib shortage did not significantly affect coverage with the primary Hib series in the VSD population.

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