



COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC HEALTH
IMMUNIZATION PROGRAM
NATIONAL IMMUNIZATION SURVEY, 2006
JANUARY 2008

Background

In April 1994, the Centers for Disease Control and Prevention (CDC), sponsored by the National Immunization Program and the National Center for Health Statistics, initiated the National Immunization Survey (NIS). The NIS was established to provide a standardized means to monitor progress toward meeting national immunization goals. The NIS produces estimates of vaccination coverage levels at selected age milestones for the national, state, and 28 selected local jurisdictions, including Los Angeles County (LAC). Results of the NIS are summarized and distributed annually on the CDC website.

Objective

The objective of the National Immunization Survey is to monitor progress toward the national goal of a 90% vaccine coverage level for preschool aged children by the year 2010.

Methods

NIS Eligibility

- Households with children 19-35 months of age.

NIS Sample Design

- Data is collected from quarterly telephone surveys.
- The sample is identified through randomly generated listed and unlisted telephone numbers.
- Telephone numbers are linked to geographic areas based on the area code and prefix.

Collected Data

- Participants are asked to provide the following:
 - Dates of their child's vaccinations from written records. If the record is not available they are asked to recall the number of doses of each vaccine their child has.
 - Names and addresses of their child's vaccination providers.
 - Verbal consent to contact their child's vaccination providers.
 - Demographic information.
- Vaccination providers are contacted by mail to obtain and/or verify vaccination dates of their patients participating in the NIS, provided the parent/guardian gives consent.

Data Analysis

- Vaccination rates are estimated by adjusting the data for non-response of parents and providers and for households that do not have telephones.
- Confidence limits are presented for each estimate. The confidence limits reflect the range within which 95% of the estimates would fall if the survey were repeated over and over. When confidence intervals overlap in comparisons, the point estimates do not represent statistically significant differences.

Results

The 2006 survey includes children who were born between February 2003 and May 2005 (i.e., children who were 19-35 months of age during 2006). Results from the survey are grouped into five categories:

- I. Sampling and Response Rates.
- II. Estimated Vaccination Coverage with Individual Vaccines and Selected Vaccination Series – General Summary and Trends.
- III. Estimated Vaccination Coverage with Individual Vaccines and Selected Vaccination Series – Stratified Summary.
- IV. Estimated Vaccination Coverage with Individual Vaccines by Age Milestone.
- V. Healthy People 2010 Objectives and Los Angeles County Status.

I. Sampling and Response Rates

Table 1. Number of eligible households and children with completed interviews and adequate provider data for the United States and Los Angeles County, National Immunization Survey – 2006.

	United States	Los Angeles County
Households		
Number eligible	33,960	516
Number with completed interviews (%)	29,065 (85.6)	439 (85.1)
Children		
Number with completed interviews	29,880	442
Completed interviews and adequate provider data (%)	21,044 (70.4)	267 (60.4)

- In 2006 LAC's NIS household response rate paralleled the national rate.
 - Of the 516 households that were eligible for inclusion, 439 (85.1%) completed interviews, an increase of 7.6% from 2005 and only 0.5% below the national level.
- The percent of completed child interviews with adequate provider data in LAC improved from 2005 but remained significantly below the national level.
 - The 439 household interviews resulted in 442 completed interviews on children in the eligible age-range. Of these 442 children, 267 (60.4%) had adequate provider data. This proportion is 10 points below the national rate.

II. Estimated Vaccination Coverage with Individual Vaccines and Selected Vaccination Series – General Summary and Trends

Table 2. Estimated vaccination coverage levels among children 19-35 months of age for Los Angeles County, the United States, and other urban areas, National Immunization Survey– 2006.

	4:3:1:3:3 series ¹	4:3:1:3:3:1 series ²
	% ± 95% CI ³	% ± 95% CI
Los Angeles County, CA (n=267)	81.3 ± 5.7	78.5 ± 5.9
United States (n=21,044)	80.6 ± 1.0	77.0 ± 1.0
California State	80.3 ± 4.2	78.6 ± 4.2
Fresno County, CA [Fresno] ⁴	77.0 ± 5.9	73.5 ± 6.2
San Diego County, CA [San Diego]	82.8 ± 5.1	80.3 ± 5.5
Santa Clara County, CA [San Jose]	79.9 ± 5.7	77.7 ± 6.0
Maricopa County, AZ [Phoenix]	72.9 ± 6.0	68.2 ± 6.2
District of Columbia	82.7 ± 5.3	78.4 ± 5.8
Miami-Dade County, FL [Miami]	81.7 ± 5.8	79.9 ± 6.1
Fulton/DeKalb Counties, GA [Atlanta]	82.6 ± 6.3	74.9 ± 7.6
Chicago, IL	79.0 ± 5.7	77.3 ± 5.8
Baltimore, MD	76.0 ± 7.1	72.2 ± 7.4
Boston, MA	85.3 ± 4.7	81.4 ± 5.1
Detroit, MI	66.3 ± 7.1	65.2 ± 7.1
Newark, NJ	71.2 ± 6.7	68.1 ± 7.0
New York, NY	76.4 ± 6.2	72.0 ± 6.4
Cuyahoga County, OH [Cleveland]	85.1 ± 5.5	77.3 ± 6.5
Allegheny County, PA [Pittsburgh]	78.8 ± 6.7	74.0 ± 7.2
Philadelphia County, PA [Philadelphia]	80.0 ± 6.9	78.4 ± 7.0
Shelby County, TN [Memphis]	76.1 ± 6.7	74.2 ± 6.8
Bexar County, TX [San Antonio]	76.8 ± 6.6	74.7 ± 6.8
Houston, TX	73.8 ± 5.9	69.9 ± 6.3
Dallas County, TX [Dallas]	76.6 ± 6.7	73.9 ± 7.1
King County, WA [Seattle]	75.7 ± 8.7	69.2 ± 9.3
Milwaukee County, WI [Milwaukee]	80.4 ± 6.7	78.1 ± 6.8

¹ Four or more doses of DTaP/DTP, three or more doses of poliovirus vaccine, one or more doses of MMR, three or more doses of Hib, and three or more doses of hepatitis B vaccine.

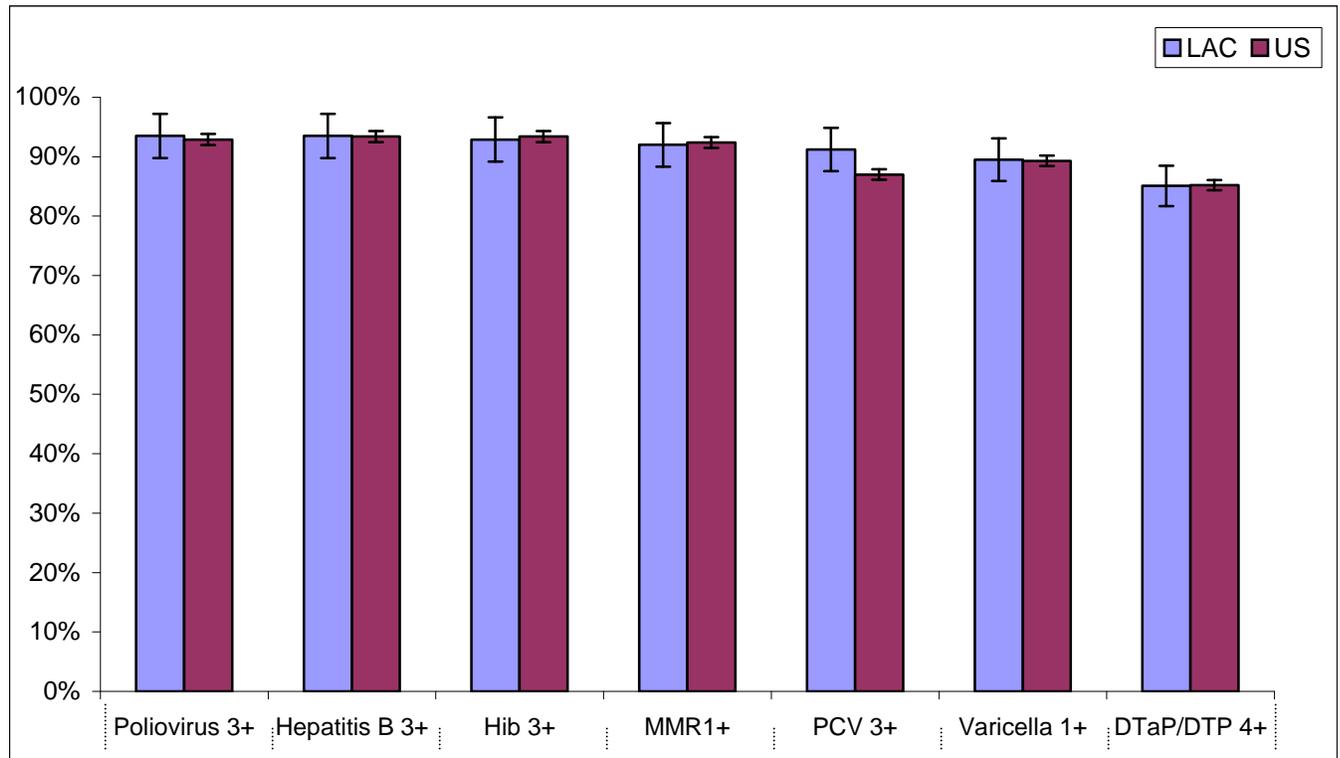
² Four or more doses of DTaP/DTP, three or more doses of poliovirus vaccine, one or more doses of MMR, three or more doses of Hib, three or more doses of hepatitis B vaccine, and one or more doses of varicella vaccine.

³ Confidence interval.

⁴ Cities in brackets are the primary cities in the county.

- In 2006, LAC's 4:3:1:3:3 and 4:3:1:3:3:1 series coverage levels surpassed national levels.
 - In LAC, the 4:3:1:3:3 series coverage level reached 81.3% and the 4:3:1:3:3:1 series coverage reached 78.5%, above the national level by 1 and 1.5 percentage points respectively.
- The estimate for LAC 4:3:1:3:3:1 series coverage level was consistent with the overall state level and with most other urban areas throughout the US.
 - LAC was only 0.1 percentage points below that state coverage level of 78.6%.
 - Compared to the 28 other urban areas, LAC ranked 4th highest.

Figure 1. Estimated vaccination coverage levels among children 19-35 months of age, Los Angeles County and the United States, National Immunization Survey – 2006¹.



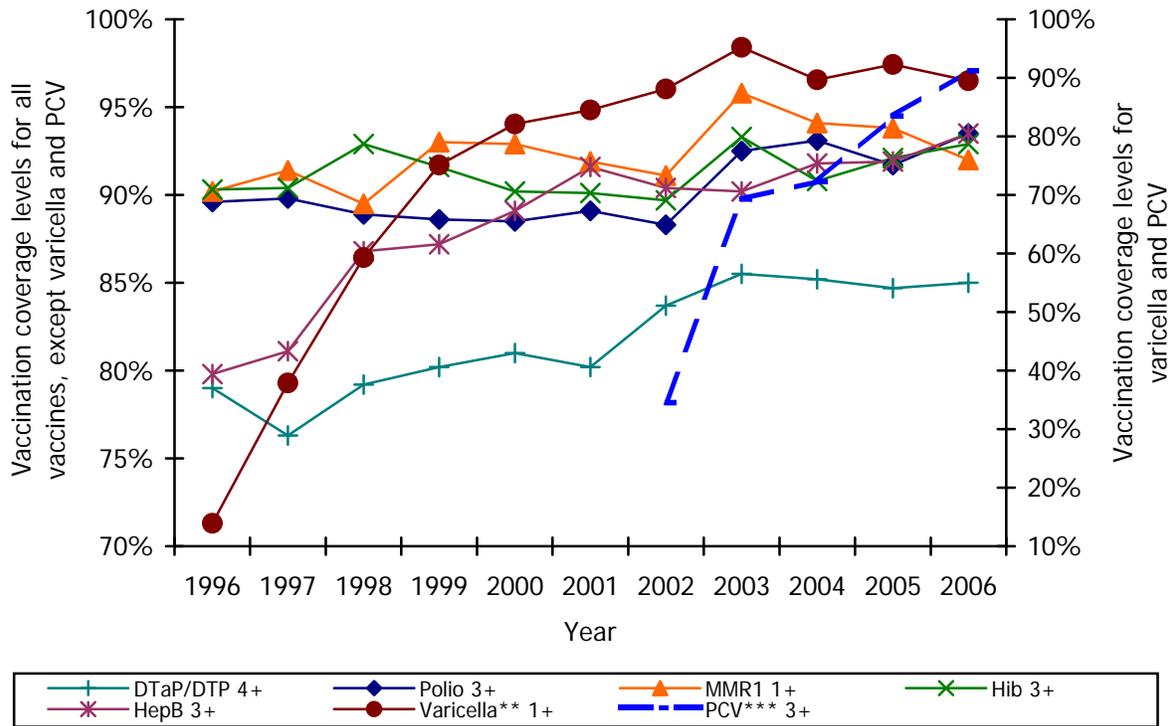
■ LAC n=267	93.5 ± 3.5 ²	93.5 ± 3.7	92.9 ± 3.8	92.0 ± 3.9	91.2 ± 3.8	89.5 ± 4.5	85.0 ± 5.3
■ US n=21,044	92.9 ± 0.6	93.4 ± 0.6	93.4 ± 0.6	92.4 ± 0.6	87.0 ± 0.8	89.3 ± 0.7	85.2 ± 0.9

¹The lines at the top of each bar represent confidence intervals of the estimated coverage levels.

²Coverage Level is presented as % ± 95% confidence interval.

- In 2006, LAC met or exceeded national antigen-specific immunization coverage levels.
 - LAC was within 1 percentage point of the national coverage levels for three or more doses of poliovirus, three or more doses of Hepatitis B, three or more doses of Hib 3, one or more doses of MMR, one or more doses of varicella, and four or more doses of DTaP/DTP.
 - The LAC coverage level for three or more doses of PCV was 91.2%, 4.2 percentage points above the national level.
- The lowest coverage level for both LAC and nationwide was for four or more doses of DTaP/DTP at 85.1% and 85.2% respectively.

Figure 2. Estimated vaccination coverage with individual vaccines among children 19-35 months of age, Los Angeles County, National Immunization Survey, 1996-2006.



**Varicella vaccine was licensed by the Food and Drug Administration in 1995 and was added to the recommended childhood immunization schedule and the VFC Program in 1996.

***Pneumococcal conjugate vaccine (PCV) was first licensed in 2000 and was added to the recommended childhood immunization schedule and the VFC Program that same year.

- In 2006, three or more doses of Hep B, Polio, and Hib3 ranked as the top three highest coverage levels.
 - Three or more doses of Hep B and three or more doses of Polio achieved their highest coverage levels, both at 93.5%.
 - Three or more doses of Hib increased for the second year to 92.9%.
- Historically one or more doses of MMR held the highest coverage level, however MMR1 levels have declined over the past 3 years and by 2006 MMR1 fell to the 4th highest coverage level at 92.0%.
- The PCV coverage level has steadily increased since 2002 and reached 91.2% (the fifth highest) in 2006.
 - The low coverage for PCV in 2002 was most likely due to a vaccine shortage.

Table 3. Estimated vaccination coverage levels for children 19-35 months of age, Los Angeles County, National Immunization Survey – 1996-2006.

Year	4:3:1:3 series ¹	4:3:1:3:3 series ²	4:3:1:3:3:1 series ³
	% ± 95% CI ⁴	% ± 95% CI	% ± 95% CI
1996 ⁵	74.6 ± 6.4	67.3 ± 6.8	-
1997 ⁵	71.6 ± 6.8	64.6 ± 7.2	-
1998	76.0 ± 6.0	70.5 ± 6.3	-
1999	76.0 ± 5.7	71.0 ± 6.0	-
2000	76.5 ± 5.2	72.6 ± 5.4	-
2001	73.3 ± 5.4	71.6 ± 5.5	-
2002	77.1 ± 5.8	76.0 ± 5.9	-
2003	83.5 ± 5.0	80.3 ± 5.4	-
2004	81.7 ± 5.3	80.1 ± 5.5	-
2005	81.7 ± 5.6	79.0 ± 5.8	77.9 ± 5.9 ⁶
2006	82.1 ± 5.6	81.3 ± 5.7	78.5 ± 5.9

¹ Four or more doses of DTaP/DTP, three or more doses of poliovirus vaccine, one or more doses of MMR, and three or more doses of Hib.

² Four or more doses of DTaP/DTP, three or more doses of poliovirus vaccine, one or more doses of MMR, three or more doses of Hib, and three or more doses of hepatitis B vaccine.

³ Four or more doses of DTaP/DTP, three or more doses of poliovirus vaccine, one or more doses of MMR, three or more doses of Hib, three or more doses of hepatitis B vaccine, and one or more doses of varicella vaccine.

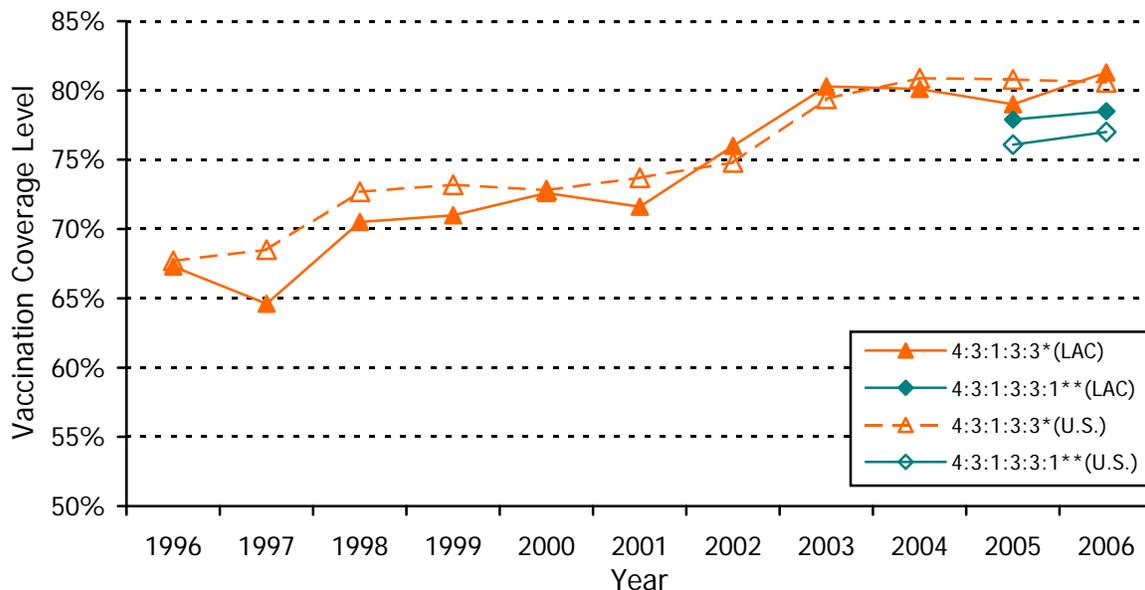
⁴ Confidence interval.

⁵ Estimates from previous reports differ because they were obtained from different reporting sources. Currently, all estimates are obtained from NIS tables.

⁶ 2005 is the first year estimates for the 4:3:1:3:3:1 series were collected.

- The coverage level of the 4:3:1:3:3:1 series reached 78.5%, an increase of 0.8% from 2005.
- Estimates for the 4:3:1:3 and 4:3:1:3:3 vaccine series have been relatively stable over the last four years.
 - From 2003 to 2006, the 4:3:1:3 and 4:3:1:3:3 series coverage levels fluctuated within 0.5% and 0.3% respectively.

Figure 3. Estimated vaccination coverage levels with selected vaccination series among children 19-35 months of age, Los Angeles County (LAC) and the United States (U.S.), National Immunization Survey, 1996-2006.



*Four or more doses of DTaP/DTP, three or more doses of poliovirus vaccine, one or more doses of MMR, three or more doses of Hib, and 3 or more doses of hepatitis B vaccine.

**Four or more doses of DTaP/DTP, three or more doses of poliovirus vaccine, one or more doses of MMR, three or more doses of Hib, 3 or more doses of hepatitis B vaccine, and one or more doses of varicella vaccine.

- Since 2002, LAC has matched national vaccination series coverage levels.
 - From 2002 to 2006, LAC levels stayed within 2.7% of national coverage levels.
- Estimated coverage levels for each series are typically lower than the estimated coverage levels for the individual vaccines. Delaying the fourth dose of DTaP is the primary reason for the low vaccine coverage levels for the 4:3:1:3 and 4:3:1:3:3 series.

III. Estimated Vaccination Coverage with Individual Vaccine and Selected Vaccination Series – Stratified Summary

IIIa. Race/Ethnicity

There were no significant differences in any of the vaccine coverage estimates for non-Hispanic whites compared with Hispanics (data not shown). Race-specific estimates for other racial/ethnic groups were not calculated because of insufficient sample size.

IIIb. Poverty Level

Table 4. Estimated vaccination coverage levels among children 19-35 months of age, overall and by poverty level, Los Angeles County, National Immunization Survey – 2006.

Vaccine(s)	Children 19-35 months of age	Above poverty level	Below poverty level
	% ± 95% CI ¹	% ± 95% CI	% ± 95% CI
DTaP/DTP 4+	85.0 ± 5.3	89.2 ± 5.9	NA ²
Poliovirus 3+	93.5 ± 3.5	96.0 ± 3.1	90.3 ± 7.6
MMR ³ 1+	92.0 ± 3.9	93.0 ± 4.2	90.7 ± 7.8
Hib 3+	92.9 ± 3.8	95.6 ± 3.1	89.6 ± 8.3
Hepatitis B 3+	93.5 ± 3.7	91.7 ± 5.1	89.9 ± 8.2
Varicella 1+	89.5 ± 4.5	92.0 ± 5.1	85.4 ± 9.1
PCV 3+	91.2 ± 3.8	91.6 ± 4.9	NA
4:3:1:3 ⁴	82.1 ± 5.6	87.4 ± 6.1	NA
4:3:1:3:3 ⁵	81.3 ± 5.7	86.4 ± 6.2	NA
4:3:1:3:3:1 ⁶	78.5 ± 5.9	82.8 ± 7.1	NA

¹ Confidence interval.

² Estimate Not Available (NA) if the unweighted sample size for the numerator was <30 or (CI half width)/Estimate >0.5 or (CI half width) >10.

³ Measles-Mumps-Rubella vaccine.

⁴ Four or more doses of DTaP/DTP, three or more doses of poliovirus vaccine, one or more doses of MMR, and three or more doses of Hib.

⁵ Four or more doses of DTaP/DTP, three or more doses of poliovirus vaccine, one or more doses of MMR, three or more doses of Hib, and three or more doses of hepatitis B vaccine.

⁶ Four or more doses of DTaP/DTP, three or more doses of poliovirus vaccine, one or more doses of MMR, three or more doses of Hib, three or more doses of hepatitis B vaccine, and one or more doses of varicella vaccine.

- Vaccine coverage levels for children living below poverty were lower than the coverage levels of children living at or above the poverty level (from 1.8 to 6.6 percentage points lower). However the disparities were not statistically significant.

IIIc. VFC Provider Status

Table 5. Estimated vaccination coverage levels among children 19-35 months of age by provider participation in the Vaccines for Children (VFC) Program¹, Los Angeles County, National Immunization Survey – 2006.

Vaccine(s)	Children whose providers participated in the VFC program	Children whose providers did not participate in the VFC program
	% ± 95% CI ²	% ± 95% CI
DTaP/DTP 4+	85.3 ± 7.1	NA ³
Poliovirus 3+	93.8 ± 5.0	88.7 ± 9.0
MMR ⁴ 1+	92.9 ± 5.1	91.6 ± 7.4
Hib 3+	93.6 ± 5.3	93.5 ± 6.6
Hepatitis B 3+	94.2 ± 5.2	96.1 ± 5.6
Varicella 1+	89.1 ± 6.4	91.9 ± 7.2
PCV 3+	95.2 ± 3.6	86.6 ± 9.5
4:3:1:3:3 ⁵	83.8 ± 7.3	NA
4:3:1:3:3:1 ⁶	72.7 ± 7.1	NA

¹ The Vaccines for Children (VFC) Program is federally funded and, through state and local health departments, provides free vaccines to participating health care providers. These providers administer vaccines to children who are eligible for Medi-Cal and the Child Health and Disability Prevention (CHDP) Program, are American Indian or Alaskan Native, or do not have health insurance. Additionally, children whose health insurance does not cover vaccinations may go to federally qualified health centers and rural health clinics to receive vaccine provided by the VFC Program.

²Confidence interval.

³ Estimate Not Available (NA) if the unweighted sample size for the numerator was <30 or (CI half width)/Estimate >0.5 or (CI half width)>10.

⁴ Measles-Mumps-Rubella vaccine; previous reports of vaccination coverage were for measles-containing vaccine (MCV).

⁵ Four or more doses of DTaP/DTP, three or more doses of poliovirus vaccine, one or more doses of MCV, three or more doses of Hib, and three or more doses of hepatitis B vaccine.

⁶ Four or more doses of DTaP/DTP, three or more doses of poliovirus vaccine, one or more doses of MMR, three or more doses of Hib, three or more doses of hepatitis B vaccine, and one or more doses of varicella vaccine.

- There were no statistically significant differences in vaccine coverage levels among providers participating in the VFC program and those not participating.
 - VFC participants had higher point estimates for coverage levels than non-participants for the third dose of polio, the first dose of MMR, the third dose of Hib, and the third dose of PCV.
 - Providers not participating in the VFC program had higher point estimates for coverage levels than VFC participants for the third dose of Hep B and the first dose of varicella.

IV. Estimated Vaccination Coverage with Individual Vaccines by Age Milestone

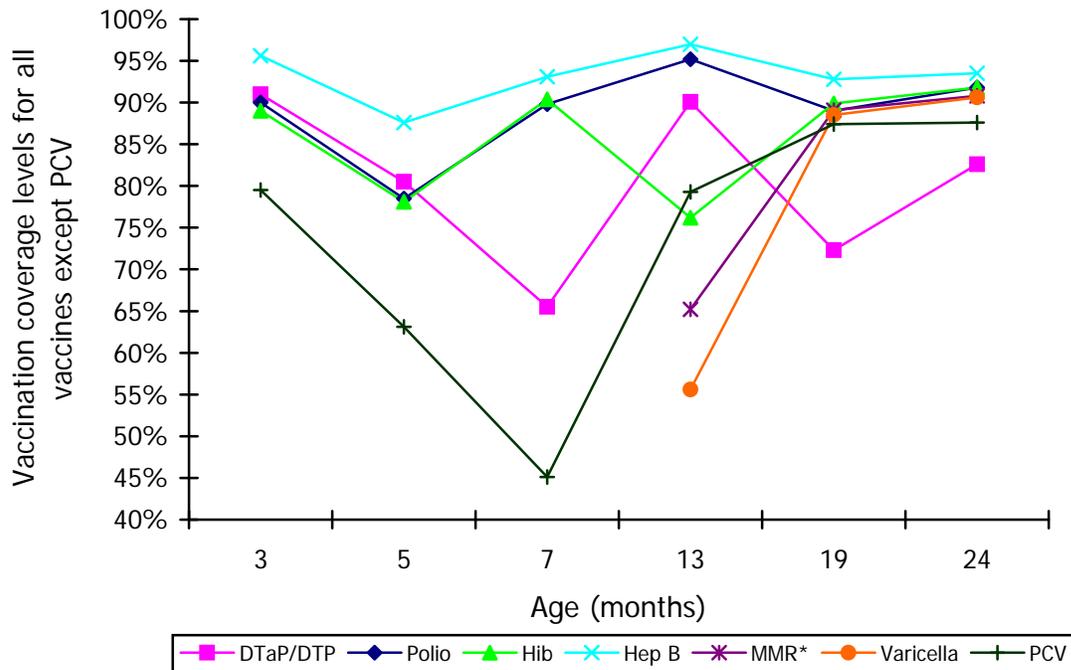
Table 6. Required number of doses of individual vaccines at 3, 5, 7, 13, 19 and 24 months of age.

Age (months)	DTaP/DTP	Polio	MMR	Hib	Hep B	Varicella	PCV
3	1	1	0	1	1	0	1
5	2	2	0	2	2	0	2
7	3	2	0	2	2	0	3
13	3	2	1	3	2	1	3
19	4	3	1	3	3	1	3
24	4	3	1	3	3	1	3

Coverage was estimated at 3, 5, 7, 13, 19, and 24 months of age. The required number of doses of individual vaccines at each age milestone for which coverage was estimated is shown in Table 7.

Note: Four Hib conjugate vaccines are licensed for use in infants 6 weeks of age and older. One of these requires only two primary doses, as opposed to three primary doses, for children immunized before 7 months of age. This particular vaccine is also the Hib component in the combination Hib and hepatitis B vaccine, which is widely used in Los Angeles County. For this reason, the assessment of Hib coverage levels at 7, 13, 19, and 24 months of age is based upon the schedule for the vaccine requiring two primary doses.

Figure 4. Estimated vaccination coverage with individual vaccines by age, Los Angeles County, National Immunization Survey, 2006.



*Measles-Mumps-Rubella vaccine; previous reports of vaccination coverage were for measles-containing vaccine (MCV).

- Trends in coverage levels by age milestone differ for each antigen-specific vaccine.
 - DTaP, poliovirus, and hepatitis B vaccines coverage estimates peaked at 13 months of age.
 - Coverage estimates for Hib, varicella, MMR, and PCV vaccines increased at each successive age milestone after 13 months.
 - Hepatitis B vaccine has the highest coverage level at each age group, peaking at 97% at 13 months of age and leveling to 94% at 24 months of age.
- Both DTaP/DTP and PCV have consistently low coverage levels.
 - PCV is a relatively new vaccine and has experienced periodic shortages since its licensure in 2000 attributing to its low coverage rate.
 - The increase in DTaP/DTP vaccine coverage levels from 66% at 7 months to 90% at 13 months implies a delay in children receiving the third dose of the vaccine. Similarly, the change from a 72% coverage level at 19 months to an 83% coverage level at 24 months implies that children are also late in receiving their fourth dose of DTaP/DTP vaccine.
- By 24 months of age, most antigen-specific vaccines achieve similar coverage estimates (91-94%). The exceptions are DTaP and PCV, which have significantly lower levels at 83% and 88% respectively.

V. Healthy People 2010 Objectives and Los Angeles County Status

Table 7. Immunization objectives for *Healthy People 2010*, target coverage levels vs. Los Angeles County coverage estimates from different data sources.

	<i>Healthy People 2010 Target (%)</i>	NIS LAC Estimate 2006 (%)	NIS previous 5-Year Average 2001-2005 (%)	Clinic Audits 2006 DHS ¹ Facilities (%)	Clinic Audits 2006 CHC ² Facilities (%)	Fall Assessment 2006 (%)
Age of Enrollees		19-35 months	19-35 months	24-35 months	24-35 months	24-59 months
Healthy People 2010 Objective #1:						
Increase in and Maintenance of Vaccination Coverage Levels for Among Enrollees Aged 19 to 35 Months						
4 doses DtaP	90	85.0	83.9	49.8	69.6	96.1
3 doses HiB	90	92.9	91.2	75.6	85.8	--
3 doses Hep B	90	93.5	91.2	80.2	88.0	96.8
1 dose MMR	90	92.0	93.3	71.9	83.5	97.7
3 doses polio	90	93.5	90.9	78.7	89.3	97.3
1 dose varicella	90	89.5	90.0	69.1	81.3	97.2
Healthy People 2010 Objective #2:						
Increase in Coverage Levels of Universally Recommended Vaccines Among Children Aged 19 to 35 Months						
4:3:1:3:3 ³	80	81.3	77.4	65.8	80.6	--

¹ LAC Department of Health Services health centers and hospitals.

² Community Health Centers (non-profit healthcare providers that receive immunization subvention contract funds).

³ Four doses of DtaP/DTP, three doses of poliovirus vaccine, one dose of MMR, three doses of Hib, and three doses of hepatitis B vaccine.

- NIS achieved most of the *Healthy People 2010* targets and demonstrated higher coverage levels than the clinics, but placed below the Fall Assessment levels.
 - High Fall Assessment coverage levels may reflect the older age group of the sample. The Fall Assessment includes children between 24-59 months of age whereas NIS includes children between 19-35 months.
 - The disparity in coverage between NIS and CHC may be the product of variations in healthcare providers. NIS encompasses all households and provider types while CHC only includes enrollees whose care is given by non-profit healthcare providers that receive immunization contract funds.
- CHC facilities outperformed DHS facilities in vaccine coverage levels. The difference in coverage levels may be due to the type of services provided at each clinic and its ability to gather complete immunization records.
 - CHC facilities are used as a regular source of care while DHS facilities are used on a drop-in basis and consequently have difficulty obtaining complete records.

Discussion

Summary

The National Immunization Survey provides an essential tool for LAC in monitoring immunization trends and detecting changes in coverage levels. According to the NIS 2006 statistics, most *Healthy People 2010* targets have been met. After experiencing a decline in 2005, LAC's combination series 4:3:1:3:3 rose to 81.3% in 2006, meeting the national rate and exceeding the 80% target set by *Healthy People 2010*. LAC's 4:3:1:3:3:1 series coverage level at 78.5% met the national rate but failed to meet the 80% *Healthy People 2010* target. For antigen specific vaccines, the first dose of MMR, the third dose of polio, the third dose of hepatitis B, and the third dose of Hib met or exceeded the *Healthy People 2010* target of 90%. The only exceptions were the fourth dose of DTP and the first dose of varicella at 85.0% and 89.5% respectively.

Alarming, the first dose of MMR coverage level has been trending down since 2003. During this same time period, the personal belief exemption rate steadily increased and is now at an all time high. These trends may reflect parents' growing apprehension over vaccines, its side effects and safety and the safety associated with simultaneous vaccine administration. Although studies have continuously proven that there is no link between autism and thimerosal, a mercury-containing vaccine preservative used in the MMR vaccine until 2001, parents' concerns over vaccination safety remain. Additionally, there has been a recent study that found a link between early vaccination for DTP and the rise of asthma among children¹. It should be noted however, that this is only a single study and its results still need to be verified. These and other safety concerns may have resulted in a decline in the varicella coverage seen in 2006 from the previous year.

Similar trends were observed in the 2006 Fall Assessment. The Fall Assessment, which evaluated immunization coverage from a sample of children enrolled in licensed preschools and kindergartens, found that many of the antigen specific immunization coverage levels have been declining over the last few years. For preschool enrollees, all 2006 coverage levels decreased from 2005 including the first dose of MMR. For kindergarten enrollees, the second dose of MMR, the fourth dose of DTP, the third dose of Hep B, and the third dose of Polio decreased. The first dose of MMR remained stable. However, unlike the NIS results, the Fall Assessment found an increase in the first dose of varicella. Additionally, both studies concluded that the lowest coverage level was for DTP. To address these concerns, LAC has employed a number of outreach initiatives, including parent home visits and culturally appropriate interventions with an educational component for high-risk populations, to help raise parents' awareness on vaccine safety and efficacy and improve immunization coverage levels.

Limitations

The NIS provides overall vaccination coverage estimates for Los Angeles County. Because of the sample size and survey technique, the data cannot be analyzed for smaller geographic regions or specific communities. The NIS is useful for monitoring overall trends in the county but is limited in its ability to assist communities in assessing their immunization needs.

Further Information

Complete results of the 2006 NIS are available at www.cdc.gov/vaccines/stats-surv/default.htm.

References:

1. McDonald KL, Huq SI, Lix LM, et al. Delay in diphtheria, pertussis, tetanus vaccination is associated with a reduced risk of childhood asthma. *Journal of Allergy and Clinical Immunology*. In Press. Available online January 2008. (<http://www.sciencedirect.com/science/article/B6WH4-4RM8946-1/2/745d55f4b3ffde7d4d4760079db1a327>)