COUNTY OF LOS ANGELES DEPARTMENT OF HEALTH SERVICES
IMMUNIZATION PROGRAM
NATIONAL IMMUNIZATION SURVEY, 2000
OCTOBER 2001

Background

The National Immunization Survey (NIS) provides estimates of vaccination coverage among children 19-35 months of age for the United States. Estimates are also provided for each state and 28 urban areas, including Los Angeles County. The NIS was initiated by the Centers for Disease Control and Prevention (CDC) in April 1994 as a standardized means to monitor progress in meeting national goals to appropriately vaccinate 90% of preschool aged children by the year 2000.[1] Results of the NIS are summarized and distributed annually by the CDC.

Methods

The NIS is a telephone survey conducted using randomly generated listed and unlisted telephone numbers. In Los Angeles County, approximately 110 interviews are completed each quarter. Telephone numbers are linked to geographic areas based on the area code and prefix. Households with children 19-35 months of age are eligible for inclusion in the survey. Participants are asked to provide the dates of their child's vaccinations either from written records or recall, the names and addresses of their child's vaccination providers, verbal consent to contact their child's vaccination providers, and demographic information about the mother and child. Vaccination providers are contacted by mail for the vaccination dates of their patients participating in the NIS.

Vaccination coverage is assessed for individual vaccines and routine combinations of vaccines at selected age milestones. Vaccination rates are estimated by adjusting the data for non-response of parents and providers and for households that do not have telephones. This report provides Los Angeles County summary information for the 2000 survey year.

Results

The 2000 survey includes children who were born from February 1997 through May 1999, i.e., children who were 19-35 months of age during 2000. Coverage estimates were highest for one or more doses of measles-containing vaccine [MCV] and lowest for four or more doses of diphtheria and tetanus toxoids and pertussis [DTaP/DT] vaccine (Table 1). The coverage estimate for the recommended 4:3:1:3 series (four or more doses of DTaP/DT vaccine, three or more doses of poliovirus vaccine, one or more doses of MCV, and three or more doses of *H. influenzae* type b [Hib] vaccine) was 76.5%. Estimates for the 32% of children living below the poverty level were not significantly different from the overall estimates. Most of the coverage estimates for children whose providers participated in the Vaccines for Children (VFC) Program were lower, but not significantly different, than estimates for children whose providers did not participate in the VFC Program (Table 2). There were no significant differences in any of the vaccine coverage estimates for non-Hispanic whites compared with Hispanics. Race-specific estimates for other racial/ethnic groups were not calculated because of insufficient sample size. There were no changes in completion estimates of the 4:3:1 and 4:3:1:3 series for children 19-35 months of age in 1999 compared to children 19-35 months of age in 2000 (Table 3).

[1] US Department of Health and Human Services, Public Health Service. Healthy People 2000: National health promotion and disease prevention objectives. US Government Printing Office. Publication number (PHS) 91-50212, 1991.

Completion estimates for varicella vaccine increased from 1999 to 2000, but not significantly (Table 3).

Among the 28 urban areas for which coverage was estimated, the 4:3:1 series and 4:3:1:3 series estimates were lowest for the city of Detroit (61.8% and 58.7%, respectively). The 4:3:1 series coverage estimate was highest for Duval County, Florida (81.4%). Fulton and DeKalb counties in Georgia had the highest coverage estimate for the 4:3:1:3 series (79.7%). Coverage estimates for Los Angeles County were consistent with those for San Diego County, the state of California, and many urban areas throughout the United States (Table 4).

Coverage was also estimated at 3, 5, 7, 13, 19, and 24 months of age. The number of doses of individual vaccines at each age milestone for which coverage was estimated is shown in Table 5. 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 that particular vaccine. For DTaP/DT and hepatitis B vaccine, coverage estimates peaked at 13 months of age (Figure 1). Coverage estimates for poliovirus and MCV increased at each successive age milestone after 13 months.

Table 1. Estimated vaccination coverage among children 19-35 months of age and those living below the poverty level, Los Angeles County, National Immunization Survey – 2000.

Vaccine(s)	Children 19-35 months of age	Below poverty level
	% ± 95% CI[1]	% ± 95% CI
± 4 DTaP/DT	81.0 ± 4.8	73.3 ± 9.7
± 3 Poliovirus	88.5 ± 3.9	85.8 ± 7.7
± 1 MCV	92.9 ± 2.9	90.7 ± 7.0
± 3 Hib	90.2 ± 3.6	87.1 ± 6.6
± 3 Hepatitis B	89.1 ± 3.5	86.6 ± 6.7
± 1 Varicella	82.1 ± 4.4	79.4 ± 8.2
4:3:1[2]	78.2 ± 5.1	N/A[3]
4:3:1:3[4]	76.5 ± 5.2	N/A[3]

[1] Confidence interval.
[2] Four or more doses of DTaP/DT, three or more doses of poliovirus vaccine, one or more doses of MCV.
[3] Estimate not available (N/A) if the unweighted sample size for the numerator was less than 30.
[4] Four or more doses of DTaP/DT, three or more doses of poliovirus vaccine, one or more doses of MCV, and three or more doses of Hib.

Table 2. Estimated vaccination coverage among children 19-35 months of age by provider participation in the Vaccines for Children (VFC) Program, Los Angeles County, National Immunization Survey – 2000.

Vaccine(s)	Children whose providers participated in the VFC program	Children whose providers did not participate in the VFC program
	% ± 95% CI[1]	% ± 95% CI
± 4 DTaP/DT	78.8 ± 6.0	86.1 ± 9.2
± 3 Poliovirus	89.4 ± 4.5	87.3 ± 9.0
± 1 MCV	92.1 ± 3.7	95.9 ± 4.8
± 3 Hib	89.5 ± 4.5	92.6 ± 6.4
± 3 Hepatitis B	88.6 ± 4.3	91.3 ± 7.0
± 1 Varicella	79.6 ± 5.5	86.8 ± 8.8
4:3:1[2]	76.0 ± 6.3	86.1 ± 9.2
4:3:1:3[3]	74.4 ± 6.4	83.3 ± 9.7

[1] Confidence interval.
[2] Four or more doses of DTaP/DT, three or more doses of poliovirus vaccine, one or more doses of MCV.
[3] Four or more doses of DTaP/DT, three or more doses of poliovirus vaccine, one or more doses of MCV, and three or more doses of Hib.

Table 3. Vaccination coverage estimates for children 19-35 months of age, Los Angeles County, National Immunization Survey – 1995-2000.

Year	Varicella[1]	4:3:1 series[2]	4:3:1:3 series[3]
	% ± 95% CI[4]	% ± 95% CI	% ± 95% CI
1995[5]	--	73 ± 7.1	70 ± 7.2
1996[5]	--	81 ± 4.8	79 ± 4.9
1997[5]	40 ± 5.5	73 ± 5.5	71 ± 5.5
1998	59.3 ± 6.8	76.5 ± 5.9	76.0 ± 6.0
1999	75.1 ± 5.6	78.1 ± 5.6	76.0 ± 5.7
2000	82.1 ± 4.4	78.2 ± 5.1	76.5 ± 5.2

[1] Varicella vaccine was not included in NIS before 1997.
[2] Four or more doses of DTaP/DT, three or more doses of poliovirus vaccine, one or more doses of MCV.
[3] Four or more doses of DTaP/DT, three or more doses of poliovirus vaccine, one or more doses of MCV, and three or more doses of Hib.
[4] Confidence interval.
[5] Decimal precision for point estimate not available.

Table 4. Estimated vaccination coverage among children 19-35 months of age for selected geographic areas, National Immunization Survey – 2000.

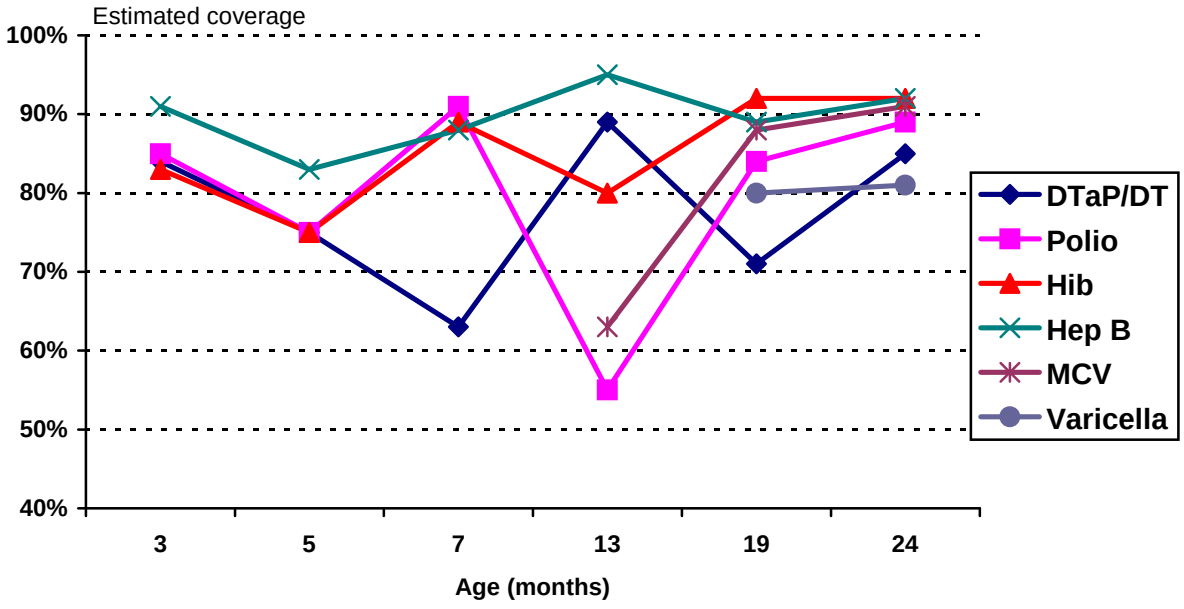
	4:3:1 series[1]	4:3:1:3 series[2]
	% ± 95% CI[3]	% ± 95% CI
United States	77.6 ± 0.9	76.2 ± 0.9
California State	77.3 ± 3.4	75.3 ± 3.5
Los Angeles County, CA	78.2 ± 5.1	76.5 ± 5.2
San Diego County, CA	77.5 ± 5.2	75.7 ± 5.3
Duval County, FL	81.4 ± 4.9	79.0 ± 5.1
Fulton/DeKalb Counties, GA	80.9 ± 5.2	79.7 ± 5.3
Chicago City, IL	67.2 ± 6.3	65.1 ± 6.4
Detroit, MI	61.8 ± 7.1	58.7 ± 7.2
New York, NY	70.7 ± 5.9	68.1 ± 6.1
Houston, TX	65.4 ± 6.5	64.5 ± 6.5

[1] Four or more doses of DTaP/DT, three or more doses of poliovirus vaccine, one or more doses of MCV.
[2] Four or more doses of DTaP/DT, three or more doses of poliovirus vaccine, one or more doses of MCV, and three or more doses of Hib.
[3] Confidence interval.

Table 5. Number of doses of individual vaccines for which coverage was estimated at 3, 5, 7, 13, 19 and 24 months of age, National Immunization Survey – 2000.

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

Figure 1. Estimated vaccination coverage with individual vaccines by age, Los Angeles County, National Immunization Survey – 2000.



Discussion

The NIS estimates are derived from a sample of Los Angeles County residents. Repeatedly selected samples of different children would yield different results. For this reason, 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, the point estimates do not represent statistically significant differences.

As seen in Figure 1, the national 90% vaccination goal for children 24 months of age was achieved for three doses of Hib vaccine, three or more doses of hepatitis B vaccine, and one or more doses of MCV. This goal was nearly achieved for three or more doses of poliovirus vaccine (88.9 ± 4.4). Los Angeles County was only able to achieve a completion level of 85% for the DTaP/DT vaccine.

Historically, coverage was estimated for 2 doses of poliovirus vaccine at 13 months of age. In 1999, coverage was estimated for 3 doses of poliovirus vaccine at 13 months of age. This change in criteria accounts for the decrease in the poliovirus vaccine coverage estimate from above 90% in 1998 to 61% in 1999 and 55% in 2000. The large drop in the 2000 coverage estimates between 7 and 13 months may also be a result of the change from assessing 2 doses to assessing 3 doses at 13 months. The 2000 childhood immunization schedule recommends that children get the third dose of poliovirus vaccine between the ages of 6 to 18 months. The decrease in the coverage estimates between 7 and 13 months followed by the increase in coverage estimates from 55% at 13 months to 84% at 19 months implies that children are receiving their third dose later in the recommended age range.

The increase in DTaP/DT vaccine coverage levels from 63% at 7 months to 89% at 13 months implies a delay in children getting the third dose of the vaccine. Similarly, the change from a 71% coverage level at 19 months to an 85% coverage level at 24 months implies that children

are late in receiving their fourth dose of DTaP/DT vaccine. The delay in receiving the fourth dose was the primary reason for low vaccine coverage levels of the 4:3:1 and 4:3:1:3 series.

Varicella vaccine was licensed by the Food and Drug Administration in 1995. It was added to the recommended childhood immunization schedule and the VFC Program in 1996. Until this year, coverage estimates for varicella vaccine have significantly increased each year since its addition to the NIS in 1997. Although the increase this year was not significant, it is an indication that acceptance of the vaccine by the general population and health care providers remains high.

The 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. The reasons for the lower coverage estimates in children whose providers participate in the VFC Program compared to the coverage estimates in children whose providers do not participate in the VFC Program are unclear. The difference may be due to the characteristics of the population generally served by VFC Program providers, a difference in the follow-up practices of the providers, or a combination of population and provider characteristics.

The vaccination coverage estimates from the NIS are higher than the estimates from the annual kindergarten retrospective survey conducted in Los Angeles County. The kindergarten retrospective survey is an annual survey of a sample of children entering public or private kindergartens in Los Angeles County. School-based vaccination records required for kindergarten entry are reviewed to estimate vaccination coverage levels in prior years. Of children who entered kindergarten in fall 2000, an estimated 64.6% had received the 4:3:1 series when they were 24 months of age in 1997. There are several reasons for the differences in the NIS and kindergarten retrospective survey estimates. First, the target age for the NIS is 19-35 months compared with 24 months for the kindergarten retrospective survey. Second, the two surveys use different sampling methods and are subject to different biases. The kindergarten retrospective survey is a records-based assessment and is not subject to sampling bias or response bias. Third, the two surveys provide estimates for different cohorts of children. The 2000 kindergarten retrospective survey provides an estimate for children who were two years of age in 1997 compared with those 19-35 months of age in 2000 for the NIS.

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. Despite improvements in vaccination coverage among preschool-aged children in Los Angeles County, optimal vaccination levels have not been achieved. Through annual surveys like the NIS and the kindergarten retrospective survey we will continue to monitor our progress in achieving our vaccination goals. Complete results of the 2000 NIS are available at http://www.cdc.gov/vaccines/stats-surv/default.htm.