EXPANDED KINDERGARTEN RETROSPECTIVE SURVEY, 1996 AND 1999

BACKGROUND

During the 1995-1996 school year, more than 160,000 children entered kindergarten in Los Angeles County (LAC). During the 1998-1999 school year, the number of children entering kindergarten in LAC was more than 150,000 children. California law requires that proof of vaccination, or exemption from vaccination, be presented to the school staff before a child can be admitted to any public or private California school.[1] Children who have not received all the vaccinations required for school entry must obtain them before being admitted. A child lacking two or more doses in a series of vaccinations may be admitted to school on the condition that the additional doses are received as they become due in the future. Exemptions from vaccination can be granted for medical reasons, or religious or personal beliefs.

To monitor vaccination coverage levels among preschool-aged children in LAC, the Immunization Program (IP) reviews vaccination records for vaccine dates for a sample of kindergarten entrants each year. In 1996 and 1999 the IP reviewed all vaccination records for all kindergarteners entering over 46 LAC schools during the 1995-1996 and 1998-1999 school years. The results of the 1996 and 1999 Expanded Kindergarten Retrospective Surveys (EKRS) are presented in this report.

The Kindergarten Retrospective Survey is a historical cohort survey. The vaccination dates from the school vaccination record are used to retrospectively estimate vaccination coverage levels during prior years and calculate age-appropriate series completion rates. In 1996 and 1999 an EKRS was conducted. The 61,268 children who entered a kindergarten in the Los Angeles Unified School District (LAUSD) in 1995 were eligible for inclusion in the 1996 EKRS. The 59,992 children who entered a kindergarten in the LAUSD in 1998 were eligible for inclusion in the 1999 EKRS. Most children who entered kindergarten during these school years were born in 1990 or 1993.

Age-appropriate coverage can be calculated at any desired age milestone. There, age-appropriate coverage levels are presented at 3, 5, 7, 12, 19, 24, 36, 48, and 60 months of age. Twenty-four months of age is a commonly used checkpoint for assessing age-appropriate vaccination coverage levels. In addition to calculating age-appropriate coverage, series completion rates were calculated for:

- one dose of poliovirus (OPV) vaccine and one dose of diphtheria and tetanus toxoids and pertussis (DTP) vaccine at 3 months of age
- two OPV and two DTP at 5 months of age
- two OPV and three DTP at 7 and 12 months of age
- three OPV, four DTP and one dose of measles-mumps-rubella (MMR) vaccine at 19, 24, 36, 48, and 60 months of age.

METHODS

In 1996, the LAC IP augmented the core KRS with an expanded survey by randomly selecting 49 additional public schools from the LAUSD. The selected schools represented 12% of the elementary schools in the LAUSD. The schools selected for the EKRS were not included in the core survey sample.

In 1999, the EKRS was repeated on 91 schools, including 46 of the 49 schools selected for the 1996 EKRS. At each selected school, a 100% sample of kindergarten student records was reviewed. In order to compare 1996 completion rates to 1999 completion rates, only information gathered from the mutual 46 schools were analyzed. There were 5,675 records in 1996 and 5,968 records in 1999.

RESULTS

Overall, 40% of the children in the 1996 EKRS sample had received four DTP, three OPV, and one MMR by 24 months of age (Table 1). At each age milestone assessed, coverage levels were generally lowest for Blacks and highest for Asians (Figure 1). At 3 month of age, 70% of Whites, 58% of Blacks, 69% of Hispanics, and 77% of Asians had received one OPV and one DTP. After 19 months of age, coverage levels gradually increased among all race/ethnic groups. At 60 months age, Asians had the highest coverage level at 80%. Hispanics had a 75% coverage level. Whites and Blacks had about the same coverage level at 60 months (67% and 66%, respectively).

In the 1999 EKRS sample, 55% of the children had received four DTP, three OPV, and one MMR by 24 months of age (Table 1). Similar to the 1996 results, coverage levels were generally lowest for Blacks and highest for Asians and Whites (Figure 2). At 3 months of age, 79% of Whites, 61% of Blacks, 74% of Hispanics, and 82% of Asians had received one OPV and one DTP. At 13 months of age, coverage levels for two OPV and three DTP were about the same as the coverage levels at 3 months of age for each race/ethnic group. Coverage levels were lowest for Blacks and Hispanics at 7 months: 29% for Blacks and 41% for Hispanics. Asians and whites experienced their lowest coverage level at 19 months of age: 48% for Asians and 50% for Whites. After 19 months of age, coverage levels gradually increased among all race/ethnic groups. At 60 months of age, Asians, Hispanics, and Whites had the highest coverage levels at 90%, 89%, and 88%, respectively. Blacks had the lowest coverage level of 80%.

Estimates for both the 1996 and 1999 EKRS were summarized by Service Planning Areas (SPAs) (Table 2, Figure 3). SPAs with at least 30 students residing in them were included in the analysis (Figures 4 & 5). In the 1996 EKRS coverage levels for four DTP, three OPV, and one MMR at 24 months of age ranged from 33% to 60%. In the 1999 EKRS coverage levels at 24 months of age ranged from 45% to 60%.

Similarly, estimates for both surveys were summarized by zip code of the student's residence. Zip codes with at least 30 students residing in them were included in the analysis. In 1996, coverage

levels at 24 months of age for four DTP, three OPV, and one MMR from the 31 zip code areas included in the analysis ranged from 18% to 51% (Table 3). In 1999, coverage levels at 24 months for four DTP, three OPV, and one MMR from the 36 zip codes included in the analysis ranged from 0% to 74% (Table 4).

In the 1996 EKRS the coverage levels for hepatitis B vaccine were very low. At 24 months of age only 20 students (less than one percent of the total number of students included in the survey) had received three doses of hepatitis B vaccine. At 60 months of age 45 students had completed the hepatitis B vaccine series. However, this was still less than 1% of the total. In the 1999 EKRS 65% of all the students had received 3 doses of hepatitis B vaccine at 24 months of age. By 60 months of age the coverage level increased to 83%.

DISCUSSION

The EKRS provides a population-based estimate of vaccination coverage levels in children attending schools in the LAUSD. One limitation of a retrospective survey is that it measures events that happened in the past and does not provide a current estimate of vaccination coverage. The 1996 EKRS provides an estimate of vaccination coverage for children who were 24 months of age in 1992 while the 1999 EKRS provides an estimate of vaccination coverage for children who were 24 months of age in 1995.

In general, coverage levels have improved greatly between 1996 and 1999. Only SPA 5 experienced a drop in the overall coverage level. However, due to the small number of students from SPA 5, the change is probably not significant. The increase in hepatitis B coverage levels can be attributed primarily to the California law, effective August 1997, requiring three doses of the hepatitis B vaccine for school entry.[1]

Although the basic series of four DTP, three OPV, and one MMR should be completed by 18 months of age, many children in the surveys did not actually complete the basic series until kindergarten entry. Twenty-six percent of the children from the 1996 EKRS sample and 12% of the children from the 1999 EKRS sample were lacking one or more vaccinations at 60 months of age. Of the 161,638 children who entered kindergarten in LAC during the 1995-1996 school year, 92% provided documentation at the time of school entry that they had received the required vaccinations.[2] During the 1998-1999 school year, 91% of the 155,585 students provided documentation that they had received the required vaccinations.[3] The difference in coverage levels at 60 months of age and upon school entry indicate that many children are completing the basic series after their fifth birthday but before school starts.

A more timely estimate of vaccination coverage is provided by the National Immunization Survey (NIS) conducted by the Centers for Disease Control and Prevention. The NIS is an ongoing survey that provides estimates of vaccination coverage among children aged 19-35 months throughout the United States and for selected urban areas. Data are collected quarterly by telephone using randomly selected telephone numbers. The estimated coverage from the NIS for four DTP, three

OPV, and one MMR among children aged 19-35 months in LAC was 73% (±7%).[4] These data were collected in 1995 and represent children born between February 1992 and May 1994. This estimate is much higher than the coverage level of children 24 months old obtained from the 1999 EKRS, which generally represents children born in 1993.

There are several reasons for differences in coverage estimates from the EKRS and the NIS. First, the target age for the NIS is 19-35 months compared with 24 months for the EKRS. Children who were vaccinated according to the recommended schedule would complete the basic series of four DTP, three OPV, and one MMR by 18 months of age.[5] Series completion rates increase with age. By assessing vaccination coverage at 24 months of age, the EKRS allows six additional months for a child to complete the basic series. The NIS allows from one to up to 11 additional months for a child to complete the basic series. Second, the surveys collect information about different cohorts at different periods of time. The 1999 EKRS estimates vaccination coverage levels for children born in 1993 who were 24 months of age in 1995 whereas the 1995 NIS estimates coverage for children born between February 1992 and May 1994 and who were 19-35 months of age in 1995. Third, the NIS estimate for LAC is based on a sample of only about 440 respondents. Fourth, the NIS data are adjusted for households without telephones. The adjustment is based on national demographic characteristics that may not be applicable for LAC.[6] Lastly, the NIS takes a random sample of all children in LAC whereas the EKRS was a random sample of schools from the LAUSD. Therefore, the EKRS has limited representation from Antelope Valley, San Gabriel Valley and West Los Angeles. Also, children from private schools and other school districts are not represented in the EKRS.

Regardless of the survey method used, vaccination coverage level estimates for LAC are below the national goal to completely vaccinate 90% of children by their second year of life.[7] The IP will continue to monitor vaccination coverage estimates from various sources for use in the development of interventions and to improve vaccination coverage levels.

Table 1. Proportion of Kindergarten Students Who Received 4 DTP, 3 OPV, and MMR by 24 Months of Age, by Race/Ethnicity

	Expanded Survey Schools[a] 46 Schools, 1996			Expanded Survey Schools[b] 46 Schools, 1999		
Race/ Ethnicity	**Sample size**	**% of sample**	**% up-to-date**	**Sample size**	**% of sample**	**% up-to-date[b]**
White	538	9.5%	36.1%	344	5.8%	64.8%
Black	379	6.7%	31.9%	229	3.8%	38.4%
Hispanic	4,475	78.9%	41.2%	4,640	77.8%	55.0%
Asian	141	2.5%	50.4%	165	2.8%	61.2%
Total	**5,675[c]**	**100.0%**	**40.1%**	**5,968[d]**	**100.0%**	**54.8%**

a. Random sample of LAUSD public elementary schools. In 1996, the sampled schools represented 12% of the elementary schools in the LAUSD. At each school, records for all kindergarten students were reviewed.
b. The same LAUSD schools that were assessed in 1996 were assessed in 1999.
c. Total includes 142 (2.5%) children of other or unknown race/ethnicity.
d. Total includes 590 (9.9%) children of other or unknown race/ethnicity.

Table 2. Proportion of Kindergarten Students Who Received 4 DTP, 3 OPV, AND MMR BY 24 Months of Age, by SPA

SPA[c]	Expanded Survey Schools[a] 46 Schools, 1996			Expanded Survey Schools[b] 46 Schools, 1999		
	Sample size	% of sample	% up-to-date	Sample size	% of sample	% up-to-date[b]
2: San Fernando	1,441	25.4%	37.8%	1,591	26.7%	60%
4: Metro	2,157	38.0%	45.1%	2,656	44.5%	55%
5: West	35	0.6%	60.0%	41	0.7%	51%
6: South	535	9.4%	33.1%	297	5.0%	45%
7: East	862	15.2%	40.4%	938	15.7%	51%
8: South Bay	251	4.4%	33.1%	212	3.6%	49%
Total	**5,675**[d]	**100.0%**	**40.1%**	**5,968**[e]	**100.0%**	**54.8%**

a. Random sample of LAUSD public elementary schools. In 1996, the sampled schools represented 12% of the elementary schools in the LAUSD. At each school, records for all kindergarten students were reviewed.

b. The same LAUSD schools that were assessed in 1996 were assessed in 1999.

c. SPA=Service Planning Area. Analysis excludes SPAs with less than 30 records and records with missing SPA information.

d. Total includes 394 (6.9%) children from SPA 1 or with missing SPA information.

e. Total includes 233 (3.9%) children from SPAs 1 & 3 or with missing SPA information.

Table 3. Proportion of Kindergarten Students Who Received 4 DTP, 3 OPV, and 1 MMR by 24 Months of Age, by Zip Code of Residence, 1996

Coverage Estimate Ranges for Zip Codes of Residence				
10%-19%	**20%-29%**	**30%-39%**	**40%-49%**	**50%-59%**
90247	90027	90003	90005	90004
	90255	90008	90006	91406
	91343	90018	90012	
	91401	90028	90022	
		90047	90026	
		90303	90032	
		90731	90042	
		91335	90057	
		91606	90201	
			90270	
			90280	
			91304	
			91331	
			91340	
			91411	

Table 4. Proportion of Kindergarten Students Who Received 4 DTP, 3 OPV, and 1 MMR by 24 Months of Age, by Zip Code of Residence, 1999

Coverage Estimate Ranges for Zip Codes of Residence					
0%-9%	**20%-29%**	**40%-49%**	**50%-59%**	**60%-69%**	**70%-79%**
90022	90247	90008	90005	90017	91304
		90012	90006	90026	91307
		90018	90020	90028	
		90027	90033	91335	
		90032	90043	91340	
		90042	90057	91343	
			90069	91606	
			90201		
			90255		
			90270		
			90280		
			90731		
			91306		
			91331		
			91356		
			91401		
			91402		
			91406		
			91411		

**Figure 1. 1996 Expanded Kindergarten Retrospective Survey
Proportion Up-to-date at Selected Ages by Race
n=46 schools; 5,675 students**

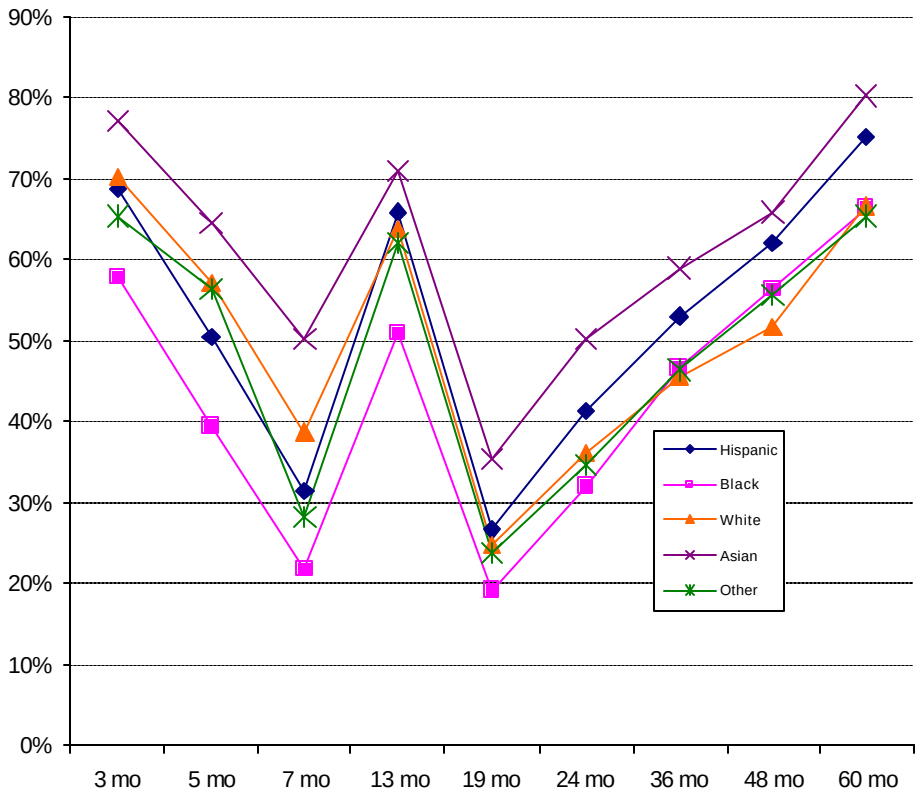


Figure 2. 1999 Expanded Kindergarten Retrospective Survey
Proportion Up-to-date at Selected Ages by Race
n=46 schools; 5,968 students

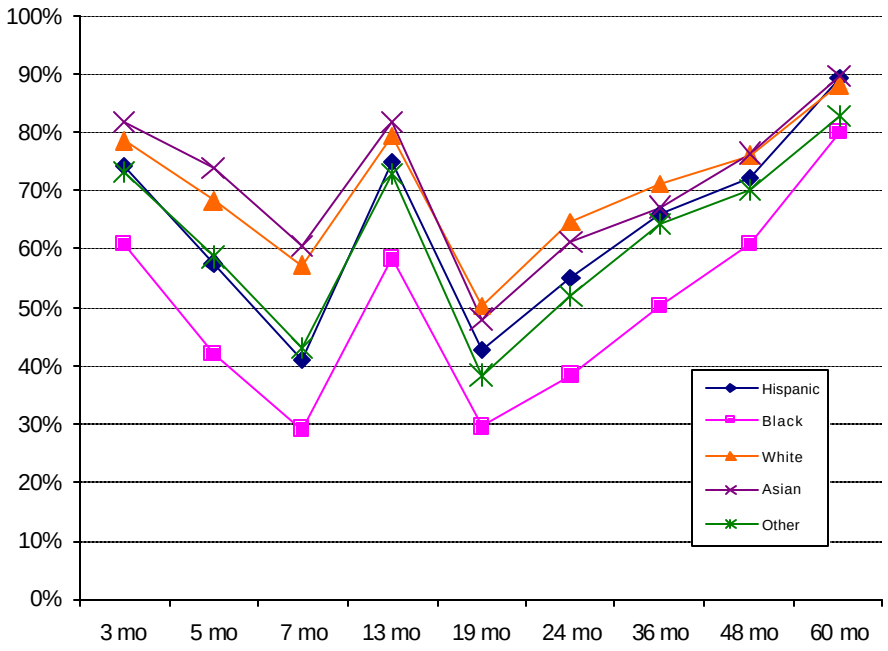


Figure 3. Proportion of Kindergarten Students Who Received 4 DTP, 3 OPV, and 1 MMR by 24 Months of Age, By Service Planning Area (1996/1999)

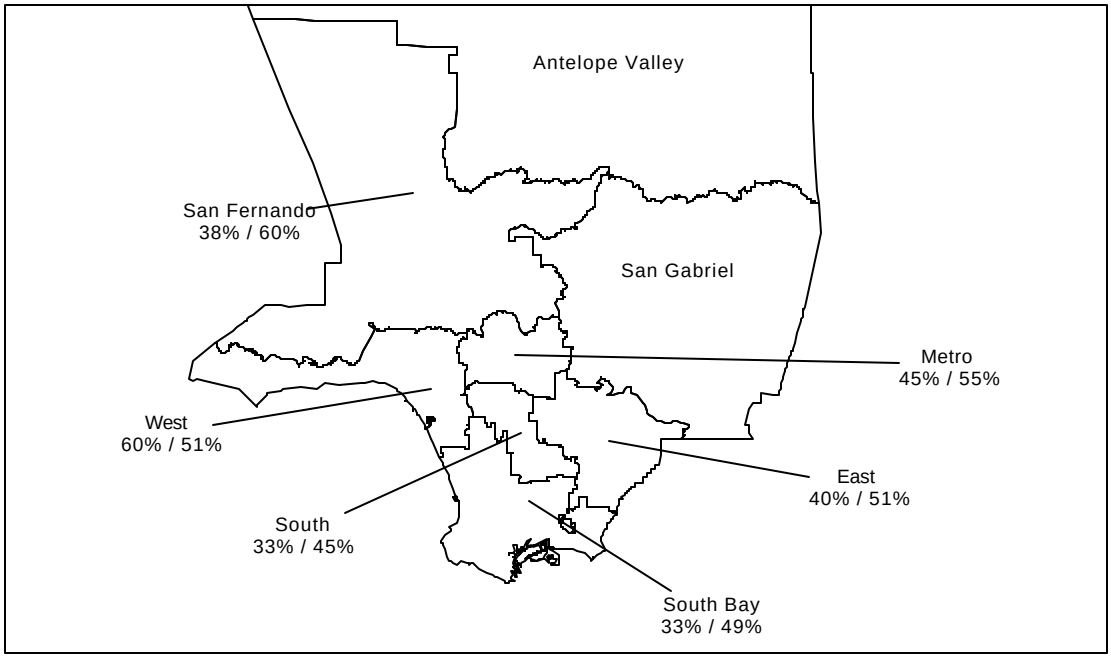


**Figure 4. 1996 Expanded Kindergarten Retrospective Survey
Proportion Up-to-date at Selected Ages by SPA
n=46 schools; 5,675 students**

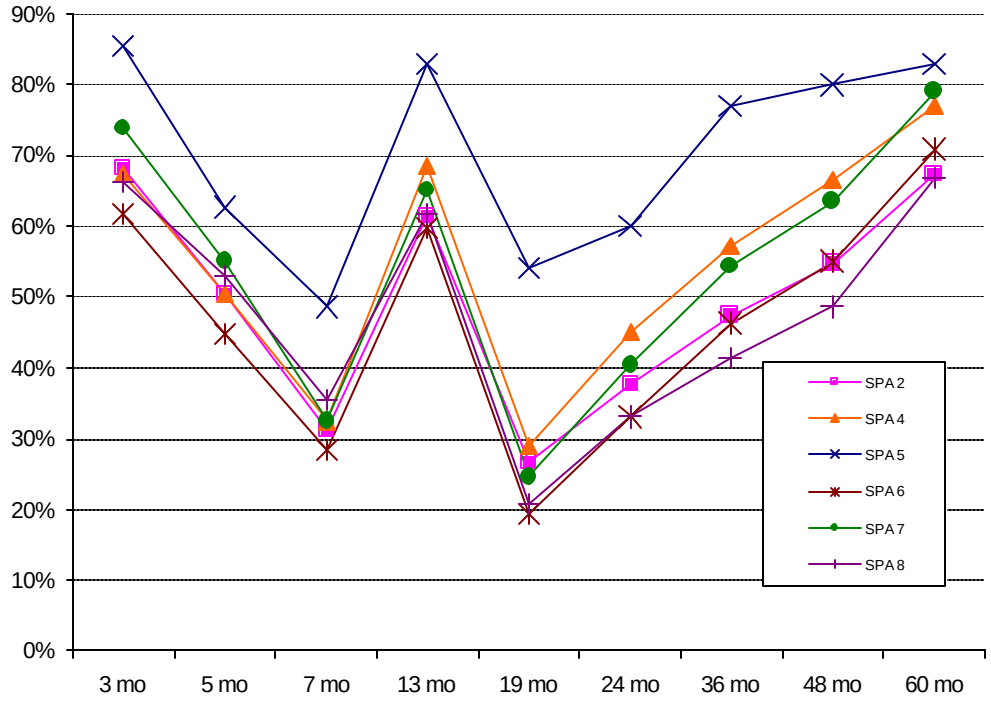
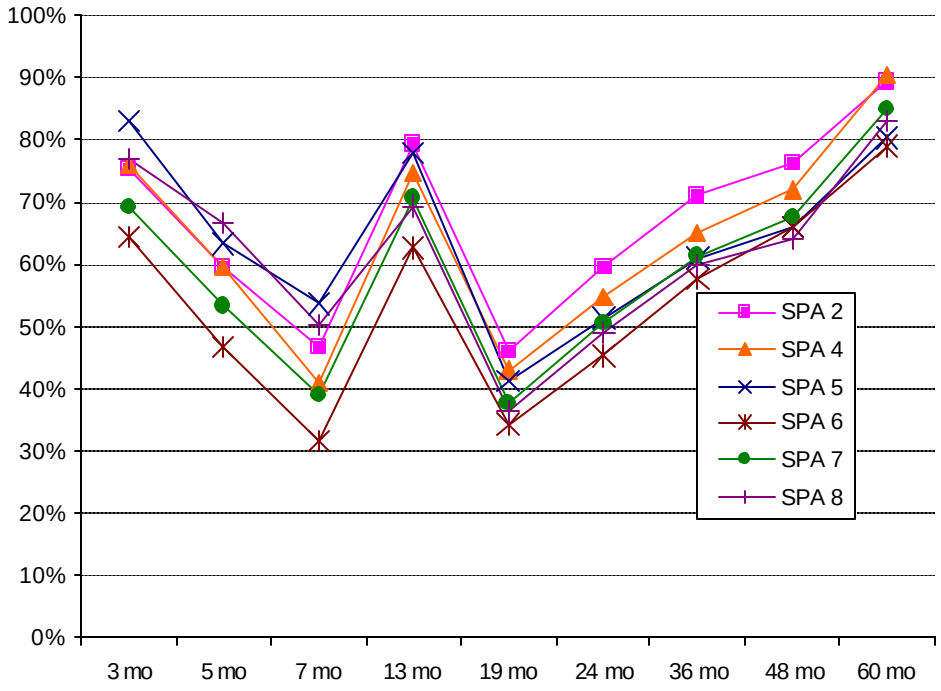


Figure 5. 1999 Expanded Kindergarten Retrospective Survey
Proportion Up-to-date at Selected Ages by SPA
n=46 schools; 5,968 students



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