

Vaccination Coverage Among Children in Kindergarten — United States, 2015–16 School Year

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State-mandated vaccination requirements for school entry protect children and communities against vaccine-preventable diseases (1). Each school year, federally funded immunization programs (e.g., states, territories, jurisdictions) collect and report kindergarten vaccination data to CDC. This report describes vaccination coverage estimates in all 50 states and the District of Columbia (DC), and the estimated number of kindergartners with at least one vaccine exemption in 47 states and DC, during the 2015–16 school year. Median vaccination coverage* was 94.6% for 2 doses of measles, mumps and rubella vaccine (MMR); 94.2% for diphtheria, tetanus, and acellular pertussis vaccine (DTaP); and 94.3% for 2 doses of varicella vaccine. MMR coverage increased in 32 states during the last year, and 22 states reported coverage $\geq 95\%$ (2). A total of 45 states and DC had either a grace period allowing students to attend school before providing documentation of vaccination or provisional enrollment that allows undervaccinated students to attend school while completing a catch-up schedule. Among the 23 states that were able to voluntarily report state-level data on grace period or provisional enrollment to CDC, a median of 2.0% of kindergartners were not documented as completely vaccinated and were attending school within a grace period or were provisionally enrolled. The median percentage of kindergartners with an exemption from one or more vaccinations[†] was 1.9%. State and local immunization programs, in cooperation with schools, can improve vaccination coverage by ensuring that all kindergartners are vaccinated during the grace period or provisional enrollment.

Federally funded immunization programs in 50 states and DC partner with departments of education, school nurses, and other school personnel to assess vaccination coverage and exemption status of children enrolled in public and private kindergartners.[§] Eight states reported data for some homeschooled

kindergartners.[¶] During the 2015–16 school year, for the first time, 23 states reported data on children who were neither fully vaccinated nor exempt, but attending kindergarten under a grace period or provisional enrollment. A grace period is a set number of days during which a student can be enrolled and attend school without proof of complete vaccination or exemption. A provisional enrollment allows a student without complete vaccination or exemption to attend school while completing a catch-up vaccination schedule.

States use a range of data sources to assess vaccination coverage, and during the 2015–16 school year, vaccination assessments varied by immunization program because of differences in state mandates, data reported, and available resources. Among the 51 programs reporting data, 32 used a census to collect kindergarten vaccination data; 10 used a sample; three used a voluntary school response; and six used a mix of sampling methods.** Programs used the same methods to collect both vaccination coverage and exemption data, except for programs in Alaska, Kansas, New Mexico, and Virginia, which used a sample to collect vaccination coverage data and a census

[¶] California included data for independent study students in public school data and data for homeschooled students with six or more students in private school data. Minnesota requires vaccination and exemption reporting for homeschooled students beginning at age 7 years and reports these data separately from public and private school data, although the actual number of homeschooled students included in the data was not known. North Carolina included students enrolled in virtual academies in public school data. North Dakota reported that some public school jurisdictions included homeschooled students in their data. Oregon reported some homeschool data separately and children enrolled in public online homeschools were included in the public school data. Pennsylvania included all homeschooled students in their public school data. Utah included students enrolled in public and private online schools. Vermont included homeschooled students in their public and private school data if they were enrolled in one or more classes in those schools; homeschooled children who were exclusively homeschooled were not subject to vaccination requirements and were not included in these estimates.

** States using a census attempted to collect data from all kindergartners at all schools and succeeded with collecting data for $\geq 90\%$ of students. The type of sample employed by the 10 states using a sample for determining coverage rates varied, and included a stratified two-stage cluster sample (eight states), a stratified one-stage cluster sample (one), and a simple random sample (one). A voluntary response of schools was defined as census survey with a response rate $< 90\%$ of the known population of kindergartners. A mix of methods included two or more described methods, usually a census for one school type and voluntary response for the other.

* Median vaccination coverage was determined using estimates from the 50 states and DC.

[†] Median exemption rate was determined using estimates from 47 states and DC; states excluded were Illinois, Minnesota, and Missouri. Data from Wyoming were included in the median for any exemption, but not for medical or nonmedical exemptions.

[§] Assessment date varied by state/area.

for exemption data. Six states (Colorado, Delaware, Hawaii, Nevada, South Carolina, and Wisconsin) used a sample for both vaccination coverage and exemption data. Kindergartners were considered up-to-date for a vaccine if they received all doses required for school entry,^{††} except in seven states^{§§} that considered kindergartners up-to-date only if they had received all doses of all vaccines required for school entry.

Kindergartners with a history of varicella disease were reported as either vaccinated against varicella or medically exempt, varying by program. Medical exemptions were those that were issued by a health care provider; all other exemptions (i.e., religious and philosophic) were nonmedical. Vaccination coverage and exemption estimates were adjusted based on survey type and response rates.^{¶¶}

During the 2015–16 school year, vaccination coverage data were reported for 4,087,187 kindergartners, exemption data for 3,791,755 kindergartners, and grace period/provisional enrollment data for 2,173,042 kindergartners.^{***} Among the 50 states and DC, median MMR coverage was 94.6% (range = 87.1% [Colorado] to 99.4% [Maryland and Mississippi]); 22 states reported coverage $\geq 95\%$, and three states and DC reported coverage $< 90\%$ (Table 1). Among 49 states and DC that require DTaP vaccination, median coverage was 94.2% (range = 86.6% [Colorado] to 99.6% [Maryland]); 20 states reported coverage $\geq 95\%$, and four states and DC reported coverage $< 90\%$. Among 42 states and DC that required 2-dose varicella vaccination, median coverage was 94.3% (range = 85.7% [Colorado] to 99.4% [Mississippi]); 18 states reported coverage $\geq 95\%$, and five states and DC

reported coverage $< 90\%$. The number of states requiring 2 doses of varicella vaccine for school entry increased from 39 in 2014–15 to 42 in 2015–16. Median 2-dose varicella coverage increased from 93.6% to 94.3%, in part because of high coverage in three states that added a requirement for 2 doses of varicella vaccine (Montana [93.6%]; North Carolina [97.0%]; and Utah [94.8%]) (3).

Since the 2014–15 school year, MMR coverage increased in 32 states (2). Compared with 2014–15, among states that reported coverage for both 2014–15 and 2015–16, four fewer states reported $< 90\%$ MMR coverage, and five more states reported $\geq 95\%$ MMR coverage in 2015–16 (Figure). The median increase was 0.7 percentage points (range = 0.1 [Wyoming] to 4.1 [Oklahoma]) (2).

Twenty-three^{†††} states voluntarily reported data on grace period or provisional enrollment for the 2015–16 school year. The median reported percentage of kindergartners attending school during a grace period or provisional enrollment was 2.0% (range = 0.0% [Wyoming] to 5.4% [New Hampshire]) (Table 2). In 12 of these 23 states, the percentage of children who were provisionally enrolled or within a grace period at the time of the assessment exceeded the percentage of children with exemptions from one or more vaccines.

Among the 47 states and DC reporting kindergartners with at least one exemption, the median was 1.9% (range = $< 0.1\%$ [Mississippi] to 6.3% [Oregon]), an increase of 0.2 percentage points from the previous year (Table 2). The percentage of kindergartners with any exemption was $< 1\%$ in six states, and $\geq 4\%$ in nine states. From the 2014–15 to the 2015–16 school year, the exemption rate decreased by > 1.0 percentage points in three states (Colorado, Michigan, and Wisconsin), and increased by > 0.5 percentage points in two states (Nevada and North Dakota). The number of states with exemption rates $\geq 4.0\%$ decreased from 11 in 2014–15 to nine in 2015–16. Michigan reported a 1.7 percentage point decrease in exemptions. Among states that reported exemptions by type, the median percentage of medical exemptions was 0.2% (range = $< 0.1\%$ in four states [Colorado, Delaware, Mississippi, South Carolina] to 1.2% [Alaska]), and the median percentage of nonmedical exemptions was 1.6% (range = 0.4% [DC] to 6.2% [Oregon]). During 2015–16, a total of 25 states^{§§§} share or plan to share

^{††} All the 50 states and DC required 2 doses of a measles-containing vaccine, with MMR as the only measles-containing vaccine available in the United States. For local DTaP vaccine requirements, Nebraska required 3 doses, four states (Illinois, Pennsylvania, Virginia, and Wisconsin) required 4 doses, Pennsylvania did not require pertussis, and all other states required 5 doses unless the fourth dose was administered on or after the fourth birthday. Kentucky required 5 doses of DTaP by age 5, but reported 4-dose coverage for kindergartners. For varicella vaccine, eight states required 1 dose and 42 states and DC required 2 doses.

^{§§} Alabama, Florida, Georgia, Iowa, Mississippi, New Hampshire, and New Jersey considered kindergartners up-to-date only if they had received all doses of all vaccines required for school entry.

^{¶¶} Most of the programs using a census or voluntary response provided CDC with data aggregated at the state level. Coverage and exemption data based on a census were adjusted for nonresponse using the inverse of the response rate, stratified by school type. Programs using complex sample surveys provided CDC with de-identified data aggregated at the school or county level for weighted analysis. Weights were calculated to account for sample design and adjusted for nonresponse for data collected by complex sample design wherever possible.

^{***} Immunization programs in U.S. territories reported vaccination coverage and exemptions to CDC. Their data were not included in median coverage and exemption calculations. Select U.S. cities also reported data to CDC, which were included in state-reported data to calculate medians.

^{†††} California, Colorado, Florida, Georgia, Hawaii, Idaho, Iowa, Maine, Mississippi, Montana, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, Pennsylvania, Tennessee, Texas, Utah, Vermont, Washington, West Virginia, and Wyoming reported data on kindergartners attending school under a grace period or provisional enrollment.

^{§§§} <http://www.cdc.gov/vaccines/imz-managers/SchoolVaxView/pubs-resources.html>.

TABLE 1. Estimated vaccination coverage* among children enrolled in kindergarten, by vaccine and state/area — United States, 2015–2016 school year

State/Area	Kindergarten population†	Total surveyed	Proportion surveyed (%)	Type of survey conducted§	MMR¶ 2 doses (%)	DTaP** 5 doses (%)	Varicella	
							1 dose (%)	2 doses (%)
Median††					94.6	94.2	96.1	94.3
Alabama§§	60,392	60,392	100.0	Census	≥93.1	≥93.1	≥93.1	NReq
Alaska¶¶,***	9,937	772	7.8	Stratified 2-stage cluster sample	93.5	92.8	NReq	92.6
Arizona§§	83,088	83,088	100.0	Census	94.2	94.2	96.7	NReq
Arkansas†††	40,258	38,480	95.6	Census (public); voluntary response (private)	90.8	88.2	NReq	90.6
California†††	593,788	551,123	92.8	Census	94.5	94.2	96.3	NReq
Colorado	69,137	350	0.5	Simple random sample	87.1	86.6	NReq	85.7
Connecticut§§	39,533	39,533	100.0	Census	97.0	97.0	NReq	96.6
Delaware	11,589	1,103	9.5	Stratified 2-stage cluster sample	97.6	98.0	NReq	97.6
District of Columbia§§	8,080	8,080	100.0	Census	88.5	88.2	NReq	88.1
Florida§§,¶¶	224,430	224,430	100.0	Census	≥93.7	≥93.7	NReq	≥93.7
Georgia§§	131,403	131,403	100.0	Census	≥94.6	≥94.6	NReq	≥94.6
Hawaii	16,325	1,098	6.7	Stratified 2-stage cluster sample	91.6	93.8	95.4	NReq
Idaho§§	22,686	22,686	100.0	Census	90.2	89.8	NReq	89.1
Illinois§§	151,309	151,309	100.0	Census	94.9	95.0	NReq	95.5
Indiana	83,525	58,062	69.5	Voluntary response	89.2	92.6	NReq	88.0
Iowa§§	41,215	41,215	100.0	Census	≥91.8	≥91.8	NReq	≥91.8
Kansas¶¶,***,†††	39,555	8,304	21.0	Stratified 2-stage cluster sample	89.4	89.4	NReq	87.9
Kentucky¶¶,†††	54,353	54,075	99.5	Census	92.2	93.9	NReq	91.6
Louisiana§§	59,159	59,159	100.0	Census	96.8	98.3	NReq	96.8
Maine	13,526	12,243	90.5	Census	95.1	96.1	96.1	NReq
Maryland†††	72,012	67,903	94.3	Census (public); voluntary response (private)	99.4	99.6	NReq	99.2
Massachusetts§§,†††	72,897	72,897	100.0	Census	96.4	94.9	NReq	95.8
Michigan§§	116,299	116,299	100.0	Census	95.7	95.9	NReq	95.2
Minnesota¶¶	69,710	68,143	97.8	Census	92.8	93.0	NReq	92.3
Mississippi§§	41,042	41,042	100.0	Census	≥99.4	≥99.4	NReq	≥99.4
Missouri§§,¶¶	74,413	74,413	100.0	Census	95.7	95.6	NReq	95.4
Montana§§	11,484	11,484	100.0	Census	94.9	94.0	NReq	93.6
Nebraska§§,†††	30,409	30,409	100.0	Census	95.6	96.8	NReq	97.3
Nevada	37,118	1,222	3.3	Stratified 2-stage cluster sample	94.7	94.2	NReq	93.4
New Hampshire	11,852	11,831	99.8	Census	≥91.9	≥91.9	NReq	≥91.9
New Jersey§§	110,116	110,116	100.0	Census	≥96.3	≥96.3	≥96.3	NReq
New Mexico***	29,049	774	2.7	Stratified 2-stage cluster sample	96.2	94.7	NReq	95.8
New York (including New York City)§§	232,521	232,521	100.0	Census	95.6	94.1	NReq	94.8
New York City§§	104,621	104,621	100.0	Census	94.6	91.9	NReq	93.5
North Carolina¶¶,†††	128,290	117,971	92.0	Census (public); voluntary response (private)	97.3	97.1	NReq	97.0
North Dakota	9,875	9,586	97.1	Census	90.7	90.8	NReq	90.4
Ohio	144,604	135,434	93.7	Census (public); voluntary response (private)	92.1	92.1	NReq	91.5
Oklahoma†††	54,335	52,215	96.1	Census	94.4	96.1	NA	NReq
Oregon§§,†††	45,531	45,531	100.0	Census	93.9	93.5	95.2	NReq
Pennsylvania	143,298	133,604	93.2	Census (public); voluntary response (private)	95.5	NReq§§§	NReq	96.5
Rhode Island§§,¶¶,†††	11,165	11,163	100.0	Census	96.4	96.8	NReq	96.0
South Carolina	59,240	5,251	8.9	Stratified 1-stage cluster sample	96.5	97.0	NReq	96.2
South Dakota§§	12,181	12,181	100.0	Census	96.5	96.4	NReq	95.2
Tennessee§§,¶¶	79,233	79,233	100.0	Census	93.5	93.5	NReq	93.5
Texas (including Houston)¶¶,†††	394,801	389,604	98.7	Census (public); voluntary response (private)	97.6	97.4	NReq	97.2
Houston, TX¶¶,†††	42,173	41,509	98.4	Census	96.5	96.6	NReq	96.0
Utah§§	50,114	50,114	100.0	Census	94.2	93.7	NReq	94.8
Vermont§§	6,366	6,366	100.0	Census	93.6	93.6	NReq	91.9
Virginia¶¶,***	100,074	4,304	4.3	Stratified 2-stage cluster sample	95.7	98.3	NReq	93.7
Washington¶¶	86,492	84,155	97.3	Census	91.0	91.1	NReq	89.4
West Virginia	21,333	18,690	87.6	Voluntary response	95.2	94.8	NReq	94.3
Wisconsin¶¶,†††	70,220	1,375	2.0	Stratified 2-stage cluster sample	93.2	96.9	NReq	92.5
Wyoming¶¶,¶¶¶	7,825	5,791	74.0	Voluntary response	96.9	96.6	NReq	96.5

See table footnotes on the next page.

TABLE 1. (Continued) Estimated vaccination coverage* among children enrolled in kindergarten, by vaccine and state/area — United States, 2015–2016 school year

State/Area	Kindergarten population†	Total surveyed	Proportion surveyed (%)	Type of survey conducted§	MMR¶ 2 doses (%)	DTaP** 5 doses (%)	Varicella	
							1 dose (%)	2 doses (%)
Guam***	2,715	780	28.7	Stratified 2-stage cluster sample	89.8	92.6	NReq	NReq
N. Mariana Islands§§	900	900	100.0	Census	89.8	77.7	NReq	89.9
Puerto Rico	35,573	1,489	4.2	Stratified 2-stage cluster sample	96.5	92.9	NReq	95.4
U.S. Virgin Islands	1,418	577	40.7	Stratified 2-stage cluster sample	87.2	85.6	NReq	86.9

Abbreviations: DTaP/DT = diphtheria and tetanus toxoids (DT) and acellular pertussis vaccine; MMR = measles, mumps, and rubella vaccine; NA = not available (i.e., not collected or reported to CDC); NReq = not required for school entry.

* Estimates are adjusted for nonresponse and weighted for sampling where appropriate. Estimates based on a completed vaccine series (i.e., not antigen-specific) are designated by use of the ≥ symbol. Coverage might include history of disease and laboratory evidence of immunity.

† The kindergarten population is an approximation provided by each state/area.

§ Sample designs varied by state/area: census = all schools (public and private), and all children within schools were included in the assessment; simple random = a simple random sample design was used; 1-stage or 2-stage cluster sample = schools were randomly selected, and all children in the selected schools were assessed (1-stage) or a random sample of children within the schools was selected (2-stage); voluntary response = a census with a student response rate of <90% and does not imply that participation was optional.

¶ Most states required 2 doses of MMR; Alaska, California, New Jersey, and Oregon required 2 doses of measles, 1 dose of mumps, and 1 dose of rubella vaccines. Georgia, New York, New York City, North Carolina, Pennsylvania, and Virginia required 2 doses of measles and mumps, 1 dose of rubella vaccines. Iowa required 2 doses of measles and 2 doses of rubella vaccines.

** Pertussis vaccination coverage might include some DTP (diphtheria and tetanus toxoids and pertussis vaccine) vaccinations if administered in another country or vaccination provider continued to use after 2000. Most states required 5 doses of DTaP vaccine for school entry; Illinois, Virginia, and Wisconsin required 4 doses; Nebraska required 3 doses. Pennsylvania required 4 doses of diphtheria and tetanus vaccine, but pertussis vaccine was not required. Kentucky required ≥5 but reported ≥4 doses of DTaP.

†† Median calculated from data from the 50 states and the District of Columbia (i.e., does not include Houston, New York City, Guam, N. Mariana Islands, Puerto Rico, or U.S. Virgin Islands).

§§ The proportion surveyed was probably <100%, but shown as 100% based on incomplete information about the actual current enrollment.

¶¶ Did not include some special types of schools.

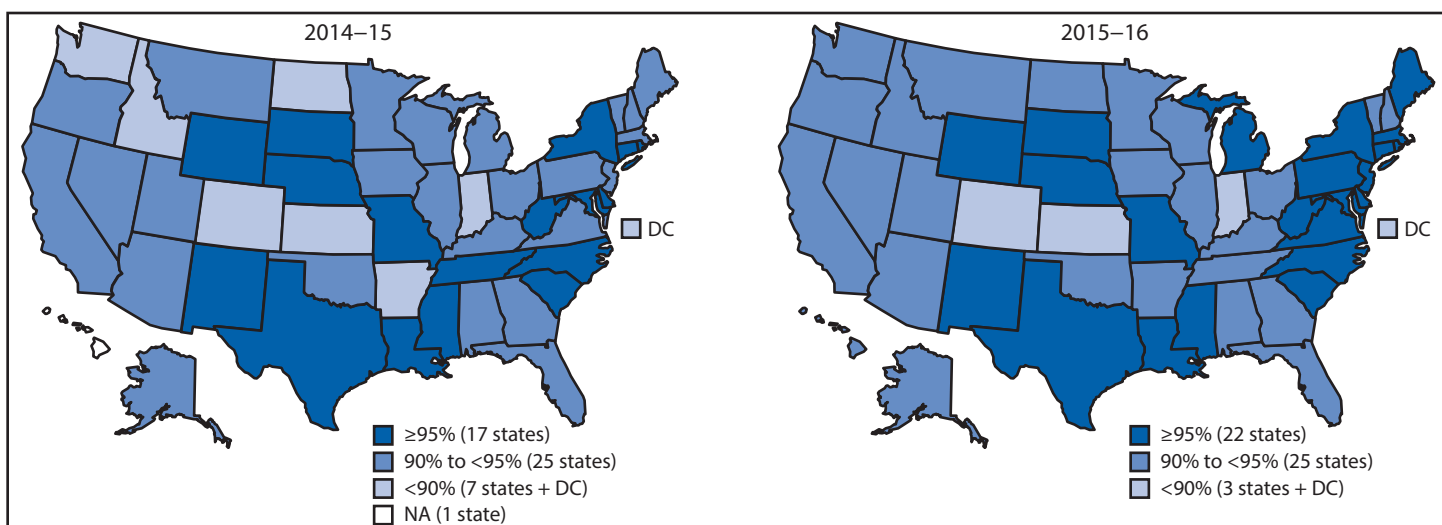
*** Kindergarten coverage data were collected from a sample, and exemption data were collected from a census of kindergartners.

††† Counted some or all vaccine doses received regardless of Advisory Committee on Immunization Practices recommended age and time interval; vaccination coverage rates shown might be higher than those for valid doses.

§§§ Pertussis vaccine was not required in Pennsylvania. Coverage for diphtheria and tetanus was 96.3%.

¶¶¶ Collected public school data only.

FIGURE. Estimated measles, mumps, and rubella vaccine (MMR) coverage among kindergartners — United States, 2014–15 and 2015–16 school years*,†,§



* In 2014–15, most states required 2 doses of MMR. Alaska, California, New Jersey, and Oregon required 2 doses of measles, 1 dose of mumps, and 1 dose of rubella vaccines. Georgia, New York, Pennsylvania, and Virginia required 2 doses of measles and mumps, 1 dose of rubella. Iowa required 2 doses of measles and 2 doses of rubella vaccines. New York required 2 doses of measles and mumps and 1 dose of rubella vaccine by age 7 years, but reported ≥1 doses of MMR.

† For 2014–15, Hawaii is excluded from the map because it reported compliance, rather than coverage.

§ For 2015–16, most states required 2 doses of MMR. Alaska, California, New Jersey, and Oregon required 2 doses of measles, 1 dose of mumps, and 1 dose of rubella vaccines. Georgia, New York, New York City, North Carolina, Pennsylvania, and Virginia required 2 doses of measles and mumps, 1 dose of rubella vaccines. Iowa required 2 doses of measles and 2 doses of rubella vaccines.

local-level data online for vaccination coverage, exemptions, or both, which is an increase from 21 states during 2014–15 (3).

Discussion

During the 2015–16 school year, median kindergarten vaccination coverage was nearly 95% for MMR (94.6%), DTaP (94.2%), and varicella vaccine (94.3%), which was similar to the previous school year. MMR coverage increased for 32 states from the previous school year. The national median exemption rate of 1.9% was a slight increase from the previous school year (1.7%), but only two states had an increase >0.5 percentage points in their state exemption rate and exemptions varied by state. The percentage of kindergartners who did not have complete documentation of vaccination, and who attended school within a grace period or were provisionally enrolled, was as high as 5.4% among the 23 states with data available.

Grace period and provisional enrollment, not collected in previous years, might in part explain results from previous years indicating that some children were enrolled in school but reported neither as vaccinated nor as exempt (3). Immunization programs can support and work with schools with high provisional enrollment and help students obtain missing vaccine doses. For example, the California Health Department worked to improve vaccination coverage at schools identified from local-level data as having high levels of provisional enrollment. School staff members were trained on the proper use of provisional enrollment (4). As a result, from 2014–15 to 2015–16, the number of provisionally enrolled kindergartners decreased from 36,731 (6.3%) to 24,424 (4.4%), MMR coverage increased from 92.6% to 94.5%, and DTaP coverage increased from 92.4% to 94.2% (4). The decrease in the number of provisionally enrolled children in California and the increase in MMR and DTaP coverage demonstrates that state immunization programs and schools can use provisional enrollment data to boost school vaccination coverage.

The increase in MMR coverage observed among 32 states during the 2015–16 school year might be attributable in part to the 2015 measles outbreaks, which included a reported total of 159 persons from 18 states and DC, of whom approximately 80% were unvaccinated or had unknown vaccination status (5). Maintaining high vaccination coverage levels is important for measles control and elimination (6).

A slight increase (0.2 percentage points) in the median exemption rate from 2014–15 to 2015–16 is accounted for in part by the addition of reports from Texas (1.6%) and Wyoming (2.7%), neither of which reported the number of children with an exemption from one or more vaccines for the 2014–15 school year. The 1.7 percentage point decrease in exemptions reported by Michigan might be because of a new

Summary

What is already known about this topic?

Immunization programs conduct annual kindergarten vaccination assessments to monitor vaccination coverage among school children. Although state-level vaccination coverage is high and exemptions are low, some children in kindergarten remain undervaccinated.

What is added by this report?

Among the 50 states and the District of Columbia (DC), median vaccination coverage was 94.6% for 2 doses of measles, mumps, and rubella vaccine (MMR) and 94.2% for local requirements for diphtheria, tetanus, and acellular pertussis vaccine among 49 states and DC. Among the 42 states and DC with a 2-dose varicella vaccine requirement, varicella vaccine coverage was 94.3%. Thirty-two states reported an increase in 2-dose MMR coverage. The median exemption level remained low (1.9%) but exemption rates varied by state. In 12 of 23 states that reported data on grace period or provisional enrollment for children who were not fully vaccinated, the proportion of kindergartners under a grace period or provisional enrollment was higher than the proportion that were exempt from one or more vaccines.

What are the implications for public health practice?

Routine monitoring of vaccination coverage and exemptions among kindergartners at the state level is important to ensure all children are protected from vaccine-preventable diseases. Local-level data on school vaccination coverage, exemptions, and grace period/provisional enrollment are essential to help immunization programs identify schools with higher numbers of students who are not completely vaccinated and not exempt. Immunization programs and schools can use local level data to work together to improve vaccination coverage and protect all kindergartners from vaccine-preventable diseases. TABLE 1. Estimated vaccination coverage* among children enrolled in kindergarten, by vaccine and state/area — United States, 2015–2016 school year

state rule requiring parents who request exemptions to receive health education at a county health department about the risks for vaccine-preventable diseases and the benefits of vaccination (7). The greatest fluctuations in exemptions occurred among states that used samples to collect exemption data. Of the five states with an increase of ≥ 0.5 percentage points or decrease of ≥ 1 percentage points in exemptions since the previous school year, three (Colorado, Nevada, and Wisconsin) reported data from a sample of students. CDC recommends using a census of schools to collect exemption data because exemptions are rare events that cluster geographically (8). Since the 2011–12 school year, five states switched to a census from a sample to collect exemption data, increasing representativeness and reliability.

Healthy People 2020 sets a vaccination coverage target of 95% among kindergartners for the vaccines reported here, as

TABLE 2. Estimated number and percentage* of children enrolled in kindergarten with reported type of exemption from vaccination, and grace period/provisional enrollment, by state/area† — United States, 2015–16 school year

State/Area	Medical exemptions	Nonmedical exemptions			Any exemption			Grace period/ Provisional enrollment [§]	
	No. (%)	No. religious	No. philosophic	Total No. (%)	Total No.	2015–2016 (%)	2014–2015 (%)	% point difference	No. (%)
<i>Median (%)[¶]</i>	<i>0.2</i>	<i>NC</i>	<i>NC</i>	<i>1.6</i>	<i>NC</i>	<i>1.9</i>	<i>1.7</i>	<i>0.2</i>	<i>2.0</i>
Alabama	40 (0.1)	438	—**	438 (0.7)	478	0.8	0.8	0.0	NA
Alaska	103 (1.2)	421	—**	421 (4.7)	524	5.9	5.8	0.1	NA
Arizona	189 (0.2)	— ^{††}	3,732	3,732 (4.5)	3,921	4.7	4.8	-0.1	NA
Arkansas	21 (0.1)	160	332	491 (1.2)	512	1.3	1.3	0.0	NA
California	993 (0.2)	3,323	10,684	14,008 (2.4)	15,000	2.5	2.7	-0.2	26,232 (4.4)
Colorado	0 (<0.1)	198	2,765	2,963 (4.3)	2,963	4.3	5.4	-1.1	395 (0.6)
Connecticut	110 (0.3)	689	—**	689 (1.7)	799	2.0	1.9	0.1	NA
Delaware	5 (<0.1)	131	—**	131 (1.1)	136	1.2	1.3	-0.1	NA
District of Columbia	44 (0.5)	33	—**	33 (0.4)	77	1.0	1.1	-0.1	NA
Florida	699 (0.3)	4,226	—**	4,226 (1.9)	4,925	2.2	2.1	0.1	8,875 (4.0)
Georgia	145 (0.1)	2,315	—**	2,315 (1.8)	2,460	1.9	2.1	-0.2	2,672 (2.0)
Hawaii	70 (0.4)	426	—**	426 (2.5)	496	2.9	3.3	-0.4	294 (1.7)
Idaho	69 (0.3)	122	1,198	1,320 (5.8)	1,389	6.1	6.5	-0.4	537 (2.4)
Illinois ^{§§}	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indiana	395 (0.5)	912	—**	912 (1.1)	1,035	1.2	1.1	0.1	NA
Iowa	119 (0.3)	635	—**	635 (1.5)	754	1.8	1.8	0.0	1,730 (4.2)
Kansas	97 (0.2)	554	—**	554 (1.4)	651	1.6	1.4	0.2	NA
Kentucky	129 (0.2)	382	—**	382 (0.7)	510	0.9	0.9	0.0	NA
Louisiana	75 (0.1)	28	342	370 (0.6)	445	0.8	0.6	0.2	NA
Maine	69 (0.5)	28	515	542 (4.0)	612	4.5	4.4	0.1	169 (1.3)
Maryland	348 (0.5)	601	—**	601 (0.8)	949	1.3	1.2	0.1	NA
Massachusetts	216 (0.3)	760	—**	760 (1.0)	976	1.3	1.4	-0.1	NA
Michigan	246 (0.2)	749	3,208	3,957 (3.4)	4,203	3.6	5.3	-1.7	NA
Minnesota ^{§§}	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mississippi	18 (<0.1)	— ^{††}	—**	— ^{††,**}	18	<0.1	<0.1	0.0	194 (0.5)
Missouri ^{§§}	NA	NA	NA	NA	NA	NA	NA	NA	NA
Montana	49 (0.4)	390	—**	390 (3.4)	439	3.8	3.9	-0.1	262 (2.3)
Nebraska	186 (0.6)	422	—**	422 (1.4)	608	2.0	1.6	0.4	564 (1.9)
Nevada	37 (0.1)	695	—**	695 (1.9)	732	2.0	1.3	0.7	1,265 (3.4)
New Hampshire	21 (0.2)	288	—**	288 (2.4)	309	2.6	2.9	-0.3	645 (5.4)
New Jersey	211 (0.2)	1,727	—**	1,727 (1.6)	1,938	1.8	1.8	0.0	1,256 (1.1)
New Mexico	19 (0.1)	346	—**	346 (1.2)	365	1.3	1.2	0.1	441 (1.5)
New York (including New York City)	323 (0.1)	1,729	—**	1,729 (0.7)	2,052	0.9	0.8	0.1	NA
New York City	44 (<0.1)	394	—**	394 (0.4)	438	0.4	0.4	0.0	NA
North Carolina	141 (0.1)	1,240	—**	1,240 (1.0)	1,382	1.1	1.0	0.1	NA
North Dakota	30 (0.3)	59	240	299 (3.0)	329	3.3	2.7	0.6	NA
Ohio	358 (0.2)	— ^{¶¶}	— ^{¶¶}	2,896 (2.0)	3,255	2.3	2.1	0.2	NA
Oklahoma	79 (0.1)	236	580	816 (1.5)	895	1.6	1.5	0.1	NA
Oregon	61 (0.1)	— ^{¶¶}	— ^{¶¶}	2,810 (6.2)	2,871	6.3	6.0	0.3	NA
Pennsylvania	511 (0.4)	1,212	1,408	2,620 (1.8)	3,132	2.2	2.1	0.1	7,365 (5.1)
Rhode Island	21 (0.2)	105	—**	105 (0.9)	126	1.1	1.1	0.0	NA
South Carolina	23 (<0.1)	937	—**	937 (1.6)	960	1.6	1.2	0.4	NA
South Dakota	22 (0.2)	175	—**	175 (1.4)	197	1.6	1.7	-0.1	NA
Tennessee	111 (0.1)	739	—**	739 (0.9)	850	1.1	1.1	0.0	1,003 (1.3)
Texas (including Houston)	821 (0.2)	— ^{¶¶}	— ^{¶¶}	5,350 (1.4)	6,170	1.6	NA	NA	11,048 (2.8)
Houston, TX	90 (0.2)	— ^{¶¶}	— ^{¶¶}	301 (0.7)	392	0.9	0.3	0.6	NA
Utah	88 (0.2)	10	2,204	2,214 (4.4)	2,302	4.6	4.3	0.3	1,085 (2.2)
Vermont	9 (0.1)	59	293	352 (5.5)	361	5.7	6.1	-0.4	296 (4.6)
Virginia	254 (0.3)	901	—**	901 (0.9)	1,155	1.2	1.1	0.1	NA
Washington	862 (1.0)	267	2,886	3,153 (3.6)	3,878	4.5	4.6	-0.1	1,730 (2.0)
West Virginia	35 (0.2)	— ^{††}	—**	— ^{††,**}	35	0.2	0.2	0.0	414 (1.9)
Wisconsin	244 (0.3)	190	1,861	2,051 (2.9)	2,295	3.3	5.3	-2.0	NA
Wyoming ^{§§,***}	NA	NA	NA	NA	209	2.7	NA	NA	0.0 (<0.1)

See table footnotes on the next page.

TABLE 2. (Continued) Estimated number and percentage* of children enrolled in kindergarten with reported type of exemption from vaccination, and grace period/provisional enrollment, by state/area† — United States, 2015–16 school year

State/Area	Medical exemptions	Nonmedical exemptions			Any exemption			Grace period/Provisional enrollment [§]	
	No. (%)	No. religious	No. philosophic	Total No. (%)	Total No.	2015–2016 (%)	2014–2015 (%)	% point difference	No. (%)
Guam	0 (0.0)	1	—**	1 (<0.1)	1	<0.1	0.1	-0.1	NA
N. Mariana Islands	0 (0.0)	0	0	0 (0.0)	0	0.0	0.0	0.0	NA
Puerto Rico	39 (0.1)	57	—**	57 (0.2)	97	0.3	0.2	0.1	NA
U.S. Virgin Islands	0 (<0.1)	9	—**	9 (0.6)	9	0.6	1.7	-1.1	NA

Abbreviations: NA = not available (i.e., not collected or reported to CDC); NC = not calculated.

* Estimates were adjusted for nonresponse and weighted for sampling where appropriate.

† Medical exemptions, nonmedical exemptions, and grace period/provisional enrollment status might not be mutually exclusive. Some children might have both medical and nonmedical exemptions, and some enrolled under a grace period/provisional enrollment might be exempt from one or more vaccinations.

§ Grace period/provisional enrollment data were collected for the first time in 2015–16. Data were reported voluntarily. A grace period is a set number of days during which a student can be enrolled and attend school without proof of complete vaccination or exemption. Provisional enrollment allows a student without complete vaccination or exemption to attend school while completing a catch-up vaccination schedule. In states with one or both of these policies, the estimates represent the number of kindergartners within a grace period, provisionally enrolled, or some combination of these categories.

¶ Medians calculated from data from 47 states and District of Columbia; states excluded were Illinois, Minnesota, and Missouri. Wyoming was included in only the Any Exemption median. Houston, New York City, Guam, N. Mariana Islands, Puerto Rico, and U.S. Virgin Islands were also excluded.

** Exemptions because of philosophic reasons were not allowed.

†† Exemptions because of religious reasons were not allowed.

§§ State did not report the number of children with exemptions, but instead reported the number of exemptions for each vaccine, which would count some children more than once. Lower bounds of the percentage of children with any exemptions, estimated using the individual vaccines with the highest number of exemptions are the following: for Illinois, 0.2% with medical exemptions, 1.1% with religious exemptions, and 1.4% for any exemptions; for Minnesota, 0.2% with medical exemptions, 3.1% with nonmedical exemptions, and 3.4% for any exemptions; for Missouri 0.2% with medical exemptions, 1.7% with religious exemptions, and 1.8% for any exemptions; and for Wyoming, 0.2% with medical exemptions and 2.2% with religious exemptions.

¶¶ Religious and philosophic exemptions were not reported separately.

*** Collected public school data only.

well as for other vaccines.^{¶¶¶} This report found medians for MMR, DTaP, and varicella vaccine all approach the *Healthy People 2020* target. A total of 22 states met the *Healthy People 2020* target for vaccination with MMR, 20 states met the DTaP vaccination target, and 18 states met the varicella vaccination target.

The findings in this report are subject to at least three limitations, which have been previously reported (3). First, comparability is limited because of variations in states' requirements. Second, representativeness might be negatively affected because of data collection methodologies that miss some schools or students or assess vaccination status at different times. Finally, actual vaccination coverage, exemption estimates, or both might be under- or overestimated because of improper or absent documentation. State-level aggregate grace period/provisional enrollment data were reported to CDC by states that could easily access the data from reporting schools,

^{¶¶¶} *Healthy People 2020* objective IID-10.1 is 4 doses of DTaP vaccine. This report describes compliance with state requirements of 3, 4, or 5 doses of DTaP vaccine. Among the 50 states and DC, only Nebraska required and reported 3 doses of DTaP vaccine. The IID-10.2 target is ≥95% of kindergartners receiving ≥ 2 doses of MMR vaccine. Four states required 2 doses of measles-containing vaccine but only 1 dose each of mumps and rubella vaccine. Four states required 2 doses measles and mumps but only 1 dose of rubella vaccine. One state required 2 doses of measles and rubella and zero doses of mumps. The IID-10.5 target is ≥95% of kindergartners receiving ≥2 doses of varicella vaccine. State-level data with *Healthy People 2020* targets are available on SchoolVaxView (<http://www.cdc.gov/vaccines/imz-managers/coverage/schoolvaxview/data-reports/index.html>).

and represent kindergartners who are identified by the schools as having incomplete vaccination records. The definition of kindergartners under a grace period/provisional enrollment varied by state, so those estimates might not be comparable.

Kindergarten vaccination requirements provide an opportunity for children who are behind on early childhood vaccinations to be vaccinated by school entry. Thorough school vaccination assessments at the state and local levels allow immunization programs to identify schools and communities where focused action could improve vaccination coverage to ensure that more children can benefit from the protection offered by vaccines. Local-level data allow programs to identify schools with undervaccinated students, and public dissemination raises awareness of community vaccination coverage. Immunization programs can use the data to monitor grace period/provisional enrollment levels, in addition to coverage and exemptions, and to work with schools with higher grace period or provisional enrollment rates to ensure all kindergartners receive recommended vaccinations and are protected from vaccine-preventable diseases.

¹National Center for Immunization and Respiratory Disease, Immunization Services Division, CDC; ²Association of Schools and Programs of Public Health.

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