

**RETROSPECTIVE IMMUNIZATION COVERAGE SURVEY  
2009-2010 Results (School Year 2013-2014)**



**Charles L. Cohlma, MPH  
Bureau of Epidemiology and Public Health Informatics  
Division of Health  
Kansas Department of Health and Environment  
1000 SW Jackson, Suite 075  
Topeka, Kansas 66612-1290  
Telephone (785) 296-1059  
Fax (785) 291-3775**

## **VACCINE ACRONYMS**

DTaP4	4 doses of diphtheria and tetanus toxoids and acellular pertussis vaccines including diphtheria and tetanus toxoids (DTaP/DT) vaccine
HepB3	3 doses of hepatitis B vaccine
Hib3	3 doses of <i>Haemophilus influenzae</i> type b vaccine
MMR1	1 doses of measles, mumps, and rubella vaccine
PCV3	4 doses of pneumococcal conjugate vaccine
Polio3	3 doses of polio vaccine
Var1	1 dose of varicella vaccine
4-3-1-3-3	DTaP4-Polio3-MMR1-Hib3-HepB3
4-3-1-3-3-1-4	DTaP4-Polio3-MMR1-Hib3-HepB3-Var1-PCV4

## **EXECUTIVE SUMMARY**

### Overview

The Kansas Certificates of Immunizations (KCIs) and other immunization records for children enrolled in a kindergarten class in Kansas public and private schools during the 2013-2014 school year were collected and evaluated for immunization coverage. Retrospective vaccination coverage levels were calculated for children at 24 months of age and 35 months of age. Children who were between the ages of five and seven years on the first day of the 2013-2014 school year were included in the study. In total, there were 616 schools, 535 public and 81 private, included in the analysis, which consisted of a representative sample of 11,526 children from both public and private schools.

### Coverage at 24 and 35 months of age

The statewide coverage levels at 24 months of age for all vaccinations required for school entry (DTaP4, Polio3, MMR1, Var1, and HepB3) were at or above 79%, with Polio3 having the highest coverage at 92%. Polio3 and HepB3 were the only vaccinations to meet the Healthy People 2020 (HP2020) goal of at least 90% coverage for children at 24 months of age. The complete series for all five required vaccinations (4-3-1-3-3) had a coverage level of 67% at 24 months of age.

Vaccination coverage levels for all immunizations and both vaccine series (4-3-1-3-3 and 4-3-1-3-3-1-4) increased significantly by the time the children reached 35 months of age. Vaccination coverage levels for all required vaccines except for DTaP4 were at or above the HP2020 goal of 90% at 35 months. Among children at the age of 35 months, Polio3 remained the vaccine with the highest coverage at 94%. The two vaccine series measured in this study (4-3-1-3-3 and 4-3-1-3-3-1-4) increased to 77% and 66% respectively.

# RETROSPECTIVE IMMUNIZATION COVERAGE SURVEY 2009-2010 RESULTS (SCHOOL YEAR 2013-2014)

## INTRODUCTION

### **Objective**

This study was conducted to estimate the immunization coverage levels of children at 24 months and 35 months of age.

### **Study Population**

The study population included a representative sample of all Kansas kindergarten students enrolled in either a private or public school in the 2013-2014 school year.

### **Study Design**

A stratified, cross-sectional design was utilized for this study, with each county representing a stratum. The characteristics of interest, or outcome variables, were the percentages of children who were fully immunized against diphtheria, tetanus, pertussis, polio, measles, mumps, rubella, *Haemophilus influenzae* type b, hepatitis A virus, hepatitis B virus, varicella, and pneumococcal disease. Vaccination coverage was retrospectively assessed for these children at 24 months and at 35 months of age.

Vaccination coverage was measured for single vaccine series and combinations of vaccines according to the recommended immunization schedule for children by 24 months of age.<sup>1</sup> *The results of the survey refer to children who were born between September 2, 2007, and September 1, 2008. The coverage levels refer to the point in time at which these children turned 24 months old, between September 2, 2009, and September 1, 2010.*

## METHODS

### **Sampling Techniques**

A probability sample of all children enrolled in Kansas public school kindergartens was drawn. To ensure an adequate sample size in each county and to maximize the efficiency of the sampling process, a different sampling ratio was established for each county, and a probability sample was selected using a systematic sampling technique. Due to the small size of the private school population in Kansas, all records from private schools were solicited. Children who were home schooled or attended other special schools were not included in the sampling scheme.

### **Data Collection**

All Kansas public and private schools with a kindergarten class received a letter, co-signed by officials representing the Kansas Department of Health and Environment (KDHE) and the Kansas State Department of Education (KSDE), requesting their participation in the survey.

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<sup>1</sup> The Recommended Immunization Schedule used, as reference for ages and immunization in this paper was the schedule approved by the Advisory Committee on Immunization Practices (ACIP), the American Academy of Pediatrics (AAP) and the American Academy of Family Physicians (AAFP) for the year 2012.

Point estimates of coverage levels and 95% confidence intervals (95% CI) for DTaP4, Polio3, MMR1, Hib3, HepB3, Var1, PCV4, HepA2 vaccinations, the 4-3-1-3-3 series, and the 4-3-1-3-3-1-4 series were calculated. A child was considered up-to-date (UTD) for single vaccination series if, at 24 months of age, he or she had received at least four doses of DTaP (DTaP4), three doses of polio (Polio3), one dose of measles, mumps, and rubella (MMR1), three doses of *H. influenzae* type b (Hib3), three doses of hepatitis B (HepB3), one dose of varicella (Var1) vaccine, four doses of pneumococcal conjugate (PCV4), or two doses of hepatitis A (HepA2). A child was considered up-to-date for the 4-3-1-3-3 series if he or she was up-to-date for DTaP4, Polio3, MMR1, Hib3, and HepB3 vaccinations, and up-to-date for the 4-3-1-3-3-1-4 series if he or she was up-to-date for DTaP4, Polio3, MMR1, Hib3, HepB3, Var1, and PCV4 vaccinations. All children who indicated history of varicella disease were included in the denominator, but only those who reported history of varicella vaccination were included in the numerator because the date of disease was frequently not recorded; it could not be determined at what age the child had varicella.

The coverage levels produced by this analysis were compared to the HP2020 goals for childhood immunization among children by age 19 to 35 months. These goals include having 90% vaccine coverage for DTaP4, Polio3, MMR1, Hib3, HepB3, Var1, and PCV4, 85% coverage for HepA2, and 80% coverage for the vaccine series (4-3-1-3-3-1-4). The results from this survey were compared with the results from the 2010 National Immunization Survey (NIS).<sup>2,3</sup> Data for the population-based NIS are collected by the Centers for Disease Control and Prevention (CDC) through a telephone survey of randomly selected households. For accuracy, healthcare providers of children included in the survey are contacted by mail.

## **RESULTS**

### **Data Collection**

Letters of invitation to participate in the survey were sent to 833 Kansas schools; of these, 720 were public schools and 113 were private. Five schools reported not having a kindergarten class for the 2013-2014 school year and 73 did not respond. Of the 755 responding schools, 139 did not provide at least 75% of the requested records and were excluded. The remaining 616 schools (535 public and 81 private) from 94 counties provided requested immunization data and were included in the analysis. This corresponds to a school participation rate of 74%. Seventy-eight percent of participating schools submitted KCIs, 7% submitted immunization records through the KSWebIZ system, and 15% of the schools submitted a combination of the two types of records.<sup>4</sup>

The number of children enrolled in kindergarten at the public and private schools included in the analysis was 30,339, which is 74% of the 41,107 children enrolled in a Kansas kindergarten in the 2013-2014 school year. The number of immunization records received was 12,084 and the number of records included in the analysis was 11,526 (95.4%) which is equivalent to one child selected for every 3.6 children enrolled.

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<sup>2</sup> <http://www.cdc.gov/vaccines/stats-surv/nis/default.htm#nis>

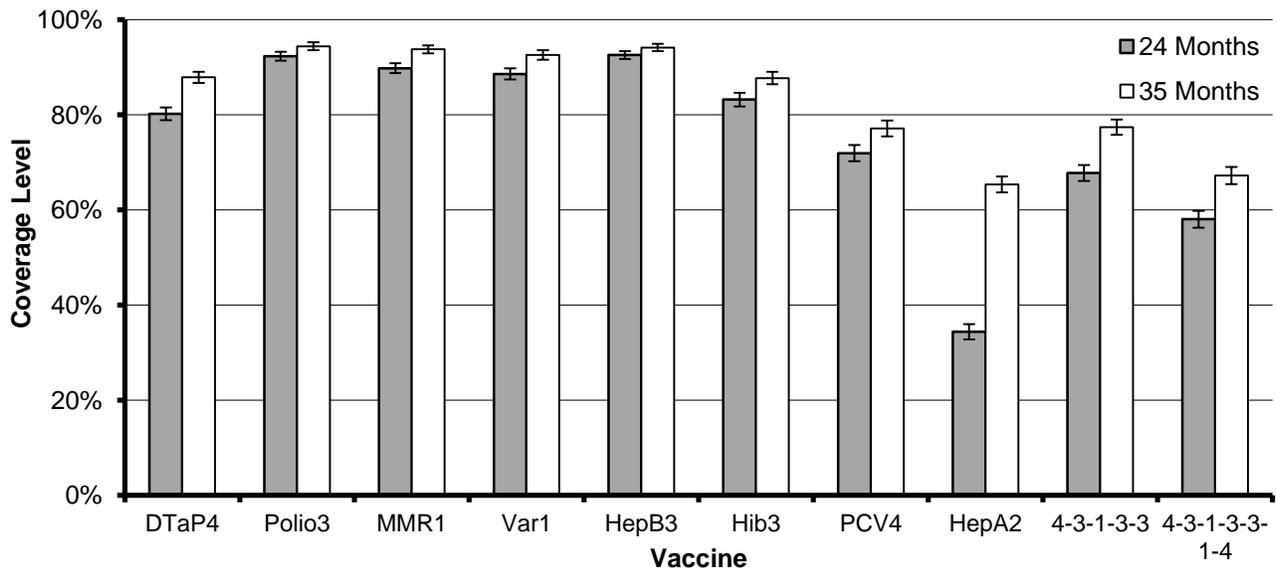
<sup>3</sup> Children in the 2010 NIS were born between January 2007 and June 2009

<sup>4</sup> Percentages are rounded.

### Statewide Immunization Coverage by Age 24 and 35 Months

By 24 months of age, the immunization coverage levels for Polio3, MMR1, HepB3, Var1, and Hib3 were all greater than 80%, but only HepB3 and Polio3 met the HP2020 goal of 90%. HepA2 had the lowest immunization coverage level at 32.6%. The immunization coverage levels for 4-3-1-3-3 and 4-3-1-3-3-1-4 were 66.8% and 56.5%, respectively. By the time these children were 35 months of age, both MMR1 and Var1 exceeded the HP2020 goal of 90%, the 4-3-1-3-3 series increased to 76.8%, and the 4-3-1-3-3-1-4 series had reached 66.0% coverage. The immunization estimate for HepA2 had the lowest with coverage of 64.0% by 35 months. All vaccinations and both vaccination series increased significantly from 24 months of age to 35 months of age (Figure 1).

**Figure 1: Immunization coverage levels at 24 and 35 months of age by vaccine, Kansas 2009-2010**



### National Immunization Survey (NIS) Coverage at 19-35 Months of Age

Comparison of Kansas NIS results for immunization coverage at 19-35 months of age with results from the current retrospective study, for 35 month olds, showed significant coverage differences in PCV4 and HepA2 (Table 1).<sup>5</sup> The other immunization estimates (DTaP4, Polio3, MMR1, Hib3, HepB3, Var1, and the 4-3-1-3-3-1-4 series) did not vary significantly between the two surveys. The US National immunization coverage levels measured by NIS were significantly higher than the vaccination coverage levels measured by the retrospective study for Hib3, PCV4, and the 4-3-1-3-3-1-4 series. The US National immunization coverage levels were also significantly lower for HepA2 and DTaP4 when compared to the retrospective study. The estimates from the Kansas NIS were not statistically different from the US National NIS estimates for any of the vaccination series.

<sup>5</sup> [http://www.cdc.gov/vaccines/stats-surv/nis/data/tables\\_2009.htm](http://www.cdc.gov/vaccines/stats-surv/nis/data/tables_2009.htm)

**Table 1: Kansas and US National immunization coverage levels**

	<b>Retrospective Study, 35 month olds % (95% CI)</b>	<b>Kansas NIS<sup>§</sup> % (95% CI)</b>	<b>US National NIS<sup>§</sup> % (95% CI)</b>
4-3-1-3-3-1-4 series	66.0 (64.3 - 67.7)	74.0 (67.3 - 80.7)	70.2 (68.9 - 71.5)
DTaP4	87.5 (86.5 - 88.5)	86.6 (81.5 - 91.7)	84.4 (83.4 - 85.4)
Polio3	94.0 (93.4 - 94.7)	94.7 (91.7 - 97.7)	93.3 (92.6 - 94.0)
MMR1	93.0 (92.2 - 93.8)	90.0 (85.4 - 94.6)	91.5 (90.8 - 92.2)
HepB3	93.1 (92.4 - 93.9)	94.7 (92.1 - 97.3)	91.8 (91.1 - 92.5)
Hib3	86.9 (85.7 - 88.1)	89.7 (84.7 - 94.7)	90.4 (89.5 - 91.3)
Var1	91.8 (90.9 - 92.7)	87.5 (82.3 - 92.7)	90.4 (89.6 - 91.2)
PCV4	75.8 (74.2 - 77.5)	85.3 (80.2 - 90.4)	83.3 (82.3 - 84.3)
HepA2	64.0 (62.4 - 65.6)	49.7 (42.3 - 57.1)	49.7 (48.3 - 51.1)

<sup>§</sup>Based on 2010 NIS, children aged 19-35 months of age

In the current study, Hib3, PCV4, HepA2, the 4-3-1-3-3 series, and the 4-3-1-3-3-1-4 series in 24 month old children had significantly higher coverage levels when compared to the coverage levels among Kansas children at 24 months of age in the 2012-2013 retrospective study (Table 2). This increase in coverage of non-required vaccines may be due to timely immunization or it may be due to a change in record keeping by submitting schools. Hib3, PCV4, and HepA2 are not required for school entry and thus not always recorded on the school immunization record.

**Table 2: Immunization coverage levels among 24 month old children, Kansas 2008-2010**

	<b>2012-2013 Retrospective Survey % (95% CI)</b>	<b>2013-2014 Retrospective Survey % (95% CI)</b>
DTaP4	79.4 (78.1-80.6)	79.3 (78.1-80.6)
Polio3	90.8 (90.0-91.6)	91.8 (90.9-92.6)
MMR1	89.8 (89.0-90.6)	88.9 (87.9-89.9)
Var1	87.2 (86.3-88.2)	87.8 (86.7-88.9)
HepB3	91.7 (90.9-92.5)	91.4 (90.6-92.3)
Hib3	75.1 (73.6-76.6)	82.2 (80.9-83.6)
PCV4	63.9 (62.0-65.7)	70.3 (68.6-72.0)
HepA2	26.3 (24.9-27.8)	32.6 (31.1-34.1)
4-3-1-3-3 Series	61.4 (59.9-63.0)	66.8 (65.2-68.3)
4-3-1-3-3-1-4 Series	47.0 (45.3-48.7)	56.5 (54.8-58.3)

## **DISCUSSION**

All individual vaccines required for school entry were above 75% coverage at 24 months of age for children included in the study. The only vaccines which met HP2020 objectives at the 24 month period were Polio3 and Hepb3. For the vaccines which did not meet the HP2020 goals, immunization coverage rates increased significantly by the time the children reached 35 months of age. The coverage level for

the 4-3-1-3-3-1-4 series was lower in the 2013-2014 Retrospective Survey when compared to the Kansas NIS for 19-35 month olds. PCV4 was significantly lower in the retrospective study compared to the KS NIS coverage. However, since PCV4 is not required for school entry, this may reflect a lack of recording this immunization on the kindergarten immunization record. HepA2 had significantly higher coverage rate in the retrospective study compared to KS NIS coverage rates.

Vaccine coverage is of great public health importance. By having greater vaccination coverage, there is an increase in herd immunity, which leads to lower disease incidence and an ability to limit the size of disease outbreaks. However, due to unvaccinated and under-vaccinated individuals, the United States has experienced increased incidence in diseases that were previously present at low levels. In 2008, the United States had 140 measles cases reported, more than any year since 1996, and in 2011 the United States documented 222 cases of measles, of which 86% were unvaccinated or had unknown vaccination history.<sup>6</sup> Additionally, in 2012 there was an increase in the number of pertussis cases throughout the United States, including Kansas which experienced a statewide outbreak in 2012 with 887 cases, compared to 145 cases in 2011.

### **Limitations**

A limitation of this study is Hib3, HepA2, and PCV4 are not required for school entry and may not consistently be reported on the immunization record, thus appearing to have lower coverage estimates for the individual vaccines as well as the 4-3-1-3-3 and 4-3-1-3-3-1-4 series. Additionally, no descriptive data are collected about sex, race, or ethnicity. Some schools who submitted records through KSWebIZ did not associate their students with a grade, and therefore records were included based on age at school entry; this may result in children from other grades being included in the analysis. Of the 755 schools that sent immunization records, 139 were excluded for sending in fewer records than were requested and therefore, could not be used in this analysis. Finally, no descriptive data are collected about sex, race, or ethnicity.

### **Strengths**

Despite the limitations, the retrospective immunization survey provides a good estimate of early childhood immunization coverage levels for Kansas. It allows state and local officials to identify counties and regions with low vaccine coverage levels. Focus on these areas with the implementation of enhanced vaccination delivery methods and educational campaigns can aid in Kansas achieving a 90% coverage goal. To measure progress towards in this goal, a similar survey is planned for next year.

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<sup>6</sup> Centers for Disease Control and Prevention. Measles – United States, 2011. MMWR 2012; 61: 253-7.

**Appendix 1: Immunization coverage levels of children 35 months of age for Kansas counties 2009-2010\*§**

COUNTY	DTaP4	Polio3	MMR1	Hib3	HepB3	Var1	PCV4	HepA2	4-3-1-3-3	4-3-1-3-3-1-4
STATEWIDE	88%	94%	93%	87%	93%	92%	76%	64%	77%	66%
ALLEN	85%	94%	97%	92%	95%	95%	85%	57%	82%	79%
ANDERSON	80%	95%	85%	95%	95%	82%	80%	47%	80%	80%
ATCHISON	86%	95%	92%	86%	94%	89%	72%	49%	78%	65%
BARBER	91%	99%	94%	95%	97%	93%	75%	49%	86%	73%
BARTON	84%	97%	93%	84%	96%	92%	81%	79%	70%	66%
BOURBON	88%	97%	96%	92%	95%	91%	88%	28%	81%	73%
BROWN	94%	99%	96%	92%	99%	96%	90%	44%	86%	83%
BUTLER	86%	93%	92%	88%	94%	90%	78%	59%	80%	71%
CHASE	82%	86%	89%	89%	89%	93%	36%	57%	75%	29%
CHAUTAUQUA	92%	92%	94%	85%	94%	94%	74%	74%	81%	70%
CHEROKEE	85%	97%	97%	82%	97%	95%	77%	56%	74%	63%
CHEYENNE	86%	98%	86%	100%	100%	86%	80%	60%	82%	78%
CLARK	96%	100%	96%	100%	100%	100%	96%	78%	92%	92%
CLAY	81%	86%	94%	76%	84%	92%	71%	72%	68%	54%
CLOUD	75%	75%	88%	75%	88%	83%	53%	35%	75%	49%
COFFEY	90%	94%	94%	93%	94%	91%	86%	61%	86%	72%
COMANCHE	95%	95%	100%	95%	100%	100%	85%	80%	85%	85%
COWLEY	86%	96%	94%	88%	96%	93%	79%	57%	78%	68%
CRAWFORD	85%	92%	91%	82%	90%	91%	71%	51%	71%	55%
DECATUR	87%	90%	90%	84%	90%	87%	87%	57%	84%	80%
DICKINSON	84%	94%	93%	86%	89%	91%	81%	70%	74%	64%
DONIPHAN	88%	94%	90%	88%	94%	90%	84%	64%	82%	80%
DOUGLAS	83%	91%	90%	85%	91%	88%	69%	64%	74%	58%
EDWARDS	89%	92%	100%	92%	87%	89%	87%	80%	85%	82%
ELK	90%	96%	91%	91%	96%	93%	76%	47%	86%	71%
ELLIS	94%	98%	98%	97%	98%	98%	95%	87%	92%	88%
ELLSWORTH	93%	100%	99%	79%	100%	96%	76%	64%	73%	63%
FINNEY	85%	94%	91%	85%	97%	90%	76%	68%	78%	71%
FORD	87%	94%	95%	89%	94%	94%	72%	69%	80%	67%
FRANKLIN	91%	100%	91%	82%	100%	91%	91%	73%	73%	73%
GEARY	90%	96%	94%	90%	96%	94%	80%	66%	82%	71%
GOVE	91%	94%	94%	85%	91%	94%	85%	50%	85%	85%
GRAHAM†	.	.	.	.	.	.	.	.	.	.
GRANT‡	.	.	.	.	.	.	.	.	.	.
GRAY	94%	97%	96%	88%	98%	96%	67%	77%	86%	62%
GREELEY	93%	93%	100%	93%	100%	100%	93%	87%	93%	93%
GREENWOOD	93%	98%	97%	97%	96%	97%	67%	50%	90%	63%
HAMILTON	93%	95%	90%	93%	95%	93%	67%	71%	86%	62%
HARPER	88%	95%	97%	75%	97%	91%	78%	49%	70%	60%
HARVEY	89%	95%	92%	89%	92%	90%	63%	56%	72%	54%
HASKELL	89%	89%	95%	89%	89%	95%	84%	68%	79%	68%
HODGEMAN‡	.	.	.	.	.	.	.	.	.	.
JACKSON	97%	97%	97%	97%	100%	97%	93%	59%	90%	86%
JEFFERSON	85%	91%	94%	86%	91%	92%	78%	62%	76%	68%

COUNTY	DTaP4	Polio3	MMR1	Hib3	HepB3	Var1	PCV4	HepA2	4-3-1-3-3	4-3-1-3-3-1-4
STATEWIDE	88%	94%	93%	87%	93%	92%	76%	64%	77%	66%
JEWELL	96%	100%	96%	88%	100%	96%	100%	32%	80%	80%
JOHNSON	92%	96%	94%	91%	93%	93%	81%	74%	82%	73%
KEARNY	77%	100%	100%	91%	95%	100%	68%	64%	73%	59%
KINGMAN	83%	91%	81%	87%	89%	80%	71%	51%	69%	59%
KIOWA	74%	86%	88%	86%	98%	88%	63%	65%	70%	57%
LABETTE	83%	87%	89%	74%	89%	89%	66%	46%	67%	55%
LANE	98%	98%	81%	96%	100%	98%	81%	94%	79%	79%
LEAVENWORTH	90%	92%	93%	88%	87%	88%	84%	65%	75%	66%
LINCOLN	96%	96%	92%	96%	96%	96%	96%	67%	92%	92%
LINN	88%	94%	92%	87%	82%	89%	57%	47%	69%	46%
LOGAN	100%	100%	100%	75%	100%	44%	75%	50%	75%	44%
LYON	79%	84%	87%	84%	86%	86%	70%	58%	75%	64%
MARION	86%	91%	92%	87%	88%	93%	78%	42%	77%	68%
MARSHALL	94%	99%	97%	93%	98%	98%	48%	84%	88%	44%
MCPHERSON	87%	91%	92%	49%	90%	91%	36%	51%	44%	29%
MEADE	83%	94%	96%	84%	92%	96%	66%	68%	81%	57%
MIAMI	89%	84%	91%	71%	91%	87%	57%	56%	56%	43%
MITCHELL	90%	99%	98%	92%	97%	95%	88%	80%	84%	79%
MONTGOMERY	82%	92%	94%	85%	91%	87%	69%	64%	79%	61%
MORRIS <sup>‡</sup>	.	.	.	.	.	.	.	.	.	.
MORTON	80%	94%	82%	76%	94%	80%	52%	53%	64%	42%
NEMAHA	100%	100%	100%	100%	100%	100%	81%	81%	100%	81%
NEOSHO	55%	98%	95%	91%	95%	96%	41%	30%	49%	37%
NESS	87%	97%	100%	94%	99%	99%	94%	55%	84%	81%
NORTON <sup>‡</sup>	.	.	.	.	.	.	.	.	.	.
OSAGE	86%	95%	95%	83%	96%	96%	76%	65%	73%	64%
OSBORNE	88%	92%	96%	100%	100%	96%	92%	44%	84%	84%
OTTAWA	89%	94%	93%	93%	94%	93%	87%	78%	83%	78%
PAWNEE	97%	98%	98%	98%	97%	97%	83%	72%	95%	80%
PHILLIPS	100%	100%	100%	100%	100%	100%	83%	100%	100%	83%
POTTAWATOMIE	79%	89%	88%	80%	84%	84%	71%	59%	67%	56%
PRATT	97%	96%	70%	94%	99%	97%	94%	82%	62%	58%
RAWLINS	81%	90%	97%	84%	90%	97%	71%	55%	78%	68%
RENO	91%	96%	92%	93%	95%	94%	82%	53%	81%	71%
REPUBLIC	89%	95%	94%	86%	98%	94%	83%	52%	77%	70%
RICE	64%	96%	95%	82%	90%	86%	66%	67%	59%	45%
RILEY	86%	94%	94%	88%	90%	91%	79%	65%	78%	70%
ROOKS <sup>‡</sup>	.	.	.	.	.	.	.	.	.	.
RUSH	83%	92%	85%	81%	94%	80%	64%	55%	69%	54%
RUSSELL	95%	95%	89%	95%	95%	95%	84%	68%	89%	84%
SALINE	91%	95%	95%	91%	97%	95%	84%	83%	85%	79%
SCOTT <sup>‡</sup>	.	.	.	.	.	.	.	.	.	.
SEDGWICK	86%	94%	94%	87%	94%	93%	74%	61%	76%	64%
SEWARD	90%	95%	95%	82%	94%	95%	67%	73%	75%	53%
SHAWNEE	90%	95%	95%	84%	94%	94%	82%	77%	77%	71%
SHERIDAN	90%	90%	97%	94%	94%	94%	90%	77%	87%	84%

COUNTY	DTaP4	Polio3	MMR1	Hib3	HepB3	Var1	PCV4	HepA2	4-3-1-3-3	4-3-1-3-3-1-4
STATEWIDE	88%	94%	93%	87%	93%	92%	76%	64%	77%	66%
SHERMAN <sup>‡</sup>	.	.	.	.	.	.	.	.	.	.
SMITH <sup>‡</sup>	.	.	.	.	.	.	.	.	.	.
STAFFORD	96%	100%	98%	96%	98%	94%	86%	86%	92%	82%
STANTON	87%	96%	94%	85%	91%	89%	83%	60%	74%	68%
STEVENS	94%	94%	95%	89%	96%	95%	72%	69%	86%	69%
SUMNER	85%	92%	89%	79%	88%	90%	59%	42%	63%	43%
THOMAS	100%	100%	100%	100%	100%	100%	83%	67%	100%	83%
TREGO	100%	100%	100%	93%	96%	96%	93%	96%	89%	81%
WABAUNSEE	94%	98%	98%	95%	100%	98%	89%	84%	91%	88%
WALLACE	50%	50%	50%	50%	50%	50%	50%	25%	50%	50%
WASHINGTON	97%	97%	100%	94%	98%	100%	81%	74%	92%	78%
WICHITA <sup>‡</sup>	.	.	.	.	.	.	.	.	.	.
WILSON	91%	99%	97%	94%	100%	100%	88%	69%	81%	78%
WOODSON <sup>‡</sup>	.	.	.	.	.	.	.	.	.	.
WYANDOTTE	85%	94%	90%	85%	91%	90%	74%	65%	69%	61%

\* Based on the retrospective survey for the school year starting 2013.

§ Due to Hib3 and PCV4 not being required for school entry, these vaccines may not consistently be reported on the immunization record, thus decreasing coverage levels for the individual vaccines, as well as the 4-3-1-3-3 and 4-3-1-3-3-1-4 series. This is evident for several counties that have low coverage levels for the 4-3-1-3-3 and 4-3-1-3-3-1-4 series as well as low Hib3 and PCV4 coverage levels.

‡ No data available