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Association between provider recommendation and influenza vaccination status among children

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Abstract

Background—Provider recommendation is associated with influenza vaccination receipt. The objectives of this study were to estimate the percentage of children 6 months–17 years for whom a provider recommendation for influenza vaccination was received, identify factors associated with receipt of provider recommendation, and evaluate the association between provider recommendation and influenza vaccination status among children.

Methods—National Immunization Survey-Flu (NIS-Flu) parentally reported data for the 2013–14, 2014–15, and 2015–16 seasons were analyzed. Tests of association between provider recommendation and demographic characteristics were conducted using Wald chi-square tests and pairwise comparison t-tests. Multivariable logistic regression was used to determine variables independently associated with receiving provider recommendation and the association between provider recommendation and influenza vaccination status.

Results—Approximately 70% of children had a parent report receiving a provider recommendation for influenza vaccination for their child. The strongest association between receipt of provider recommendation and demographic characteristics was with child's age, with younger children (6–23 months, 2–4 years, and 5–12 years) being more likely to have a provider recommendation than older children (13–17 years). In addition, children living in a household above poverty with household income >$75,000 were more likely to have a parent report receipt of a provider recommendation than children living below poverty. Children with a provider recommendation were twice as likely to be vaccinated than those without.

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Author's contribution

KEK conceived the study, with input from TAS and CBB, carried out the analysis, drafted the initial manuscript, revised the manuscript, and approved the final manuscript as submitted. TAS advised on the data analysis, participated in data interpretation, critically reviewed and revised the manuscript, and approved the final manuscript as submitted. YZ reviewed the data analysis, critically reviewed and revised the manuscript, and approved the final manuscript as submitted. CBB critically reviewed and revised the manuscript, and approved the final manuscript as submitted.

Disclosure

The findings and conclusions in this report are those of the authors and do not necessarily represent the views of the Centers for Disease Control and Prevention.

Declarations of interest: none

Conclusions—This study affirms the importance of provider recommendation for influenza vaccination among children. Ensuring that parents of all children receive a provider recommendation may improve vaccination coverage.

Keywords

Child; Immunization; Influenza,human; Surveys and questionnaires; Vaccination; Vaccination coverage

Introduction

Influenza causes significant morbidity and mortality among children.[1;2] Vaccination is an effective strategy in preventing influenza and has been recommended by the Advisory Committee on Immunization Practices (ACIP) for all children 6 months and older since 2008.[3;4] Despite this well-established recommendation, only 59.3% of children 6 months–17 years were vaccinated during the 2015–16 influenza season, which is considerably lower than the Healthy People 2020 target of 70% influenza vaccination coverage.[5;6]

The ACIP has noted the critical role of a provider recommendation for influenza vaccination and has highlighted several studies that document the positive association between a provider recommendation and receipt of influenza vaccination in a variety of populations, including adults 50–64 years, high-risk adults, Medicare beneficiaries, young children 6–23 months, and children with asthma.[7–13] Numerous studies have shown that pregnant women who received a provider recommendation for influenza vaccination were much more likely to be vaccinated than those who did not.[14–23] Studies among hospitalized children and underserved adults also identified provider recommendation as an important factor associated with influenza vaccination.[24;25] A recent study on the general population of adults reported that adults who received a provider recommendation were 1.72 times more likely to be vaccinated than those who did not, but less than half of adults had received a provider recommendation.[26] To our knowledge, there are no published studies on provider recommendation of influenza vaccination that focus on all children 6 months–17 years, regardless of health conditions, using a national sample.

The objectives of this study were to: 1) quantify the proportion of children 6 months–17 years for whom a provider recommendation for influenza vaccination was received at the state and national levels by sociodemographic characteristics, 2) identify factors associated with parental receipt of a provider recommendation for their child's influenza vaccination, and 3) determine whether parental receipt of a provider recommendation is independently associated with influenza vaccination status among children 6 months–17 years.

Methods

Data from the National Immunization Survey-Flu (NIS-Flu) from the 2013–14, 2014–15, and 2015–16 influenza seasons were analyzed to assess parental receipt of a provider recommendation for influenza vaccination for the child and influenza vaccination coverage by receipt of a provider recommendation during the three seasons.[27;28] The NIS-Flu is an ongoing, national list-assisted random-digit-dialed dual frame landline and cellular

telephone survey of households with children. It includes three components: the NIS-Child for children 19–35 months, the NIS-Teen for adolescents 13–17 years, and the NIS Child Influenza Module for children 6–18 months and 3–12 years identified during the screening of households for the NIS-Child and NIS-Teen.[27–33] Telephone interviews were conducted with parents or guardians during October through June for the three seasons from all 50 states and the District of Columbia. The NIS-Flu survey questionnaire was available in English and Spanish, and Language Line Services was used for real-time translation into many other languages.[34] The Council of American Survey and Research Organizations (CASRO) response rates ranged from 53.5%–64.8% for landline and 29.9%–38.8% for cellular telephones.[5;35–37]

The study sample included children in the NIS-Flu who had at least one visit to a doctor or other health professional since July 1st during the influenza season of the interview and had information about whether a provider recommendation for influenza was received. Survey questions about provider recommendation were only asked during the April–June interview months. Survey respondents were asked, 'Since July 1st, has [sample child] had a visit to a doctor or other health professional about his or her health?'; children were excluded if the respondent answered 'No', 'Don't Know', or if they refused to answer (26.4%, 24.6%, and 24.3% for the 2013–14, 2014–15, and 2015–16 seasons, respectively). Respondents who answered 'Yes' were asked, 'Since July 1st, did a doctor or other health professional tell you they recommend or say it was a good idea for [sample child] to get a flu vaccination?'; children were excluded if the respondent answered 'Don't Know' or refused to answer (5.2%, 5.9%, and 5.9% for the 2013–14, 2014–15, and 2015–16 seasons, respectively). Respondents were also asked if their child had received an influenza vaccination since July 1st and, if so, during which month and year. Information on child, maternal, and household sociodemographic characteristics were also collected during the interviews.

State level and national influenza vaccination coverage estimates and methods were published previously for children 6 months and older and were calculated for this study using the same methodology for children who met the inclusion criteria described previously.[5;35;36] Tests of association between receipt of a provider recommendation for influenza vaccination and demographic variables were conducted using Wald chi-square tests followed by pair-wise comparison t-tests. Multivariable logistic regression was used to determine 1) variables independently associated with receipt of a provider recommendation, and 2) whether receipt of a provider recommendation was independently associated with receipt of an influenza vaccination. Independent variables in the models included the following: child's age, sex, and race/ethnicity, language of the survey, mother's education, poverty/annual household income, number of children in the household, urban/rural residence, and region of residence. Adjusted prevalence ratios (APR) and adjusted prevalences (AP) based on predicted marginals from the logistic regression models are reported. In addition, population attributable risk (PAR) was calculated using the prevalence of provider recommendation receipt and the prevalence ratio of influenza vaccination by provider recommendation receipt to assess the potential contribution of provider recommendation to the observed influenza vaccination level.

A two-sided significance level of 0.05 was adopted for all statistical tests. Reported percentages and corresponding 95% confidence intervals (95% CI) were weighted, while reported sample sizes were unweighted. All analyses were weighted to population totals and to adjust for households having multiple telephone lines, unit non-response, and non-coverage of non-telephone households. Analyses were conducted using SAS (version 9.3) and SUDAAN (version 11.0.0) statistical software to account for the complex design. Institutional review board (IRB) approval for conducting the NIS was obtained through the National Center for Health Statistics Research Ethics Review Board and the IRB of NORC at the University of Chicago.[38]

Results

There were 24,515, 26,825, and 25,261 children who had a provider visit and were included in the study for the 2013–14, 2014–15, and 2015–16 seasons, respectively. The characteristics of children included in the study sample are presented in Table 1. In addition, the characteristics of children who did not have a provider visit and were excluded from the study are also presented.

National and state level estimates for parental receipt of a provider recommendation for influenza vaccination among children are shown in Table 2 and Figure 1. During the 2015–16 season, 70.3% of children had a parent or guardian who reported receiving a provider recommendation for influenza vaccination of their child. Influenza vaccination coverage among children for whom a provider recommendation was received was 72.2%, compared with 32.1% among children for whom a provider recommendation was not received, resulting in a PAR estimate of 46.8%. At the state level during the 2015–16 season, the proportion of children for whom a provider recommendation was received ranged from 49.6% (Wyoming) to 83.7% (District of Columbia). In each state, vaccination coverage was higher among children with a provider recommendation compared with those without a provider recommendation. The PAR ranged from 16.7% (Maryland) to 70.7% (Montana). Overall, the proportion of children for whom a provider recommendation was received was similar during each season included in the study period. Comparing 2013–14 and 2015–16, the proportion of children with a provider recommendation increased in the District of Columbia and Texas and decreased in Kansas, Mississippi, and Wyoming (Table 2).

In bivariate analysis, child's age, number of children in the household, and region of residence were all found to be associated with parental receipt of a provider recommendation across all three seasons studied, whereas child's gender and race/ethnicity were not associated with receipt of a provider recommendation (Table 3). Compared with younger children, those 13–17 years were less likely to have a parent report receiving a provider recommendation. During the 2015–16 season, the proportion of children with a provider recommendation decreased with increasing age of the child (80.0%, 75.8%, 72.2%, and 61.6% among children 6–23 months, 2–4 years, 5–12 years and 13–17 years, respectively). Children living in a household with 2–3 children compared with those with only 1 child and children living in the Northeast compared with those living in the Midwest and the South were consistently more likely to have a parent report receiving a provider recommendation. Comparing 2013–14 and 2015–16, only one difference was noted: an

increase in the proportion of children living in urban areas whose parent reported receiving a provider recommendation (68.4% versus 73.9%). Across all seasons and groups studied, vaccination coverage was higher among children for whom a provider recommendation was received. During the 2015–16 season, the PAR among all groups ranged from 23.7% for children whose parent completed the survey in Spanish to 61.1% for children who lived in households with 4 or more children. Additional estimates of parental receipt of a provider recommendation by sociodemographic characteristics are presented in Table 3.

The results of the multivariable analysis to determine factors associated with parental receipt of a provider recommendation for influenza vaccination for the child were generally consistent with the bivariate analysis (Table 4). The strongest association observed across the 2013–14, 2014–15, and 2015–16 seasons was between parental receipt of a provider recommendation and child's age, with children 6–23 months (APR 1.37, 1.28, and 1.31, respectively), 2–4 years (APR 1.37, 1.22, and 1.23, respectively), and 5–12 years (APR 1.24, 1.13, and 1.17, respectively) being more likely to have a parent report receipt of a provider recommendation than children 13–17 years. In addition, throughout the study, children living above poverty and with an annual household income greater than $75,000 were more likely to have a parent report receipt of a provider recommendation than children living below poverty (APR 1.19, 1.09, and 1.06, respectively). All results from the model are presented in Table 4, including APRs and APs.

The results of the multivariable analysis to determine whether parental receipt of a provider recommendation for influenza vaccination for the child was independently associated with the child's influenza vaccination status are presented in Table 5. Across all three seasons studied, children for whom a parent reported receipt of a provider recommendation were approximately twice as likely to be vaccinated compared with children whose parent did not report receiving a provider recommendation, even after controlling for the other demographic characteristics in the model (APR 1.80, 1.91, and 2.12 for the 2013–14, 2014–15, and 2015–16 seasons, respectively).

Discussion

We found that, across all seasons studied, approximately 70% of children 6 months–17 years had a parent report receipt of a provider recommendation for influenza vaccination for their child. While this proportion may seem relatively high, it still indicates a significant number of children for whom a provider recommendation was not received, or if it was, the recommendation may not have been strong enough or adequately understood by the child's parent. This is the first study, to our knowledge, that uses a national sample to estimate the proportion of all children, regardless of age or health conditions, for whom a provider recommendation for influenza vaccination was received and to estimate influenza vaccination coverage among this population by receipt of a provider recommendation. Studies conducted among other populations varied. For example, Gnanasekaran et al. reported that only 55% of parents of children 5–18 years with asthma in Massachusetts reported that their child's doctor had recommended the influenza vaccine during the 2003–04 season, but this was before the ACIP recommended annual influenza vaccination for all children in 2008.[3;9] Benedict et al. found that only 43.5% of adults in the general U.S.

population received a provider recommendation for influenza vaccination during the 2011–12 season, although this study took place fairly soon after the ACIP established a universal recommendation that included all adults regardless of age or health conditions.[8;26] According to reports by the CDC, based on Internet panel surveys, receipt of a provider recommendation among pregnant women increased from 62.9% during the 2011–12 season to 80.1% during the 2015–16 season.[15;17;20–22]

For all three seasons, influenza vaccination coverage was significantly higher among children for whom a provider recommendation was received than among children for whom a provider recommendation was not received. Our estimate that approximately 47% of vaccination coverage among children could be attributed to parental receipt of a provider recommendation during the 2015–16 season, highlights the critical importance of a provider recommendation for children. Our findings are consistent with several studies among pregnant women.[14–17;23] For example, CDC reported that pregnant women who received a provider recommendation or offer of seasonal influenza vaccination were much more likely to be vaccinated (62.1%) than those who did not (14.3%) during the 2009–10 season and the proportion of seasonal vaccination coverage estimated to be attributed to provider offer or recommendation was even higher (74%).[16] In addition, Gnanasekaran et al. reported 70% vaccination coverage among children with asthma whose physician recommended influenza vaccination versus 38% among those without a recommendation, and Winston et al. reported 83.7% vaccination coverage among Medicare beneficiaries who reported receiving a provider recommendation compared with 55.8% who did not.[9;13] Likewise, a study on children 6–23 months, following the 2002–03 season, reported that 90.6% of parents who had a vaccinated child believed that their child's doctor thought the child should have a flu shot compared with 31.6% of parents who had an unvaccinated child.[11]

In our study, child's age had the strongest association with parental receipt of a provider recommendation for influenza vaccination of the child across all three seasons. It is possible that providers are more likely to strongly recommend influenza vaccination for children younger than 5 years, and especially those younger than 2 years, because they are at higher risk of serious adverse complications from influenza infection.[39–42] Children less than 2 years are also receiving a number of routine vaccinations, and it would presumably be convenient for providers to recommend and administer influenza vaccine at the same time as other vaccines are given. In fact, a study in Seattle found that parents of young children were more likely to accept the influenza vaccine when recommended along with other routine vaccines.[43] Young children tend to have more encounters with their provider and, thus, have more opportunities to receive a provider recommendation for influenza vaccination. Pediatricians and family physicians have reported the following as primary barriers to adolescent immunization: adolescents rarely make preventive health visits, adolescents are not aware of the need for immunizations, and adolescents and/or parents underestimate the risk of vaccine-preventable diseases.[44] All of the adolescents included in our study had visited a provider, but the type of visit was not assessed. If the visit was not a preventive health visit (e.g., sick visit or sports physical) it is possible that a provider might not routinely recommend an influenza vaccination at such a visit. It is important for providers to take advantage of every patient encounter to recommend and, if possible, offer influenza

vaccination. Providers should refer to The Guide to Community Preventive Services, which provides guidance on effective interventions for increasing vaccination rates.[45]

We also found that children living in households with higher incomes (>$75,000) were more likely to have a parent report receipt of a provider recommendation for influenza vaccination for their child than those living at or below poverty. It is possible that parents of low income children struggle to get their child to a preventive care visit and may be more likely to bring their child to the doctor when the child is sick, at which time the parent may not receive a recommendation for influenza vaccination. It also is possible that providers who serve a higher proportion of low income children may be less likely to recommend or offer influenza vaccination. This could be due to a variety of reasons that may disproportionately affect the practices of these providers such as the anticipated cost or burden of offering influenza vaccination, storage capacity, provider beliefs about influenza vaccination, and anticipated patient beliefs about influenza vaccination. However, the Vaccines for Children (VFC) program, which provides vaccines at no cost to children who are uninsured, underinsured, Medicaid-eligible, or American Indian or Alaska Native, should reduce financial barriers to vaccination.[46] Further studies are needed to address socioeconomic differences in receipt of a provider recommendation for influenza vaccination and identify strategies to ensure all children have access to influenza vaccination services.

We found that a provider recommendation for influenza vaccination was strongly associated with vaccination status among children. Across all seasons studied, children who had a parent report receipt of a provider recommendation were approximately two times more likely to be vaccinated than children without a recommendation, even when controlling for demographic characteristics.. This reinforces the importance of a provider recommendation for influenza vaccination among children. Other studies involving different groups of children reported that a provider recommendation was the most important factor related to vaccination status.[9;11]

The findings of this study are subject to several limitations. First, receipt of a provider recommendation for influenza vaccination for the child and influenza vaccination status of the child were based on parental report and subject to whether parents recognized statements by providers as a recommendation. In addition, we did not know about the type of provider visit the child had, which may not have been a preventive care visit, or whether the child had multiple visits and, therefore, more opportunities to receive a provider recommendation. Furthermore, the timing of the visit was unknown and the questions about provider recommendation were only asked during April–June, potentially several months after a provider recommendation or vaccination might have occurred. Therefore, the results are subject to respondent recall bias. In addition, the NIS-Flu is a telephone survey that excludes households with no telephone service. Finally, the CASRO response rate was low, especially for the cellular telephone sample. Non-coverage and non-response bias may remain even after weighting adjustments designed to reduce these types of bias.

Conclusions

The results of this study highlight the strong relationship between a provider recommendation and influenza vaccination among children and identify groups of children for whom improvements in provider recommendations are needed, notably older children and children living below poverty. Policy makers and healthcare providers and healthcare systems should consider potential access barriers and mitigation strategies to improve the proportion of children whose parents receive an influenza vaccination recommendation from their child's provider.

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Abbreviations:

ACIP	Advisory Committee on Immunization Practices
NIS-Flu	National Immunization Survey-Flu
NIS-Child	National Immunization Survey-Child
NIS-Teen	National Immunization Survey-Teen
CASRO	Council of American Survey and Research Organizations
APR	Adjusted Prevalence Ratio
AP	Adjusted Prevalence
PAR	Population Attributable Risk
CI	Confidence Interval
MSA	Metropolitan Statistical Area

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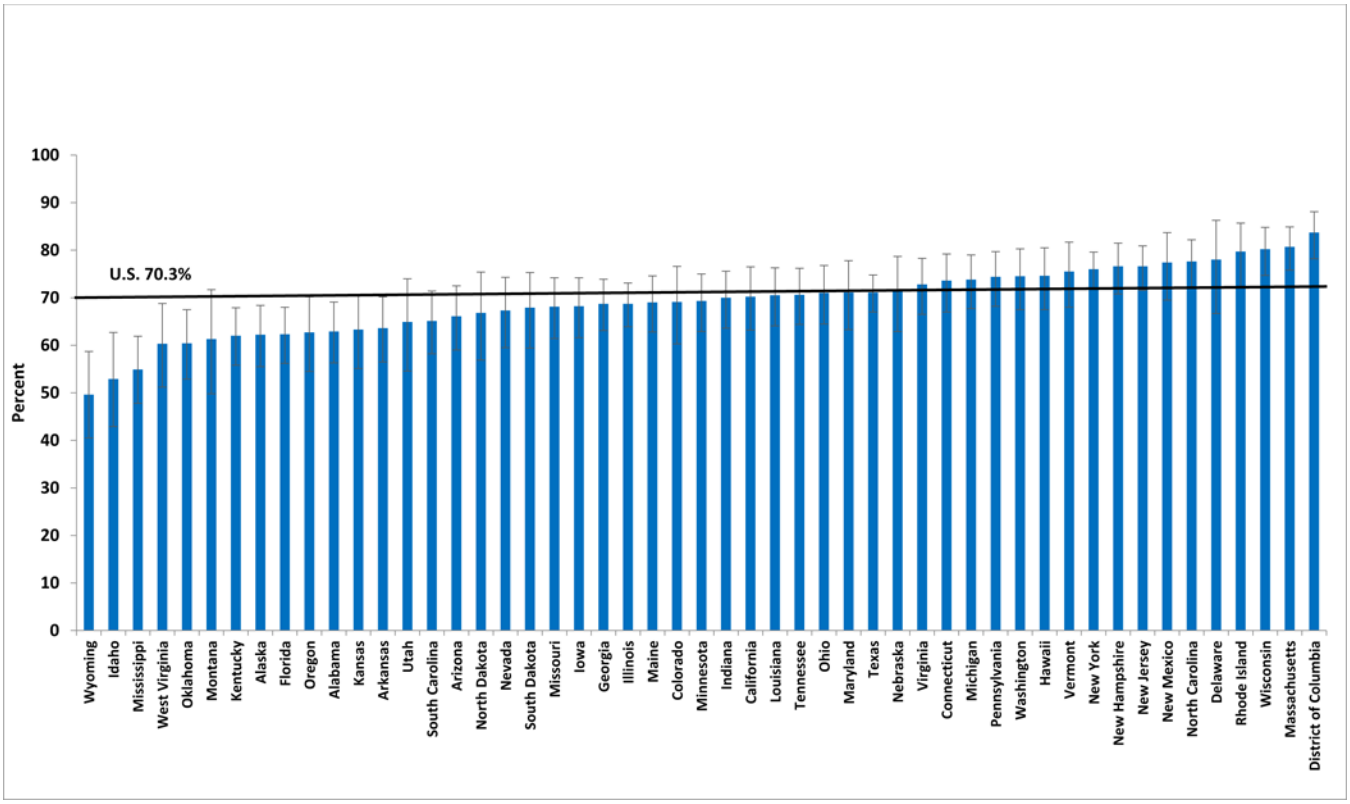

Figure 1.

Prevalence of children 6 months–17 years for whom their parent received a provider recommendation for them to receive an influenza vaccination, United States, National Immunization Survey-Flu (NIS-Flu), 2015–16 influenza season

Table 1.

Sociodemographic and other characteristics of children 6 months–17 years who had a provider visit since July 1st during the influenza season, and children who did not have a provider visit, United States, National Immunization Survey-Flu (NIS-Flu), 2013–14 through 2015–16 influenza seasons

Characteristics	2013–14 influenza season				2014–15 influenza season				2015–16 influenza season			
	Visit since July 1st		No visit since July 1st		Visit since July 1st		No visit since July 1st		Visit since July 1st		No visit since July 1st	
	unweighted n	weighted % (± 95% CI*)	unweighted n	weighted % (± 95% CI)	unweighted n	weighted % (± 95% CI)	unweighted n	weighted % (± 95% CI)	unweighted n	weighted % (± 95% CI)	unweighted n	weighted % (± 95% CI)
Total	24,515	100 (± 0.0)	9,045	100 (± 0.0)	26,825	100 (± 0.0)	9,032	100 (± 0.0)	25,261	100 (± 0.0)	8,394	100 (± 0.0)
Influenza vaccination status												
≥1 dose	15,560	60.7 (± 2.2)	5,284	59.2 (± 2.8)	17,179	61.2 (± 1.3)	5,183	55.8 (± 2.2)	15,996	60.4 (± 1.3)	4,916	59.2 (± 2.2)
Not vaccinated	8,955	39.3 (± 2.2)	3,761	40.8 (± 2.8)	9,646	38.8 (± 1.3)	3,849	44.2 (± 2.2)	9,265	39.6 (± 1.3)	3,478	40.8 (± 2.2)
Provider recommendation												
Yes	17,294	69.1 (± 2.2)			19,135	71.0 (± 1.2)			17,784	70.3 (± 1.2)		
No	7,221	30.9 (± 2.2)			7,690	29.0 (± 1.2)			7,477	29.7 (± 1.2)		
Child's age												
6–23 months	3,303	10.0 (± 1.0)	502	5.2 (± 1.5)	4,049	10.3 (± 0.6)	583	4.2 (± 0.7)	3,748	10.0 (± 0.6)	581	5.0 (± 0.8)
2–4 years	3,802	16.0 (± 2.2)	1,015	10.8 (± 1.6)	4,647	15.1 (± 0.9)	1,215	12.9 (± 1.4)	4,312	14.9 (± 0.9)	1,123	12.0 (± 1.3)
5–12 years	11,693	42.5 (± 2.3)	5,269	54.6 (± 2.8)	11,324	44.7 (± 1.3)	4,619	50.8 (± 2.0)	10,264	45.3 (± 1.3)	4,109	50.8 (± 2.2)
13–17 years	5,717	31.4 (± 2.2)	2,259	29.4 (± 2.5)	6,805	30.0 (± 1.2)	2,615	32.2 (± 2.0)	6,937	29.8 (± 1.2)	2,581	32.2 (± 2.1)
Child's sex												
Male	12,583	50.7 (± 2.3)	4,692	51.7 (± 2.8)	13,797	51.3 (± 1.3)	4,680	50.5 (± 2.1)	13,088	50.3 (± 1.3)	4,452	53.4 (± 2.2)
Female	11,932	49.3 (± 2.3)	4,353	48.3 (± 2.8)	13,028	48.7 (± 1.3)	4,352	49.5 (± 2.1)	12,173	49.7 (± 1.3)	3,942	46.6 (± 2.2)
Child's race/ethnicity†												
White, non-Hispanic	15,006	54.1 (± 2.5)	5,258	51.6 (± 3.0)	15,357	54.5 (± 1.4)	4,720	49.4 (± 2.2)	14,934	53.9 (± 1.4)	4,486	47.2 (± 2.2)
Black, non-Hispanic	2,510	14.3 (± 1.6)	928	13.2 (± 2.0)	2,840	13.8 (± 1.0)	1,012	13.5 (± 1.5)	2,744	13.2 (± 0.9)	975	16.0 (± 1.8)
Hispanic	4,326	22.9 (± 2.6)	1,758	25.3 (± 2.8)	5,567	22.8 (± 1.3)	2,188	27.4 (± 2.1)	4,369	23.4 (± 1.3)	1,762	26.4 (± 2.2)
Other, non-Hispanic	2,673	8.7 (± 1.5)	1,101	9.9 (± 1.7)	3,061	8.9 (± 0.7)	1,112	9.7 (± 1.2)	3,214	9.5 (± 0.8)	1,171	10.4 (± 1.3)
Language survey completed												
English	22,689	89.5 (± 1.4)	8,203	85.8 (± 2.3)	24,311	88.3 (± 1.1)	7,902	84.3 (± 1.8)	23,487	90.3 (± 0.9)	7,493	85.5 (± 1.8)

Characteristics	2013–14 influenza season				2014–15 influenza season				2015–16 influenza season			
	Visit since July 1st		No visit since July 1st		Visit since July 1st		No visit since July 1st		Visit since July 1st		No visit since July 1st	
	unweighted n	weighted % (± 95% CI*)	unweighted n	weighted % (± 95% CI)	unweighted n	weighted % (± 95% CI)	unweighted n	weighted % (± 95% CI)	unweighted n	weighted % (± 95% CI)	unweighted n	weighted % (± 95% CI)
Spanish	1,540	9.3 (± 1.3)	703	12.1 (± 2.2)	2,153	10.4 (± 1.1)	972	13.6 (± 1.8)	1,396	8.2 (± 0.8)	709	11.9 (± 1.7)
Other language	286	1.2 (± 0.3)	139	2.1 (± 0.9)	361	1.3 (± 0.3)	158	2.1 (± 0.6)	378	1.6 (± 0.4)	192	2.6 (± 0.8)
Mother's education												
<High school	2,127	13.3 (± 1.8)	1,055	16.1 (± 2.5)	2,420	11.9 (± 1.1)	1,179	17.8 (± 1.8)	2,175	11.7 (± 1.1)	1,035	16.1 (± 1.6)
High school or equivalent	3,944	18.1 (± 1.8)	1,777	21.8 (± 2.6)	4,479	19.0 (± 1.2)	1,815	20.3 (± 1.8)	3,966	17.2 (± 1.0)	1,640	21.3 (± 2.1)
Some college	6,223	25.5 (± 1.9)	2,353	27.0 (± 2.8)	6,643	25.9 (± 1.2)	2,230	24.0 (± 1.8)	6,200	25.7 (± 1.2)	1,979	22.6 (± 1.8)
≥College degree	11,309	43.1 (± 2.5)	3,409	35.1 (± 2.8)	12,128	43.2 (± 1.3)	3,313	38.0 (± 2.2)	11,817	45.4 (± 1.4)	3,279	40.0 (± 2.3)
Poverty/annual household income‡												
Above poverty (>$75,000)	9,993	35.5 (± 2.4)	3,222	31.4 (± 2.7)	10,817	36.0 (± 1.2)	3,144	32.8 (± 2.0)	10,648	38.6 (± 1.3)	3,079	33.2 (± 2.1)
Above poverty (≤$75,000)	8,127	33.1 (± 2.2)	3,202	32.0 (± 2.7)	8,653	30.9 (± 1.2)	2,989	29.3 (± 1.9)	8,017	30.8 (± 1.3)	2,710	29.8 (± 2.0)
Below poverty	3,909	21.8 (± 2.1)	1,532	24.2 (± 2.8)	4,562	21.3 (± 1.3)	1,686	23.6 (± 2.0)	3,833	19.0 (± 1.1)	1,469	22.2 (± 2.0)
Unknown	2,486	9.6 (± 1.1)	1,089	12.4 (± 2.0)	2,793	11.8 (± 0.9)	1,213	14.4 (± 1.5)	2,763	11.6 (± 0.8)	1,136	14.8 (± 1.6)
Number of children in household												
1	7,952	25.6 (± 1.8)	2,684	22.1 (± 2.1)	9,363	26.7 (± 1.0)	2,861	23.4 (± 1.7)	8,941	26.7 (± 1.1)	2,692	24.2 (± 1.8)
2–3	14,382	62.3 (± 2.2)	5,339	63.2 (± 2.8)	15,096	61.1 (± 1.3)	5,154	60.9 (± 2.2)	14,152	61.1 (± 1.3)	4,839	61.8 (± 2.2)
≥4	2,132	12.1 (± 1.6)	1,000	14.7 (± 2.3)	2,285	12.2 (± 1.1)	980	15.7 (± 1.9)	2,063	12.2 (± 1.0)	849	14.0 (± 1.6)
Urban-rural residence												
Urban (MSA,§ principal city)	6,505	25.7 (± 1.9)	2,240	24.8 (± 2.6)	7,566	26.6 (± 1.2)	2,395	25.2 (± 2.0)	6,764	25.9 (± 1.2)	2,277	25.2 (± 1.9)
Suburban (MSA, not principal city)	13,097	60.5 (± 2.2)	4,696	58.3 (± 2.9)	14,615	59.7 (± 1.3)	4,815	59.8 (± 2.1)	13,945	59.8 (± 1.3)	4,513	59.8 (± 2.2)
Rural (non-MSA)	4,913	13.8 (± 1.3)	2,109	16.9 (± 2.2)	4,644	13.7 (± 0.8)	1,822	15.0 (± 1.3)	4,552	14.3 (± 0.9)	1,604	15.1 (± 1.4)
Region of residence												
Northeast	5,325	17.8 (± 1.4)	1,427	12.5 (± 1.8)	5,432	17.2 (± 0.9)	1,374	14.0 (± 1.5)	5,854	17.6 (± 0.9)	1,529	13.0 (± 1.3)
Midwest	5,013	21.5 (± 1.7)	2,056	20.7 (± 1.8)	5,170	21.5 (± 0.9)	1,874	21.8 (± 1.5)	4,652	21.4 (± 0.9)	1,627	21.9 (± 1.6)
South	9,136	37.5 (± 2.2)	3,163	39.8 (± 2.9)	10,819	37.7 (± 1.2)	3,573	37.5 (± 2.0)	9,921	38.0 (± 1.2)	3,259	38.7 (± 2.1)

Characteristics	2013–14 influenza season				2014–15 influenza season				2015–16 influenza season			
	Visit since July 1st		No visit since July 1st		Visit since July 1st		No visit since July 1st		Visit since July 1st		No visit since July 1st	
	unweighted n	weighted % (± 95% CI*)	unweighted n	weighted % (± 95% CI)	unweighted n	weighted % (± 95% CI)	unweighted n	weighted % (± 95% CI)	unweighted n	weighted % (± 95% CI)	unweighted n	weighted % (± 95% CI)
West	5,041	23.2 (± 2.5)	2,399	27.0 (± 2.7)	5,404	23.5 (± 1.4)	2,211	26.7 (± 2.3)	4,834	23.0 (± 1.5)	1,979	26.5 (± 2.5)

*CI = confidence interval half-width.

†Race/ethnicity is based on parental report. Children of Hispanic ethnicity may be of any race. Children categorized as white, black, or other were identified as non-Hispanic. The other race category included children of reported Asian, American Indian or Alaska Native, Native Hawaiian or other Pacific Islander, other, or multiple (i.e. selected more than one race category) races.

‡Poverty level was defined based on the reported number of people living in the household and annual household income, according to the U.S. Census poverty thresholds (https://www.census.gov/data/tables/time-series/demo/income-poverty/historical-poverty-thresholds.html).

§MSA = metropolitan statistical area. MSA was based on parent/guardian respondent-reported city, state, county, and zip code of residence using the (https://www.census.gov/programs-surveys/metro%20micro.html) MSA definitions file.

Table 2.

Weighted prevalence (%) of children 6 months–17 years for whom their parent received a provider recommendation for them to receive an influenza vaccination,* and who received influenza vaccination stratified by parental receipt of provider recommendation, nationally and by state of residence, United States, National Immunization Survey-Influenza (NIS-Flu), 2013–14 through 2015–16 influenza seasons

State of residence	2013–14 influenza season					2014–15 influenza season					2015–16 influenza season				
	Prevalence of provider recommendation		Influenza vaccination coverage by parental receipt of provider recommendation		PAR†	Prevalence of provider recommendation		Influenza vaccination coverage by parental receipt of provider recommendation		PAR	Prevalence of provider recommendation		Influenza vaccination coverage by parental receipt of provider recommendation		PAR
			Recommendation	No recommendation				Recommendation	No recommendation				Recommendation	No recommendation	
	n	% (± 95% CI‡)	% (± 95% CI)	% (± 95% CI)	%	n	% (± 95% CI)	% (± 95% CI)	% (± 95% CI)	%	n	% (± 95% CI)	% (± 95% CI)	% (± 95% CI)	%
United States	24,515	69.1 (± 2.2)	71.1 (±2.4)	37.0 (±4.6)	38.9	26,826	71.0 (± 1.2)	72.4 (±1.4)	34.4 (±2.1)	44.0	25,261	70.3 (± 1.2)	72.2 (±1.5)	32.1 (±2.3)	46.8
Alabama	399	69.5 (± 6.2)	75.0 (±8.1)	37.1 (±10.8)§	41.5	504	62.4 (± 7.3)	73.2 (±6.9)	35.7 (±11.5)§	39.6	422	62.9 (± 6.5)	76.7 (±6.2)	47.9 (±11.7)§	27.4
Alaska	380	62.9 (±10.0)	69.0 (±8.7)	29.9 (±13.7)§	45.1	486	57.9 (± 7.3)	75.3 (±7.6)	39.6 (±11.1)§	34.3	590	62.2 (± 6.4)	71.7 (±7.9)	19.8 (±6.8)	62.0
Arizona	369	66.1 (±11.0)§	60.0 (±18.1)§	21.9 (±11.8)§	53.5	483	63.8 (± 6.8)	70.6 (±7.0)	27.0 (±9.7)	50.7	497	66.1 (± 6.8)	75.7 (±7.1)	33.2 (±10.3)§	45.8
Arkansas	403	54.8 (±26.5)§	81.6 (±9.9)	24.6 (±26.1)§	55.9	391	65.5 (± 7.4)	71.0 (±10.1)§	62.0 (±11.6)§	8.7	340	63.6 (± 6.9)	82.4 (±6.8)	48.6 (±12.1)§	30.7
California	457	77.7 (± 8.1)	76.3 (±8.9)	31.7 (±14.3)§	52.2	607	74.5 (± 5.5)	71.1 (±6.6)	35.4 (±11.2)§	42.9	519	70.2 (± 6.7)	67.2 (±8.5)	29.8 (±12.9)§	46.8
Colorado	561	75.4 (± 7.1)	61.2 (±14.4)§	43.6 (±13.0)§	23.3	493	75.6 (± 5.2)	70.2 (±6.9)	28.4 (±10.4)§	52.7	265	69.1 (± 8.2)	77.4 (±8.1)	33.0 (±15.2)§	48.2
Connecticut	483	75.2 (± 6.5)	79.4 (±7.7)	31.2 (±11.1)§	53.7	489	75.3 (± 5.5)	78.0 (±6.2)	33.2 (±11.3)§	50.4	537	73.6 (± 6.1)	86.5 (±4.4)	37.4 (±10.6)§	49.1
Delaware	518	75.2 (±11.6)§	67.8 (±17.5)§	27.9 (±16.6) §	51.8	419	77.4 (± 6.0)	80.8 (±6.2)	46.1 (±13.9)§	36.8	431	78.0 (± 9.9)	80.9 (±9.5)	25.5 (±13.7)§	62.9
District of Columbia	393	64.6 (±14.3)§	85.3 (±5.6)	21.0 (±13.7) §	66.4	754	79.0 (± 5.2)	84.4 (±5.4)	43.0 (±12.2)§	43.2	549	83.7 (± 4.9)//	83.1 (±5.7)	52.3 (±13.7)§	33.0
Florida	413	64.9 (± 8.6)	64.6 (±13.9)§	30.2 (±11.2)§	42.5	550	62.6 (± 6.1)	65.7 (±7.4)	22.8 (±7.6)	54.1	531	62.3 (± 5.9)	58.8 (±7.9)	26.9 (±8.7)	42.5
Georgia	391	64.8 (± 9.2)	66.9 (±10.1)§	32.7 (±13.4)§	40.4	511	70.2 (± 5.8)	70.9 (±7.1)	34.8 (±10.7)§	42.1	528	68.7 (± 5.4)	66.5 (±7.7)	28.3 (±8.2)	48.1
Hawaii	310	80.5 (±10.0)	74.9 (±10.7)§	42.7 (±26.9)§	37.8	392	75.5 (± 7.6)	83.1 (±5.9)	57.0 (±16.5)§	25.7	444	74.6 (± 6.5)	82.1 (±6.0)	43.9 (±12.7)§	39.4
Idaho	276	59.2 (±10.7)§	70.6 (±12.0)§	29.7 (±18.9)§	44.9	347	63.1 (± 7.4)	72.8 (±8.5)	28.5 (±12.6)§	49.5	298	52.9 (±10.0)	71.3 (±9.6)	14.9 (±8.2)	66.7
Illinois	950	69.3 (±11.5)§	60.8 (±12.3)§	26.1 (±17.0)§	48.0	1,003	71.4 (± 4.0)	67.0 (±5.4)	22.1 (±5.9)	59.2	773	68.7 (± 4.6)	69.5 (±5.3)	26.5 (±7.0)	52.7

State of residence	2013–14 influenza season					2014–15 influenza season					2015–16 influenza season				
	Prevalence of provider recommendation		Influenza vaccination coverage by parental receipt of provider recommendation		PAR[†]	Prevalence of provider recommendation		Influenza vaccination coverage by parental receipt of provider recommendation		PAR	Prevalence of provider recommendation		Influenza vaccination coverage by parental receipt of provider recommendation		PAR
			Recommendation	No recommendation				Recommendation	No recommendation				Recommendation	No recommendation	
	n	% (± 95% CI[‡])	% (± 95% CI)	% (± 95% CI)	%	n	% (± 95% CI)	% (± 95% CI)	% (± 95% CI)	%	n	% (± 95% CI)	% (± 95% CI)	% (± 95% CI)	%
Indiana	505	66.1 (± 7.9)	58.3 (±12.3)[§]	28.6 (±11.4)[§]	40.7	416	63.4 (± 6.2)	67.6 (±7.7)	34.8 (±10.7)[§]	37.4	462	70.0 (± 6.0)	68.0 (±7.6)	19.2 (±7.5)	64.0
Iowa	388	65.9 (± 7.0)	70.3 (±11.0)[§]	34.5 (±10.4)[§]	40.6	396	71.3 (± 6.7)	69.5 (±7.8)	26.9 (±11.3)[§]	53.0	392	68.2 (± 6.3)	68.5 (±7.9)	40.1 (±12.0)[§]	32.6
Kansas	311	75.3 (± 7.8)	75.5 (±10.0)	35.8 (±12.2)[§]	45.5	366	56.0 (±10.2)[§,//]	70.4 (±9.3)	34.5 (±16.1)[§]	36.8	304	63.3 (± 7.9)[//]	70.7 (±9.1)	23.5 (±11.5)[§]	56.0
Kentucky	346	69.4 (± 8.1)	61.4 (±14.5)[§]	25.3 (±9.7)	49.8	480	67.7 (± 5.8)	63.4 (±7.9)	30.3 (±9.3)	42.5	442	62.0 (± 6.1)	69.6 (±7.9)	25.4 (±8.5)	51.9
Louisiana	498	65.2 (± 8.9)	79.5 (±8.0)	24.4 (±8.9)	59.6	429	69.5 (± 5.8)	68.5 (±7.7)	38.1 (±10.8)[§]	35.7	380	70.5 (± 6.1)	71.1 (±7.6)	19.6 (±8.7)	64.9
Maine	428	69.8 (±11.5)[§]	71.7 (±7.2)	27.1 (±16.2)[§]	53.5	452	77.5 (± 7.5)	79.1 (±6.1)	37.6 (±16.0)[§]	46.1	575	69.0 (± 5.9)	75.6 (±6.7)	25.0 (±8.9)	58.3
Maryland	482	76.9 (± 8.4)	77.8 (±8.8)	34.0 (±15.8)[§§]	49.8	718	78.9 (± 7.2)	79.7 (±8.2)	54.0 (±19.9)[§]	27.3	699	71.1 (± 7.3)	81.3 (±7.4)	63.4 (±13.2)[§]	16.7
Massachusetts	497	80.7 (± 7.5)	82.7 (±6.2)	40.5 (±17.9)[§]	45.7	470	85.0 (± 4.6)	79.6 (±5.9)	52.2 (±16.3)[§]	30.9	627	80.7 (± 4.5)	82.4 (±4.7)	51.2 (±13.0)[§]	33.0
Michigan	389	66.1 (± 9.6)	69.6 (±13.3)[§]	25.8 (±12.6)[§]	52.9	408	73.3 (± 6.5)	66.3 (±7.4)	30.3 (±12.7)[§]	46.5	342	73.8 (± 5.7)	64.2 (±8.1)	30.2 (±12.1)[§]	45.4
Minnesota	318	61.1 (±24.2)[§]	72.7 (±11.4)[§]	18.6 (±19.5)[§]	64.0	440	66.3 (± 7.3)	71.6 (±8.1)	48.8 (±14.3)[§]	23.7	408	69.3 (± 6.1)	76.3 (±6.1)	49.0 (±12.1)[§]	27.9
Mississippi	399	71.3 (±11.0)[§]	59.1 (±26.5)[§]	24.1 (±10.1)[§]	50.9	453	64.8 (± 5.8)	60.5 (±7.9)	32.8 (±9.4)	35.4	386	54.9 (± 7.1)[//,¶]	75.4 (±7.5)	29.0 (±9.9)	46.8
Missouri	395	56.8 (±10.7)[§]	66.7 (±10.5)[§]	45.9 (±20.6)[§]	20.5	398	71.9 (± 6.3)[//]	70.4 (±8.1)	33.2 (±11.3)[§]	44.6	356	68.1 (± 6.5)	80.2 (±6.5)	28.6 (±9.7)	55.1
Montana	352	60.9 (± 8.9)	76.1 (±8.3)	29.4 (±14.1)[§]	49.2	303	58.0 (±10.4)[§]	68.7 (±10.4)[§]	18.9 (±12.4)[§]	60.4	325	61.3 (±11.1)[§]	67.7 (±12.3)[§]	13.7 (±7.3)	70.7
Nebraska	327	47.7 (±30.0)[//]	73.3 (±7.6)	14.5 (±17.9)[§]	65.9	319	66.5 (± 8.2)	78.0 (±8.6)	50.2 (±15.6)[§]	26.9	266	71.4 (± 8.0)	80.9 (±7.2)	24.1 (±11.7)[§]	62.7
Nevada	452	70.7 (± 8.3)	71.0 (±11.3)[§]	17.1 (±12.2)[§]	69.0	374	61.5 (± 7.6)	62.4 (±10.2)[§]	28.3 (±12.1)[§]	42.6	321	67.3 (± 7.4)	66.6 (±10.4)[§]	19.0 (±8.4)	62.8
New Hampshire	504	77.5 (± 8.8)	83.6 (±7.6)	44.2 (±14.5)[§]	40.9	428	79.7 (± 5.1)	71.0 (±9.3)	33.0 (±12.2)[§]	47.9	488	76.6 (± 5.4)	82.1 (±6.0)	47.5 (±12.8)[§]	35.8
New Jersey	540	70.0 (± 8.2)	80.2 (±6.1)	37.7 (±16.1)[§]	44.1	533	72.9 (± 5.3)	80.5 (±5.5)	37.9 (±10.9)[§]	45.0	522	76.6 (± 4.6)	79.6 (±5.1)	38.2 (±11.0)[§]	45.4
New Mexico	489	80.3 (± 9.4)	77.0 (±16.3)[§]	41.5 (±10.7)[§]	40.7	440	68.0 (± 6.1)[//]	74.0 (±8.1)	53.0 (±11.6)[§]	21.2	252	77.4 (± 7.1)[¶]	82.4 (±8.0)	32.5 (±13.9)[§]	54.3

State of residence	2013–14 influenza season					2014–15 influenza season					2015–16 influenza season				
	Prevalence of provider recommendation		Influenza vaccination coverage by parental receipt of provider recommendation		PAR[†]	Prevalence of provider recommendation		Influenza vaccination coverage by parental receipt of provider recommendation		PAR	Prevalence of provider recommendation		Influenza vaccination coverage by parental receipt of provider recommendation		PAR
			Recommendation	No recommendation				Recommendation	No recommendation				Recommendation	No recommendation	
	n	% (± 95% CI[‡])	% (± 95% CI)	% (± 95% CI)	%	n	% (± 95% CI)	% (± 95% CI)	% (± 95% CI)	%	n	% (± 95% CI)	% (± 95% CI)	% (± 95% CI)	%
New York	862	69.3 (± 9.8)	69.7 (±8.8)	54.6 (±19.0)[§]	16.1	1,020	75.7 (± 3.8)	74.8 (±5.0)	35.9 (±7.8)	45.1	950	76.0 (± 3.9)	72.8 (±4.6)	36.5 (±8.8)	43.0
North Carolina	502	76.9 (± 6.5)	68.6 (±14.8)[§]	36.4 (±10.7)[§]	40.5	384	68.5 (± 6.9)	74.9 (±7.4)	31.7 (±11.9)[§]	48.3	537	77.6 (± 5.0)[¶]	69.6 (±7.1)	24.0 (±9.4)	59.6
North Dakota	373	63.8 (± 8.6)	68.3 (±10.6)[§]	46.1 (±15.3)[§]	23.5	334	74.4 (± 8.3)	79.6 (±7.7)	40.7 (±17.9)[§]	41.6	243	66.8 (± 9.4)	75.7 (±12.2)[§]	41.9 (±19.0)[§]	35.0
Ohio	432	73.3 (± 8.7)	60.5 (±18.3)[§]	22.4 (±8.8)	55.5	418	69.3 (± 6.2)	73.7 (±7.1)	23.7 (±9.7)	59.4	404	71.0 (± 6.2)	79.3 (±6.3)	21.2 (±10.3)[§]	66.1
Oklahoma	417	68.1 (± 9.7)	83.1 (±7.9)	29.7 (±10.5)[§]	55.0	367	69.9 (± 6.4)	75.4 (±8.3)	37.1 (±11.7)[§]	41.9	325	60.4 (± 7.4)	81.9 (±6.7)	36.8 (±12.1)[§]	42.5
Oregon	353	72.1 (± 8.2)	71.1 (±9.6)	25.6 (±13.4)[§]	56.2	346	73.6 (± 7.0)	75.8 (±8.1)	31.1 (±14.8)[§]	51.4	345	62.7 (± 7.9)[¶]	74.9 (±7.8)	25.0 (±9.4)	55.6
Pennsylvania	1,114	77.3 (± 5.1)	76.8 (±6.3)	24.0 (±8.3)	63.0	1,057	75.5 (± 8.3)	66.4 (±9.0)	30.5 (±15.6)[§]	47.1	1,185	74.4 (± 5.8)	72.7 (±7.7)	25.5 (±9.4)	57.9
Rhode Island	442	83.6 (± 5.8)	86.5 (±5.4)	39.1 (±15.7)[§]	50.3	506	85.0 (± 4.2)	87.0 (±4.5)	54.4 (±14.0)[§]	33.7	550	79.7 (± 6.8)	82.2 (±5.4)	37.9 (±16.1)[§]	48.2
South Carolina	463	68.3 (± 9.0)	75.0 (±10.4)[§]	28.7 (±13.2)[§]	52.4	487	63.1 (± 6.2)	66.5 (±7.7)	32.7 (±9.9)	39.5	661	65.1 (± 6.6)	72.1 (±7.9)	35.3 (±13.7)[§]	40.4
South Dakota	291	66.8 (±10.1)[§]	87.9 (±6.1)	50.9 (±17.9)[§]	32.7	287	73.4 (± 8.2)	71.1 (±12.3)[§]	46.5 (±16.7)[§]	28.0	308	67.9 (± 8.0)	78.7 (±8.3)	54.2 (±15.4)[§]	23.5
Tennessee	403	60.3 (±24.4)[§]	75.0 (±7.9)	73.4 (±27.4)[§]	1.3	425	65.8 (± 6.4)	76.5 (±6.8)	41.6 (±11.3)[§]	35.6	400	70.6 (± 5.9)	79.2 (±5.9)	38.5 (±11.5)[§]	42.7
Texas	2,109	60.4 (± 9.9)	74.6 (±8.2)	51.9 (±18.6)[§]	20.9	2,955	72.5 (± 3.6)[//]	78.5 (±4.2)	41.6 (±7.3)	39.1	2,113	71.1 (± 3.9)[//]	70.5 (±5.4)	38.1 (±7.4)	37.7
Utah	297	58.6 (± 8.5)	64.9 (±9.5)	39.2 (±15.0)[§]	27.8	277	58.1 (± 8.9)	76.7 (±8.7)	39.9 (±15.5)[§]	34.9	282	64.9 (± 9.8)	75.3 (±9.0)	30.9 (±17.2)[§]	48.3
Vermont	455	71.1 (± 9.5)	68.3 (±13.8)[§]	18.1 (±10.4)[§]	66.4	477	72.8 (± 5.3)	71.4 (±7.3)	26.1 (±9.1)	55.8	420	75.5 (± 6.9)	73.4 (±13.8)[§]	31.0 (±13.0)[§]	50.8
Virginia	492	63.5 (±16.1)[§]	65.2 (±11.7)[§]	62.9 (±25.6)[§]	2.3	622	75.3 (± 6.8)	79.6 (±7.8)	38.0 (±15.4)[§]	45.2	699	72.8 (± 5.9)	74.5 (±7.1)	34.7 (±11.6)[§]	45.5
Washington	376	66.6 (± 9.3)	68.1 (±11.6)[§]	47.4 (±18.7)[§]	22.5	439	66.9 (± 6.9)	65.8 (±8.0)	34.1 (±12.4)[§]	38.3	422	74.5 (± 6.4)	73.3 (±8.3)	37.7 (±14.2)[§]	41.3
West Virginia	508	68.4 (± 8.2)	75.7 (±8.8)	19.4 (±8.3)	66.5	370	70.5 (± 6.6)	71.4 (±7.8)	4(±13.30.4)[§]	35.1	478	60.3 (± 8.9)	76.9 (±6.3)	21.6 (±10.1)[§]	60.7
Wisconsin	334	73.5 (± 7.4)	70.1 (±8.8)	35.1 (±16.1)[§]	42.3	385	76.8 (± 6.4)	65.9 (±8.9)	24.1 (±12.7)[§]	57.1	394	80.2 (± 5.0)	67.7 (±7.5)	41.4 (±14.1)[§]	33.8

State of residence	2013–14 influenza season					2014–15 influenza season					2015–16 influenza season				
	Prevalence of provider recommendation		Influenza vaccination coverage by parental receipt of provider recommendation		PAR[†]	Prevalence of provider recommendation		Influenza vaccination coverage by parental receipt of provider recommendation		PAR	Prevalence of provider recommendation		Influenza vaccination coverage by parental receipt of provider recommendation		PAR
			Recommendation	No recommendation				Recommendation	No recommendation				Recommendation	No recommendation	
	n	% (± 95% CI[‡])	% (± 95% CI)	% (± 95% CI)	%	n	% (± 95% CI)	% (± 95% CI)	% (± 95% CI)	%	n	% (± 95% CI)	% (± 95% CI)	% (± 95% CI)	%
Wyoming	369	75.2 (± 8.7)	51.8 (±19.2)[§]	25.2 (±9.3)	44.3	418	57.8 (± 7.1)[//]	64.9 (±8.6)	30.7 (±10.8)[§]	39.2	274	49.6 (± 9.2)[//]	63.1 (±11.3)[§]	20.4 (±10.4)[§]	50.9

[*] Children who did not have a provider visit between July 1 and the date of the interview during an influenza season were excluded

[†] PAR = population attributable risk. Population attributable risk is a measure to assess the potential contribution of provider recommendation to the observed vaccination level and was calculated using the formula: P (PR-1) / [P (PR-1)+1], where P was the prevalence of receiving a provider recommendation for influenza vaccination and PR was the prevalence ratio of vaccination by provider recommendation.

[‡] CI = confidence interval half-width.

[§] Estimates might not be reliable because confidence interval half-width is >10.

[//] Statistically significant difference compared with the estimate for prevalence of provider recommendation from the 2013–14 influenza season.

[¶] Statistically significant difference compared with the estimate for prevalence of provider recommendation from the 2014–15 influenza season.

Table 3.

Weighted prevalence (%) of children 6 months–17 years for whom their parent received a provider recommendation for them to receive an influenza vaccination,[*] and who received influenza vaccination stratified by parental receipt of provider recommendation, by selected sociodemographic characteristics, United States, National Immunization Survey-Influenza (NIS-Flu), 2013–14 through 2015–16 influenza seasons

Characteristics	2013–14 influenza season				2014–15 influenza season				2015–16 influenza season			
	Prevalence of provider recommendation	Influenza vaccination coverage by parental receipt of provider recommendation[†]		PAR[‡]	Prevalence of provider recommendation	Influenza vaccination coverage by parental receipt of provider recommendation		PAR	Prevalence of provider recommendation	Influenza vaccination coverage by parental receipt of provider recommendation		PAR
		Recommendation	No recommendation			Recommendation	No recommendation			Recommendation	No recommendation	
	% (± 95% CI[§])	% (± 95% CI)	% (± 95% CI)	%	% (± 95% CI)	% (± 95% CI)	% (± 95% CI)	%	% (± 95% CI)	% (± 95% CI)	% (± 95% CI)	%
Overall	69.1 (± 2.2)	71.1 (±2.4)	37.0 (±4.6)	38.9	71.0 (± 1.2)	72.4 (±1.4)	34.4 (±2.1)	44.0	70.3 (± 1.2)	72.2 (±1.5)	32.1 (±2.3)	46.8
Child's age												
a. 6–23 months	77.3 (± 4.9)[//,d]	79.2 (±5.7)[c,d]	34.8 (±10.5)[¶]	49.7	80.7 (± 2.5)[c,d]	80.8 (±2.6)[c,d]	42.5 (±7.2)[d]	42.1	80.0 (± 2.5)[b,c,d]	80.7 (±3.2)[c,d]	37.3 (±6.6)[d]	48.2
b. 2–4 years	78.9 (± 4.3)[c,d]	79.8 (±4.9)[c,d]	43.1 (±8.7)[d]	40.2	77.5 (± 2.5)[c,d]	77.9 (±2.6)[c,d]	43.1 (±6.1)[d]	38.5	75.8 (± 2.9)[a,c,d]	76.5 (±3.2)[d]	40.0 (±6.7)[d]	40.9
c. 5–12 years	71.6 (± 3.1)[b,d]	71.7 (±3.2)[a,b,d]	43.0 (±7.4)[d]	32.3	72.3 (± 1.7)[a,b,d]	73.6 (±2.1)[a,b,d]	37.4 (±3.4)[d]	41.2	72.2 (± 1.8)[a,b,d]	73.5 (±2.3)[a,d]	33.5 (±3.5)[d]	46.3
d. 13–17 years	58.2 (± 4.4)[a,b,c]	60.6 (±5.2)[a,b,c]	30.3 (±7.5)[b,c]	36.8	62.5 (± 2.4)[a,b,c]	63.2 (±3.2)[a,b,c]	27.0 (±3.3)[a,b,c]	45.6	61.6 (± 2.3)[a,b,c]	63.6 (±3.2)[a,b,c]	27.3 (±3.7)[a,b,c]	45.0
Child's sex												
a. Male	69.4 (± 3.2)	74.0 (±3.2)[b]	38.4 (±6.2)	39.2	71.1 (± 1.6)	74.2 (±1.8)[b]	35.4 (±2.9)	43.8	69.2 (± 1.7)	72.2 (±1.9)	33.4 (±3.3)	44.6
b. Female	68.9 (± 3.1)	68.1 (±3.5)[a]	35.5 (±6.9)	38.8	70.9 (± 1.7)	70.4 (±2.1)[a]	33.3 (±3.1)	44.1	71.5 (± 1.7)	72.2 (±2.3)	30.7 (±3.0)	49.1
Child's race/ethnicity[**]												
a. White, non-Hispanic	68.7 (± 2.4)	68.6 (±3.0)[c,d]	33.5 (±5.1)	41.9	70.2 (± 1.5)	71.2 (±1.8)[d]	31.6 (±2.8)[c,d]	46.8	69.2 (± 1.5)	71.4 (±1.9)[d]	27.9 (±2.4)[c,d]	51.9
b. Black, non-Hispanic	69.0 (± 5.3)	65.0 (±7.4)[c,d]	33.6 (±10.0)	39.2	71.0 (± 3.1)	70.0 (±4.1)[d]	33.4 (±5.6)[d]	43.8	70.5 (± 3.0)	69.8 (±3.8)[d]	32.3 (±5.4)[d]	45.0
c. Hispanic	70.9 (± 6.3)	76.8 (±4.9)[a,b]	45.9 (±13.2)[¶]	32.3	72.5 (± 2.7)	74.1 (±3.5)	38.5 (±5.1)[a]	40.1	72.9 (± 3.0)	73.6 (±4.1)	38.0 (±5.9)[a]	40.6
d. Other, non-Hispanic	67.7 (± 8.7)	81.1 (±5.1)[a,b]	42.5 (±16.7)[¶]	38.1	72.3 (± 3.4)	78.7 (±3.7)[a,b]	43.6 (±7.0)[a,b]	36.8	70.6 (± 4.4)	76.6 (±4.4)[a,b]	43.7 (±10.0)[a,b]	34.7
Language survey completed												
a. English	68.4 (± 2.4)[b]	70.0 (±2.7)[b,c]	36.7 (±4.9)	38.3	70.3 (± 1.2)[b]	71.5 (±1.4)[b]	32.6 (±2.2)[b,c]	45.6	70.0 (± 1.3)	71.2 (±1.6)[b,c]	29.8 (±2.3)[b,c]	49.3
b. Spanish	77.2 (± 7.5)[a,c]	79.0 (±5.7)[a]	38.2 (±15.7)[¶]	45.2	77.4 (± 3.8)[a,c]	79.5 (±5.4)[a]	49.7 (±8.5)[a]	31.7	75.1 (± 4.6)	80.7 (±5.0)[a]	57.1 (±10.2)[¶,a]	23.7

Characteristics	2013–14 influenza season				2014–15 influenza season				2015–16 influenza season			
	Prevalence of provider recommendation	Influenza vaccination coverage[†] by parental receipt of provider recommendation		PAR[‡]	Prevalence of provider recommendation	Influenza vaccination coverage by parental receipt of provider recommendation		PAR	Prevalence of provider recommendation	Influenza vaccination coverage by parental receipt of provider recommendation		PAR
		Recommendation	No recommendation			Recommendation	No recommendation			Recommendation	No recommendation	
	% (± 95% CI[§])	% (± 95% CI)	% (± 95% CI)	%	% (± 95% CI)	% (± 95% CI)	% (± 95% CI)	%	% (± 95% CI)	% (± 95% CI)	% (± 95% CI)	%
c. Other language	63.3 (±11.2)[b]	84.5 (±10.4)[¶,a]	52.4 (±17.4)[¶]	27.9	67.6 (± 8.9)[b]	72.5 (±14.6)[¶]	60.4 (±14.1)[¶,a]	11.9	64.2 (±10.0)	87.4 (±9.5)[a]	53.2 (±14.7)[¶,a]	29.2
Mother's education												
a. <High school	68.2 (± 7.3)	75.5 (±6.5)[b,c]	49.2 (±15.0)[¶,c]	26.7	71.2 (± 3.8)[d]	75.1 (±4.9)[b,c]	41.8 (±7.6)[c]	36.2	71.0 (± 4.2)	78.0 (±4.3)[b,c]	45.1 (±8.2)[b,c,d]	34.1
b. High school or equivalent	63.7 (± 5.9)	63.3 (±6.2)[a,d]	33.1 (±12.8)[¶]	36.8	67.6 (± 3.1)[d]	68.1 (±4.2)[a,d]	35.2 (±5.0)	38.7	66.9 (± 3.0)[d]	71.3 (±4.0)[a,c]	30.7 (±4.7)[a]	46.9
c. Some college	68.7 (± 3.5)	66.2 (±4.6)[a,d]	28.5 (±4.9)[a,d]	47.6	67.7 (± 2.4)[d]	66.4 (±2.9)[a,d]	30.8 (±4.0)[a]	43.9	66.3 (± 2.6)[d]	65.7 (±3.4)[a,b,d]	27.2 (±3.8)[a]	48.4
d. ≥College degree	72.3 (± 3.4)	76.3 (±3.0)[b,c]	40.4 (±7.4)[c]	39.1	75.7 (± 1.6)[a,b,c]	76.4 (±1.8)[b,c]	35.2 (±3.4)	47.0	73.9 (± 1.7)[b,c]	74.5 (±2.2)[c]	31.6 (±3.8)[a]	50.1
Poverty/annual household income[††]												
a. Above poverty (>$75,000)	73.7 (± 3.2)[b,c,d]	77.2 (±3.2)[b]	38.8 (±6.7)	42.2	76.0 (± 1.7)[b,c,d]	75.4 (±2.0)[b]	34.4 (±3.7)	47.5	72.5 (± 1.9)[‡‡]	74.3 (±2.1)[b]	31.8 (±4.1)	49.2
b. Above poverty (≤$75,000)	68.2 (± 3.6)[a]	64.1 (±4.5)[a,c]	31.2 (±6.9)	41.8	68.5 (± 2.1)[a]	68.4 (±2.6)[a,d]	32.7 (±3.5)[c]	42.8	69.3 (± 2.2)	67.2 (±3.2)[a,c]	28.3 (±3.3)[c,d]	48.8
c. Below poverty	65.4 (± 5.9)[a]	71.3 (±5.4)[b]	45.3 (±12.3)[¶]	27.3	69.6 (± 2.8)[a,d]	71.4 (±3.6)	40.0 (±5.3)[b,d]	35.3	68.4 (± 3.0)	76.6 (±3.2)[b]	37.1 (±5.7)[b]	42.1
d. Unknown	64.5 (± 6.2)[a]	70.5 (±5.9)	31.8 (±8.9)	44.0	64.7 (± 3.7)[a,c]	74.4 (±4.5)[b]	29.4 (±5.3)[c]	49.8	69.2 (± 3.4)	71.4 (±4.4)	34.9 (±5.6)[b]	42.0
Number of children in household												
a. 1	62.2 (± 3.9)[b,c]	71.4 (±4.2)	32.2 (±6.5)	43.1	67.9 (± 1.9)[b,§§]	72.0 (±2.4)	35.1 (±3.1)	41.7	66.2 (± 2.2)[b,c]	72.8 (±3.0)	31.0 (±3.9)[c]	47.2
b. 2–3	71.5 (± 3.0)[a]	71.7 (±3.2)	39.1 (±6.8)	37.3	73.0 (± 1.6)[a,c]	72.2 (±1.9)	34.2 (±3.0)	44.8	71.5 (± 1.6)[a]	72.9 (±1.8)	34.7 (±3.1)[c]	44.0
c. ≥4	71.4 (± 5.5)[a]	67.4 (±7.0)	39.5 (±10.2)[¶]	33.5	67.4 (± 4.0)[b]	73.7 (±4.4)	33.4 (±7.2)	44.9	73.7 (± 3.6)[a,‡‡]	67.6 (±5.5)	21.6 (±5.2)[a,b]	61.1
Urban-rural residence												
a. Urban (MSA,[////] principal city)	68.4 (± 4.0)	73.3 (±4.0)	34.3 (±7.4)	43.7	73.1 (± 2.3)[c,§§]	75.6 (±2.7)[b,c]	35.4 (±4.2)	45.4	73.9 (± 2.2)[b,c,§§]	77.5 (±2.5)[b,c]	38.0 (±4.7)[b,c]	43.4
b. Suburban (MSA, not principal city)	70.7 (± 3.1)	70.1 (±3.5)	41.4 (±6.6)[c]	32.9	72.0 (± 1.5)[c]	71.9 (±1.9)[a,c]	35.3 (±2.8)	42.7	70.4 (± 1.7)[a,c]	70.4 (±2.1)[a]	30.9 (±3.1)[a]	47.4
c. Rural (non-MSA)	63.8 (± 4.9)	71.8 (±4.3)	25.7 (±5.9)[b]	53.4	62.3 (± 3.3)[a,b]	67.8 (±3.3)[a,b]	30.0 (±5.2)	44.0	63.7 (± 2.9)[a,b]	69.8 (±3.8)[a]	28.7 (±4.2)[a]	47.7
Region of residence												

Characteristics	2013–14 influenza season				2014–15 influenza season				2015–16 influenza season			
	Prevalence of provider recommendation	Influenza vaccination coverage[†] by parental receipt of provider recommendation		PAR[‡]	Prevalence of provider recommendation	Influenza vaccination coverage by parental receipt of provider recommendation		PAR	Prevalence of provider recommendation	Influenza vaccination coverage by parental receipt of provider recommendation		PAR
		Recommendation	No recommendation			Recommendation	No recommendation			Recommendation	No recommendation	
	% (± 95% CI[§])	% (± 95% CI)	% (± 95% CI)	%	% (± 95% CI)	% (± 95% CI)	% (± 95% CI)	%	% (± 95% CI)	% (± 95% CI)	% (± 95% CI)	%
a. Northeast	73.3 (± 4.2)[b,c]	75.9 (±3.8)[b]	41.8 (±10.7)[¶,b]	37.4	76.6 (± 2.5)[b,c,d]	75.1 (±2.9)[b]	36.3 (±5.4)	45.0	76.0 (± 2.2)[b,c,d]	76.5 (±2.7)[b,c,d]	35.3 (±4.6)[b]	47.0
b. Midwest	67.3 (± 4.3)[a]	65.4 (±5.4)[a]	28.4 (±6.1)[a,c]	46.7	69.8 (± 2.1)[a]	69.4 (±2.5)[a,c]	30.6 (±3.8)[c]	47.0	70.7 (± 2.0)[a]	72.1 (±2.4)[a]	29.0 (±3.6)[a,c]	51.2
c. South	65.6 (± 3.8)[a,d]	71.3 (±3.7)	41.8 (±8.3)[b]	31.6	69.2 (± 1.7)[a]	73.6 (±2.0)[b]	36.0 (±3.1)[b]	42.0	68.4 (± 1.7)[a]	71.0 (±2.3)[a]	34.2 (±3.0)[b]	42.4
d. West	73.5 (± 4.8)[c]	72.0 (±6.0)	32.9 (±7.3)	46.6	70.9 (± 3.2)[a]	71.0 (±3.9)	34.1 (±5.7)	43.4	69.0 (± 3.7)[a]	70.8 (±4.8)[a]	29.6 (±6.8)	49.0

[*] Children who did not have a provider visit between July 1and the date of the interview during an influenza season were excluded.

[†] Influenza vaccination coverage was calculated by the Kaplan Meier method.

[‡] PAR = population attributable risk. Population attributable risk is a measure to assess the potential contribution of provider recommendation to the observed vaccination level and was calculated using the formula: P (PR-1) / [P (PR-1)+1], where P was the prevalence of receiving a provider recommendation for influenza vaccination and PR was the prevalence ratio of vaccination by provider recommendation.

[§] CI = confidence interval half-width.

[//] The presence or absence of superscripted letters denotes whether that estimate was statistically significantly different at P < 0.05 from another row, and denotes which row it differed from (a, b, c, or d), based on pair-wise comparison t-test. For example, in 2013–14, the percentage of children 6–23 months (a) who received a provider recommendation (77.3%) was statistically significantly different from the percentage of children 13–17 years (d) who received a provider recommendation (58.2%).

[¶] Estimates might not be reliable because confidence interval half-width is >10.

[**] Race/ethnicity is based on parental report. Children of Hispanic ethnicity may be of any race. Children categorized as white, black, or other were identified as non-Hispanic. The other race category included children of reported Asian, American Indian or Alaska Native, Native Hawaiian or other Pacific Islander, other, or multiple (i.e. selected more than one race category) races.

[††] Poverty level was defined based on the reported number of people living in the household and annual household income, according to the U.S. Census poverty thresholds (https://www.census.gov/data/tables/time-series/demo/income-poverty/historical-poverty-thresholds.html).

[‡‡] Statistically significant difference compared with the estimate for prevalence of provider recommendation from the 2014–15 influenza season.

[§§] Statistically significant difference compared with the estimate for prevalence of provider recommendation from the 2013–14 influenza season.

[////] MSA = metropolitan statistical area. MSA was based on parent/guardian respondent-reported city, state, county, and zip code of residence using the (https://www.census.gov/programs-surveys/metro-micro.html) MSA definitions file.

Table 4.

Association of parental receipt of a provider recommendation for their child to receive influenza vaccination with sociodemographic characteristics among children 6 months–17 years who had a provider visit since July 1st during the influenza season, United States, National Immunization Survey-Influenza (NIS-Flu), 2013–14 through 2015–16 influenza seasons

Characteristics	2013–14 influenza season		2014–15 influenza season		2015–16 influenza season	
	APR* ± 95% CI†	AP‡ %	APR ± 95% CI	AP %	APR ± 95% CI	AP %
Child's age						
6–23 months	**1.37 (1.25–1.51)**	79.3 (74.6–83.3)	**1.28 (1.22–1.34)**	81.3 (78.7–83.6)	**1.31 (1.25–1.37)**	80.8 (78.3–83.1)
2–4 years	**1.37 (1.25–1.49)**	78.9 (74.9–82.5)	**1.22 (1.17–1.29)**	78.0 (75.4–80.4)	**1.23 (1.16–1.29)**	75.7 (72.6–78.6)
5–12 years	**1.24 (1.14–1.34)**	71.5 (68.5–74.2)	**1.13 (1.08–1.18)**	72.2 (70.5–73.9)	**1.17 (1.11–1.22)**	72.0 (70.2–73.8)
13–17 years	Referent	57.8 (53.3–62.2)	Referent	63.7 (61.3–66.1)	Referent	61.8 (59.4–64.2)
Child's sex						
Male	1.01 (0.95–1.07)	69.5 (66.5–72.4)	1.00 (0.97–1.03)	71.5 (69.9–73.1)	0.97 (0.94–1.00)	69.3 (67.5–71.0)
Female	Referent	69.0 (65.9–71.9)	Referent	71.6 (69.8–73.2)	Referent	71.5 (69.8–73.2)
Child's race/ethnicity§						
White, non-Hispanic	Referent	69.1 (66.6–71.5)	Referent	71.1 (69.4–72.7)	Referent	69.1 (67.4–70.8)
Black, non-Hispanic	1.07 (0.99–1.15)	73.9 (68.7–78.5)	1.04 (0.99–1.09)	73.9 (70.8–76.8)	1.05 (1.00–1.10)	72.3 (69.2–75.3)
Hispanic	0.96 (0.86–1.08)	66.7 (59.4–73.3)	0.99 (0.94–1.05)	70.5 (67.0–73.8)	1.05 (0.99–1.11)	72.3 (68.6–75.7)
Other, non-Hispanic	0.99 (0.89–1.10)	68.2 (60.7–74.8)	1.03 (0.98–1.09)	73.2 (69.5–76.7)	1.02 (0.95–1.09)	70.5 (65.8–74.9)
Language survey completed						
English	Referent	67.6 (64.7–70.4)	Referent	70.2 (68.7–71.5)	Referent	69.9 (68.5–71.4)
Spanish	**1.23 (1.11–1.36)**	83.0 (75.2–88.6)	**1.17 (1.11–1.24)**	82.4 (78.0–86.0)	1.09 (1.00–1.18)	75.9 (69.8–81.1)
Other language	0.96 (0.79–1.17)	64.7 (51.5–76.0)	0.97 (0.83–1.13)	68.0 (56.6–77.5)	0.97 (0.81–1.15)	67.8 (55.2–78.2)
Mother's education						
<High school	Referent	66.9 (59.3–73.7)	Referent	70.6 (66.2–74.6)	Referent	70.1 (65.6–74.4)
High school or equivalent	0.99 (0.86–1.13)	66.1 (60.8–71.0)	0.97 (0.90–1.04)	68.5 (65.4–71.4)	0.97 (0.90–1.04)	67.7 (64.6–70.7)
Some college	1.05 (0.93–1.18)	70.0 (66.7–73.0)	0.99 (0.92–1.06)	69.8 (67.4–72.0)	0.96 (0.89–1.03)	67.3 (64.8–69.8)
≥College degree	1.06 (0.94–1.20)	71.0 (67.3–74.3)	1.05 (0.98–1.13)	74.4 (72.5–76.2)	1.04 (0.97–1.12)	73.3 (71.4–75.1)
Poverty/annual household income//						
Above poverty (>$75,000)	**1.19 (1.07–1.32)**	73.9 (70.8–76.7)	**1.09 (1.03–1.15)**	75.5 (73.6–77.4)	**1.06 (1.00–1.13)**	72.0 (69.9–73.9)

Characteristics	2013–14 influenza season		2014–15 influenza season		2015–16 influenza season	
	APR* ± 95% CI†	AP‡ %	APR ± 95% CI	AP %	APR ± 95% CI	AP %
Above poverty (≤$75,000)	**1.12 (1.01–1.24)**	69.4 (65.9–72.7)	1.00 (0.95–1.06)	69.7 (67.5–71.7)	1.04 (0.98–1.10)	70.4 (68.2–72.6)
Below poverty	Referent	62.1 (55.9–67.9)	Referent	69.4 (66.1–72.5)	Referent	67.6 (64.2–70.8)
Unknown	1.06 (0.93–1.21)	66.0 (59.7–71.7)	0.97 (0.89–1.04)	67.0 (62.7–71.0)	1.03 (0.95–1.10)	69.4 (65.4–73.1)
Number of children in household						
1	Referent	62.5 (58.9–66.0)	Referent	69.0 (67.2–70.8)	Referent	66.8 (64.5–69.0)
2–3	**1.14 (1.07–1.21)**	71.3 (68.3–74.0)	**1.06 (1.02–1.10)**	73.1 (71.5–74.7)	**1.06 (1.02–1.11)**	71.1 (69.4–72.7)
≥4	**1.17 (1.07–1.27)**	72.9 (67.8–77.5)	1.00 (0.94–1.07)	69.2 (65.1–73.0)	**1.12 (1.06–1.19)**	74.8 (71.0–78.2)
Urban-rural residence						
Urban (MSA,¶ principal city)	1.00 (0.91–1.08)	67.7 (63.7–71.4)	**1.11 (1.05–1.18)**	73.3 (70.9–75.5)	**1.12 (1.06–1.18)**	73.3 (71.0–75.5)
Suburban (MSA, not principal city)	1.03 (0.96–1.11)	70.2 (67.2–73.1)	**1.10 (1.04–1.16)**	72.2 (70.6–73.7)	**1.07 (1.02–1.13)**	70.3 (68.6–72.0)
Rural (non-MSA)	Referent	68.0 (63.4–72.3)	Referent	65.8 (62.4–69.0)	Referent	65.6 (62.5–68.6)
Region of residence						
Northeast	**1.10 (1.02–1.18)**	73.1 (68.8–77.0)	**1.09 (1.05–1.14)**	76.7 (74.1–79.1)	**1.11 (1.07–1.16)**	75.9 (73.6–78.1)
Midwest	1.02 (0.95–1.10)	68.0 (64.2–71.7)	1.02 (0.98–1.06)	71.4 (69.2–73.4)	**1.05 (1.01–1.09)**	71.8 (69.7–73.8)
South	Referent	66.5 (62.9–70.0)	Referent	70.1 (68.3–71.9)	Referent	68.1 (66.3–69.9)
West	**1.08 (1.00–1.17)**	72.0 (67.7–75.9)	1.00 (0.95–1.05)	70.3 (67.1–73.3)	1.01 (0.95–1.07)	68.7 (64.9–72.2)

*APR = adjusted prevalence ratio. Estimates in bold are statistically significantly different from the referent ($P < 0.05$). All variables listed in the table were included in the model.

†CI = confidence interval.

‡AP = adjusted prevalence.

§Race/ethnicity is based on parental report. Children of Hispanic ethnicity may be of any race. Children categorized as white, black, or other were identified as non-Hispanic. The other race category included children of reported Asian, American Indian or Alaska Native, Native Hawaiian or other Pacific Islander, other, or multiple (i.e. selected more than one race category) races.

//Poverty level was defined based on the reported number of people living in the household and annual household income, according to the U.S. Census poverty thresholds (https://www.census.gov/data/tables/time-series/demo/income-poverty/historical-poverty-thresholds.html).

¶MSA = metropolitan statistical area. MSA was based on parent/guardian respondent-reported city, state, county, and zip code of residence using the (https://www.census.gov/programs-surveys/metro-micro.html) MSA definitions file.

Table 5.

Association of receiving influenza vaccination with parental receipt of a provider recommendation for their child to receive influenza vaccination, controlling for sociodemographic characteristics,* among children 6 months–17 years who had a provider visit since July 1st during the influenza season, United States, National Immunization Survey-Influenza (NIS-Flu), 2013–14 through 2015–16 influenza seasons

Characteristics	2013–14		2014–15		2015–16	
	APR† ± 95% CI‡	AP§ %	APR ± 95% CI	AP %	APR ± 95% CI	AP %
Provider recommendation						
Yes	**1.80 (1.61–2.01)**	70.7 (68.4–73.0)	**1.91 (1.79–2.04)**	71.2 (69.8–72.7)	**2.12 (1.98–2.28)**	71.5 (70.0–73.1)
No	Referent	39.3 (35.0–43.8)	Referent	37.3 (35.0–39.6)	Referent	33.7 (31.4–36.0)

*The model included the following sociodemographic variables: child's age, child's sex, child's race/ethnicity, language survey completed, mother's education, poverty/annual household income, number of children in household, urban/rural residence, and region of residence.

†APR = adjusted prevalence ratio. Estimates in bold are statistically significantly different from the referent ($P < 0.05$).

‡CI = confidence interval.

§AP = adjusted prevalence.