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Vaccination Coverage Among Persons with Asthma — United States, 2010–2011 Influenza Season

Asthma was the most common underlying condition among persons hospitalized with pandemic influenza A (H1N1) virus infection in 2009 (*1*). Although persons with asthma are not more likely than others to get influenza, influenza can make asthma symptoms worse, trigger asthma attacks, and lead to pneumonia or other complications that result in hospitalization and even death.* During 1964–2010, the Advisory Committee on Immunization Practices (ACIP) recommended that all adults and children aged ≥6 months with asthma receive an influenza vaccination annually (*2*). Beginning with the 2010–11 influenza season, ACIP expanded its annual vaccination recommendation to include all persons aged ≥6 months, while emphasizing that protection of persons at higher risk for influenza-related complications continue as a focus of vaccination efforts (*2*). To provide the first update of national vaccination coverage among persons aged ≥2 years with asthma since the new ACIP recommendation, CDC analyzed data from the 2010 and 2011 National Health Interview Survey (NHIS). This report describes the results of that analysis, which indicated that influenza vaccination during the 2010–11 season among persons with asthma was 50%, up from 36% 5 years earlier (*3*). However, vaccination coverage across all age groups, including among those with health insurance, a usual place for health care, and one or more health-care visits in the past 12 months, remained well below *Healthy People 2020* targets† of 80% for children aged 6 months–17 years and 90% for adults aged ≥18 years who are at high risk. These findings highlight the need to educate health-care providers and persons with asthma about the importance of annual influenza vaccination.

NHIS is an annual, in-person survey of the noninstitutionalized U.S. civilian population. It is based on a multistage sampling of households (*4*). From each family surveyed, one sample child (if present) and one sample adult are randomly selected, and information about receipt of influenza vaccination in the previous 12 months is collected. This analysis used 2010 and 2011 NHIS data to estimate influenza vaccination coverage among persons with current asthma§ aged ≥2 years¶ during the 2010–11 influenza season. To better assess influenza vaccination coverage for the 2010–11 season, data from respondents interviewed during September–June and vaccinated during August–May were analyzed. For missing vaccination month and year, information was imputed from donor pools matched for week of interview, age group, region of residence, and race/ethnicity. The Kaplan-Meier survival analysis procedure was used.**

* Additional information available at http://www.cdc.gov/flu/asthma/index.htm.

† From objective IID-12 (Increase the percentage of children and adults who are vaccinated annually against seasonal influenza). Available at http://www.healthypeople.gov/2020/topicsobjectives2020/objectiveslist.aspx?topicid=23.

§ *Current asthma (child):* "Yes" response to the following survey questions, "Has a doctor or other health professional ever told you that [child] had asthma?" and "Does [child] still have asthma?" *Current asthma (adult):* "Yes" response to the following survey questions, "Have you ever been told by a doctor or other health professional that you had asthma?" and "Do you still have asthma?"

¶ Children aged <2 years were not included for two reasons: 1) asthma diagnoses are considered unreliable in children at this age, and 2) there is a need for consistency with previous studies.

** Original estimates published in 2008 for the 2005–06 season were based on a different method for calculating season-specific influenza vaccination coverage, but those estimates were similar to estimates based on the Kaplan-Meier approach used in this report. Original and Kaplan-Meier estimates for persons with asthma by age group for the 2005–06 season were 36.2% versus 36.0% for persons aged ≥2 years, 29.3% versus 32.5% for children aged 2–17 years, 23.6% versus 22.3% for adults aged 18–49 years, 48.6% versus 45.9% for adults aged 50–64 years, and 75.7% versus 80.0% for adults ≥65 years, respectively. Original and Kaplan-Meier estimates were 14.3% versus 15.9% for children aged 2–17 years without asthma, respectively.

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All analyses were conducted using statistical software to account for the complex sample design. Vaccination status was stratified by characteristics known to be associated with influenza vaccination, including age group, race/ethnicity, family income relative to family size, health insurance coverage, number of health-care visits in the past year, and having a usual place for health care (*3,5,6*). Weighted estimates of vaccination coverage were compared using t-tests, with statistical significance defined as p<0.05.

The response rates for the 2010 and 2011 NHISs were 79.5 and 82.0%, respectively. Responses from 32,636 persons aged ≥2 years were analyzed. Of those, 2,809 (8.6%) reported having (or were reported to have) current asthma. Vaccination coverage for the 2010–11 season among persons with current asthma was 49.6%, compared with 37.5% among those without current asthma (p<0.05) (Table 1). Among persons with current asthma, those aged 50–64 years and ≥65 years had the highest vaccination coverage (61.7% and 76.5%, respectively). For all age groups, a higher proportion of persons with current asthma received influenza vaccination than did those without current asthma (p<0.05) (Table 1). Vaccination coverage among persons with asthma who experienced an asthma attack in the preceding 12 months did not differ significantly from the coverage of persons with asthma who did not have an asthma attack or an emergency department (ED)/urgent care visit in the preceding 12 months. Vaccination coverage was also similar among persons with asthma who had an ED/urgent care visit in the preceding 12 months to the coverage of persons with asthma who did not have an asthma attack or ED/urgent care visit in the preceding 12 months.

For all persons, vaccination coverage increased as the number of health-care visits over the past year increased, and coverage was significantly lower among those with no health-care visits in the past year (Table 2). Except for persons who had six to nine health-care visits and for persons who had no usual place for health care, influenza vaccination was significantly

TABLE 1. Influenza vaccination coverage* among persons aged ≥2 years, by current asthma status† and age group§ — National Health Interview Survey (NHIS), United States, 2010–11 influenza season

	All persons			Without current asthma			With current asthma		
Age group (yrs)	No.¶	%	(95% CI)	No.	%	(95% CI)	No.	%	(95% CI)
2–17	6,900	40.2	(38.4–42.1)	6,186	38.8	(37.0–40.8)	714	52.8**	(47.3–58.6)
18–49	14,208	26.1††	(25.0–27.2)	13,118	25.4††	(24.3–26.5)	1,090	34.6**††	(30.7–38.8)
50–64	6,218	43.7††	(42.1–45.4)	5,652	42.0††	(40.4–43.7)	566	61.7**††	(55.8–67.7)
≥65	5,310	70.2††	(68.2–72.1)	4,871	69.7††	(67.7–71.7)	439	76.5**††	(70.2–82.2)
Total	**32,636**	**38.5**	**(37.7–39.4)**	**29,827**	**37.5**	**(36.6–38.4)**	**2,809**	**49.6****	**(47.0–52.3)**

See table footnotes on page 975.

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TABLE 1. (*Continued*) Influenza vaccination coverage* among persons aged ≥2 years, by current asthma status† and age group§ — National Health Interview Survey (NHIS), United States, 2010–11 influenza season

	With asthma and attack in past 12 mos			With asthma and ED/urgent care visit in past 12 mos			With asthma and no attack or ED/urgent care visit in past 12 mos		
Age group (yrs)	No.	%	(95% CI)	No.	%	(95% CI)	No.	%	(95% CI)
2–17	268	49.0	(40.9–57.7)	118	50.6	(37.8–65.0)	328	57.1	(49.0–65.5)
18–49	415	37.3††	(30.8–44.7)	118	35.2	(24.4–48.9)	557	32.4††	(26.9–38.8)
50–64	240	59.6	(50.0–69.3)	74	62.6	(46.7–78.5)	252	63.4	(55.1–71.7)
≥65	133	74.3††	(63.2–84.3)	50	83.7††	(68.9–94.1)	256	75.8††	(67.4–83.3)
Total	**1,056**	**48.5**	**(44.3–52.8)**	**360**	**51.3**	**(44.3–58.7)**	**1,393**	**50.2**	**(46.3–54.2)**

Abbreviations: CI = confidence interval; ED = emergency department.

* Estimates are based on interviews conducted during September 2010–June 2011 and vaccination received during August 2010–May 2011. Estimates are based on responses by an adult to the following survey questions: "During the past 12 months, has [person] had a flu shot? A flu shot is usually given in the fall and protects against influenza for the flu season," and "During the past 12 months, has [person] had a flu vaccine sprayed in his/her nose by a doctor or other health professional? This vaccine is usually given in the fall and protects against influenza for the flu season," and "During what month and year did you receive your most recent flu shot?" and "During what month and year did you receive your most recent flu nasal spray?" or responses by an adult about a child to the following questions: "During the past 12 months, has [child] had a flu vaccination? A flu vaccination is usually given in the fall and protects against influenza for the flu season," and "During what month and year did [child] receive his/her most recent flu vaccine?"

† *Current asthma (child):* "Yes" response to the following survey questions, "Has a doctor or other health professional ever told you that [child] had asthma?" and "Does [child] still have asthma?" *Current asthma (adult):* "Yes" response to the following survey questions, "Have you ever been told by a doctor or other health professional that you had asthma?" and "Do you still have asthma?" *Without current asthma (child):* "No" response to one of the following survey questions: "Has a doctor or other health professional ever told you that [child] had asthma?" or "Does [child] still have asthma?" *Without current asthma (adult):* "No" response to one of the following survey questions: "Have you ever been told by a doctor or other health professional that you had asthma?" or "Do you still have asthma?" *Asthma attack or episode:* "Yes" response to the following survey questions, "During the past 12 months, have you [has child] had an episode of asthma or an asthma attack?" and "No" or "Don't know/Refused" response to "During the past 12 months, have you [has child] had to visit an emergency room or urgent care center because of asthma?" *ED/urgent care visit*: "Yes" response to "During the past 12 months, have you [has child] had to visit an emergency room or urgent care center because of asthma?" and "Yes", "No", or "Don't know/Refused" response to "During the past 12 months, have you [has child] had an episode of asthma or an asthma attack?" *No asthma attack or ED/urgent care visit:* "No" responses to the following survey questions: "During the past 12 months, have you [has child] had an episode of asthma or an asthma attack?" and "During the past 12 months, have you [has child] had to visit an emergency room or urgent care center because of asthma?" or "No" response to one of the two questions and "Don't know/Refused" response to the other question.

§ Children were classified into age groups based on their age as of November 1, 2010. Adults were classified into age groups based on their age at time of NHIS interview.

¶ Unweighted sample size; percentages and CIs are weighted proportions.

** p<0.05 by t-test for comparisons between asthma groups (with current asthma versus without current asthma; with asthma and attack in past 12 months versus with asthma and no attack or ED/urgent care visit in past 12 months; and with asthma and ED/urgent care visit in past 12 months versus with asthma and no attack or ED/urgent care visit in past 12 months).

†† p<0.05 by t-test for comparisons between age groups, with persons aged 2–17 years as the reference group.

higher among persons with current asthma than it was for those without current asthma across all other characteristics, including number of health-care visits in the past 12 months, racial/ethnic group, having a usual place for health care, ability to pay for prescription drugs, and family income adjusted for family size (Table 2).

Among all persons, more than twice as many persons with health insurance coverage were vaccinated compared with those without health insurance coverage. Similarly, vaccination coverage was more than double among persons with a usual place for health care than among persons without a usual place for care (Table 2). Among persons with current asthma, 52.0% of those with a usual place for care were vaccinated, compared with 19.2% of those without a usual place for care (p<0.05). Regardless of asthma status, vaccination coverage was significantly lower among those who could not afford prescription drugs during the past 12 months than for those who could (Table 2).

Within the "all persons" and "without current asthma" groups, vaccination coverage for persons in families with incomes ≥250% the poverty threshold for family size was significantly higher than it was for persons in families with incomes less than the poverty threshold for family size. In addition, within the "all persons" and "without current asthma" groups, vaccination coverage was lower among non-Hispanic blacks and Hispanics than among non-Hispanic whites (Table 2). Among persons with current asthma, vaccination coverage was similar across racial/ethnic and income-to-poverty threshold ratio groups.

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Editorial Note

This report provides the first update of influenza vaccination coverage among the noninstitutionalized U.S. civilian population of persons with current asthma since ACIP recommended annual influenza vaccination for all persons aged ≥6 months

TABLE 2. Influenza vaccination coverage* among persons aged ≥2 years by current asthma status,† number of health-care visits,§ race/ethnicity,¶ health insurance coverage status, usual place of care,†† inability to afford prescription drugs,§§ and income-to-poverty threshold ratio¶¶ — National Health Interview Survey (NHIS), United States, 2010–11 influenza season**

Characteristic	All persons			Without current asthma			With current asthma		
	No.***	%†††	(95% CI)†††	No.***	%†††	(95% CI)†††	No.***	%†††	(95% CI)†††
No. of health-care visits in past 12 mos									
0§§§	5,804	14.7	(13.4–16.2)	5,576	14.5	(13.2–16.0)	228	19.7	(13.8–27.8)
1	5,713	29.8¶¶¶	(28.1–31.5)	5,407	29.3¶¶¶	(27.6–31.0)	306	39.3¶¶¶****	(31.5–48.3)
2–5	13,769	43.7¶¶¶	(42.5–45.0)	12,528	43.2¶¶¶	(41.9–44.5)	1,241	49.0¶¶¶****	(45.1–53.0)
6–9	3,211	51.4¶¶¶	(49.0–53.8)	2,836	51.3¶¶¶	(48.8–53.9)	375	52.1¶¶¶	(44.7–59.8)
≥10	4,023	55.9¶¶¶	(53.6–58.1)	3,377	54.2¶¶¶	(51.8–56.7)	646	65.7¶¶¶****	(60.1–71.3)
Race/Ethnicity									
White, non-Hispanic§§§	18,100	40.7	(39.5–41.8)	16,600	39.8	(38.6–41.0)	1,500	50.7****	(47.3–54.2)
Black, non-Hispanic	5,009	33.7¶¶¶	(31.5–36.0)	4,450	32.3¶¶¶	(29.9–34.9)	559	44.8****	(38.6–51.4)
Hispanic	6,700	32.8¶¶¶	(30.9–34.8)	6,174	31.5¶¶¶	(29.6–33.5)	526	49.3****	(42.4–56.7)
Other, non-Hispanic	2,827	39.3	(36.2–42.6)	2,603	38.2	(35.1–41.6)	224	51.0****	(41.2–61.7)
Health insurance coverage									
Covered§§§	26,794	42.7	(41.7–43.6)	24,390	41.6	(40.7–42.6)	2,404	53.6****	(50.9–56.4)
Not covered	5,738	17.8¶¶¶	(16.2–19.6)	5,343	17.2¶¶¶	(15.5–19.0)	395	25.8¶¶¶****	(19.9–33.1)
Usual place for health care									
Yes§§§	27,899	42.0	(41.0–42.9)	25,319	41.0	(40.0–42.0)	2,580	52.0****	(49.3–54.8)
No	4,366	15.5¶¶¶	(13.9–17.1)	4,154	15.3¶¶¶	(13.7–17.0)	212	19.2¶¶¶	(13.0–27.7)
Could not afford prescription drugs in past 12 mos									
Yes§§§	2,874	31.6	(29.1–34.2)	2,408	30.1	(27.3–33.0)	466	39.4****	(33.3–46.2)
No	29,748	39.2¶¶¶	(38.3–40.1)	27,407	38.1¶¶¶	(37.2–39.1)	2,341	51.5¶¶¶****	(48.7–54.4)
Income-to-poverty threshold ratio									
0–0.99§§§	6,326	33.1	(30.8–35.3)	5,644	31.3	(29.0–33.5)	682	46.9****	(40.6–53.3)
1.0–2.49	9,892	34.9	(33.3–36.6)	9,017	33.8	(32.1–35.6)	876	46.9****	(41.7–52.0)
2.5–4.49	8,230	38.4¶¶¶	(36.8–40.0)	7,565	37.3¶¶¶	(35.6–39.0)	665	50.3****	(44.7–56.0)
≥4.5	8,188	45.0¶¶¶	(43.3–46.6)	7,602	44.3¶¶¶	(42.6–45.9)	586	54.2****	(48.9–59.5)

Abbreviation: CI = confidence interval.

* Estimates are based on interviews conducted during September 2010–June 2011 and vaccination received during August 2010–May 2011. Estimates are based on responses by an adult to the following survey questions: "During the past 12 months, has [person] had a flu shot? A flu shot is usually given in the fall and protects against influenza for the flu season," and "During the past 12 months, has [person] had a flu vaccine sprayed in his/her nose by a doctor or other health professional? This vaccine is usually given in the fall and protects against influenza for the flu season," and "During what month and year did you receive your most recent flu shot?" and "During what month and year did you receive your most recent flu nasal spray?" or responses by an adult about a child to the following questions: "During the past 12 months, has [child] had a flu vaccination? A flu vaccination is usually given in the fall and protects against influenza for the flu season," and "During what month and year did [child] receive his/her most recent flu vaccine?"

† *Current asthma (child):* "Yes" response to the following survey questions, "Has a doctor or other health professional ever told you that [child] had asthma?" and "Does [child] still have asthma?" *Current asthma (adult):* "Yes" response to the following survey questions, "Have you ever been told by a doctor or other health professional that you had asthma?" and "Do you still have asthma?" *Without current asthma (child):* "No" response to one of the following survey questions: "Has a doctor or other health professional ever told you that [child] had asthma?" or "Does [child] still have asthma?" *Without current asthma (adult):* "No" response to one of the following survey questions: "Have you ever been told by a doctor or other health professional that you had asthma?" or "Do you still have asthma?"

§ Based on response to the question, "During the past 12 months, how many times have you seen a doctor or other health care professional about your own health at a doctor's office, a clinic, or some other place? Do not include times you were hospitalized overnight, visits to hospital emergency rooms, home visits, dental visits, or telephone calls."

¶ Based on responses to the following questions: "What race or races do/does [person] consider [yourself/herself/himself] to be? Please select one or more of these categories," and "Which one of these groups, that is [read groups selected] would you say best represents [person's] race?"

** Health insurance coverage is at the time of the NHIS interview. Persons covered by Medicare, Medicaid, private insurance, Indian Health Service, military health care, state-sponsored health plans, or other government programs are considered covered. Persons not covered by any of these are considered not covered. This pertains to overall health insurance coverage and does not address whether vaccinations specifically are included in the coverage.

†† *Yes*: "Yes" or "There is more than one place" response to the question, "Is there a place that you usually go to when you are sick or need advice about your health?" *No*: "There is no place" response to the same question.

§§ *Yes*: "Yes" response to the question, "During the past 12 months, was there any time when you needed any of the following, but didn't get it because you couldn't afford it? Prescription medicines?" *No*: "No" response to the same question.

¶¶ Income-to-poverty threshold ratio is based on family income using the U.S. Census Bureau poverty thresholds for different family sizes. Family income was imputed when information was missing, using a multiple imputation methodology.

*** Unweighted sample size.

††† Percentages and CIs are weighted proportions.

§§§ Reference group used for pairwise significance testing within characteristic group and current asthma stratum.

¶¶¶ p<0.05 by t-test when compared with reference group within column.

**** p<0.05 by t-test for comparisons between "with current asthma" and "without current asthma" groups.

What is already known on this topic?

Although persons with asthma historically have had higher influenza vaccination coverage than persons without asthma, coverage remains lower than *Healthy People 2020* targets.

What is added by this report?

Analysis of 2010 and 2011 National Health Interview Survey data shows that influenza vaccine coverage during the 2010–11 season among persons with asthma was 50%, up from 36% during the 2005–06 season, but coverage across all age groups remained well below *Healthy People 2020* targets of 80% for children aged 6 months–17 years and 90% for adults aged ≥18 years who are at high risk.

What are the implications for public health practice?

Measures that increase influenza vaccination among persons with asthma should be implemented. Interventions that have demonstrated benefits in similar settings include client reminders, reduced client out-of-pocket costs, and provider reminder systems.

beginning with the 2010–11 influenza season. Vaccination coverage among persons with current asthma has increased from 36% during the 2005–06 influenza season[††] (*3*) to 50% during the 2010–11 season, with coverage increasing for all age groups.

This analysis supports findings from previous studies using NHIS data (*3,6*) indicating that having more health-care visits, health insurance coverage, a usual place for health care, and a higher family income relative to family size are significantly associated with higher vaccination coverage. Despite increased vaccination coverage among those with more health-care visits over the past year, more than half of persons with current asthma lacked current vaccination, suggesting that many health-care visits are missed opportunities for influenza-related education and vaccination.

ACIP has incrementally expanded the populations in the United States for whom seasonal influenza vaccination is recommended. Although children with asthma have been recommended to receive influenza vaccination annually, ACIP first recommended vaccination for all children aged 24–59 months regardless of risk status for the 2006–07 influenza season, and ACIP expanded that recommendation to include all children aged 5–18 years for the 2008–09 influenza season (*7,8*).[§§] For the 2010–11 influenza season, ACIP recommended seasonal influenza vaccination for all persons aged ≥6 months (*2*). Although influenza vaccination coverage among persons with current asthma increased from 36.0% in 2005–06 to 49.6% in 2010–11, coverage among persons with current asthma increased the most among children aged 2–17 years (a 20.3 percentage point increase, from 32.5% to 52.8%). A similar increase was observed over the same period among children aged 2–17 years without current asthma (a 22.9 percentage point increase, from 15.9% to 38.8%). The increase suggests that the 2006 and 2008–2009 ACIP recommendations indicating vaccination of children regardless of risk status might have raised awareness about the importance of annual influenza vaccination among all children. Another possible contributing factor is that the 2009 H1N1 pandemic led to increased coverage during the 2010–11 influenza season.

The findings in this report are subject to at least five limitations. First, the limited sample size of persons with current asthma (n = 2,809) prevented reliable estimation of vaccination coverage of other sociodemographic subgroups not examined in this analysis. Second, because NHIS includes only those in the noninstitutionalized U.S. civilian population who agreed to participate, results might not be representative of other populations. Third, the NHIS response rates of 79.5% and 82.0% might have resulted in nonresponse bias, even after adjustment for nonresponse. Fourth, ACIP recommends that children aged 6 months–8 years who have never been vaccinated for influenza receive two vaccinations during the first influenza season to optimize immune response, but this analysis could not determine vaccination status from previous years (*2*). Finally, determination of asthma status and vaccination status in NHIS is made by self-report, which introduces the possibility of recall bias and misclassification (*9*).

These findings highlight the need to increase awareness of the importance of seasonal influenza vaccination for persons with asthma. The findings support recommendations made by the Task Force on Community Preventive Services, which recommends multicomponent interventions aimed at increasing influenza vaccination coverage (*10*). Specifically, the task force recommends the combination of one or more interventions to enhance access to vaccination services (e.g., reduced client out-of-pocket costs) with at least one provider-based or system-based intervention (e.g., provider reminder systems), and/or at least one intervention to increase client demand for vaccination (e.g., client reminders). In addition, to be consistent with ACIP recommendations, asthma education for health-care professionals could include recommendations for influenza vaccination for all patients with current asthma.

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James A. Singleton, Walter W. Williams, National Center for Immunization and Respiratory Diseases; Dana Flanders, National Center for Environmental Health, CDC.

[††] Additional information available at http://www.cdc.gov/flu/professionals/vaccination/coverage_1112estimates.htm#data.

[§§] ACIP recommended adding children aged 5–18 years for annual influenza vaccination beginning in the 2008–09 influenza season, if feasible, but no later than the 2009–10 influenza season (*8*).

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Multistate Outbreak of *Salmonella* Chester Infections Associated with Frozen Meals — 18 States, 2010

On May 24, 2010, a cluster of 17 human *Salmonella enterica* serotype Chester clinical isolates with indistinguishable pulsed-field gel electrophoresis (PFGE) patterns was reported to PulseNet, the national molecular subtyping network for foodborne disease surveillance. This PFGE pattern had not been reported previously. Subsequently, CDC conducted an investigation that identified 44 ill persons in 18 states during May 24–June 19, 2010. In a multistate case-control study, consumption of a brand A frozen meal was associated with illness (matched odds ratio [mOR] = 30.7; 95% confidence interval [CI] = 6.4–∞). On June 17, 2010, the manufacturer (company A) voluntarily recalled its brand A cheesy chicken and rice frozen meals. The outbreak strain of *Salmonella* Chester was isolated from eight unopened samples. A root cause analysis conducted by company A identified chicken as a possible contaminated ingredient. Many frozen meals are not "heat and serve" items but rather are "not-ready-to-eat" (NRTE) products that require full cooking before consumption because they might include ingredients that have not gone through a pathogen kill-step process. Because *Salmonella* and other pathogens can survive in NRTE products, such products must be fully cooked before eating and clearly labeled with instructions for safe handling and cooking.

Epidemiologic Investigation

For this investigation, a case was defined as a laboratory-confirmed infection with the outbreak strain PFGE pattern JCPX01.0060 of *Salmonella enterica* serotype Chester and illness onset during April 4–June 19, 2010 (Figure 1). A total of 44 cases from 18 states were identified (Figure 2). The median age of patients was 36 years (range: <1–88 years), 30 (73%) of 41 patients were aged >19 years, and 21 (54%) of 39 were female. Among 43 patients with available information, 16 (37%) were hospitalized; no deaths were reported.

During June 4–11, 2010, ill persons were interviewed using a structured questionnaire to assess exposure to approximately 300 food and other items; these hypothesis-generating interviews revealed that six of 11 persons with infection reported eating brand A frozen meals before illness onset. A matched case-control study was initiated on June 14, 2010. Case-patients aged >2 years were enrolled. Controls were recruited from well persons among neighbors of case-patients identified by reverse-digit dialing and were matched by age group (<40 and ≥40 years). The questionnaire included questions on the consumption of items commonly reported during hypothesis generation (i.e., frozen meals, cereal, chicken, and lettuce). Case-patients were asked about exposures during the week before illness onset, and controls were asked about exposures in the week before their interview. Totals of 11 case-patients and 22 controls were enrolled from seven participating states.

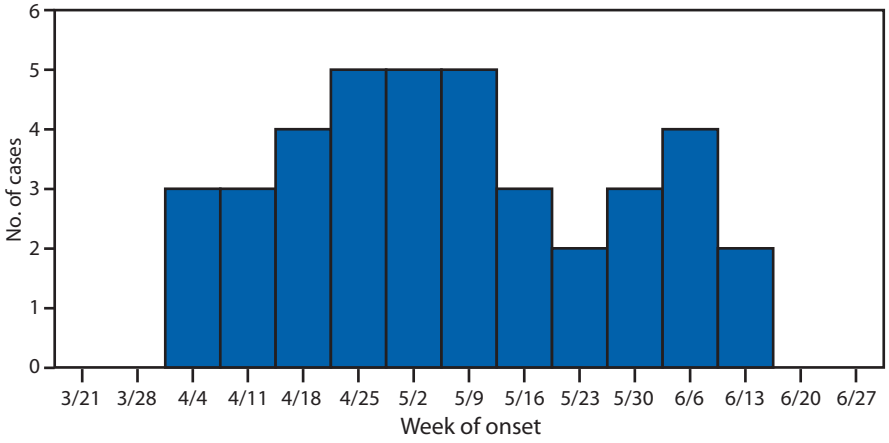
Consuming a brand A frozen meal was significantly associated with illness. All 11 of the case-patients reported eating a frozen meal, compared with three (14%) of the 22 control subjects (mOR = 24.3) (Table). The same case-patients reported eating a brand A frozen meal, whereas none of the three controls who reported eating a frozen meal ate a brand A meal (mOR = 30.7). Cheesy chicken and rice was the most commonly consumed brand A frozen meal, reported by eight (73%) of the 11 case-patients, followed by three (27%) consuming sweet and sour chicken. No other food item was associated with illness (Table).

After completing the case-control study, patients were interviewed using a standard questionnaire to further explore the types of brand A frozen meals potentially linked with illness. Among the 31 patients from whom information was collected, 25 (81%) reported consuming a frozen brand A meal during the week before illness onset. A total of 21 (84%) of 25 reported eating a brand A cheesy chicken and rice meal. In addition, patients were asked questions regarding how they cooked their frozen meals. Twenty-one (84%) of 25 reported cooking their frozen meal in a microwave, whereas five (20%) cooked their frozen meal in a conventional oven. A total of 22 (88%) let their meal stand for the time recommended in the cooking instructions before eating, and six (25%) of 24 cooked more than one meal at a time using the same method (microwave or oven).

Control Measures

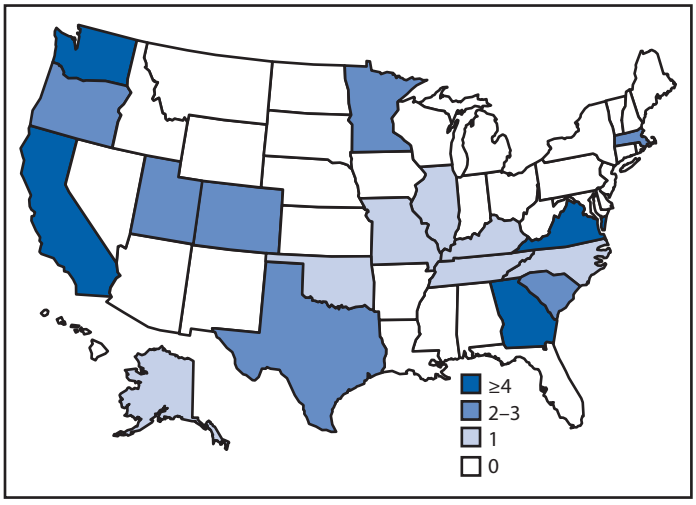
On June 17, 2010, CDC informed company A of the association between brand A cheesy chicken and rice frozen meals and the outbreak of *Salmonella* Chester infections. That day, the U.S. Department of Agriculture's Food Safety and Inspection Service (USDA-FSIS) convened its Recall Committee (*1*), and company A announced a recall of all brand A cheesy chicken and rice frozen meals, regardless of production date. This recall was conducted based on the strength of the epidemiologic data, and was done before the strain was isolated from brand A cheesy chicken and rice frozen meals.

FIGURE 1. Number of confirmed cases (N = 44) of infection with the outbreak strain of *Salmonella* Chester, by week of illness onset* — 18 states, April 4–June 19, 2010



* Week of illness onset was not reported for five of the 44 confirmed cases.

FIGURE 2. Number of confirmed cases (N = 44) of *Salmonella* Chester infection in outbreak associated with frozen meals* — 18 states, April 4–June 19, 2010



* The outbreak strain was identified by pulsed-field gel electrophoresis pattern.

Environmental Investigation

The outbreak strain was later isolated from eight unopened brand A cheesy chicken and rice frozen meals with three production dates ranging from July 14, 2009 to March 12, 2010. Brand A cheesy chicken and rice frozen meals contained a cooked chicken product, raw broccoli, partially cooked rice, and cheese. The cooked chicken was produced by company B; USDA-FSIS reviewed company B's hazard analysis and critical control point plan and sanitation records and did not find any deficiencies.

During July 7–August 9, 2010, USDA-FSIS and the Food and Drug Administration (FDA) Center for Food Safety and Applied Nutrition and Office of Regulatory Affairs conducted a comprehensive food safety assessment at company A, where the cheesy chicken and rice meal was produced, and did not identify any significant food safety issues. FDA conducted a traceback investigation into the sources of broccoli, but did not identify any common suppliers. Company A conducted a root cause analysis to identify common sources for ingredients used for the three production dates where the outbreak strain had been isolated. This extensive review identified a single poultry farm as a common supplier of chicken to a chicken cooking facility, company B. The three production dates of interest suggested that cooked chicken might have been the contaminated ingredient.

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Editorial Note

Outbreaks of *Salmonella* and Shiga toxin–producing *E. coli* infections associated with consuming frozen NRTE entrées have been previously reported (*2*–*6*). A common feature among these outbreaks is the consumer's misconception that the microwave process is for palatability and reheating, and not a critical control point to ensure raw and uncooked ingredients in NRTE products reach a sufficient temperature to render them safe from microbial hazards. Although safe handling instructions must be displayed in a prominent manner using terms that are easily understood such as uncooked, raw, or NRTE (*7*), a lack of clear cooking instructions on food product packaging, combined with consumers' limited knowledge of the wattage on their microwave ovens, appeared to be important factors contributing to the previous outbreaks.

A majority (84%) of U.S. residents report using their microwave oven to prepare packaged products. However, a survey conducted in 2010 found that only 69% followed all the

TABLE. Comparison between case-patients with *Salmonella* Chester infection and control subjects, by selected food exposures — 18 states, 2010

Food exposure	Case-patients (n = 11)		Controls (n = 22)		Matched odds rato	(95% CI)
	No.	(%)	No.	(%)		
Frozen meal	11	(100)	3	(14)	24.3	(4.9–∞)
Brand A frozen meals	11	(100)	0	—	30.7	(6.4–∞)
Cheesy chicken and rice	8	(73)	0	—	22.1	(4.4–∞)
Sweet and sour chicken	3	(27)	0	—	7.7	(1.2–∞)
Fettuccini with chicken and broccoli	2	(18)	0	—	4.8	(0.6–∞)
Pot pie	2	(18)	0	—	4.8	(0.6–∞)
Fried chicken and gravy	2	(18)	0	—	4.8	(0.6–∞)
Turkey breast with stuffing	2	(18)	0	—	4.8	(0.6–∞)
Beef tips in mushroom sauce	2	(18)	0	—	4.8	(0.6–∞)
Beef and broccoli	2	(18)	0	—	4.8	(0.6–∞)
Meat lasagna	2	(18)	0	—	4.8	(0.6–∞)
Pre-cut chicken parts	5	(45)	9	(41)	5.8	(0.6–295.4)
Boxed cereal	9	(82)	13	(59)	2.8	(0.5–30.9)
Bagged lettuce	3	(27)	9	(41)	1.3	(0.2–10.5)
Butter	3	(27)	13	(59)	1.0	(0.01–97.9)
Peanut butter	3	(27)	10	(45)	0.9	(0.1–7.3)
Bananas	3	(27)	13	(59)	0.5	(0.04–5.4)

Abbreviation: CI = confidence interval.

What is already known on this topic?

Salmonella commonly causes foodborne illness, and ingredient-driven outbreaks are difficult to detect. Not-ready-to-eat (NRTE) microwave products contain raw, uncooked ingredients and can contain pathogens that cause foodborne illnesses.

What is added by this report?

In May 2010, CDC identified a cluster of 17 human *Salmonella enterica* serotype Chester clinical isolates with indistinguishable pulsed-field gel electrophoresis patterns; the pattern had not been reported previously. The investigation identified 44 ill persons in 18 states. The potential source was chicken in an NRTE cheesy chicken and rice frozen meal.

What are the implications for public health practice?

Food manufacturers should place step-by-step, easy to follow, product-specific cooking instructions on all NRTE frozen microwavable products. Consumers should know the wattage of their microwave, and carefully read and follow instructions printed on the packaging for preparing NRTE frozen microwave entrées, including microwaving and allowing the product to stand for the recommended time before consuming.

cooking instructions (*8*). Another survey found that only 26% of participants reported they knew their microwave wattage (*9*).

In this outbreak, brand A cheesy chicken and rice packaging provided clearly marked cooking instructions for both microwave and conventional ovens; labeling for safe handling was displayed on both sides of the packaging, stating that the product must be "cooked thoroughly." However, not all of the persons with *Salmonella* Chester infection who were interviewed reported allowing their meal to stand for the time recommended in the cooking instructions before eating; microwave standing time is part of the cooking process.

Although no definitive cause was identified, company A's investigation suggested that cooked chicken in the frozen meal might have been contaminated. Company A has since implemented changes in its frozen foods Food Safety and Quality Programs. The company is now testing finished products and selected raw materials for various pathogens and partnering with suppliers to initiate more robust testing of lots dedicated for frozen meals. In addition, company A has developed internal methods to improve its processes at manufacturing establishments and has added consumer handling of frozen meals to its hazard analysis (*10*).

This outbreak highlights the need for consumers to thoroughly cook frozen foods that are NRTE because they contain raw ingredients. Manufacturers should clearly label products as NRTE and as containing raw ingredients. Food manufacturers should place step-by-step, easy to follow, product-specific cooking instructions on all NRTE frozen microwavable products. These instructions should be validated to account for variability in microwave wattage. Microwave oven manufacturers should clearly indicate the oven wattage on the front of the appliance. Consumers should know the wattage of their microwave and carefully read and follow instructions printed on packaging on how to properly heat and prepare NRTE frozen microwave entrées. Consumers should not only follow instructions for microwaving but should also allow the product to stand for the recommended time before consuming. Additionally, a food thermometer should be used to ensure that entrees are fully cooked and that all ingredients reach at least 165°F (74°C).

Acknowledgments

State and local health and agriculture departments in Alaska, California, Colorado, Georgia, Illinois, Kentucky, Massachusetts, Minnesota, Missouri, North Carolina, Oklahoma, Oregon, South Carolina, Tennessee, Texas, Utah, Virginia, and Washington. IEH Laboratories & Consulting Group, Lake Forest Park, Washington. US Dept of Agriculture's Food Safety and Inspection Svc District Offices. Food and Drug Administration. PulseNet, and Div of Foodborne, Waterborne, and Environmental Diseases, National Center for Emerging and Zoonotic Infectious Diseases, CDC.

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Rubella and Congenital Rubella Syndrome Control and Elimination — Global Progress, 2000–2012

Rubella virus usually causes a mild fever and rash in children and adults.* However, infection during pregnancy, especially during the first trimester, can result in miscarriage, stillbirth, or infants with congenital malformations, known as congenital rubella syndrome (CRS). In 2011, the World Health Organization (WHO) updated guidance on the preferred strategy for introduction of rubella-containing vaccine (RCV) into national routine immunization schedules with an initial wide-age-range vaccination campaign that includes children aged 9 months–15 years (*1*). WHO also urged all member states to take the opportunity offered by accelerated measles control and elimination activities as a platform to introduce RCVs (*1*). The Global Measles and Rubella Strategic Plan (2012–2020) published by the Measles Rubella Initiative partners in 2012 and the Global Vaccine Action Plan endorsed by the World Health Assembly in 2012 include milestones to eliminate rubella and CRS in two WHO regions by 2015, and eliminate rubella in five WHO regions by 2020. This report summarizes the global progress of rubella and CRS control and elimination during 2000–2012. As of December 2012, a total of 132 (68%) WHO member states had introduced RCV, a 33% increase from 99 member states in 2000. A total of 94,030 rubella cases were reported to WHO in 2012 from 174 member states, an 86% decrease from the 670,894 cases reported in 2000 from 102 member states. The WHO Region of the Americas (AMR) and European Region (EUR) have established rubella elimination goals of 2010 and 2015, respectively. AMR has started to document the elimination of measles, rubella, and CRS; in EUR, rubella incidence has decreased significantly, although outbreaks continue to occur.

Immunization Activities

Data were obtained from the WHO and United Nations Children's Fund (UNICEF) Joint Reporting Form (JRF), which is used to collect information from United Nations member states on vaccination campaigns, vaccination schedules, and number of doses of RCV administered by routine immunization services (*2*). Data from 2000–2012 were analyzed to assess the changes in rubella and CRS control activities.

As of December 2012, a total of 132 (68%) of the 194 member states had introduced RCV: three (7%) in the African Region (AFR), 35 (100%) in AMR, 14 (64%) in the Eastern Mediterranean Region (EMR), 53 (100%) in EUR, five (45%) in the South-East Asia Region (SEAR), and 22 (81%) in the Western Pacific Region (WPR). Member states with RCV in their schedule accounted for 59% of the global population in 2012, up from 31% in 2000. The proportion of infants who received a RCV dose was 22%† in 2000 to 43% in 2012, a 96% increase (Figure 1).

During 2000–2012, of the 33 member states introducing RCV, one is in AFR, four in AMR, two in EMR, 13 in EUR, three in SEAR, and 10 in WPR. A wide-age-range campaign was part of the implementation for introduction in 23 member states. One member state in the past 10 years interrupted RCV use and plans to reintroduce RCV. Of the 62 member states that had not introduced RCV into their national immunization program by the end of 2012, 50 (81%) are eligible for GAVI Alliance support (Figure 2).§ Eligibility requirements include measles coverage >80% and a gross national income per capita ≤1,550 U.S. dollars.

Of 132 member states that have introduced RCV, 124 (94%) provide the first RCV dose with the first routine dose of measles-containing vaccine (MCV) and eight (6%) provide the first RCV dose with the second MCV dose. In 2012, the first RCV dose was administered at age 9 months in eight (6%) member states, age 12–18 months in 120 (91%) member states, and age >18 months in three (3%) member states. RCV is provided in combination with measles vaccine alone in 11% of member states and in combination with measles and mumps (with or without varicella vaccine) in 89% of member states.

Surveillance Activities

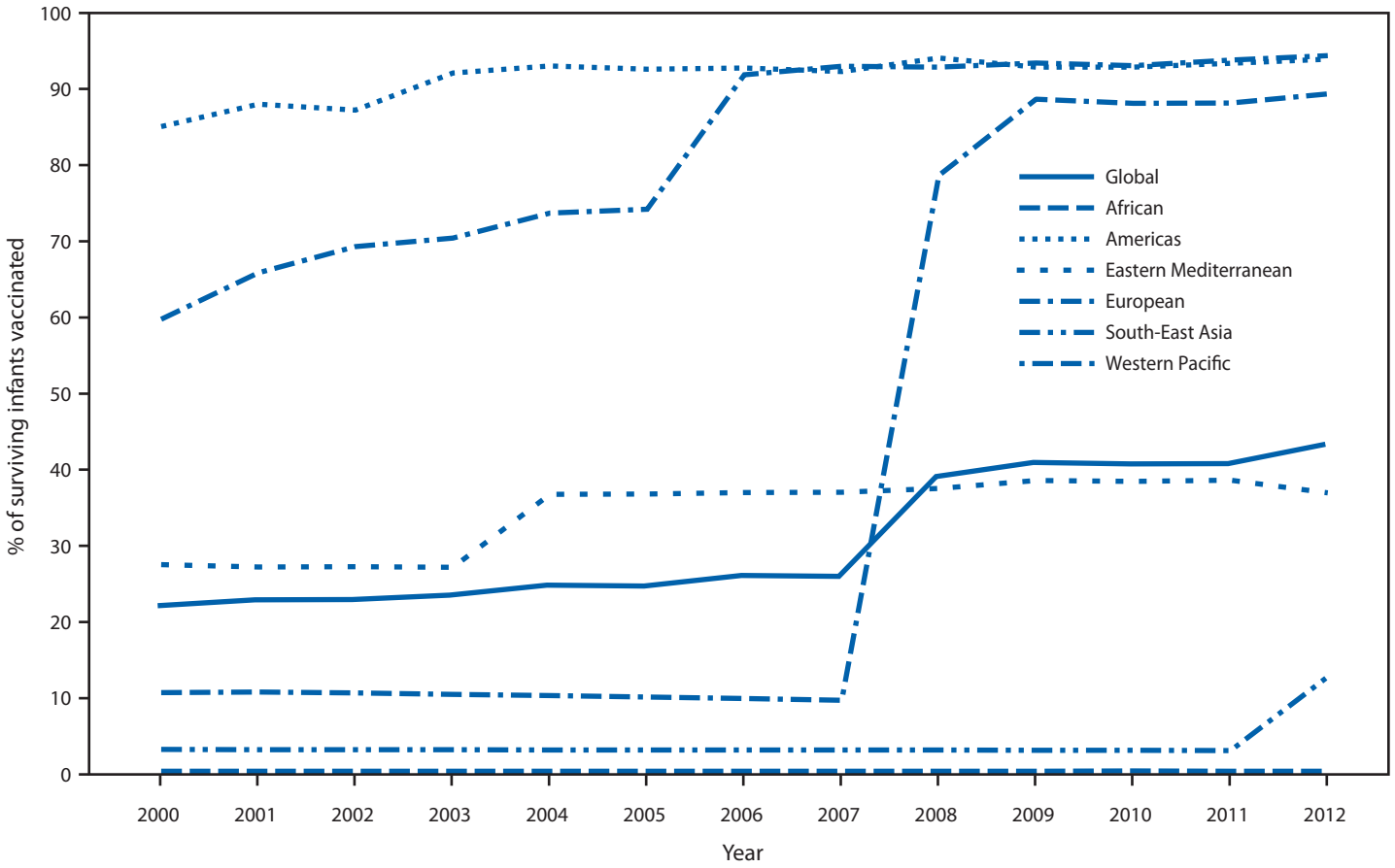
Rubella and CRS surveillance are necessary to evaluate the disease burden before and after introduction of RCV, and to identify pregnant women infected with rubella and children with CRS who require follow-up. The JRF collects surveillance data from member states, including cases of rubella and congenital rubella syndrome; for this report, data from 2000–2012 were analyzed. WHO has published case definitions for rubella and CRS as recommended standards for member state reporting (*3*). The number of member states reporting rubella cases increased from 102 in 2000 to 174 in 2012. The number of member states reporting CRS cases increased from 75 in 2000

*Additional information available at http://www.cdc.gov/vaccines/vpd-vac/rubella/in-short-adult.htm.

†Based on 2012 UNICEF–WHO joint estimate adjusted for 2012 United Nations Development Programme calculations of surviving infants per region, available at http://www.who.int/immunization_monitoring/data/en.

§Additional information about the GAVI Alliance, formerly the Global Alliance for Vaccines and Immunisation, and the support it provides, is available at http://www.gavialliance.org.

FIGURE 1. Proportion of surviving infants receiving rubella-containing vaccine (RCV) — World Health Organization (WHO) regions, 2000–2012*



* Based on WHO–United Nations Children's Fund (UNICEF) estimates of rubella coverage. Note: China introduced RCV into its immunization schedule in 2008.

to 129 in 2012. Of 132 member states that introduced RCV before 2012, 129 (98%) had reported rubella cases and 121 (92%) had reported CRS surveillance results in the previous 5 years. Of the 62 member states that had not introduced RCV before 2012, 60 (97%) had reported rubella cases and 49 (79%) had reported CRS cases in the previous 5 years (Table). In 2012, substantially more cases were reported in EUR (30,536 cases) and WPR (44,275 cases) than in other regions (19,219 cases). Rubella outbreaks with >2,000 cases were reported during 2012 in Romania (*4*), Japan (*5*), and Poland (*6*). These outbreaks occurred in member states with established rubella control programs, and where RCV introduction focused initially on vaccination of females.

Rubella elimination targets have been established in AMR and EUR. In AMR, the last endemic rubella and CRS case was reported in 2009, and the region is documenting the elimination of rubella and CRS. In EUR, the number of rubella cases decreased by 95%, from 621,039 in 2000 to 30,536 in 2012; however, cases increased from 9,672 in 2011.

Reported by

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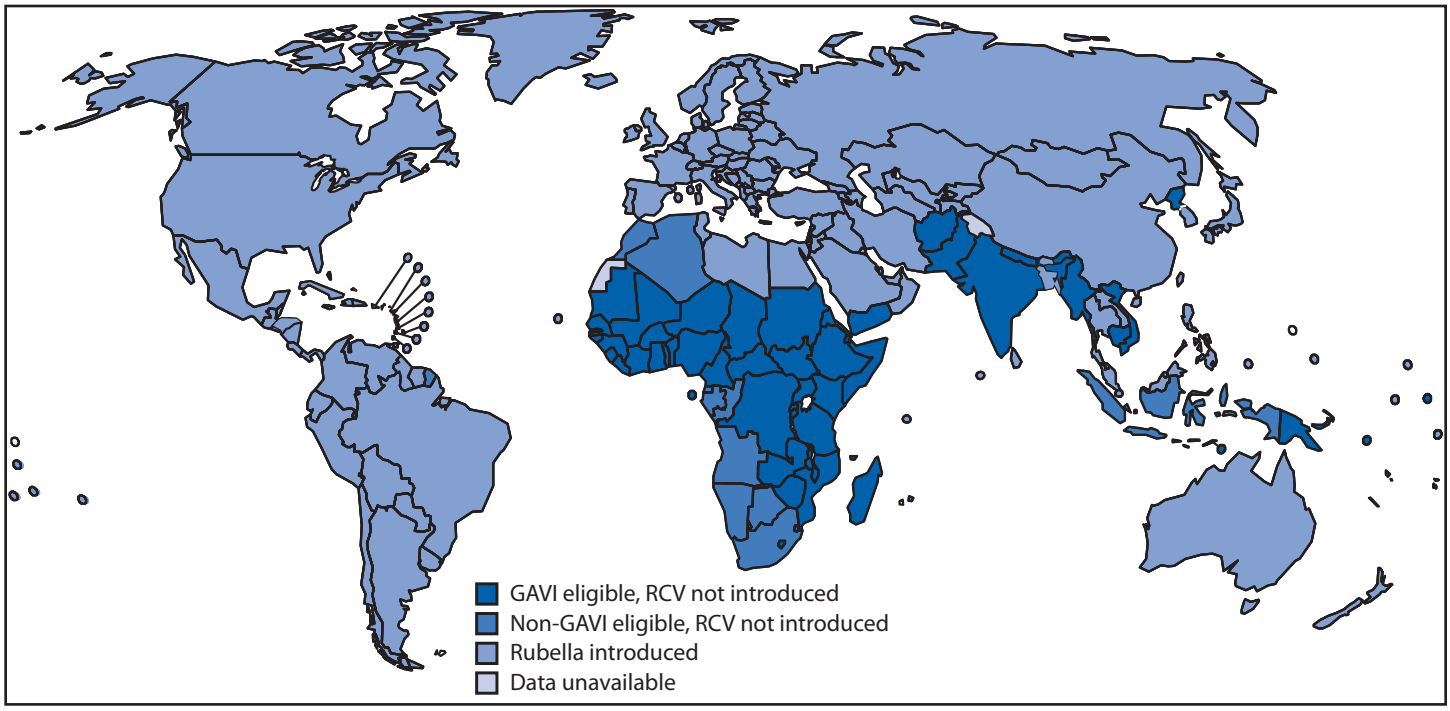
Editorial Note

Following a period of steady but slow increases in rubella control, a new phase of accelerated rubella control and CRS prevention has begun, marked by the 2011 WHO position paper recommending a strategy to eliminate rubella and CRS, and emphasizing RCV introduction in all member states and the linkage of rubella to measles control activities. Programmatic integration of RCV into an existing measles schedule is straightforward, involving no increase in the number of injections or in cold-chain requirements with a combined measles-rubella vaccine, no change in age of vaccine administration, and minimal change in recording and reporting formats. Sustainable financing

FIGURE 2. World Health Organization member states that have introduced rubella-containing vaccine (RCV) and member states potential to introduce RCV with GAVI Alliance support,* 2012



* Additional information about the GAVI Alliance, formerly the Global Alliance for Vaccines and Immunisation, and the support it provides, is available at http://www.gavialliance.org.

from government and partners is required to introduce and maintain routine rubella immunization activities and inclusion of RCV for all measles campaigns following introduction. The additional cost to include the rubella antigen with the measles vaccine is 0.199 to 0.309 U.S. dollars per dose.¶ GAVI Alliance funding is available for eligible member states to support introduction; the funding supports a grant for introduction of RCV into the national routine immunization schedule and a wide-age-range RCV campaign. Nine member states applied for these funds in 2012.

For RCV introduction to succeed, decision makers need to identify rubella and CRS as a public health priority, provide sustainable support, and ensure adequate coverage. Suboptimal implementation of rubella control strategies might result in an increase in CRS cases; following years of low vaccine coverage and lower levels of rubella virus transmission, persons who would have been infected as children remain susceptible until they reach adolescence and adulthood, resulting in a potential increase in CRS cases, as seen in Greece (*7*). To prevent an increase in rubella and CRS, the preferred RCV introduction strategy is to first conduct a national wide-age-range campaign and then immediately introduce RCV into the routine immunization schedule. Postcampaign coverage surveys validate the campaign coverage and can identify potential gaps.

Activities to reach elimination goals in AMR and EUR have decreased the number of cases in 2012 relative to 2000. Improvements in surveillance have not been consistent between member states and WHO regions. Improved surveillance for rubella in AFR and SEAR has increased the number of rubella cases detected that previously would have been undetected. Strong reporting systems in WPR and EUR resulted in a greater proportion of the cases reported globally. In AMR, a clear decrease in rubella cases is associated with a decrease in CRS cases.

Outbreaks in EUR and WPR indicate that while control and elimination activities are ongoing, some member states within these regions are at risk for large outbreaks. Initiation of CRS control activities focused on vaccinating girls and women, which decreased rubella virus transmission but resulted in a large proportion of susceptible persons, especially males. A large population susceptible to rubella infection (primarily males) has a high risk for outbreak and transmission of rubella virus to unvaccinated pregnant women. Surveillance for rubella infection benefits from integration with measles surveillance systems, but additional effort is required to strengthen the system to ensure that febrile rash illness cases reported in pregnant women or their immediate contacts are fully investigated,

¶ UNICEF vaccine price information for measles and measles-rubella vaccine available at http://www.unicef.org/supply/index_57476.html.

TABLE. Global progress in rubella and congenital rubella syndrome (CRS) control and elimination activities — World Health Organization (WHO) regions, 2000 and 2012

	2000						2012						
	Member states with rubella-containing vaccine in schedule		Member states reporting		No. of reported cases		Member states with rubella-containing vaccine in schedule		Member states reporting		No. of reported cases		
WHO region	No.	(%)	Rubella	CRS	Rubella	CRS	No.	(%)	Rubella	CRS	Rubella	CRS	Control target*
Africa (46 member states)	2	(4)	7	3	865	0	3	(6)	41	20	10,830	69	None
Americas (35 member states)	31	(89)	25	18	39,228	80	35	(100)	35	35	21	3	Elimination
Eastern Mediterranean (22 member states)	12	(55)	11	6	3122	0	14	(64)	18	9	1,698	20	None
Europe (53 member states)	40	(75)	41	34	621,039	48	53	(100)	46	42	30,536	60	Elimination
South-East Asia (11 member states)	2	(18)	3	2	1,165	26	5	(45)	11	6	6,670	14	None
Western Pacific (27 member states)	12	(44)	15	12	5,475	3	22	(81)	23	17	44,275	134	Control
Global (194 member states)	**99**	**(51)**	**102**	**75**	**670,894**	**157**	**132**	**(68)**	**174**	**129**	**94,030**	**300**	**None**

Source: WHO–United Nations Children's Fund (UNICEF) Joint Reporting Form.
* No control targets were set before 2000.

What is already known on this topic?

Rubella virus infection during pregnancy, especially during the first trimester, can cause miscarriage, stillbirth, or congenital rubella syndrome (CRS). The World Health Organization (WHO) recommends that all member states introduce rubella-containing vaccines (RCVs) to control rubella and CRS. The World Health Assembly has set two goals: rubella elimination in two WHO regions by 2015 and measles and rubella elimination in five WHO regions by 2020.

What is added by this report?

The number of countries using RCVs in their immunization program and reporting rubella and CRS surveillance data has steadily increased from 2000 to 2012. As of December 2012, a total of 132 (68%) WHO member states had introduced RCV, a 33% increase from 99 member states in 2000. A total of 94,030 rubella cases were reported to WHO in 2012 from 174 member states, an 86% decrease from the 670,894 cases reported in 2000 from 102 member states.

What are the implications for public health practice?

Near elimination of rubella and CRS in the Americas proves that the tools exist to make elimination possible, and substantial progress is being made globally. However, gaps in surveillance limit the ability to monitor progress toward elimination, and recent outbreaks in Europe and Asia demonstrate the need for sustained, high-quality immunization programs.

including ascertaining pregnancy outcome. Surveillance to detect CRS is needed to monitor the impact of vaccination.

The difference between the 2012 global coverage with the first dose of MCV (83%) and RCV (43%) highlights the extent of the opportunity missed by the lack of integration of RCV with MCV. With a new phase of rubella control, member states should consider introducing or strengthening RCVs immunization activities and strengthening their existing rubella and CRS surveillance systems. The availability of technical expertise and financial resources from Measles Rubella Initiative partners, including the GAVI Alliance, provides a foundation to accelerate rubella control and CRS prevention activities globally. In addition, political commitment at the federal, provincial, and district levels is needed to reach the Measles Rubella Initiative and Global Vaccine Action Plan goal of elimination in five WHO regions by 2020.

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Notes from the Field

Escherichia coli O157:H7 Outbreak Associated with Seasonal Consumption of Raw Ground Beef — Wisconsin, December 2012–January 2013

On January 8, 2013, the Wisconsin State Laboratory of Hygiene notified the Wisconsin Division of Public Health (WDPH) of two patients with *Escherichia coli* O157:H7 clinical isolates that had indistinguishable, but commonly identified, pulsed-field gel electrophoresis (PFGE) patterns. The two patients were interviewed by local health departments within 1 day of the initial report. They revealed that they had eaten raw ground beef purchased from the same meat market and served as "tiger meat" or "cannibal sandwiches." In this dish, the raw ground beef typically is served on rye bread or crackers with onions and is a traditional winter holiday specialty in certain regions of the upper Midwest. Five agencies (the Watertown Department of Health; WDPH; Wisconsin Department of Agriculture, Trade, and Consumer Protection; U.S. Department of Agriculture's Food Safety and Inspection Service; and CDC) investigated to determine the magnitude of the outbreak, prevent additional infections, and better understand raw ground beef consumption.

The market provided a list of 62 persons who preordered raw ground beef for the 2012 winter holiday season. A case-finding and knowledge-attitudes-practices questionnaire was administered to 53 of 62 persons included on that list, plus nine additional household members, and two persons with reported illness. A probable case was defined as diarrhea with onset occurring in a person who had been exposed in the previous 10 days to raw ground beef sold by the market during December 22, 2012–January 4, 2013. A confirmed case was an illness meeting the probable case definition in a person from whose stool *E. coli* O157:H7 with PFGE and multilocus variable-number tandem-repeat analysis (MLVA) patterns indistinguishable from those of the outbreak strain had been isolated.

Among 17 patients (four with confirmed and 13 with probable cases), 13 were female, and median age was 46 years (range: 1–82 years). Eight (47%) had received outpatient medical care; no hospitalizations or deaths occurred. Fourteen patients reported eating raw ground beef served as tiger meat or cannibal sandwiches during the holiday, and three had exposure to raw ground beef from cross-contamination. The market voluntarily recalled 2,532 pounds (1,148 kg) of raw ground beef on January 15, 2013. *E. coli* O157:H7 isolates from four patients and two raw ground beef samples (one in original packaging) collected from two households had PFGE and MLVA patterns indistinguishable from the outbreak strain.

Among respondents to the questionnaire, 55 (98%) of 56 reported consuming raw ground beef only during special occasions or winter holidays. A total of 53 (91%) of 58 were aware that consuming raw ground beef could cause illness, but only 17 (41%) of 42 thought that illness could be severe. Six of 15 (40%) patients and 28 (70%) of 40 non-ill persons said they intended to eat raw ground beef in the future.

In this same region of Wisconsin, raw ground beef served as tiger meat was associated with large (more than 50 cases) outbreaks of foodborne illness reported to WDPH during 1972, 1978, and 1994 (*1*–*3*). Despite ongoing outreach efforts addressing the dangers associated with consuming undercooked or raw ground beef, this regional holiday tradition continues to be associated with outbreaks.

Epidemiologic, laboratory, and traceback evidence implicated raw ground beef from the market as the source of *E. coli* O157:H7 in this outbreak. The rapid public health response resulted in timely case detection and likely prevention of additional cases through product recall.

Discouraging this tradition requires regional targeted consumer and retailer education to ensure understanding of the potential for severe illness associated with raw ground beef consumption. Retailers in this region should be encouraged to directly discourage their customers from consuming raw ground beef. To prevent illness, ground beef should be cooked to an internal temperature of 160°F (71°C), as measured with a food thermometer, before consumption.

Reported by

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Announcement

National Influenza Vaccination Week — December 8–14, 2013

The U.S. Department of Health and Human Services, CDC, state and local health departments, and other health agencies will observe National Influenza Vaccination Week December 8–14, 2013, with educational and promotional activities scheduled across the country. The observance was begun in 2005 to highlight the importance of annual influenza vaccination and to foster greater use of influenza vaccine in the months of December, January, and beyond. As of November 15, 2013, approximately 126 million doses of 2013–14 seasonal influenza vaccine had been distributed to vaccination providers in the United States (*1*).

The Advisory Committee on Immunization Practices recommends influenza vaccination for all persons aged ≥6 months (*2*). Influenza vaccination is especially important for certain persons at higher risk for influenza-related complications. Persons in high-risk groups include children aged <5 years, and especially children aged <2 years; persons with certain chronic health conditions, such as heart disease, asthma, and diabetes; pregnant women; and adults aged ≥65 years. In addition, health-care personnel are at greater risk for acquiring influenza and can transmit it to their patients (*3*).

Educational materials, web tools, and CDC's planned activities for National Influenza Vaccination Week are available at http://www.cdc.gov/flu/nivw/index.htm, whereas general materials regarding influenza vaccination are available at http://www.cdc.gov/flu/freeresources. Additional information and resources for health-care professionals are available at http://www.cdc.gov/flu/professionals. Current influenza vaccination coverage estimates are available at http://www.cdc.gov/flu/fluvaxview.

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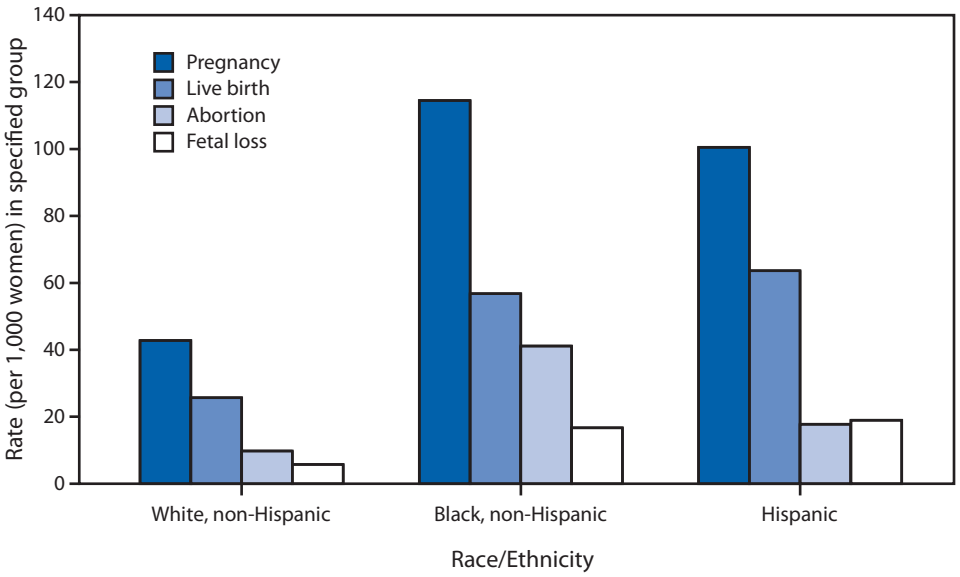
2. CDC. Prevention and control of seasonal influenza with vaccines: recommendations of the Advisory Committee on Immunization Practices—United States, 2013–14. MMWR 2013;62(No. RR-7).
3. CDC. Immunization of health-care personnel: recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR 2011; 60(No. RR-7).

QuickStats

FROM THE NATIONAL CENTER FOR HEALTH STATISTICS

Rates of Pregnancies and Pregnancy Outcomes Among Teens Aged 15–19 Years, by Race/Ethnicity — United States, 2009



The pregnancy rate for non-Hispanic white teenagers aged 15–19 years (42.8 per 1,000) was less than half that of non-Hispanic black (114.5) and Hispanic teenagers (100.5). Hispanic teenagers aged 15–19 had the highest birth rate of all groups (63.6 per 1,000), whereas non-Hispanic black teenagers had the highest abortion rate (41.1 per 1,000). Fetal loss rates were more than twice as high for non-Hispanic black (16.7 per 1,000) and Hispanic teenagers (19.0) than for non-Hispanic white teenagers (7.3).

Source: Curtin SC, Abma JC, Ventura SJ, Henshaw SK. Pregnancy rates for U.S. women continue to drop. NCHS data brief no. 136. Hyattsville, MD: US Department of Health and Human Services, National Center for Health Statistics, CDC; 2013 (in press).

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