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Ciguatera Fish Poisoning — New York City, 2010–2011

During August 2010–July 2011, the New York City Department of Health and Mental Hygiene (DOHMH) received reports of six outbreaks and one single case of ciguatera fish poisoning (CFP), involving a total of 28 persons. CFP results from consumption of certain large, predatory, tropical reef fish that have bioaccumulated ciguatoxins (CTX). CFP is characterized by various gastrointestinal, cardiovascular, and neurologic symptoms. A prolonged period of acute illness can result, and the neurologic symptoms can last months, with variable asymptomatic and symptomatic periods. The first two outbreaks and the single case, involving 13 persons, were reported during August 6–September 13, 2010. DOHMH distributed a health alert in November 2010 requesting health-care providers be alert for CFP signs and symptoms. The health alert resulted in identification of 11 more cases that month and an additional two outbreaks involving four persons in July 2011. In comparison, only four CFP outbreaks, involving 21 persons total, had been reported in New York City (NYC) during the preceding 10 years (2000–2009). DOHMH's investigation revealed that 13 persons became ill after eating barracuda, and 15 became ill after eating grouper. Although specific and highly sensitive laboratory analyses can detect and confirm CTX in fish, no practical field tests are available for fish monitoring programs. CFP prevention depends on educating the public, seafood suppliers, and distributors about known CFP endemic areas and high-risk fish species. Traceback investigations of fish associated with outbreaks provide valuable information regarding fishing areas associated with CFP. Not all fish from CFP endemic areas are ciguatoxic, but persons who eat fish from endemic regions are at higher risk for CFP. If an illness is suspected to be CFP, public health authorities should be notified and informed of the case history for possible investigation and intervention measures.

On August 6, 2010, an adolescent female aged 16 years, and her mother aged 47 years went to a hospital emergency department (ED) with diarrhea, light-headedness, and perioral tingling after eating barracuda purchased at a fish market in Queens, New York. Hours later, an additional four family members (three males and one female) who had eaten the same fish, reported tingling in their extremities. Two of the four also visited the ED. Later, the four who had gone to the ED experienced abdominal cramps, dizziness, headache, faintness, nausea, and vomiting. Hypotension and bradycardia persisted, despite volume resuscitation with normal saline. The treating physician suspected a link between the barracuda consumption and neurologic and gastrointestinal symptoms (Table 1), subsequently diagnosed CFP,* and contacted the NYC Poison Control Center (PCC). The PCC reported the incident to DOHMH, and a DOHMH inspector collected samples of barracuda from the fish market and the patients' home. The inspector also embargoed barracuda sale at the fish market.

Samples were analyzed for CTX at the Gulf Coast Seafood Laboratory of the Food and Drug Administration (FDA) using methods developed by FDA to confirm CFP cases. These methods included an in vitro mouse neuroblastoma cell assay for sodium channel toxins to provide a semiquantitative measure of composite ciguatoxicity in fish (*1*). Extracts that were

* Additional information on CFP signs and symptoms available at http://www.nyc.gov/html/doh/downloads/pdf/cd/2010/10md25.pdf.

Continuing Education examination available at http://www.cdc.gov/mmwr/cme/conted_info.html#weekly.

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positive by this method were subsequently analyzed by liquid chromatography–tandem mass spectrometry for unequivocal confirmation of ciguatoxins (*1*). One meal remnant was confirmed to contain Caribbean CTX-1 and -2 at a toxicity level of 1.1 μg/kg total C-CTX-1 equivalents, more than 10 times the FDA guidance level of 0.1 μg/kg total C-CTX-1 equivalents. The patients reported that some of their neurologic symptoms persisted for 2–5 months (Table 1).

During August–September 2010, an additional seven CFP cases were reported to DOHMH. These consisted of two outbreaks (outbreaks 2 and 3; Table 1) and a single case. All patients experienced symptoms consistent with CFP after eating barracuda purchased from fish markets in three different NYC boroughs and one restaurant (Table 2). On the evening of November 19, 2010, after reading the health alert about CFP, a physician reported a suspected CFP outbreak in Queens (outbreak 4). This new outbreak involved 11 persons from three families who had eaten fish labeled as grouper that was purchased from a Queens supermarket. Five hours after eating the fish, one family member visited the ED with vomiting, nausea, hypotension, and leg cramping. Shortly thereafter, other members of the family reported experiencing numbness and tingling, and two had bradycardia diagnosed several days after fish consumption. In contrast with previously reported cases, four patients experienced tooth pain or paradoxical dysesthesias (Table 1). New York State Department of Agriculture and Markets completed their traceback investigation and identified the same distributor involved in the barracuda-related CFP outbreak reported earlier that year.

On July 12, 2011, two separate outbreaks and an additional four cases that were associated with eating grouper at Manhattan restaurants were reported to DOHMH. One of the patients was a physically active man who swam >2 miles per day before his illness. After the onset of acute CFP symptoms, he had difficulty walking that persisted for several months. A sample of leftover fish was confirmed by FDA to contain 1.9 μg/kg total C-CTX-1 equivalents, exceeding the FDA guidance level by almost 20 times. Before this most recent outbreak, the implicated vendor was inspected by FDA and issued a warning letter detailing violations.

Reported by

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TABLE 1. Characteristics of persons with suspected ciguatera fish poisoning — New York City, August 2010–July 2011

Patient	Outbreak	Date fish consumed	Age (yrs)	Sex	Hours from consumption to symptom onset	Reported fish consumed*	Sought medical attention	Hospitalized	Symptoms			
									Gastrointestinal	Cardiac	Neurologic	Nonspecific/ Other
1	1	Aug 6, 2010	47	F	7	Barracuda	Yes	Yes (ICU)	N, V, D, CR	S, B, LBP,	NT, P	ST, DZ
2	1	Aug 6, 2010	16	F	7	Barracuda	Yes	Yes (ICU)	N, V, D, CR	S, B, LBP, HP	DW	CS, W, DZ
3	1	Aug 6, 2010	50	M	8	Barracuda	Yes	No	N, V, D, CR	S, LBP, HP	NT, DW	CS, W, DZ
4	1	Aug 6, 2010	31	M	8	Barracuda	Yes	No	N, V, D, CR	S, LBP, HP	NT, DW	CS, W, DZ
5	1	Aug 6, 2010	12	F	8	Barracuda	Yes	No	CR		NT	H
6	1	Aug 6, 2010	24	M	3	Barracuda	Yes	No	D, CR		NT, P	R
7	2	Aug 16, 2010	43	F	3.5	Barracuda	Yes	No	N, V, D, CR		DW, P	CH, My
8	2	Aug 16, 2010	49	F	4.5	Barracuda	Yes	No	N, V, D, CR	B	P	CH
9	None	Sep 14, 2010	50	M	2	Barracuda	Yes	No	D	B		My, W
10	3	Aug 24, 2010	32	F	20	Barracuda	Yes	Yes	N, V, D		DW, P	My, DZ, Fv
11	3	Aug 24, 2010	31	M	11	Barracuda	No	No	D		DW, P	My, W, DZ, Fv
12	3	Aug 24, 2010	33	F	N/A	Barracuda	No	No			P	My
13	3	Aug 24, 2010	41	M	N/A	Barracuda	No	No				My
14	4	Nov 13, 2010	2	F	0.5	Grouper	Yes	No	N, V, CR		NT	Fv
15	4	Nov 9, 2010	28	F	38.5	Grouper	No	No	D		NT	W
16	4	Nov 9, 2010	33	F	15	Grouper	No	No	N, V		NT	W
17	4	Nov 9, 2010	56	F	3.5	Grouper	Yes	No	N, V, D, CR	LBP, HP, B	NT, PD, DW, P	W, H
18	4	Nov 9, 2010	32	F	25.5	Grouper	Yes	No	N, V, D, CR		NT, TP, PD, DW, P	W, Fv, H
19	4	Nov 9, 2010	58	M	4.5	Grouper	No	No	D, CR	HP	NT, PD, DW, P	W, H
20	4	Nov 9, 2010	12	F	1	Grouper	Yes	No	CR		NT, DW, P	W
21	4	Nov 9, 2010	53	F	44.5	Grouper	Yes	No	D		NT, DW, P	W, H
22	4	Nov 9, 2010	7	F	4.5	Grouper	Yes	No	N, V, D, CR		NT, P	W, H
23	4	Nov 9, 2010	7	F	16.5	Grouper	Yes	No	N, V, CR		NT, P	H
24	4	Nov 19, 2010	51	M	10	Grouper	Yes	No	N, V, D, CR	HP, LBP, B	NT, TP, DW, P	W
25	5	Jul 13, 2011	54	F	9	Grouper	No	No	N, CR			
26	5	Jul 13, 2011	51	M	5	Grouper	No	No	N, D, CR		PD, P	W
27	6	Jul 13, 2011	48	F	4	Grouper	Yes	Yes	N, V, D, CR		PD	
28	6	Jul 13, 2011	60	M	6	Grouper	No	No	D, CR		PD	W

Abbreviations: B = bradycardia; CH = chills; CR = cramps; CS = cold sweats; D = diarrhea; DW = difficulty walking; DZ = dizziness; F = female; Fv = fever; H = headache; HP = heart palpitations; ICU = intensive-care unit; LBP = hypotension; M = male; My = myalgia; N = nausea; N/A = not available; NT = numbness or tingling; P = pruritus; PD = paradoxical dysesthesias; R = rash; S = syncope; ST = swollen tongue; TP = tooth pain; V = vomiting; W = weakness.
* None of the fish were speciated; all species were reported from food establishment records.

TABLE 2. Frequency of reported symptoms among ciguatera patients (N = 28) — New York City, August 2010–July 2011

Symptom	No.	(%)
Cramps	20	(71)
Diarrhea	20	(71)
Nausea	17	(61)
Weakness	16	(57)
Pruritus	16	(57)
Numbness/Tingling	16	(57)
Vomiting	15	(54)
Difficulty walking	12	(43)
Headache	7	(25)
Myalgia	6	(21)
Dizziness	6	(21)
Paradoxical dysesthesias	6	(21)
Heart palpitations	6	(21)
Bradycardia	6	(21)
Hypotension	6	(21)

Editorial Note

CTX are naturally occurring toxins that can accumulate in commonly consumed coral reef fish (e.g., barracuda, grouper, snapper, amberjack, and surgeonfish). Precursors of CTX are derived from marine dinoflagellates (microalgae) that live on the surfaces of seaweeds and denuded corals. These microalgae are consumed by herbivorous fish and undergo bioconversion to the more potent CTX as they move through the food chain. CTX can accumulate in reef fish that eat other fish, reaching levels that can cause CFP among humans when consumed. The toxins are colorless, odorless, tasteless, and temperature-stable, making them difficult to detect or destroy. Consequently, CFP occurrence is not attributable to incorrect food handling, storage, preparation, or procurement methods. The attack rate can be 80%–90% among persons who have eaten a toxic fish, depending on the concentration of CTX in the fish, the total amount of fish consumed, and the consumer's body weight and health status (*2*). As in the outbreaks described in this report, symptomatology is variable.

Initial treatment options for CFP are limited and supportive only. The majority of patients experience symptoms within 6–48 hours after eating contaminated fish. In an acutely symptomatic patient, any vital sign instability or electrolyte imbalance should be treated in accordance with the normal standard of care (*3*). Administration of intravenous mannitol was thought to reduce neuronal edema; however, a randomized double-blind, clinical trial found no evidence of mannitol being superior to normal saline, and mannitol can cause additional side effects, including hypotension, requiring caution during administration (*4–6*). Treatment of CFP symptoms (e.g.,

What is already known on this topic?

Ciguatera fish poisoning can occur after eating coral reef fish (e.g., barracuda, grouper, snapper, amberjack, and surgeonfish). Cases are underreported to health authorities, and physicians can have difficulty correctly diagnosing cases, even in areas where poisoning commonly is reported.

What is added by this report?

During August 2010–July 2011, New York City experienced 28 ciguatera fish poisoning cases occurring in six outbreaks and a single case, more than occurred in the previous 10 years combined. Early detection and outreach led to additional cases being identified and treated.

What are the implications for public health practice?

Until the time when premarket testing of fish becomes practical, additional outreach and education to industry and health-care providers is warranted. New York City's experience from these outbreaks highlights the importance of industry adherence to approved hazard analysis and critical control points plans to reduce the risk for ciguatoxic fish entering the market. This study also illustrates the importance of accurate diagnosis and consistent reporting to public health agencies to ensure the prevention of additional cases through traceback investigations, product embargoes, and regulatory enforcement.

neuropathy, fatigue, and headache) with amitriptyline, sodium channel blockers, and pain medications all have been tried with variable success (*4*). Consultation with the local PCC is recommended and in NYC fulfills the reporting requirement.

This report reflects the importance of surveillance and outreach networks in responding to patients' histories, including food consumption, that are indicative of CFP, and highlights prevention challenges. Reports made to the NYC PCC allowed expeditious and effective action when the first cases of CFP were reported. Investigators notified other jurisdictions, consulted local health departments with expertise in CFP prevention and case management, and conducted outreach to NYC health-care providers. In southern Florida, where CFP is endemic, 68% of physicians who were presented with a typical case of CFP diagnosed it correctly (*7*). As a result of considerable education and outreach efforts by the Florida Department of Health during the past decade, accuracy of CFP diagnosis in that state has improved. However, in other nonendemic regions, diagnostic recognition remains low.

An interstate comparison of reports to PCCs revealed additional trends, beyond the increased number of NYC CFP cases. Unpublished data from CFP-related calls to the American Association of Poison Control Centers during 2000–2010 were analyzed for trends and changes in geographic distribution. The data revealed that the rate of CFP-related calls per capita during 2010, compared with the previous 10 years, was 55% higher in NYC but 44% lower in Florida. Although this data set might not be representative of individual state CFP records, the rate per capita of U.S. cases remained relatively constant throughout the preceding 11 years. This increase of reported cases in NYC might reflect changing sources and diversity of fish species marketed in NYC and elsewhere. The increase might also indicate improved awareness and capacity for investigation by the medical and public health community. The decrease in CFP reports from Florida likely was the result of improved awareness of CFP after extensive long-term outreach and education efforts and specific guidance on the harvest of high-risk fish in this endemic region.

CFP is considered a highly underreported illness, with only an estimated 10% of cases reported to health authorities (*7*). Increasing awareness among health-care providers might improve reporting and investigation. However, CFP prevention is complicated by difficulty in identifying high-risk fishing grounds and inadequate industry knowledge and compliance with the FDA seafood Hazard Analysis and Critical Control Point (HACCP) regulations.[†] Premarket testing of fish for CTX is not feasible because of the lack of rapid field methods and the sporadic distribution of toxic fish, even in endemic areas. Coordinated tracebacks of implicated fish by federal and state agencies to specific fishing grounds remains the primary strategy for managing CFP.

The findings in this report are subject to at least three limitations. First, meal remnant samples were available only in three of the six CFP outbreaks. Second, where physician reports to the PCC were unavailable, the symptoms were based entirely on self-report or secondhand reports from family members. Finally, additional cases might have occurred but were unrecognized because of lack of physician awareness to make an appropriate diagnosis and the need to report.

This investigation demonstrates the value of CFP-implicated fish traceback along with updated information on emerging CFP risks, including new harvest areas and species. Prevention through education alone might be limited by seafood mislabeling. Reports indicate that 20%–25% of all seafood products are mislabeled (*8*). A recent assessment of seafood purchased at retail stores and restaurants in New York, New Jersey, and Connecticut indicated that >20% of 190 specimens were mislabeled, incompletely labeled, or misidentified by employees (*8*). Methods for fish species identification using DNA barcoding have been validated (*9*) and are being implemented in several U.S. state and federal laboratories, as well as academic

[†] Additional information, including advisories and guidance related to high-risk species and endemic regions, is available at http://www.fda.gov/food/foodsafety/hazardanalysiscriticalcontrolpointshaccp/seafoodhaccp/default.htm.

institutions. These methods have been applied to multiple CFP cases. Ongoing collaborative efforts with federal, state, and local agencies tasked with consumer protection and food safety might be useful in controlling CFP and mislabeling of fish (*10*). Until accurate and cost-effective means of premarket testing become available, prevention of additional cases will continue to be dependent on HACCP compliance by the seafood industry and CFP diagnosis and reporting by health-care providers, warranting additional outreach and education.

Acknowledgment

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Noninfluenza Vaccination Coverage Among Adults — United States, 2011

On January 29, 2013, this report was posted as an MMWR *Early Release on the* MMWR *website (http://www.cdc.gov/mmwr).*

Vaccinations are recommended throughout life to prevent vaccine-preventable diseases and their sequelae. Adult vaccination coverage, however, remains low for most routinely recommended vaccines (*1*) and well below *Healthy People 2020* targets.* In October 2012, the Advisory Committee on Immunization Practices (ACIP) approved the adult immunization schedule for 2013 (*2*). Apart from influenza vaccination, which is now recommended for all adults, other vaccines recommended for adults target different populations based on age, certain medical conditions, behavioral risk factors (e.g., injection drug use), occupation, travel, and other indications (*2*). To assess adult (aged ≥19 years) vaccination coverage for select vaccines, CDC analyzed data from the 2011 National Health Interview Survey (NHIS). This report summarizes the results of that analysis for pneumococcal vaccine, tetanus toxoid–containing vaccines (including tetanus and diphtheria toxoid [Td] with acellular pertussis vaccine [Tdap]), and hepatitis A, hepatitis B, herpes zoster (shingles), and human papillomavirus (HPV) vaccines, by selected characteristics (age, race/ethnicity,† and vaccination target criteria). Influenza vaccination coverage estimates for the 2011–12 influenza season have been published separately (*3*). Compared with 2010 (*1*), the data indicate modest increases in Tdap vaccination among persons aged 19–64 years and HPV vaccination among women, but only little improvement in coverage for the other vaccines among adults in the United States. Coverage for tetanus vaccination (with any tetanus toxoid–containing vaccine) during the past 10 years was unchanged. Substantial increases in vaccination coverage are needed to reduce the occurrence of vaccine-preventable diseases among adults. The Community Preventive Services Task Force and other authorities have recommended that health-care providers incorporate vaccination needs assessment, recommendation, and offer of vaccination into routine clinical practice for adult patients (*4,5*).

NHIS collects information about the health and health care of the noninstitutionalized, civilian population in the United States using nationally representative samples. Interviews are conducted in respondents' homes by the U.S. Census Bureau for CDC's National Center for Health Statistics. Questions about receipt of recommended vaccinations for adults are asked of one randomly selected adult within each family in the household. The presence of high-risk conditions,§ as defined by ACIP for each vaccine, was determined by responses to questions in the NHIS (*2*). The final sample adult component response rate for the 2011 NHIS was 66.3%. Weighted data¶ were used to produce national estimates. Point estimates and estimates of corresponding variances were calculated using statistical software to account for the complex sample design. Statistical significance was defined as $p<0.05$.

Pneumococcal Vaccination Coverage

Pneumococcal vaccination coverage among adults aged 19–64 years at high risk was 20.1% overall, a 1.6 percentage point increase from 2010 (Table 1). Coverage among whites aged 19–64 years at high risk was higher (20.1%) compared with Hispanics (18.3%) and Asians (12.0%), but coverage was not significantly different for other racial/ethnic groups. Among adults aged ≥65 years, coverage was 62.3% overall, a 2.6 percentage point increase from 2010. Coverage among whites aged ≥65 years increased from 2010 (by 3.0 percentage points to 66.5%) and was higher compared with Asians (40.3%), Hispanics (43.1%), and blacks (47.6%).

Tetanus Vaccination Coverage

In 2011, the proportion of adults receiving any tetanus toxoid–containing vaccination (i.e., Td or Tdap) during the past 10 years was 64.5% for adults aged 19–49 years, 63.9% for adults aged 50–64 years, and 54.4% for adults aged ≥65 years (Table 1). The proportion of adults receiving tetanus vaccination during the past 10 years across all age groups did not change compared with 2010 (*1*). Whites had higher coverage across all age groups compared with Asians, Hispanics, and blacks.

Among adults aged 19–64 years for whom Tdap vaccination specifically could be assessed, Tdap coverage increased compared with 2010 (a 4.3 percentage point increase to 12.5%)

* *Healthy People 2020* objectives and targets for immunization and infectious diseases are available at http://www.healthypeople.gov/2020/topicsobjectives2020/objectiveslist.aspx?topicid=23.

† Race/ethnicity was categorized as follows: Hispanic, black, white, Asian and "other." In this report, persons identified as Hispanic might be of any race. Persons identified as black, white, Asian, or other race are non-Hispanic. "Other" includes American Indian/Alaska Native and multiple race. The five racial/ethnic categories are mutually exclusive.

§ Adults were considered at high risk for pneumococcal disease if they had ever been told by a doctor or other health professional that they had diabetes, emphysema, coronary heart disease, angina, heart attack, or other heart condition; had a diagnosis of cancer during the previous 12 months (excluding nonmelanoma skin cancer); had ever been told by a doctor or other health professional that they had lymphoma, leukemia, or blood cancer; had been told by a doctor or other health professional that they had chronic bronchitis or weak or failing kidneys during the preceding 12 months; had an asthma episode or attack during the preceding 12 months; or were current smokers. Information on high-risk status for hepatitis B or A was not collected in 2011.

¶ Additional information on NHIS methods is available at http://www.cdc.gov/nchs/nhis/methods.htm.

TABLE 1. Estimated proportion of adults aged ≥19 years who received selected vaccinations, by age group, high-risk status,* race/ethnicity,† and other selected characteristics — National Health Interview Survey, United States, 2011

Characteristic	No. in sample	%	(95% CI)	Percentage point difference from 2010
Pneumococcal vaccination, ever§				
19–64 yrs, high-risk, total	9,056	20.1	(19.1–21.1)	1.6¶
19–64 yrs, high-risk, white	5,510	20.1	(18.9–21.4)	1.1
19–64 yrs, high-risk, black	1,547	22.8	(20.3–25.5)	4.2
19–64 yrs, high-risk, Hispanic	1,365	18.3	(15.8–21.1)**	3.5
19–64 yrs, high-risk, Asian	354	12.0	(8.6–16.6)**	0.5
19–64 yrs, high-risk, other	280	21.7	(16.7–27.7)	-4.4
≥65 yrs, total	6,641	62.3	(60.7–63.8)	2.6¶
≥65 yrs, white	4,739	66.5	(64.8–68.2)	3.0¶
≥65 yrs, black	840	47.6	(43.1–52.2)**	1.8
≥65 yrs, Hispanic	664	43.1	(38.6–47.8)**	4.2
≥65 yrs, Asian	297	40.3	(34.5–46.4)**	-7.9
≥65 yrs, other	101	67.4	(54.1–78.4)	9.0
Tetanus vaccination, past 10 yrs††				
19–49 yrs, total	16,843	64.5	(63.5–65.4)	0.5
19–49 yrs, white	8,889	69.6	(68.4–70.8)	0.3
19–49 yrs, black	2,509	54.8	(52.1–57.4)**	-2.0
19–49 yrs, Hispanic	3,793	56.3	(54.1–58.5)**	1.9
19–49 yrs, Asian	1,223	52.5	(48.9–56.0)**	2.2
19–49 yrs, other	429	69.6	(64.0–74.8)	7.4
50–64 yrs, total	7,822	63.9	(62.4–65.3)	0.5
50–64 yrs, white	4,997	67.7	(66.0–69.4)	0.4
50–64 yrs, black	1,270	54.4	(51.0–57.9)**	1.7
50–64 yrs, Hispanic	1,040	52.6	(48.8–56.4)**	1.7
50–64 yrs, Asian	359	45.1	(38.9–51.4)**	-2.7
50–64 yrs, other	156	67.9	(58.4–76.1)	-0.5
≥65 yrs, total	6,471	54.4	(52.9–56.0)	1.1
≥65 yrs, white	4,612	57.0	(55.2–58.7)	0.6
≥65 yrs, black	809	44.4	(40.0–48.8)**	4.7
≥65 yrs, Hispanic	666	45.1	(40.7–49.6)**	1.4
≥65 yrs, Asian	286	37.9	(31.1–45.2)**	1.4
≥65 yrs, other	98	63.2	(50.5–74.3)	1.2
Tetanus vaccination including pertussis vaccine, past 6 yrs§§				
19–64 yrs, total	17,480	12.5	(11.8–13.2)	4.3¶
19–64 yrs, white	9,482	13.8	(12.9–14.7)	4.7¶
19–64 yrs, black	2,784	11.0	(9.5–12.6)**	3.6¶
19–64 yrs, Hispanic	3,558	7.7	(6.6–8.9)**	2.9¶
19–64 yrs, Asian	1,250	11.7	(9.4–14.5)	2.5
19–64 yrs, other	406	19.7	(15.0–25.5)	11.3¶
19–64 yrs, living with an infant aged <1 yr	700	21.5	(17.9–25.6)	10.9¶
19–64 yrs, not living with an infant aged <1 yr	16,802	12.1	(11.4–12.8)	4.0¶
Hepatitis A vaccination (≥2 doses), ever¶¶				
19–49 yrs, total	14,893	12.5	(11.8–13.3)	1.8¶
19–49 yrs, white	7,951	12.3	(11.3–13.2)	1.9¶
19–49 yrs, black	2,260	11.2	(9.4–13.2)	0.9
19–49 yrs, Hispanic	3,276	11.3	(9.8–12.9)	0.9
19–49 yrs, Asian	1,049	19.1	(15.7–23.0)**	3.8
19–49 yrs, other	357	21.1	(16.1–27.1)**	4.6
19–49 yrs, had traveled outside the United States to countries other than Japan, Australia, New Zealand, Canada, or the countries of Europe since 1995	5,361	20.1	(18.8–21.5)	3.5¶
19–49 yrs, had not traveled outside the United States to countries other than Japan, Australia, New Zealand, Canada, or the countries of Europe since 1995	9,505	8.4	(7.6–9.2)	0.9
19–49 yrs, with chronic liver conditions, overall	136	17.1	(10.9–25.7)	-2.7

See table footnotes on page 68.

(Table 1). Tdap coverage was estimated after excluding from the 25,783 respondents all those without a "yes" or "no" response for tetanus vaccination status in the past 10 years (n = 1,118 [4.3%]) or tetanus vaccination status during 2005–2011 (n = 803 [3.1%]), and those who reported tetanus vaccination during 2005–2011 but were not told (n = 5,501 [21.3%]) or did not know the vaccine type (n = 881 [3.4%]) (Td or Tdap). Among 9,805 respondents who received a tetanus vaccination during 2005–2011, 55.9% reported that they were not informed of the vaccination type, and 8.9% could not recall

TABLE 1. (*Continued*) Estimated proportion of adults aged ≥19 years who received selected vaccinations, by age group, high-risk status,* race/ethnicity,† and other selected characteristics — National Health Interview Survey, United States, 2011

Characteristic	No. in sample	%	(95% CI)	Percentage point difference from 2010
Hepatitis B vaccination (≥3 doses), ever* **				
19–49 yrs, total	15,568	35.9	(34.9–36.9)	2.1¶
19–49 yrs, white	8,256	37.8	(36.5–39.2)	2.2
19–49 yrs, black	2,349	33.0	(30.7–35.3)**	-1.5
19–49 yrs, Hispanic	3,429	28.9	(27.1–30.9)**	3.6¶
19–49 yrs, Asian	1,144	40.7	(36.8–44.6)	3.5
19–49 yrs, other	390	44.1	(38.5–49.9)	6.6
19–59 yrs, with diabetes, overall	1,224	26.9	(23.8–30.3)	4.2
≥60 yrs, with diabetes, overall	1,746	12.4	(10.8–14.3)	1.5
Herpes zoster (shingles) vaccination, ever†††				
≥60 yrs, total	9,278	15.8	(14.8–16.9)	1.4
≥60 yrs, white	6,531	17.6	(16.4–18.9)	1.0
≥60 yrs, black	1,204	7.9	(6.2–9.9)**	3.4¶
≥60 yrs, Hispanic	978	8.0	(6.2–10.2)**	3.6¶
≥60 yrs, Asian	409	14.0	(10.4–18.6)**	1.3
≥60 yrs, other	156	12.0	(7.2–19.3)	3.8
Human papillomavirus (HPV) vaccination among females (≥1 dose), ever§§§				
19–21 yrs, total	718	43.1	(38.4–48.0)	14.9¶
22–26 yrs, total	1,459	21.5	(18.8–24.5)	5.0¶
19–26 yrs, total	2,177	29.5	(27.0–32.1)	8.8¶
19–26 yrs, white	1,083	32.5	(29.1–36.1)	10.1¶
19–26 yrs, black	388	28.3	(23.3–33.9)	7.9
19–26 yrs, Hispanic	480	20.2	(16.3–24.8)**	5.1
19–26 yrs, Asian	153	22.3	(16.0–30.2)	0.3
19–26 yrs, other	73	39.0	(25.6–54.3)	22.5
HPV vaccination among males (≥1 dose), ever§§§				
19–26 yrs, total	1,833	2.1	(1.4–3.2)	1.5¶
19–21 yrs, total	601	2.8	(1.6–4.9)	2.5¶
22–26 yrs, total	1,232	1.7	(0.9–3.2)	0.9

Abbreviation: CI = confidence interval.

* Adults were considered at high risk for pneumococcal disease if they had ever been told by a doctor or other health professional that they had diabetes, emphysema, coronary heart disease, angina, heart attack, or other heart condition; had a diagnosis of cancer during the previous 12 months (excluding nonmelanoma skin cancer); had ever been told by a doctor or other health professional that they had lymphoma, leukemia, or blood cancer; had been told by a doctor or other health professional that they had chronic bronchitis or weak or failing kidneys during the preceding 12 months; had an asthma episode or attack during the preceding 12 months; or were current smokers. Information on high-risk status for hepatitis B or A was not collected in 2011.

† Race/ethnicity was categorized as follows: Hispanic, black, white, Asian, and "other." In this report, persons identified as Hispanic might be of any race. Persons identified as black, white, Asian, or other race are non-Hispanic. "Other" includes American Indian/Alaska Native and multiple race. The five racial/ethnic categories are mutually exclusive.

§ Respondents were asked if they had ever had a pneumonia shot.

¶ p<0.05 by t test for comparisons between 2011 and 2010 within each level of each characteristic.

** p<0.05 by t test for comparisons with whites as the reference.

†† Respondents were asked if they had received a tetanus shot in the past 10 years. Vaccinated respondents included adults who received tetanus-diphtheria toxoid (Td) during the past 10 years or tetanus, diphtheria, and acellular pertussis vaccine (Tdap) during 2005–2011.

§§ Respondents who had received a tetanus shot in the past 10 years were asked if their most recent shot was given in 2005 or later. Respondents who had received a tetanus shot since 2005 were asked if they were told that their most recent tetanus shot included the pertussis or whooping cough vaccine. Among 25,783 respondents aged 19–64 years, those without a "yes" or "no" classification for tetanus vaccination in the past 10 years (n = 1,118 [4.3%]) or for tetanus vaccination during 2005–2011 (n = 803 [3.1%]), and those who reported tetanus vaccination during 2005–2011 but were not told vaccine type by the provider (n = 5,501 [21.3%]) or did not know vaccine type (Td or Tdap) (n = 881 [3.4%]) were excluded, yielding a sample of 17,480 respondents aged 19–64 years for whom Tdap vaccination status could be assessed. Advisory Committee on Immunization Practices recommendations on use of Tdap in certain adults aged ≥65 years were published January 14, 2011.

¶¶ Respondents were asked if they had ever received the hepatitis A vaccine, and if yes, were asked how many shots were received.

*** Respondents were asked if they had ever received the hepatitis B vaccine, and if yes, if they had received ≥3 doses or <3 doses.

††† Respondents were asked if they had ever received a shingles vaccine.

§§§ Respondents were asked if they had ever received the HPV shot or cervical cancer vaccine.

what type of tetanus vaccination they had received (Table 2). Of the remaining 35.2% of respondents who reported they knew what type of tetanus vaccine they received, 61.1% reported receiving Tdap.

Compared with 2010, Tdap coverage increased among all racial/ethnic groups except Asians. For white and black respondents, coverage increased by 4.7 and 3.6 percentage points, respectively, to 13.8% and 11.0%. For Hispanic respondents, coverage increased by 2.9 percentage points to 7.7% (Table 1).

The largest increase occurred among adults aged 19–64 years who indicated a race other than Asian, black, or white, and non-Hispanic ethnicity (a 11.3 percentage point increase to 19.7%). Increases compared with 2010 also occurred among persons with and without household contact with an infant aged <1 year** (a 10.9 percentage point increase to 21.5%, and a 4.0 percentage point increase to 12.1%, respectively). However, reported Tdap coverage among persons aged 19–64 years remained low overall. Whites had higher Tdap coverage (13.8%) compared with blacks (11.0%) and Hispanics (7.7%).

During 2005–2011, Tdap vaccination of health-care personnel (HCP) (26.8%) was 6.5 percentage points higher than the 2010 estimate (Table 3). White HCP had higher Tdap coverage (27.2%) compared with black HCP (21.7%). Compared with 2010, Tdap coverage increased for Hispanic HCP (by 16.3 percentage points to 30.1%) and was similar to that of white HCP.

Among persons aged 19–64 years who received a tetanus vaccination, HCP were more likely to report receipt of Tdap (66.8%) than non-HCP (59.7%) (Table 2).

Hepatitis A Vaccination Coverage

Compared with 2010, overall hepatitis A vaccination coverage (≥2 doses) increased among adults aged 19–49 years (by 1.8 percentage points to 12.5%) but remained low. Vaccination coverage was higher (20.1%) among adults aged 19–49 years who had traveled outside the United States since 1995 to a country of high or intermediate endemicity than among respondents who had traveled only to countries of low endemicity (8.4%) (Japan, Australia, New Zealand, Canada, and the countries of Europe). Vaccination coverage among adult travelers to highly endemic countries increased by 3.5 percentage points from 2010 to 2011 (Table 1). Coverage was higher for Asians (19.1%) and adults aged 19–49 years who indicated a race other than Asian, black, or white and non-Hispanic ethnicity (21.1%) than for other groups. Coverage among those with chronic liver conditions (17.1%) was similar to the estimate for 2010.

Hepatitis B Vaccination Coverage

In 2011, information on high-risk status for hepatitis B virus infection was not collected. Overall hepatitis B vaccination coverage (≥3 doses) among all adults aged 19–49 years was 35.9% (2.1 percentage points higher than the 2010 estimate) (Table 1). Vaccination coverage was lower for blacks (33.0%) and Hispanics (28.9%) compared with whites (37.8%). Vaccination coverage for persons with diabetes was 26.9% for those aged 19–59 years and 12.4% for those aged ≥60 years, similar to the estimates for 2010. Overall, hepatitis B vaccination coverage among HCP was 63.8%, similar to the estimate for 2010. Coverage for black HCP (57.1%) and Hispanic HCP (59.4%) was lower compared with white HCP (65.1%), but coverage for Asian HCP (70.4%) was higher than that for white HCP (Table 3).

Herpes Zoster Vaccination Coverage

In 2011, 15.8% of adults aged ≥60 years reported receiving herpes zoster vaccination to prevent shingles, similar to the estimate for 2010 (Table 1). Whites aged ≥60 years had higher herpes zoster vaccination coverage (17.6%) compared with blacks (7.9%), Hispanics (8.0%), and Asians (14.0%). Coverage for blacks and Hispanics aged ≥60 years increased by more than 3 percentage points compared with herpes zoster vaccination coverage estimates in 2010.

HPV Vaccination Coverage

In 2011, 29.5% of women aged 19–26 years reported receipt of ≥1 dose of HPV vaccine, an increase from the 20.7% reported for 2010 (Table 1) (*1*), and a further increase from the 17.1% reported for 2009 (*1*). Coverage was 43.1% among women aged 19–21 years and 21.5% among those aged 22–26 years. Among women aged 19–26 years, Hispanics had lower coverage (20.2%) compared with whites (32.5%), but coverage across racial/ethnic groups otherwise did not differ. Compared with 2010, receipt of ≥1 dose of HPV vaccine increased among males aged 19–26 years (by 1.5 percentage points to 2.1%). Coverage was 2.8% for males aged 19–21 years and 1.7% for those aged 22–26 years.

Reported by

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Editorial Note

In 2011, noninfluenza adult vaccination coverage in the United States was similar to 2010, except for modest increases in Tdap vaccination overall and HPV vaccination among women, with little or no improvements in coverage for the other vaccines recommended for adults. Many adults have not received one or more recommended vaccines. Vaccination coverage estimates for the three vaccines in this report that are included in *Healthy People 2020* (pneumococcal, herpes zoster, and hepatitis B [for

** In 2011, a single dose of Tdap was recommended for adults aged ≥65 years who have or who anticipate having close contact with an infant aged <1 year (e.g., grandparents, child-care providers, and health-care personnel) to reduce the risk for transmitting pertussis. Other adults aged ≥65 years may receive Tdap.

TABLE 2. Type of tetanus vaccine received, and proportion that were tetanus, diphtheria, acellular pertussis (Tdap) vaccine, among adults aged 19–64 years who received a tetanus vaccination, by selected characteristics — National Health Interview Survey, United States, 2011

	Type of vaccine received among those who received a tetanus vaccination during 2005–2011									Proportion Tdap of total tetanus vaccinations during 2005–2011*		
		Received Tdap		Received other tetanus vaccine		Doctor did not inform the patient		Could not recall vaccine type				
Characteristic	No. in sample	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)	No. in sample	%	(95% CI)
Adults aged 19–64 yrs	9,805	21.5	(20.4–22.6)	13.7	(12.7–14.7)	55.9	(54.5–57.3)	8.9	(8.2–9.7)	3,422	61.1	(58.8–63.3)
HCP aged 19–64 yrs†	1,230	37.3	(33.9–40.8)	18.5	(15.9–21.5)	38.8	(35.4–42.4)	5.4	(4.1–7.0)	695	66.8§	(62.2–71.0)
Non-HCP aged 19–64 yrs	8,565	19.3	(18.1–20.5)	13	(12.0–14.1)	58.3	(56.8–59.8)	9.4	(8.6–10.3)	2,723	59.7	(57.0–62.3)

Abbreviations: CI = confidence interval; HCP = health-care personnel.

* Calculated by dividing number of respondents who reported receiving Tdap by the sum of those who reported receiving Tdap and those who reported receiving other tetanus vaccination; respondents who reported that the doctor did not inform them of the vaccine type they received and those who could not recall the vaccine type were excluded.

† Adults were classified as HCP if they reported that they currently volunteer or work (full-time or part-time) in a hospital, medical clinic, doctor's office, dentist's office, or nursing home, or provided professional nursing care in the home.

§ p<0.05 by t test for comparisons between HCP and non-HCP aged 19–64 years.

TABLE 3. Estimated proportion of health-care personnel* who received selected vaccinations, by race/ethnicity† — National Health Interview Survey, United States, 2011

Characteristic	No. in sample	%	(95% CI)	Percentage point difference from 2010
Tetanus vaccination including pertussis vaccine, past 6 yrs§				
19–64 yrs, total	1,759	26.8	(24.2–29.5)	6.5¶
19–64 yrs, white	1,046	27.2	(24.1–30.6)	5.7
19–64 yrs, black	315	21.7	(16.4–28.1)**	7.7
19–64 yrs, Hispanic	217	30.1	(22.7–38.7)	16.3¶
19–64 yrs, Asian	146	27.8	(19.2–38.4)	0.9
19–64 yrs, other	35	31.2	(16.9–50.4)	—††
Hepatitis B vaccination (≥3 doses), ever§§				
≥19 yrs, total	2,564	63.8	(61.4–66.2)	0.6
≥19 yrs, white	1,581	65.1	(62.0–68.1)	1.3
≥19 yrs, black	432	57.1	(50.5–63.4)**	-1.7
≥19 yrs, Hispanic	314	59.4	(51.7–66.7)**	2.4
≥19 yrs, Asian	186	70.4	(61.6–77.8)**	-2.4
≥19 yrs, other	51	70.0	(50.9–84.0)	-0.2

Abbreviation: CI = confidence interval.

* Adults were classified as health-care personnel if they reported that they currently volunteer or work (full-time or part-time) in a hospital, medical clinic, doctor's office, dentist's office, or nursing home, or provided professional nursing care in the home.

† Race/ethnicity was categorized as follows: Hispanic, black, white, Asian, and "other." In this report, persons identified as Hispanic might be of any race. Persons identified as black, white, Asian, or other race are non-Hispanic. "Other" includes American Indian/Alaska Native and multiple race. The five racial/ethnic categories are mutually exclusive.

§ Respondents who had received a tetanus shot in the past 10 years were asked if their most recent shot was given in 2005 or later. Respondents who had received a tetanus shot since 2005 were asked if they were told that their most recent tetanus shot included the pertussis or whooping cough vaccine. Among 2,439 health-care personnel aged 19–64 years, those without a "yes" or "no" classification for tetanus vaccination status in the past 10 years (n = 60 [2.5%]) or for tetanus vaccination status during 2005–2011 (n = 85 [3.5%]), and those who reported tetanus vaccination during 2005–2011 but were not told vaccine type by the provider (n = 463 [19.0%]) or did not know vaccine type (Td or Tdap) (n = 72 [3.0%]) were excluded, yielding a sample of 1,759 respondents aged 19–64 years for whom Tdap vaccination status could be assessed. Advisory Committee on Immunization Practices recommendations on use of Tdap in certain adults aged ≥65 years were published January 14, 2011.

¶ p<0.05 by t test for comparisons between 2011 and 2010 within each level of each characteristic.

** p<0.05 by t test for comparisons with whites as the reference.

†† Estimate is not reliable because of small sample size (n<30) or relative standard error (standard error / estimates) >0.3.

§§ Respondents were asked if they had ever received the hepatitis B vaccine, and if yes, if they had received ≥3 doses or <3 doses.

HCP] vaccines) are well below the respective target levels of 90% for persons aged ≥65 years and 60% for persons aged 18–64 years at high risk (pneumococcal vaccine [objectives IID 13.1 and IID 13.2, respectively]), 30% (herpes zoster vaccine [IID 14]), and 90% (hepatitis vaccine for HCP [IID 15.3]). These data indicate little progress was made in improving adult coverage in the past year and highlight the need for continuing efforts to increase adult vaccination coverage.

Since 2006, ACIP has recommended that adults aged 19–64 years receive a single dose of Tdap to replace a dose of Td for active booster vaccination against tetanus, diphtheria, and pertussis if they received their most recent dose of Td ≥10 years earlier (*6*). In October 2010, ACIP recommended expanded use of Tdap, indicating that adults aged ≥65 years who have or who anticipate having close contact with an infant aged <1 year, and who previously have not received Tdap, should

receive a single dose of Tdap to protect against pertussis and reduce the likelihood of transmission. ACIP also recommended that Tdap, when indicated, be administered regardless of the interval since the most recent tetanus or diphtheria toxoid–containing vaccine was received (*6*). Information on Tdap vaccination of adults aged ≥65 years was not collected in the 2011 NHIS but is being collected starting in 2012. In February 2012, ACIP recommended that all adults aged ≥19 years who have not yet received a dose of Tdap should receive a single dose regardless of the interval since the most recent tetanus or diphtheria toxoid–containing vaccine was received.[††] These recommendations supersede previous Tdap recommendations regarding adults aged ≥65 years. Health-care providers should not miss an opportunity to vaccinate persons aged ≥19 years who have not received Tdap previously.

In June 2012, ACIP recommended routine use of 13-valent pneumococcal conjugate vaccine (PCV13) in series with the 23-valent pneumococcal polysaccharide vaccine (PPSV23) for adults aged ≥19 years with immunocompromising conditions, functional or anatomic asplenia, cerebrospinal fluid leaks, or cochlear implants.[§§] Given the high burden of invasive pneumococcal disease caused by serotypes in PPSV23 but not in PCV13, ACIP noted that broader protection might be provided through use of both pneumococcal vaccines. Current ACIP recommendations call for use of PPSV23 in adults aged 19–64 years with chronic conditions that are not immunocompromising, such as chronic heart disease or diabetes, at the time of diagnosis of the high-risk condition (*6*). All adults are eligible for a dose of PPSV23 at age 65 years, regardless of previous PPSV23 vaccination; however, a minimum interval of 5 years between PPSV23 doses should be maintained. The 2012 NHIS cannot estimate the proportion of pneumococcal vaccinations by type (PCV13 versus PPSV23).

The findings in this report provide baseline estimates of hepatitis B vaccination coverage of adults with diabetes. The ACIP-recommended administration of hepatitis B vaccine to unvaccinated adults with diabetes aged 19–59 years (category A recommendation) or aged ≥60 years (category B recommendation) in December 2011 (*6*). The recommendations were based on available information about risk for contracting acute hepatitis B among persons with diabetes, morbidity and mortality, available vaccines, age at diagnosis of diabetes, and cost-effectiveness (*6*).

The percentage of age-eligible females administered HPV vaccine has increased steadily during 2009–2011 but is still low. The largest increase in 2011 (14.9 percentage points) was reported among women aged 19–21 years. This finding might reflect the knowledge, attitude, and practices of the health-care providers of young women (*7*); the social norms of young women and the perceptions and vaccination intentions of peers (*8*); or receipt of vaccine when eligible for the Vaccines for Children Program (age <18 years) but aged ≥19 years when interviewed (*7*). The percentage of age-eligible adult males administered HPV vaccine increased by 1.5 percentage points but remained very low. The ACIP recommendation for routine use of HPV vaccine in females age 11–26 years was made in 2006, whereas use in males aged 11–21 years and males aged 22–26 years at high risk was recommended in October 2011 (*6*). Thus, coverage levels for males in 2011 would not reflect this new recommendation. The primary target group for HPV vaccine is girls and boys aged 11–12 years.

The findings in this report are subject to at least five limitations. First, the NHIS sample excludes persons in the military and those residing in institutions, which might result in underestimation or overestimation of vaccination coverage levels. Second, the response rate was 66.3%. A low response rate can result in sampling bias if the nonresponse is unequal among the participants regarding vaccination. Third, the determination of vaccination status and identification of high-risk conditions in NHIS were not validated by medical records. Self-report of vaccination is subject to recall bias and overestimation of rates. However, adult self-reported pneumococcal vaccination status has been shown to be sensitive and specific (*9*). Fourth, the Tdap estimate is subject to considerable uncertainty.

What is already known on this topic?

During 2008–2010, coverage with routinely recommended vaccinations among U.S. adults aged ≥19 years remained low.

What is added by this report?

Compared with 2010 estimates, modest gains occurred in human papillomavirus vaccination coverage among women aged 19–26 years and in tetanus and diphtheria toxoid with acellular pertussis vaccine (Tdap) vaccination overall and among household contacts of children. Coverage for other vaccines and risk groups increased little, and racial/ethnic disparities persisted for routinely recommended adult vaccines. Coverage for all vaccines for adults remained low.

What are the implications for public health practice?

Despite improvements in vaccination, coverage remains low for most vaccines routinely recommended for adults. Wider use of practices shown to improve adult vaccination is needed, including assessment of patients' vaccination needs by health-care providers and routine recommendation and offering of needed vaccines to adults, implementing reminder-recall systems, use of standing order programs for vaccination, and assessment of practice-level vaccination rates with feedback to staff members.

[††] Additional information available at http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6125a4.htm.

[§§] Additional information available at http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6140a4.htm?s_cid=mm6140a4_w.

Many respondents were excluded from estimations of Tdap coverage, creating a potential for bias. All respondents who reported a tetanus vaccination during 2005–2011 but were unable to say whether Td or Tdap was used, were excluded. Sensitivity calculations were conducted to assess the magnitude of potential bias. Depending on what proportion of excluded respondents actually received Tdap, actual Tdap coverage could fall within the range of 8.0%–36.4%. Comparisons of Tdap coverage across years within subgroups might be affected by bias resulting from excluding persons who did not report the type of tetanus vaccine they received. Finally, age at vaccination is not known for vaccines adults reported having "ever" received (e.g., HPV and hepatitis B vaccines), so it is not clear for younger adults whether vaccination occurred as an adult or was given as part of a child or adolescent vaccination program.

Vaccination coverage levels among adults are unacceptably low. Substantial improvement in adult vaccination is needed to reduce the health consequences of vaccine-preventable diseases among adults. Successful vaccination programs combine 1) education of potential vaccine recipients and publicity to promote vaccination; 2) increased access to vaccination services in medical and complementary settings, such as workplaces and commercial establishments (e.g., pharmacies); and 3) use of practices shown to improve vaccination coverage, including reminder-recall systems, efforts to remove administrative and financial barriers to vaccination, use of standing order programs for vaccination, and assessment of practice-level vaccination rates with feedback to staff members (*5*). Health-care provider recommendations for vaccination are associated with patient vaccination (*10*). Routine assessment of adult patient vaccination needs, recommendation, and offer of needed vaccinations for adults should be incorporated into routine clinical care of adults (*4,5*). The adult immunization schedule (*2*), updated annually, provides current recommendations for vaccinating adults and a ready resource for persons who provide health-care services for adults in various settings.

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Notes from the Field

Multistate Outbreak of Human *Salmonella* Typhimurium Infections Linked to Contact with Pet Hedgehogs — United States, 2011–2013

CDC is collaborating with the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (USDA-APHIS) and state health departments to investigate an outbreak of human *Salmonella* Typhimurium infections with an indistinguishable pulsed-field gel electrophoresis pattern linked to contact with pet hedgehogs. This outbreak strain is historically rare, with only one to two cases reported via PulseNet (the national molecular subtyping network for foodborne disease surveillance) annually since 2002. Since 2011, an increasing number of cases have been detected. PulseNet identified 14 human isolates in 2011, 18 in 2012, and two in 2013.

Since January 2012, a total of 20 persons infected with the outbreak strain of *Salmonella* Typhimurium have been reported from eight states: Alabama (one), Illinois (one), Indiana (one), Michigan (three), Minnesota (three), Ohio (three), Oregon (one), and Washington (seven). Illness onset dates ranged from December 26, 2011, to December 31, 2012. The median patient age was 13 years (range: <1–91 years); 55% of patients were female. Four patients were hospitalized. One death associated with *Salmonella* infection has been reported. Fourteen out of 15 patients (or their proxies) reported direct or indirect contact between the patient and a hedgehog during the week before illness onset. The hedgehogs were purchased from various hedgehog breeders, many of whom were USDA-APHIS licensed, in several states. CDC, USDA-APHIS, and state health departments currently are collaborating to conduct a traceback investigation of hedgehogs purchased from USDA-APHIS licensed breeders by members of the households of ill persons.

Salmonellosis is most commonly foodborne; however, contact with infected animals and their environments also can cause illness (*1*). Salmonellosis has been linked with pet hedgehogs previously (*2,3*). Children aged <5 years, elderly persons, and immunocompromised persons are at increased risk for severe illness. Infections can result from direct contact with hedgehogs during routine care and indirect transmission through contact with objects (e.g., cages, toys, or bedding) or household surfaces that come in contact with infected hedgehogs.

Hand washing with soap and water after handling hedgehogs, especially before handling food or drinks, can reduce the risk for infection. Any equipment or materials associated with hedgehog care (e.g., feed, water, and bathing containers) should be cleaned outside the home. Detailed safe handling instructions for hedgehogs should be provided at the point of sale, and owners should ensure that anyone in direct or indirect contact with hedgehogs is aware of proper precautions to prevent *Salmonella* transmission. Additional information is available at http://www.cdc.gov/salmonella/typhimurium-hedgehogs-09-12.

Reported by

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Announcement

National Black HIV/AIDS Awareness Day — February 7, 2013

February 7 is National Black HIV/AIDS Awareness Day, an observance intended to raise awareness of human immunodeficiency virus (HIV)/acquired immunodeficiency syndrome (AIDS) and encourage action to reduce the disproportionate impact of HIV/AIDS on blacks or African Americans in the United States. Compared with other races and ethnicities, blacks or African Americans had the highest HIV prevalence in 2009 (*1*) and the highest incidence in 2010 (*2*), with an estimated HIV incidence of 68.9 per 100,000 population, which was 7.9 times the rate in whites (8.7). Two of the three goals of the National HIV/AIDS Strategy are to reduce HIV incidence and HIV-related disparities (*3*).

In 2010, among black or African American females, heterosexual contact with a person known to have, or to be at high risk for, HIV infection was associated with an estimated 87% of new infections (*2*). From 2008 to 2010, the number of new infections among black or African American females decreased 21%, from 7,700 to 6,100. By comparison, the rate of new HIV infections for black or African American females (38.1 per 100,000 population) in 2010 was 20.1 times the rate for white females (1.9).

In 2010, among black or African American males in the United States, male-to-male sexual contact was associated with an estimated 72% of new HIV infections. Among black or African American men who have sex with men, males aged 13–24 years accounted for 45% of new HIV infections. This group had the highest HIV incidence of any age and racial/ethnic subgroup. The number of new HIV infections among black or African American males was stable at 14,400 in 2008 and 14,700 in 2010. By comparison, the rate of new HIV infections for black or African American males (103.6 per 100,000 population) in 2010 was 6.6 times the rate for white males (15.8).

National Black HIV/AIDS Awareness Day is an opportunity to increase HIV prevention activities, such as HIV testing, and to link persons with HIV to effective HIV medical care that reduces morbidity, mortality, and HIV transmission (*4*). Additional information about National Black HIV/AIDS Awareness Day is available at http://www.cdc.gov/features/blackhivaidsawareness. Additional information regarding blacks or African Americans and HIV/AIDS is available at http://www.cdc.gov/hiv.

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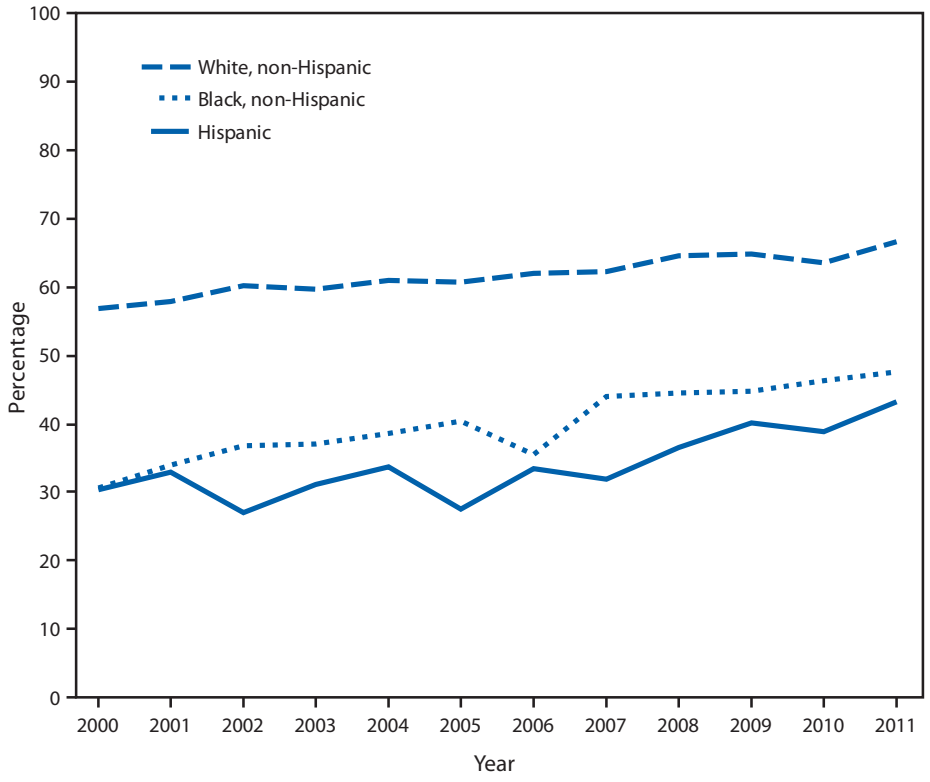
QuickStats

FROM THE NATIONAL CENTER FOR HEALTH STATISTICS

Percentage of Adults Aged ≥65 Years Who Had Ever Received a Pneumococcal Vaccination,* by Selected Race/Ethnicity† — National Health Interview Survey, United States, 2000–2011§



* Based on a survey question that asked respondents, "Have you ever had a pneumonia shot? This shot is usually given only once or twice in a person's lifetime and is different from the flu shot. It is also called the pneumococcal vaccine." Unknowns were not included in the denominators when calculating percentages.
† Persons of Hispanic ethnicity might be of any race or combination of races.
§ Estimates were based on household interviews of a sample of the U.S. civilian, noninstitutionalized population included in the National Health Interview Survey.

The percentage of adults aged ≥65 years who had ever received a pneumococcal vaccination increased from 56.8% in 2000 to 66.5% in 2011 among non-Hispanic whites, from 30.5% in 2000 to 47.6% in 2011 among non-Hispanic blacks, and from 30.4% in 2000 to 43.1% in 2011 among Hispanics. Throughout 2000–2011, the percentage who had ever received a pneumococcal vaccination was higher among non-Hispanic white adults aged ≥65 years than among Hispanics and non-Hispanic blacks.

Source: National Health Interview Survey, 2001–2011 sample adult core component. Available at http://www.cdc.gov/nchs/nhis.htm.

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