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Malaria — Great Exuma, Bahamas, May–June 2006

Malaria in humans is caused by four distinct protozoan species of the genus *Plasmodium* (*P. falciparum*, *P. vivax*, *P. ovale*, and *P. malariae*). These parasites are transmitted by the bite of an infective female *Anopheles* mosquito (*I*). In the Caribbean region, malaria has been eliminated from all islands except Hispaniola, the island consisting of Haiti and the Dominican Republic. Elimination of malaria elsewhere resulted from a combination of integrated control measures, socioeconomic development, and close public health surveillance. However, even Caribbean islands where malaria is no longer endemic remain at constant risk for reintroduction of the disease because of their tropical climate, presence of competent malaria vectors, and proximity to other countries where malaria is endemic. This susceptibility was underscored by the recent outbreak of malaria on the island of Great Exuma in the Bahamas; during May–June 2006, a total of 19 malaria cases were identified. Four of the cases, in travelers from North America and Europe, are described in this report; such cases of imported malaria can signal the presence of a malaria problem in the country visited and thus assist local health authorities in their investigations. On September 19, after 3 months with no report of new cases, CDC rescinded its previous recommendation that U.S.-based travelers take preventive doses of the antimalarial drug chloroquine before, during, and after travel to Great Exuma.*

Case 1. On May 24, 2006, a man aged 33 years from the United States received a diagnosis of malaria in a hospital emergency department in Virginia. The patient had intermittent fever, sweats, abdominal discomfort, nausea, and vomiting, which had begun during a May 4–7 visit to Great Exuma, where the patient had stayed in a resort hotel. The patient had no history of exposure to malaria. Blood smears on May 24 indicated *P. falciparum*. After outpatient treatment with chlo-

roquine, changed later to quinine and doxycycline, the patient recovered uneventfully.

Case 2. On June 6, a woman aged 29 years from Germany received a diagnosis of *P. falciparum* malaria in a hospital in Germany. She had experienced fever, headache, nausea, and vomiting since May 30, near the end of a May 18–31 visit to Great Exuma. After her return to Germany, the woman was treated initially with antibiotics for suspected sinusitis. However, her illness persisted, and she was hospitalized on June 6 with high fever and neck stiffness. Diagnostic tests included magnetic resonance imaging of her head, a lumbar puncture to exclude meningitis, and a blood smear that revealed *P. falciparum*. She was treated with artemether-lumefantrine and recovered.

Case 3. On June 16, a man aged 20 years from Canada had *P. falciparum* malaria diagnosed. The man had been born in the Bahamas and had visited friends and relatives there during April 19–June 11, spending most of his time in Georgetown, the most populous city on Great Exuma. On June 14, the man experienced fever and chills and went to an emergency department for evaluation after learning that his cousin had been treated recently for malaria on Great Exuma. The diagnosis of *P. falciparum* malaria was confirmed by blood smear on June 16. He was treated on an outpatient basis with chloroquine followed by atovaquone-proguanil and recovered uneventfully.

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* Available at http://www.cdc.gov/travel/other/2006/malaria_bahamas.htm.

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Case 4. A man aged 66 years from the United States, who lived on a boat, received a diagnosis of *P. falciparum* malaria on June 19. The man, who had not recently visited any area that was endemic for malaria, stayed in Great Exuma from late April to late May. In early May, he began experiencing fever, chills, sweats, headaches, and fatigue but did not seek medical care; he left Great Exuma to sail to other Bahamian islands. On June 18, on his return to Great Exuma, the patient learned of the outbreak and went the next day to the district medical clinic, where he received a diagnosis of *P. falciparum* malaria. He was treated with chloroquine and primaquine and recovered uneventfully.

After report of the first case in Virginia, the Bahamian Ministry of Health (MOH) initiated epidemiologic and entomologic investigations with the technical assistance of the Pan American Health Organization. MOH also heightened mosquito-control activities that were already being conducted on Great Exuma in conjunction with the Bahamian Department of Environmental Health Services.

Active case detection was conducted on Great Exuma during June 6–30; however, no case of malaria was diagnosed later than the June 19 diagnosis in case 4. Persons examined at primary-care clinics who had a history of fever and a temperature of $\geq 99.0^{\circ}\text{F}$ ($\geq 37.2^{\circ}\text{C}$) and contacts of persons who received diagnoses of malaria were screened using thick and thin blood smears stained with Wright's stain. On Great Exuma, 15 persons were determined infected with *P. falciparum*. Ages ranged from 16 to 66 years (median: 36 years); 84% were males. Most of these patients were residents of the Bahamas, clustered around the areas of Georgetown and Bahama Sound, and living in close proximity to a community of immigrants from Haiti; most said they had not recently traveled to Haiti or any other area endemic for malaria. All patients were initially treated with chloroquine and doxycycline; the latter was subsequently replaced by primaquine to eliminate gametocytes and thus prevent further transmission. All 15 patients recovered.

A parasite prevalence survey was conducted on Great Exuma in a community of immigrants from Haiti, from which anecdotal reports of illness had been received. Of 159 persons who consented to testing, 29 adults were determined infected with *P. falciparum*. This finding prompted mass treatment with chloroquine and primaquine of 203 persons within that community.

Entomologic surveys were conducted in multiple sites near bodies of fresh water identified by ground and air surveys in Great Exuma. Human bait and CDC light-trap collections yielded large populations of mosquitoes, of which only five were adult *Anopheles albimanus*. Surveys of potential breeding sites indicated few areas favorable for breeding of *An. albimanus* larvae, with five confirmed *An. albimanus* larvae collected from

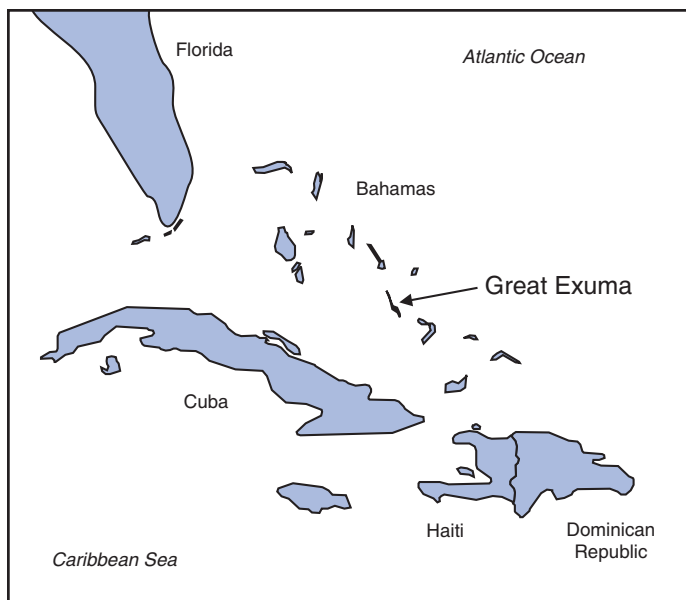
three breeding sites. Mosquito-control interventions were intensified beginning May 30. These measures included spraying 1) at all potential breeding sites, 2) within a quarter-mile radius of patients with confirmed cases, and 3) within a half-mile radius of patients detected through contact tracing, initially with a water-based pyrethroid insecticide, and later with malathion 96.5%. In addition, all bodies of fresh water on Great Exuma, neighboring Little Exuma, and surrounding cays (reefs) were treated with temephos to eliminate larvae.

As of September 19, no additional cases of malaria had been identified on Great Exuma or any other island in the Bahamas, despite intense epidemiologic surveillance. Mosquito-control measures were being continued throughout the Bahamas.

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Editorial Note: The Bahamas is an archipelagic nation in the northern Caribbean Sea, consisting of approximately 700 islands and 2,400 cays stretching between Florida and Haiti (Figure). Persons from Hispaniola and other countries have emigrated to the Bahamas, where malaria is not endemic and

FIGURE. Nineteen cases of malaria, including four among travelers, were reported as acquired on the island of Great Exuma in the Bahamas during May–June 2006



only one imported case was reported in 2005. However, because of frequent travel and relocation among countries, health-care providers in the Bahamas and other countries where malaria is not endemic should remain alert to the risk for this disease, especially in travelers and immigrants. Introduced malaria is much less common than imported malaria but of greater epidemiologic significance. Imported malaria usually occurs when travelers acquire the infection while visiting areas where malaria is endemic. Introduced malaria typically occurs when infected travelers return home and transmit the infection to local *Anopheles* mosquitoes, which subsequently transmit it to local residents. Left unchecked, this process can result in reestablishment of endemic malaria in countries that have previously eliminated the disease because these areas have climatic conditions favorable to transmission and *Anopheles* species that are receptive to malaria parasites. In the United States, 1,320 cases of imported malaria were reported in 2004 (1), and 63 episodes of introduced malaria were detected from 1957 to 2003, the year when the latest episode occurred in Florida (2–4).

Available evidence indicates that during May–June 2006, Great Exuma experienced an outbreak of introduced malaria that was successfully contained and terminated. The observations that all cases were caused by *P. falciparum* and a substantial proportion of patients were immigrants from Haiti suggest that malaria was introduced by those immigrants. All patients treated with chloroquine responded to the treatment, which is a further suggestion that the parasites originated from Haiti, where *P. falciparum* has remained sensitive to chloroquine. *P. falciparum* causes 99% of malaria cases in Haiti and the Dominican Republic (MD Milord, Ministry of Public Health and Population, Haiti, and JM Puello, National Center for Control of Tropical Diseases, Dominican Republic, personal communication, 2006), which share the only Caribbean island still endemic for malaria. Conversely, *P. vivax* causes 94% of cases in Mexico and Central America (5).

The successful containment of this malaria outbreak is attributable to several factors. The first identified case, detected in a foreign tourist returning from the Bahamas, was promptly reported to the Bahamian MOH, which responded with several complementary interventions, including identification and treatment of patients and asymptomatic parasite carriers and institution of mosquito-control measures. Fewer than 30 days elapsed between diagnosis of the first identified case in Virginia and diagnosis of the last case on Great Exuma. Since June 19, no additional cases have been noted, despite intensive ongoing surveillance among febrile patients.

In view of these findings, CDC has rescinded recommendations made on June 16, 2006, that travelers take preventive doses of chloroquine before, during, and after travel to Great

Exuma. As of September 19, CDC no longer recommends that travelers to Great Exuma take antimalarial prophylaxis.

This malaria outbreak illustrates the importance of vigilance by health-care providers and rapid response by public health authorities for successful containment (2) and also might provide incentive for measures to eliminate malaria from all Caribbean islands, including Hispaniola. Recently, the International Task Force for Disease Eradication recommended that Haiti and the Dominican Republic work jointly to eliminate from Hispaniola both malaria and lymphatic filariasis, two vectorborne parasitic diseases that have been eliminated from all other Caribbean islands (6). Agreements reached in July 2006 between the ministries of health of Haiti and the Dominican Republic represent a first step toward achieving this goal.

References

1. CDC. Malaria surveillance—United States, 2004. *MMWR* 2006;55 (No. SS-04):23–37.
2. CDC. Locally acquired mosquito-transmitted malaria: a guide for investigations in the United States. *MMWR* 2006;55 (No. RR-13):1–9.
3. CDC. Preventing reintroduction of malaria in the United States. Atlanta, GA: US Department of Health and Human Services, CDC; 2005. Available at http://www.cdc.gov/malaria/features/prevent_reintroduction.htm.
4. CDC. Multifocal autochthonous transmission of malaria—Florida, 2003. *MMWR* 2004;53:412–3.
5. Pan American Health Organization. Regional strategic plan for malaria 2006–2010. Washington, DC: World Health Organization, Pan American Health Organization; 2006. Available at <http://www.paho.org/English/ad/dpc/cd/mal-reg-strat-plan-06.pdf>.
6. International Task Force for Disease Eradication. Summary of the ninth meeting of the ITFDE (II), May 12, 2006. Atlanta, GA. International Task Force for Disease Eradication; 2006. Available at <http://www.cartercenter.org/documents/2435.pdf#search=%22itfde%20haiti%22>.

Inadvertent Misadministration of Meningococcal Conjugate Vaccine — United States, June–August 2005

During June–August 2005, CDC and the Food and Drug Administration (FDA) were notified of seven clusters of inadvertent subcutaneous (SC) misadministration of the new meningococcal conjugate vaccine (MCV4, Menactra) (Sanofi Pasteur, Inc., Swiftwater, Pennsylvania), which is licensed for intramuscular (IM) administration only. A total of 101 persons in seven states were reported to have received MCV4 by the SC route. Of these, 100 were contacted by their health-care providers and advised of the administration error. CDC conducted an investigation to determine whether SC administration of MCV4 resulted in a protective immunologic response. This report describes the results of that investigation, which indicated that, despite the misadministration, per-

sons vaccinated by the SC route were sufficiently protected and that revaccination was not necessary.

In 1978, the meningococcal polysaccharide vaccine (MPSV4, Menomune) (Sanofi Pasteur) was licensed in the United States for administration by the SC route. The newer MCV4 is a tetravalent meningococcal conjugate vaccine that was licensed in January 2005 on the basis of immunogenic noninferiority to MPSV4 and demonstrated safety (1). Both vaccines protect against *Neisseria meningitidis* serogroups A, C, Y, and W-135. Because immunogenicity and safety of MCV4 were assessed for IM administration only, the vaccine is licensed for IM use only. The immunogenicity and safety of MCV4 after SC administration were not evaluated.

CDC contacted the providers who inadvertently misadministered the vaccine to inform them of the investigation. Providers contacted the vaccinees to advise them of the error and invite them to participate in the investigation. Twelve nonserious adverse events* were reported among 54 persons from whom providers solicited such information. Eleven events were local reactions, including injection-site rash, tenderness, swelling, induration, or pain, and one was a fever of 1 day's duration. The frequency and nature of adverse events among these persons are similar to those reported after IM vaccination in MCV4 licensure trials (1).

Providers collected single serum samples from 21 to 105 days after vaccination from 38 SC vaccinees who agreed to participate (response rate: 38%). Serology results from a group of 372 subjects available from the manufacturer's prelicensure MCV4 clinical trial database, with serum samples collected 21 to 42 days after IM vaccination, were used as age-matched controls for comparison with the SC vaccinees. Age-matched comparison of rSBA response was conducted because of the effect of age on serologic response to MCV4. Immune responses for each vaccine serogroup (A, C, Y, and W-135) were measured by serum bactericidal assay using baby rabbit complement (rSBA). Serologic testing of the SC vaccinees was performed by the same laboratory using the same methods used to test the IM vaccinees from the MCV4 clinical trial. Geometric mean titers (GMTs) of SC vaccinees were compared with those of age-matched IM vaccinees from the MCV4 clinical trials. Titers of individual vaccinees were evaluated for each vaccine serogroup to determine whether the vaccinees developed a protective response as a result of the SC vaccination; rSBA titers ≥ 8 were considered protective (2,3).

For each of the four vaccine serogroups, the proportion of SC vaccinees with rSBA titers ≥ 8 was $\geq 97\%$ and did not dif-

* As defined in 21 CFR 1240.62 (Postmarketing reporting of adverse experiences), available at <http://www.accessdata.fda.gov/scripts/cdrh/cfdocs/cfcfr/CFRSearch.cfm?FR=600.80>.

fer significantly (by Fisher exact test) from the proportion of IM vaccinees with rSBA titers ≥ 8 (Table). Two patients vaccinated by the SC route had rSBA titers < 8 (one participant for serogroup C only and one for serogroup W-135 only). GMTs were significantly lower for SC vaccinees compared with age-matched IM vaccinees for serogroups A, C, and Y (odds ratios = 1.78 [95% confidence interval (CI) = 1.21–2.62]; 2.27 [CI = 1.33–3.89]; and 1.66 [CI = 1.03–2.67], respectively); however, no significant difference was observed between GMTs for serogroup W-135 (odds ratio = 0.71 [CI = 0.45–1.14]). On the basis of the protective rSBA titer results for nearly all of SC vaccinees participating in this investigation, revaccination was not recommended.

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Editorial Note: The most likely reason for the inadvertent misadministration of MCV4 described in this report was that the older meningococcal vaccine, MPSV4, in use for nearly 30 years, is licensed for SC administration, whereas MCV4 is licensed only for IM administration. This reason was cited by health-care providers participating in the investigation.

Although the overall serologic response for SC vaccinees was lower than that of IM vaccinees as determined by GMTs, nearly all persons vaccinated by the SC route developed rSBA titers ≥ 8 , which was considered protective on the basis of recent population-based studies of meningococcal C conjugate vaccine efficacy in the United Kingdom (2,3). Therefore, CDC determined that this particular group of persons vaccinated by the SC route was sufficiently protected and that revaccination was not necessary.

CDC cautions health-care providers to be aware that the licensed route of vaccine administration can vary among similar

TABLE. Number and percentage of patients with rSBA* titers ≥ 8 who were vaccinated with meningococcal conjugate vaccine via intramuscular (IM) and subcutaneous (SC) routes, by serogroup — United States, 2005

Serogroup	IM group (n = 372) [†]		SC group (n = 38)		Fisher exact 2-tailed test result
	No.	(%)	No.	(%)	
A	372	(100.0)	38	(100.0)	Undefined
C	372	(100.0)	37	(97.4)	0.09
W-135	372	(100.0)	37	(97.4)	0.09
Y	372	(100.0)	38	(100.0)	Undefined

* Serum bactericidal assay with baby rabbit complement (rSBA). A titer ≥ 8 is considered to be protective on the basis of population studies on meningococcal C conjugate vaccine efficacy in the United Kingdom (3,4).

[†] Serology results from a group of 372 subjects (available via the clinical trial database for the new meningococcal conjugate vaccine [MCV4, Menactra] [Sanofi Pasteur, Inc., Swiftwater, Pennsylvania]) were used as age-matched controls for comparison with the SC vaccinees.

vaccines and recommends that providers carefully review and follow the route of administration indicated on the vaccine label and package insert before administering vaccines. This is especially important after introduction of a new vaccine product.

Acknowledgments

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References

1. CDC. Prevention and control of meningococcal disease: recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR 2005;54(No. RR-7):1–21.
2. Borrow R, Andrews N, Goldblatt D, Miller E. Serological basis for use of meningococcal serogroup C conjugate vaccines in the United Kingdom: reevaluation of correlates of protection. *Infect Immun* 2001; 69:1568–73.
3. Andrews N, Borrow R, Miller E. Validation of serological correlate of protection for meningococcal C conjugate vaccine by using efficacy estimates from postlicensure surveillance in England. *Clin Diagn Lab Immunol* 2003;10:780–6.

Effects of Measles-Control Activities — African Region, 1999–2005

In 1999, of approximately 871,000 deaths from measles worldwide, 61% occurred in sub-Saharan Africa (1). In 2001, countries in the World Health Organization (WHO) African Region began an accelerated measles-control program to reduce by half by 2005 the number of deaths that were caused by measles in 1999 (2). The African Region accelerated measles-control program was based on four strategies: improving routine vaccinations; providing a second opportunity for measles vaccination through a routine, 2-dose vaccination schedule or through supplementary immunization activities (SIAs)*; improving measles case management; and establishing case-based surveillance with laboratory confirmation for

*Initial, nationwide catch-up SIAs target all children of a particular age group (in this region, children aged 9 months–14 years), with the goal of eliminating susceptibility to measles in the general population. Periodic follow-up SIAs then target all children born since the last SIA; follow-up SIAs are generally conducted nationwide every 3–5 years and target children aged 9–59 months, with the goal of eliminating any measles susceptibility that has developed in recent birth cohorts and protecting children who did not respond to their first measles vaccination.

all suspected measles cases. Seven countries in the region had already completed catch-up SIAs by 2000, before the regional program began; in 2001, additional countries in the region began implementing catch-up, and later, follow-up SIAs,[†] and steps were taken to improve routine vaccination coverage with measles vaccine and other vaccines in the Expanded Programme on Immunization schedule. This report summarizes the nationwide SIAs and other measles-control activities conducted in the WHO African Region during 1999–2004, analyzes the trends in reported measles cases since 1990, and compares the annual number of measles cases reported in 2005 with those reported in 1999.[§]

Immunization Activities

WHO and UNICEF publish annual country-specific estimates of routine measles vaccination coverage; these estimates are based on reviews of vaccination coverage surveys, national reports, administrative coverage data, and consultation with regional and local experts (3). According to these estimates, coverage with 1 dose of measles vaccine in the African Region among children aged 12–23 months increased from 52% in 1999 to 67% in 2004. In 2004, 37 of the region's 46 countries were estimated to have coverage rates >60%, and 17 countries were estimated to have coverage rates ≥80% (4).

By 2000, seven countries in the African Region had completed national catch-up SIAs, and during December 2001–December 2004, 25 additional countries completed national catch-up SIAs. Ten of these 32 completed national follow-up SIAs. Measles vaccination coverage rates during these SIAs were >90%, except for the catch-up SIAs in Republic of the Congo (78%), Eritrea (82%), Ethiopia (87%), and Gabon (80%) and the follow-up SIAs in Lesotho (75%), Swaziland (81%), and Zimbabwe (85%). By December 2004, a total of 207.9 million children in 32 countries had been targeted by catch-up SIAs, which is 69% of the population of children aged <15 years in the African Region. During the same period, 16.1 million children aged 9–59 months in 10 countries were targeted by follow-up SIAs, which represents 14% of the population of children aged <5 years in the African Region.

[†] These activities were supported by the Measles Initiative. Founded in 2001, the Measles Initiative is a partnership formed to reduce measles mortality and is led by the American Red Cross, the United Nations Foundation, CDC, WHO, UNICEF, and the Canadian International Development Agency. The initiative supported implementation of high-quality measles SIAs during 2000–2004 for approximately 40 African countries. Additional information is available at <http://www.measlesinitiative.org>.

[§] By convention, Algeria and the island nations of the Comoros, Mauritius, Sao Tome and Principe, and the Seychelles are not routinely included in analyses of data from the WHO African Region.

Measles Surveillance

Since the 1980s, the annual number of country-specific measles cases has been reported by the country's ministry of health each year to WHO's Regional Office for Africa. Before implementing catch-up SIAs, all countries reported measles cases to WHO through routine infectious disease information systems that provided aggregated data. The cases reported through this surveillance system were not laboratory confirmed; they were reported on the basis of clinical suspicion.

After conducting their catch-up SIAs, countries began implementing a case-based surveillance system with laboratory confirmation of suspected measles cases. In this system, each case is reported using an individual case-report form, and a blood specimen is obtained for measles immunoglobulin M (IgM) testing at a national laboratory. When a cluster of three or more cases from a health-facility catchment area has been confirmed, subsequent cases from that area are considered confirmed by epidemiologic linkage, and blood samples are not collected. The quality indicators used for the case-based surveillance system include the proportion of reported cases with a blood specimen (goal: 80% of cases not confirmed by epidemiologic linkage) and the proportion of districts reporting at least one suspected case with a blood specimen per year (goal: 80%). For Niger and Tanzania, the total number of cases with a blood specimen was <80% of the aggregate case total, so aggregate case totals were used for analysis. For all other countries, blood specimens were obtained for >90% of reported cases.

Analysis of Surveillance Data

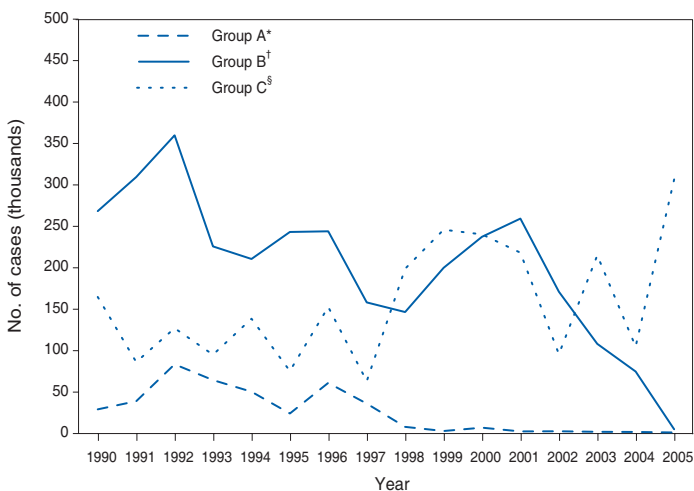
Countries were grouped according to the year in which they conducted their catch-up SIAs; number of reported cases by country group and year during 1990–2005 were calculated (Figure). Of the Group A[‡] countries, six completed catch-up SIAs by December 1999, and the seventh completed its catch-up activities by the end of 2000; these countries had a measles-elimination goal rather than a mortality-reduction goal (5). Group B^{**} consisted of 25 countries that completed nationwide catch-up SIAs during December 2001–December 2004. Group C^{††} consisted of eight countries that did not begin catch-up SIAs before March 2005 (except for SIAs in the

[‡] Botswana, Lesotho, Malawi, Namibia, South Africa, Swaziland, and Zimbabwe.

^{**} Angola, Benin, Burkina Faso, Burundi, Cameroon, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Kenya, Liberia, Madagascar, Mali, Mauritania, Niger, Republic of the Congo, Rwanda, Senegal, Sierra Leone, Togo, Uganda, Tanzania, and Zambia.

^{††} Central African Republic, Chad, Côte d'Ivoire, Democratic Republic of the Congo, Equatorial Guinea, Guinea-Bissau, Mozambique, and Nigeria.

FIGURE. Number of reported measles cases, by country group and year—World Health Organization African Region, 1990–2005



SOURCE: World Health Organization, Regional Office for Africa.

* Includes Botswana, Lesotho, Malawi, Namibia, South Africa, Swaziland, and Zimbabwe; initial supplementary immunization activities (SIAs) were conducted during 1996–2000.

† Includes Angola, Benin, Burkina Faso, Burundi, Cameroon, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Kenya, Liberia, Madagascar, Mali, Mauritania, Niger, Republic of the Congo, Rwanda, Senegal, Sierra Leone, Togo, Uganda, United Republic of Tanzania, and Zambia; initial SIAs were conducted during 2001–2004.

§ Includes Central African Republic, Chad, Côte d'Ivoire, Democratic Republic of the Congo, Equatorial Guinea, Guinea-Bissau, Mozambique, and Nigeria; countries did not begin catch-up SIAs before March 2005 (except for SIAs in the Democratic Republic of the Congo conducted in 2002 and 2004, which collectively targeted approximately half of the country's population aged <15 years).

Democratic Republic of the Congo conducted in 2002 and 2004, which collectively targeted approximately half of the country's population aged <15 years).

The number of reported measles cases in Group A and Group B countries, which have all completed their SIAs, began decreasing steadily as SIAs were conducted (Figure). No decline was evident in the Group C countries; not all areas have been covered by SIAs, and yearly fluctuations in the number of measles cases have been observed.

In countries that completed SIAs, the total number of suspected measles cases decreased 93%, from 202,972 in 1999 to 14,284 (Table); 1999 was chosen as the year for comparison because it is the baseline year for the measles mortality-reduction goal, and the initial catch-up SIAs in all countries other than the Group A countries were conducted after 1999. The number of cases in 1999 was obtained from aggregated reports of cases that were diagnosed on the basis of clinical signs and symptoms; few of these cases have laboratory confirmation, and they include other diseases consistent with the clinical case definition of measles (e.g., rubella). In 2005, after establishment of case-based surveillance, cases were con-

firmed by a laboratory or through epidemiologic linkage; confirmed case totals were available for all countries except Gabon, Liberia, Mauritania, and Sierra Leone. In 2005, aggregate data also were used for Niger because case-based surveillance was not fully operational in the country. Tanzania reported 713 possible cases through the case-based system, but because blood samples were obtained from <80% of cases, aggregate data were used in the calculations. Countries with no report for 1999 (Gabon) or 2005 (Madagascar) were excluded from the calculations.

To maintain consistency in the case definition, clinically suspected measles cases reported in 2005 (i.e., which include cases not counted later after they had negative IgM serology results) were used in the calculations. The 93% decrease during 1999–2005 in suspected cases demonstrated substantial progress in countries that have implemented accelerated measles-control activities.

To minimize the effect of using a single year as a baseline for a disease with cyclic epidemics, reports of suspected cases in 2005 also were compared with the average number of cases that occurred during 3 years (1998–2000). When the 3-year average was used as a baseline (N = 200,683 cases), reported cases also decreased 93%.

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Editorial Note: The results of this report indicate a consistent and marked decrease in the number of measles cases reported from the WHO African Region country groups that completed nationwide measles catch-up SIAs during 1996–2004. These countries have experienced a >90% reduction in clinical measles cases in 2005 compared with 1999. In contrast, the number of reported cases continued to vary widely by year in the group of countries that had not completed nationwide catch-up SIAs. Although countries do not report measles deaths to WHO, an analysis of country-level data from 13 countries in the African Region that completed nationwide catch-up SIAs during late 2001 to early 2002 documented that the percentage reduction in reported deaths from measles was similar to that for reported cases of measles (6). The use and analysis of surveillance data in this report suggest that case-based measles surveillance with laboratory confirmation in the African Region is providing useful information for monitoring program effects.

The increase from 2,988 cases in 1999 to 3,626 cases in 2005 from countries in Group A (Table) is largely a result of the increase in cases reported from South Africa. For example,

TABLE. Number of reported measles cases, by country group and year of nationwide catch-up supplementary immunization activities (SIAs) — World Health Organization African Region, 1999 and 2005

Country	Year of catch-up SIAs	Population aged <15 yrs (in millions)	No. of reported measles cases		
			1999*	2005	
				Clinical [†]	Confirmed [§]
Group A[¶]					
Botswana	1997, 1998	0.7	439	565	21
Lesotho	1999, 2000	0.7	944	218	1
Malawi	1998	6.1	152	182	24
Namibia	1997	0.8	296	235	2
South Africa	1996, 1997	15.5	385	1,944	609
Swaziland	1997, 1998	0.4	0	79	0
Zimbabwe	1998	5.2	772	403	11
<i>Group A subtotal</i>	—	29.4	2,988	3,626	667
Group B^{**}					
Angola	2003	7.4	350	397	200
Benin	2001, 2002	3.7	2,573	207	165
Burkina Faso	2003	6.2	5,516	429	231
Burundi	2003	3.4	2,928	79	0
Cameroon	2003	6.7	10,894	1,299	581
Eritrea	2003	2.0	320	1,359	32
Ethiopia	2003, 2004	34.5	5,329	159	321
Gabon	2004	0.6	NA ^{††}	0 ^{§§}	0 ^{§§}
Gambia	2003	0.6	856	18	0
Ghana	2001, 2002	8.6	15,987	350	27
Guinea	2003	4.1	18,004	95	1
Kenya	2002	14.7	8,601	1,061	97
Liberia	2003	1.5	1,679	8 ^{§§}	8 ^{§§}
Madagascar	2004	8.2	35,196	NA	NA
Mali	2001	6.5	2,506	90	24
Mauritania	2004	1.3	5,263	127 ^{§§}	127 ^{§§}
Niger	2004	6.8	36,156	2,183 ^{¶¶}	2,183 ^{¶¶}
Republic of the Congo	2004	1.9	313	125	0
Rwanda	2003	3.9	4,359	259	96
Senegal	2003	5.0	3,668	129	0
Sierra Leone	2003	2.4	NA	29 ^{§§}	29 ^{§§}
Tanzania	2001, 2002	16.3	5,887	713	23 ^{***}
Togo	2001	2.7	2,540	122	28
Uganda	2003	14.5	42,737	926	6
Zambia	2003	5.3	23,518	494	28
<i>Group B subtotal</i>	—	168.8	199,984	10,658	4,178
Total			202,972	14,284	4,845

SOURCES: United Nations. World population prospects: the 2004 revision, New York, NY: United Nations; 2005; and World Health Organization, Regional Office for Africa.

* Data are from aggregate reporting.

† Numbers of clinically suspected cases reported through the case-based system.

§ Numbers of cases confirmed by epidemiologic linkage or laboratory testing.

¶ Countries that adopted the goal of eliminating measles and conducted SIAs during 1996–2000.

** Countries that conducted SIAs during 2001–2004.

†† Not available.

§§ Case numbers from aggregate reports (no data reported through the case-based system).

¶¶ Case-based surveillance was not operational in Niger in 2005.

*** Case numbers from aggregate reports were used because blood samples were taken from only 73% of suspected cases.

in 2000, South Africa reported 117 confirmed measles cases (5), compared with 609 in 2005. During 2003–2005, South Africa experienced a large, nationwide measles outbreak involving 1,676 confirmed cases, the result of measles importation from Mozambique and failure to vaccinate enough of the population to prevent endemic measles transmission.

The data in this report are subject to at least two limitations. First, data from a single year were used to estimate changes in a disease that has cyclic epidemics. However, when the average number of reported cases that occurred during 1998–2000 (compared with 2005) was used instead of data from 1999 only (compared with 2005), the percentage

reduction was similar. Second, the system used for reporting cases changed in most countries; in 1999, the countries used aggregated reporting of clinically diagnosed cases, but in 2005, most reported laboratory-confirmed cases. Therefore, numbers of suspected cases reported in 2005 were used to estimate the decrease in cases during 1999–2005, which might have led to an even greater decrease. In addition, although the case definition for suspected measles remained the same, the change from the aggregate (in 1999) to the case-based system (in 2005) of reporting might have resulted in underreporting (because of the additional tasks of individual case reports and blood samples) or overreporting (because of increased awareness of measles surveillance after SIAs).

By December 2005, approximately 87% of the population aged <15 years (267.2 million children) in the countries in the African Region had been targeted by catch-up SIAs. In 2006, nationwide catch-up SIAs are focusing on the areas that have not yet been covered, including 29 million children in southern Nigeria and 7 million children in the Democratic Republic of the Congo. Successful control of measles in the African Region will depend on conducting high-quality campaigns (i.e., campaigns that achieve $\geq 95\%$ coverage) in these areas. At the same time, countries should continue to improve their routine immunization services, maintain high coverage with follow-up SIAs every 3–5 years, improve measles case management, and monitor their success by using case-based surveillance with laboratory confirmation to control measles and reach the global goal of reducing measles mortality.

References

1. CDC. Progress in reducing global measles deaths, 1999–2004. *MMWR* 2006;55:247–9.
2. World Health Organization, United Nations Children's Fund. Measles mortality reduction and regional elimination: strategic plan 2001–2005. World Health Organization, Geneva, Switzerland; 2001. Available at <http://www.who.int/vaccines-documents/docspdf01/www573.pdf>.
3. World Health Organization. WHO vaccine-preventable diseases: monitoring system. 2005 global summary. World Health Organization, Geneva, Switzerland; 2005. Available at <http://www.who.int/vaccines-documents/globalsummary/globalsummary.pdf>.
4. World Health Organization. Measles-containing vaccine: reported estimates of MCV coverage, 2006. Available at http://www.who.int/immunization_monitoring/en/globalsummary/timeseries/tscovagemcv.htm.
5. Biellik R, Madema S, Taole A, et al. First 5 years of measles elimination in southern Africa: 1996–2000. *Lancet* 2002;359:1564–68.
6. Otten M, Kelzaala R, Masresha B, et al. Public-health impact of accelerated measles control in the WHO African Region 2000–2003. *Lancet* 2005;366:832–9.

Update: Influenza Activity — United States and Worldwide, May 21–September 9, 2006

During May 21–September 9, 2006, influenza A(H3), influenza A(H1), and influenza B viruses cocirculated worldwide and were identified sporadically in North America. This report summarizes influenza activity in the United States and worldwide since the last *MMWR* update (1).

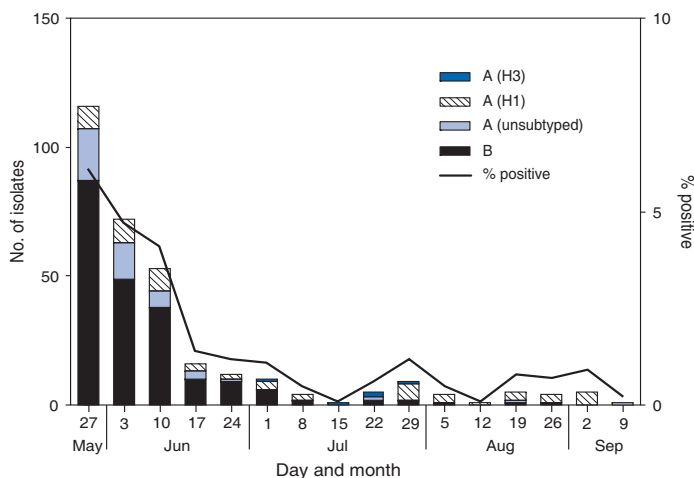
United States

In the United States, CDC uses seven systems for national influenza surveillance (2), four of which operate year-round: 1) the World Health Organization (WHO) and the National Respiratory and Enteric Virus Surveillance System (NREVSS) collaborating laboratory systems; 2) the U.S. Influenza Sentinel Provider Surveillance System; 3) the 122 Cities Mortality Reporting System; and 4) a national surveillance system that records pediatric deaths associated with laboratory-confirmed influenza. Data from these four systems are included in this report.

During May 21–September 9,* WHO and NREVSS collaborating laboratories in the United States tested 14,751 respiratory specimens; 318 (2%) were positive for influenza (Figure). Of the positive results, 208 (65%) were influenza B viruses, 58 (18%) were influenza A (H1) viruses, five (2%) were influenza A (H3) viruses, and 47 (15%) were influenza

* Data as of September 15, 2006.

FIGURE. Number* and percentage of respiratory specimens testing positive for influenza reported by World Health Organization and National Respiratory and Enteric Virus Surveillance System collaborating laboratories, by type and week — United States, May 21–September 9, 2006†



* N = 14,751.

† As of September 15, 2006.

A viruses that were not subtyped. The majority (92%) of these isolates were tested from mid-May through late June, when 3.6% of specimens tested were positive for influenza. Since July 1, of specimens tested, 0.6% were positive for influenza.

During May 21–September 9, the weekly percentage of patient visits to sentinel providers for influenza-like illness (ILI)[†] remained below the national baseline[§] of 2.5% and ranged from 0.6% to 0.9%. The percentage of deaths attributable to pneumonia and influenza as reported by the 122 Cities Mortality Reporting System remained below the epidemic threshold.[¶] One influenza-related pediatric death occurred and was reported to CDC during this period.

Worldwide

During May 21–September 9, influenza A (H3), influenza A (H1), and influenza B viruses cocirculated worldwide. Influenza A (H1) viruses predominated overall in Asia; however, in early summer, influenza B viruses predominated in Japan. In Africa, South Africa reported predominantly A (H3) viruses, and Madagascar reported a limited number of A (H3) and A (H1) viruses. In Europe and North America, small numbers of influenza A and influenza B viruses were reported. In Oceania, influenza A viruses predominated, with both influenza A (H1) and influenza A (H3) viruses circulating; influenza B viruses circulated at lower levels. In South America, influenza A (H1) viruses were most commonly reported, but influenza A (H3) and influenza B viruses also were identified.

Characterization of Influenza Virus Isolates

The WHO Collaborating Center for Surveillance, Epidemiology, and Control of Influenza located at CDC analyzes influenza virus isolates received from laboratories worldwide. Of 23 influenza A (H1) viruses that were collected during May 21–September 9 (three from Asia, 18 from Latin America, and two from the United States) and analyzed at CDC, 17 (74%) were antigenically similar to A/New Caledonia/20/99, the H1N1 component of the 2006–07 influenza vaccine. Six

(26%) of the influenza A (H1) viruses had reduced titers to antisera produced against A/New Caledonia. Of the 19 influenza A (H3) viruses (one from Europe, 12 from Latin America, three from Asia, two from Oceania, and one from the United States) that were characterized, 18 (95%) were antigenically similar to A/Wisconsin/67/2005, the H3N2 component of the 2006–07 influenza vaccine, whereas one (5%) had reduced titers to A/Wisconsin/67/2005.

Influenza B viruses currently circulating worldwide can be divided into two antigenically distinct lineages represented by B/Yamagata/16/88 and B/Victoria/2/87. The B component of the 2006–07 influenza vaccine belongs to the B/Victoria lineage. Of the 26 influenza B isolates collected during May 21–September 9 and characterized at CDC, 23 belonged to the B/Victoria lineage (one from Europe, five from Latin America, six from Asia, and 11 from the United States). Ten (43%) of the B/Victoria-lineage viruses were similar to B/Ohio/01/2005, the B component of the 2006–07 influenza vaccine, whereas 13 (57%) had reduced titers to B/Ohio.

Human Infections with Avian Influenza A (H5N1) Viruses

During December 1, 2003–September 8, 2006, a total of 244 human cases of avian influenza A (H5N1) infection were reported to WHO from 10 countries (3); 23 of these cases were reported since May 21, 2006. A total of 143 (59%) of the 244 cases were fatal. All human cases were reported from Asia (Azerbaijan, Cambodia, China, Indonesia, Iraq, Thailand, Turkey, and Vietnam) and Africa (Djibouti and Egypt), with the most recent cases reported from China, Indonesia, and Thailand. To date, no human case of avian influenza A (H5N1) virus infection has been identified in the United States.

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Editorial Note: During May 21–September 9, 2006, influenza A (H1), influenza A (H3), and influenza B viruses cocirculated worldwide. The influenza virus type and subtype that will predominate and the severity of influenza-related disease activity for the 2006–07 influenza season are difficult to predict.

Vaccination is the best method for preventing influenza. Influenza vaccine is recommended for persons at increased risk for influenza-related complications and severe disease (e.g., persons aged ≥ 50 years, children aged 6–59 months, pregnant women, and persons aged 6 months–49 years with cer-

[†] Defined as a temperature of $\geq 100.0^{\circ}\text{F}$ ($\geq 37.8^{\circ}\text{C}$), oral or equivalent, and cough and/or sore throat in the absence of a known cause other than influenza.

[§] The national baseline was calculated as the mean percentage of patient visits for ILI during noninfluenza weeks for the preceding three influenza seasons, plus 2 standard deviations. Noninfluenza weeks are those in which $<10\%$ of laboratory specimens are positive for influenza. Wide variability in regional data precludes calculating region-specific baselines; therefore, applying the national baseline to regional data is inappropriate. National and regional percentages of patient visits for ILI are weighted on the basis of state population.

[¶] The seasonal baseline is projected using a robust regression procedure that applies a periodic regression model to the observed percentage of deaths from pneumonia and influenza during the preceding 5 years. The epidemic threshold is 1.645 standard deviations above the seasonal baseline.

tain medical conditions) and for health-care workers and household contacts of persons at increased risk (4). In addition to the groups for whom influenza vaccination is recommended, influenza vaccine can be administered to anyone who wants to reduce the likelihood of becoming ill with influenza.

For the 2006–07 influenza season, the four manufacturers licensed to produce influenza vaccine for the United States (Sanofi Pasteur, Inc.; Novartis; GlaxoSmithKline, Inc.; and MedImmune Vaccines, Inc.) expect to produce more than 100 million doses of influenza vaccine. Because vaccine supplies for 2006 are projected to be plentiful and no delays are expected, influenza vaccination can proceed for all persons, whether healthy or at high risk, either individually or through mass campaigns, as soon as vaccine is available. The optimal time for influenza vaccination is during October–November; however, vaccine should be offered throughout the influenza season, even after influenza activity has been documented in the community.

As a supplement to influenza vaccination, antiviral drugs aid in the control and prevention of influenza. However, high levels of resistance to the antiviral adamantanes (i.e., amantadine and rimantadine) have been identified among circulating influenza A (H3) viruses; therefore, CDC continues to recommend against use of the adamantane class of antivirals for the treatment and prophylaxis of influenza in the United States until susceptibility to adamantanes has been reestablished among circulating influenza A isolates (5,6).

The ongoing widespread epizootic of highly pathogenic avian influenza A (H5N1) in Asia, Africa, and Europe remains a major public health concern. As of September 9, 2006, influenza A (H5N1) had been reported in migratory birds or poultry flocks in Africa, Asia, and Europe, with human cases reported from 10 countries in Africa and Asia. No evidence of sustained person-to-person transmission has been identified, although limited person-to-person transmission has occurred (7). No cases of infection with highly pathogenic influenza A (H5N1) have been identified in humans, poultry, or migratory birds in the United States. In collaboration with local and state health departments, CDC continues to recommend enhanced surveillance for possible influenza A (H5N1) infection among travelers with severe unexplained respiratory illness returning from countries affected by influenza A (H5N1) (8).

Influenza surveillance reports for the United States are posted online weekly during October–May at <http://www.cdc.gov/flu/weekly/fluactivity.htm>. Additional information about influenza viruses, influenza surveillance, the influenza vaccine, and avian influenza is available at <http://www.cdc.gov/flu>.

Acknowledgments

This report is based, in part, on data contributed by state and territorial health departments and state public health laboratories; WHO collaborating laboratories; National Respiratory and Enteric Virus Surveillance System laboratories; the U.S. Influenza Sentinel Provider Surveillance System; the 122 Cities Mortality Reporting System; WHO National Influenza Centers, Communicable Diseases, Surveillance and Response, WHO, Geneva, Switzerland; A Hay, PhD, WHO Collaborating Centre for Reference and Research on Influenza, National Institute for Medical Research, London, England; I Gust, MD, I Barr, PhD, WHO Collaborating Center for Reference and Research on Influenza, Parkville, Australia; and M Tashiro, MD, WHO Collaborating Center for Reference and Research on Influenza, National Institute of Infectious Diseases, Tokyo, Japan.

References

1. CDC. Update: influenza activity—United States and worldwide, 2005–06 season, and composition of the 2006–07 influenza vaccine. *MMWR* 2006;55:648–53.
2. CDC. Overview of influenza surveillance in the United States. Atlanta, GA: US Department of Health and Human Services, CDC; 2006. Available at <http://www.cdc.gov/flu/weekly/pdf/flu-surveillance-overview.pdf>.
3. World Health Organization. Confirmed human cases of avian influenza A (H5N1). Geneva, Switzerland: World Health Organization; 2006. Available at http://www.who.int/csr/disease/avian_influenza.
4. CDC. Prevention and control of influenza: recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR* 2006; 55(No. RR-10).
5. Bright RA, Shay DK, Shu B, Cox NJ, Klimov AI. Adamantane resistance among influenza A viruses isolated early during the 2005–2006 influenza season in the United States. *JAMA* 2006;295:891–4.
6. CDC. High levels of adamantane resistance among influenza A (H3N2) viruses and interim guidelines for use of antiviral agents—United States, 2005–06 influenza season. *MMWR* 2006;55:44–6.
7. Ungchusak K, Auewarakul P, Dowell SF, et al. Probable person-to-person transmission of avian influenza A (H5N1). *N Engl J Med* 2005; 352:333–40.
8. CDC. CDC health update: updated interim guidance for laboratory testing of persons with suspected avian influenza A (H5N1) virus in the United States. Atlanta, GA: US Department of Health and Human Services, CDC; 2006. Available at <http://www2a.cdc.gov/han/ArchiveSys/ViewMsgV.asp?AlertNum=00246>.

TABLE II. (Continued) Provisional cases of selected notifiable diseases, United States, weeks ending September 16, 2006, and September 17, 2005 (37th Week)*

Reporting area	West Nile virus disease [†]									
	Neuroinvasive					Non-neuroinvasive				
	Current week	Previous 52 weeks		Cum 2006	Cum 2005	Current week	Previous 52 weeks		Cum 2006	Cum 2005
		Med	Max				Med	Max		
United States	1	1	146	827	1,070	3	1	282	1,254	1,461
New England	—	0	2	6	7	—	0	2	2	2
Connecticut	—	0	2	6	2	—	0	1	2	1
Maine [§]	—	0	0	—	—	—	0	0	—	—
Massachusetts	—	0	0	—	4	—	0	1	—	1
New Hampshire	—	0	0	—	—	—	0	0	—	—
Rhode Island	—	0	0	—	1	—	0	0	—	—
Vermont [§]	—	0	0	—	—	—	0	0	—	—
Mid. Atlantic	—	0	8	16	35	—	0	3	5	18
New Jersey	—	0	2	2	2	—	0	2	1	1
New York (Upstate)	—	0	4	—	13	—	0	1	—	4
New York City	—	0	4	7	7	—	0	2	3	3
Pennsylvania	—	0	2	7	13	—	0	1	1	10
E.N. Central	—	0	25	118	222	—	0	16	53	112
Illinois	—	0	17	79	118	—	0	15	39	87
Indiana	—	0	2	5	9	—	0	1	3	1
Michigan	—	0	5	15	44	—	0	1	—	7
Ohio	—	0	6	14	43	—	0	3	4	12
Wisconsin	—	0	3	5	8	—	0	2	7	5
W.N. Central	1	0	27	141	138	—	0	57	260	433
Iowa	—	0	3	12	9	—	0	4	8	17
Kansas	—	0	3	14	9	—	0	3	10	N
Minnesota	—	0	6	24	17	—	0	7	30	21
Missouri	—	0	7	23	14	—	0	3	7	12
Nebraska [§]	—	0	6	23	44	—	0	14	52	122
North Dakota	—	0	4	13	12	—	0	23	88	72
South Dakota	1	0	7	32	33	—	0	20	65	189
S. Atlantic	—	0	4	6	26	—	0	3	3	19
Delaware	—	0	0	—	1	—	0	0	—	—
District of Columbia	—	0	1	—	1	—	0	1	1	—
Florida	—	0	2	3	8	—	0	0	—	11
Georgia	—	0	3	2	6	—	0	3	2	5
Maryland [§]	—	0	0	—	4	—	0	0	—	1
North Carolina	—	0	0	—	2	—	0	0	—	2
South Carolina [§]	—	0	1	—	4	—	0	0	—	—
Virginia [§]	—	0	0	—	—	—	0	1	—	—
West Virginia	—	0	1	1	—	N	0	0	N	N
E.S. Central	—	0	10	61	55	—	0	11	56	29
Alabama [§]	—	0	1	4	5	—	0	2	—	2
Kentucky	—	0	1	—	3	—	0	0	—	—
Mississippi	—	0	9	52	35	—	0	11	55	26
Tennessee [§]	—	0	2	5	12	—	0	1	1	1
W.S. Central	—	1	43	202	207	—	0	15	83	135
Arkansas	—	0	3	12	9	—	0	2	4	14
Louisiana	—	0	12	38	97	—	0	6	26	50
Oklahoma	—	0	6	17	4	—	0	3	8	6
Texas [§]	—	1	28	135	97	—	0	9	45	65
Mountain	—	0	54	225	98	1	0	158	635	205
Arizona	—	0	8	10	22	—	0	8	10	39
Colorado	—	0	9	40	18	1	0	32	159	78
Idaho [§]	—	0	27	90	3	—	0	99	305	10
Montana	—	0	2	3	8	—	0	3	7	17
Nevada [§]	—	0	9	32	8	—	0	13	65	15
New Mexico [§]	—	0	2	1	15	—	0	1	2	13
Utah	—	0	7	39	21	—	0	15	66	28
Wyoming	—	0	4	10	3	—	0	6	21	5
Pacific	—	0	17	52	282	2	0	39	157	508
Alaska	—	0	0	—	—	—	0	0	—	—
California	—	0	17	50	281	2	0	30	137	502
Hawaii	—	0	0	—	—	—	0	0	—	—
Oregon [§]	—	0	1	2	1	—	0	9	19	6
Washington	—	0	0	—	—	—	0	1	1	—
American Samoa	U	0	0	U	U	U	0	0	U	U
C.N.M.I.	U	0	0	U	U	U	0	0	U	U
Guam	—	0	0	—	—	—	0	0	—	—
Puerto Rico	—	0	0	—	—	—	0	0	—	—
U.S. Virgin Islands	—	0	0	—	—	—	0	0	—	—

C.N.M.I.: Commonwealth of Northern Mariana Islands.

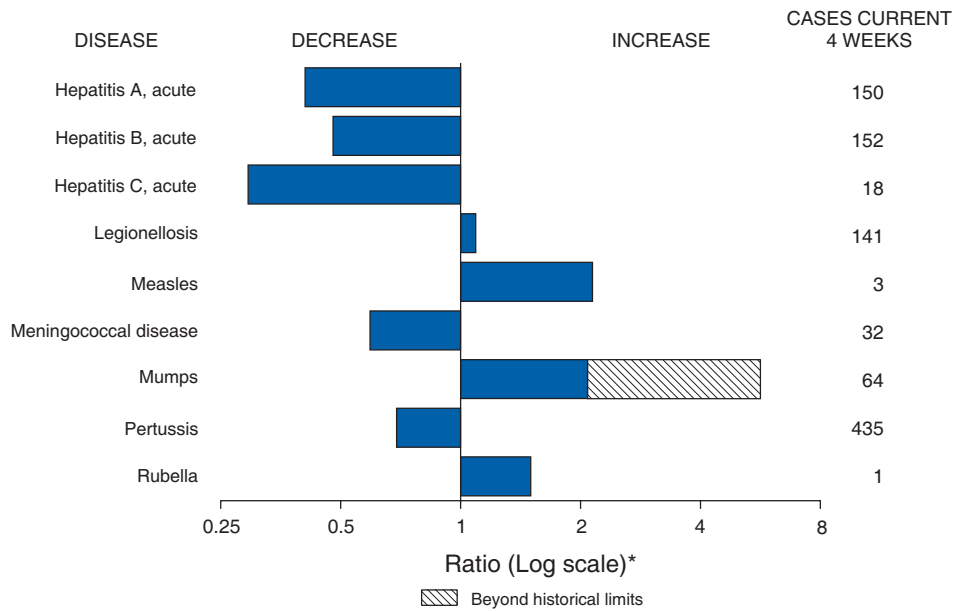
U: Unavailable. —: No reported cases. N: Not notifiable. Cum: Cumulative year-to-date counts. Med: Median. Max: Maximum.

* Incidence data for reporting years 2005 and 2006 are provisional.

† Updated weekly from reports to the Division of Vector-Borne Infectious Diseases, National Center for Zoonotic, Vector-Borne, and Enteric Diseases (proposed) (ArboNET Surveillance).

§ Contains data reported through the National Electronic Disease Surveillance System (NEDSS).

FIGURE I. Selected notifiable disease reports, United States, comparison of provisional 4-week totals September 16, 2006, with historical data



* Ratio of current 4-week total to mean of 15 4-week totals (from previous, comparable, and subsequent 4-week periods for the past 5 years). The point where the hatched area begins is based on the mean and two standard deviations of these 4-week totals.

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