



Measles— United States, 2011

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1 figure, 1 table omitted

IN 2000, THE UNITED STATES ACHIEVED measles elimination (defined as interruption of year-round endemic measles transmission).¹ However, importations of measles into the United States continue to occur, posing risks for measles outbreaks and sustained measles transmission. During 2011, a total of 222 measles cases (incidence rate: 0.7 per 1 million population) and 17 measles outbreaks (defined as three or more cases linked in time or place) were reported to CDC, compared with a median of 60 (range: 37-140) cases and four (range: 2-10) outbreaks reported annually during 2001-2010. This report updates an earlier report on measles in the United States during the first 5 months of 2011.² Of the 222 cases, 112 (50%) were associated with 17 outbreaks, and 200 (90%) were associated with importations from other countries, including 52 (26%) cases in U.S. residents returning from abroad and 20 (10%) cases in foreign visitors. Other cases associated with importations included 67 (34%) linked epidemiologically to importations, 39 (20%) with virologic evidence suggesting recent importation, and 22 (11%) linked to cases with virologic evidence of recent importation. Most patients (86%) were unvaccinated or had unknown vaccination status. The increased numbers of outbreaks and measles importations into the United States underscore the ongoing risk for measles among unvaccinated persons and the importance of vaccination against measles.³

Confirmed measles cases in the United States are reported by state and local health departments to CDC using a stan-

ard case definition.* A measles case is considered confirmed if it is laboratory-confirmed or meets the clinical case definition (an illness characterized by a generalized rash lasting ≥ 3 days, a temperature of $\geq 101^\circ\text{F}$ [$\geq 38.3^\circ\text{C}$], and cough, coryza, or conjunctivitis) and is linked epidemiologically to a confirmed case. Laboratory confirmation of measles is made by detection in serum of measles-specific immunoglobulin M (IgM), a significant rise in measles immunoglobulin G (IgG) level, isolation of measles virus, or detection of measles virus by nucleic acid amplification from a clinical specimen. Cases are considered importations if exposure to measles virus occurred outside the United States 7-21 days before rash onset and rash occurred within 21 days of entry into the United States, with no known exposure to measles in the United States during that time.

For this report, U.S. residents were classified as eligible or ineligible for measles, mumps, and rubella (MMR) vaccination according to the Advisory Committee on Immunization Practices recommendations for measles vaccination.³ Vaccine-eligible patients were defined as U.S. residents who (1) were unvaccinated or had unknown vaccination status, (2) did not have any contraindications for vaccination, and (3) were either born after 1957 and aged ≥ 12 months without previous documentation of presumptive evidence of immunity to measles† or aged 6-11 months with recent history of international travel.

During 2011, a provisional total of 222 measles cases were reported from 31 states. The median age of the patients was 14 years (range: 3 months to 84 years); 27 (14%) were aged < 12 months, 51 (26%) were aged 1-4 years, 42 (21%) were aged 5-19 years, and 76 (39%) were aged ≥ 20 years. Most patients were unvaccinated (65%) or had unknown vaccination status (21%). Of the 222, a total of 196 were U.S. resi-

What is already known on this topic?

Achievement of measles elimination was declared in the United States in 2000, but the disease remains poorly controlled in much of the world. Cases of measles are imported regularly into the United States.

What is added by this report?

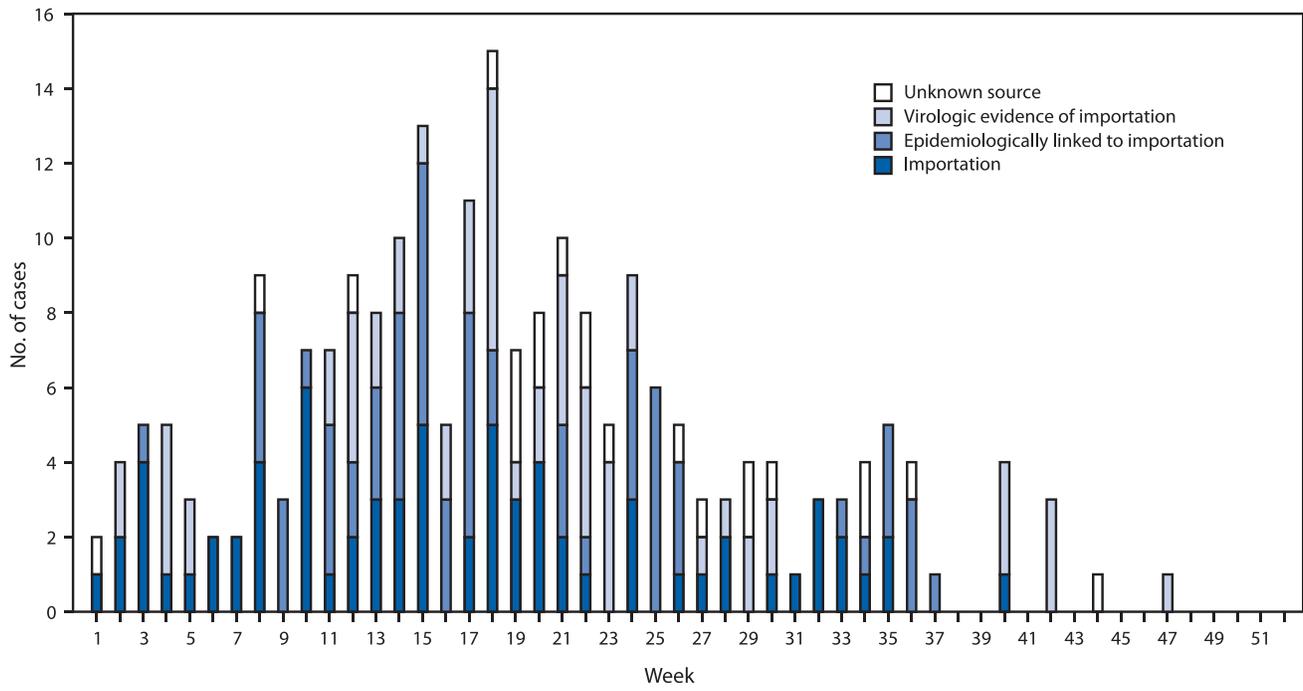
During 2011, 222 cases of measles and 17 outbreaks were reported in the United States, an increase compared with cases and outbreaks reported during 2001-2010. Importations accounted for 72 (32%) cases, including 52 (72%) cases among U.S. residents who had traveled abroad recently. Among patients who were U.S. residents, 85% were unvaccinated or had unknown vaccination status and were eligible for measles, mumps, and rubella (MMR) vaccination.

What are the implications for public health practice?

MMR vaccine is highly effective in preventing measles and its complications. Rapid public health response and high 2-dose MMR vaccine coverage are essential in preventing measles outbreaks and sustaining elimination in the United States. One dose of MMR vaccine is recommended routinely for all children at age 12-15 months, with a second dose at age 4-6 years. Adults without evidence of measles immunity should receive 1 MMR vaccine dose, whereas 2 doses are recommended for unvaccinated health-care personnel, international travelers, and students attending post-high school educational institutions.

dents. Of those U.S. residents who had measles, 166 were unvaccinated or had unknown vaccination status, 141 (85%) were eligible for MMR vaccination, 18 (11%) were too young for vaccination, six (4%) were born before 1957 and presumed immune, and one (1%) had previous laboratory evidence of pre-

FIGURE. Number of measles cases, by import status and week of rash onset (N = 222) — United States, 2011



sumptive immunity to measles. Among the 141 patients who were unvaccinated and eligible for MMR vaccination, nine (6%) were infants aged 6-11 months and had recent history of international travel; 14 (10%) were aged 12-15 months, the age recommended for receiving the first dose of MMR vaccine; and 66 (47%) were aged 16 months through 19 years. Of those 66 patients, 50 (76%) had not been vaccinated because of a philosophic, religious, or personal objection.

Among the 70 (32%) measles patients who were hospitalized, 17 (24%) had diarrhea, 15 (21%) were dehydrated, and 12 (17%) had pneumonia. No cases of encephalitis and no deaths were reported.

Of the 222 U.S. measles cases, 200 (90%) were associated with importations, of which 72 (36%) were importations from other countries, 67 (30%) were linked epidemiologically to importations, 39 (20%) had virologic evidence (i.e., isolation of a viral genotype known to circulate in a country with measles) that suggested recent importation, and 22 (11%) were linked to

cases with virologic evidence of recent importation. The source of measles acquisition in 22 cases was not determined through contact tracing or viral isolation (i.e., linking the patient to a country with measles or isolation of a viral genotype known to circulate in a country with measles). Importations were reported during 31 of the 52 reporting weeks (FIGURE). Among the 72 cases of measles importation, 52 were linked to U.S. residents who had traveled abroad, and 20 were linked to foreign visitors. Almost half (46%) of the 72 measles importations occurred among persons who acquired the disease in the World Health Organization (WHO) European Region.

Seventeen outbreaks accounted for 112 (50%) of the 222 cases. The median outbreak size was six cases (range: 3-21 cases), and outbreaks lasted a median of 18 days (range: 6-69 days).

Measles was laboratory confirmed in 200 (90%) cases: 94 (47%) by detection of measles-specific IgM and measles virus nucleic acid, 69 (35%) by detection of IgM only, and 37 (19%) by detection of measles virus nucleic acid

only. Six genotypes of measles virus were identified among samples collected: D4, D9, D8, B3, G3, and H1.

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CDC Editorial Note: Measles elimination has been maintained in the United States for more than a decade through high population immunity secondary to high MMR vaccination coverage. Coverage with 1 dose has been >90% among children aged 19-35 months since 1996. The increase in measles importations and outbreaks during 2011 serves as a reminder that measles remains endemic in many parts of the world and unvaccinated U.S. residents continue to place themselves and others in their communities at risk for measles and its complications.

The increase in importations reflects recent increases in the incidence of measles in countries visited by U.S. travelers. The source of almost half of the measles importations in 2011 was the WHO European Region, which re-

ported >30,000 cases of measles, including 27 cases of measles encephalitis, a complication that often results in permanent neurologic sequelae, and eight measles-related deaths in 2011. Five countries (France, Italy, Romania, Spain, and Germany) accounted for more than 90% of cases reported to the European Centers for Disease Prevention and Control.⁴ Although measles has been eliminated in the Region of the Americas since 2002 and considerable progress has been achieved in global measles control, measles is still common in many countries. Importations of measles virus into the United States will likely continue and cause outbreaks in communities that have clusters of unvaccinated persons. Maintenance of high MMR vaccination coverage is essential to prevent measles outbreaks and sustain measles elimination in the United States. Despite the relatively small number of reported cases in the United States, the public and the health-care providers must remain vigilant. A drop in MMR vaccination coverage in a community can increase the risk for large, sustained measles outbreaks, as experienced recently in Canada and France,^{4,5} or re-establishment of endemic transmission, as experienced in the United Kingdom.⁶

Occasionally, measles cases are reported without apparent links to importations, but virologic evidence suggests recent importation of an undetected case or chain of cases. Given travel patterns, the highly infectious nature of measles virus, and limitations of surveillance systems, not every importation of measles virus into the United States is detected. Therefore, collection of samples for virus detection is extremely important. Genetic characterization of viruses can help to confirm or suggest the likely source of imported viruses because measles genotypes are distributed heterogeneously in regions that have not yet eliminated measles.^{7,8}

Health-care providers play an important role in maintaining elimination of measles in the United States. Patients with measles frequently seek

medical care; therefore, health-care providers should maintain a high awareness of measles and suspect measles in persons who have a febrile rash illness and clinically compatible symptoms (e.g., cough, coryza, or conjunctivitis) and who recently have traveled abroad or have had contact with travelers. Providers should implement isolation precautions immediately and promptly report suspected measles cases to their local health department to limit spread to other susceptible persons, including those who cannot be vaccinated because of medical contraindications or those too young for vaccination. In several outbreaks during 2011, despite seeking medical care, the source case was not identified until after the first or second generation of cases was reported. Misdiagnosis and delayed reporting resulted in missed opportunities to prevent additional cases because of delayed implementation of control measures. Nevertheless, for most cases, early reporting by providers and rapid control efforts by state and local public health agencies have prevented measles transmission and limited the size of outbreaks.

Health-care providers should encourage vaccination of all eligible patients, including children and adults. MMR vaccine is recommended routinely for all children at age 12-15 months, with a second dose at age 4-6 years. Two doses of MMR vaccine also are recommended for unvaccinated health-care personnel, international travelers, and students attending post—high school educational institutions. Other adults without evidence of measles immunity should receive 1 dose of MMR vaccine.³ In addition, providers should remind their patients who plan to travel internationally of the increased risk for measles and potential exposures during bus, train, or air travel and at large international events or gatherings (e.g., Euro 2012 and the 2012 Summer Olympics), and of the importance of vaccination. All persons aged ≥ 6 months who will be traveling outside the United

States and are eligible to receive MMR vaccine should be vaccinated before travel. Children aged ≥ 12 months should receive 2 doses of MMR vaccine separated by at least 28 days, before travel.³

REFERENCES

8 Available.

CDC Grand Rounds: Dietary Sodium Reduction— Time for Choice

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EXCESS DIETARY SODIUM IS A MAJOR contributor to hypertension (high blood pressure) and a critical public health issue in the United States.¹ Nearly one in three U.S. adults, or 68 million persons, has hypertension, and half of those do not have their condition under control.² Hypertension is a major contributor to cardiovascular diseases, which are a leading cause of death, disability, and health-care costs in the United States.³ The average sodium intake among persons in the United States aged ≥ 2 years is 3,266 mg/day (excluding table salt).⁴ Current dietary guidelines recommend that reducing consumption of sodium to <2,300 mg/day, and that blacks, persons aged ≥ 51 years, and persons of any age with hypertension, diabetes, or chronic kidney disease (about half of the U.S. population and the majority of adults) further reduce intake to 1,500 mg/day.⁵ Regardless of age or sex, sodium intake by most U.S. residents considerably exceeds recommended levels (FIGURE). Reducing sodium intake to 2,300 mg/day potentially could prevent 11 million cases of hypertension and save billions of dollars in health-care expenditures; reducing sodium intake further would yield additional benefits.⁶ To achieve those reductions and help consumers make healthful choices,