Potential routes of perinatal TBRF infection include transplacental transmission or acquisition during delivery; however, studies have been limited.

The findings in this report are subject to at least two limitations. First, transmission route for the newborn was not determined, but possibilities include transplacental, during birth, or during residence in the cabin. Second, the cabin remains the most likely site of exposure for the mother on the basis of arrival date and acute nature of her illness; however, no rodent nests or ticks were identified within the structure to provide more substantial evidence.

TBRF should be considered a potential diagnosis among febrile patients who reside in or have traveled to the western United States, especially those inhabiting rustic housing. Cases should be reported immediately to public health officials to facilitate identification of other potentially exposed persons and to evaluate and treat those persons for TBRF infection. Additionally, TBRF is a reportable disease in 12 western U.S. states.‡ An environmental investigation should be undertaken to search for rodent nests. Reinfection and additional TBRF illnesses can occur in housing previously linked to TBRF cases.[10] Remediation efforts should include rodent-proofing and treatment of structures with pesticides (particularly crack- and crevice-type) by pest control specialists to reduce risk for continued tick exposure.

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10 Available.

*A Jarisch-Herxheimer reaction is characterized by hypotension, tachycardia, chills, rigors, diaphoresis, and elevated body temperature and can occur after initial antibiotic therapy for infections caused by spirochetes, including relapsing fever.[1]

†One woman with TBRF infection elected to terminate her pregnancy.

‡Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, North Dakota, Oregon, Texas, Utah, and Washington.

Ectopic Pregnancy Mortality—Florida, 2009-2010

MMWR. 2012;6:106-109

1 table omitted

ECTOPIC PREGNANCY OCCURS WHEN A fertilized ovum implants on any tissue other than the endometrial lining of the uterus. Approximately 1%-2% of pregnancies in the United States are ectopic[1,2]; however, these pregnancies account for 3%-4% of pregnancy-related deaths.[3] The ectopic pregnancy mortality ratio in the United States decreased from 1.15 deaths per 100,000 live births in 1980-1984 to 0.50 in 2003-2007.[4] During 1999-2008, the ectopic pregnancy mortality ratio in Florida was similar to the national rate, 0.6 deaths per 100,000 live births, but increased abruptly to 2.5 during 2009-2010. Florida's Pregnancy-Associated Mortality Review (PAMR) identified ectopic pregnancy deaths during 1999-2010 through its routine process of identifying all pregnancy-related deaths. A multidisciplinary investigation committee reviewed the ectopic pregnancy deaths for cause of death, risk factors, and prevention opportunities. This report summarizes the investigation results, which identified 11 ectopic pregnancy deaths from 2009-2010 and 13 deaths from the 10-year period 1999-2008. The increase in ectopic mortality appears to be associated with illicit drug use and delays in seeking health care. The findings underscore the importance of ongoing, state-based identification and review of pregnancy-related deaths. Such reviews have the potential to identify emerging causes of deaths and associated risk factors, such as ectopic pregnancy deaths among women who use illicit drugs. Efforts to prevent ectopic pregnancy deaths need to ensure early access to care, promote awareness about early pregnancy testing and ectopic pregnancy risk, and raise public awareness about substance abuse health risks, especially during pregnancy.

In 1996, the Florida Department of Health initiated PAMR to improve surveillance of pregnancy-related deaths in Florida. PAMR was formed to highlight gaps in health care, identify systematic service delivery problems, and make recommendations to facilitate improvements in the overall systems of care. The PAMR process begins by identifying pregnancy-associated deaths. A pregnancy-associated death is defined as occurring during or within 1 year after the end of pregnancy; the association is purely temporal. Pregnancy-associated deaths occurring within the previous year are identified through a quarterly review, using a computer algorithm examining linked data files from (1) death certificates of females aged 8-61 years, (2) statewide prenatal risk screenings for high-risk pregnancies, (3) certificates of live birth, and (4) fetal death certificates. The pregnancy-associated death certificates identified through this computer algorithm are reviewed by a PAMR subcommittee to determine if the death is pregnancy-related and to assign an underlying cause of death. A pregnancy-related death is defined as a pregnancy-associated death resulting from (1) complications of the pregnancy itself, (2) a chain of events initiated by the pregnancy that led to the death, or (3) aggravation of an unrelated condition by the physiologic or pharmacologic effects of the pregnancy that resulted in death. The PAMR subcommittee identified 470 pregnancy-related deaths that occurred during 1999-2010.

In late 2010, the PAMR subcommittee identified a potential increase in ectopic pregnancy deaths in 2009. A retrospective review of the identified pregnancy-related deaths from 1999-2009 confirmed this increase. Ectopic pregnancy deaths in 2010 were iden-

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tified by a prospective review of the pregnancy-associated deaths for 2010. The PAMR subcommittee found that 24 ectopic pregnancy-related deaths had occurred during 1999-2010.

PAMR staff members abstracted physician, hospital, medical examiner, health department, prenatal screening, and other records of all ectopic pregnancy deaths in Florida. Characteristics of the ectopic pregnancy deaths (e.g., sociodemographics, health history, and events surrounding death) were identified from available data sources. A multidisciplinary investigation committee systematically reviewed the de-identified abstracted records for causes of death, risk factors, and prevention opportunities. For deaths that occurred during 2009-2010, copies of original health records were obtained to ensure completeness. Statewide hospital discharge, ambulatory care, outpatient surgery, and emergency department databases also were searched to find evidence of other health-care encounters. Ectopic pregnancy mortality ratios were calculated as numbers of deaths per 100,000 live births using natality files for the denominator. Poisson distribution was used to calculate 95% confidence intervals. Significance was assessed using the mid-p exact test ($p<0.05$).

The PAMR subcommittee identified 368 pregnancy-related deaths from 1999-2008 and 102 pregnancy-related deaths from 2009-2010. For the period 1999-2008, 13 ectopic pregnancy-related deaths were identified in Florida, comprising 3.5% of all pregnancy-related deaths. For the period 2009-2010, 11 ectopic pregnancy-related deaths were identified, comprising 10.8% of all pregnancy-related deaths. All 24 deaths were confirmed ectopic pregnancy diagnoses and were related to pregnancy in an oviduct. In comparison with the earlier period, the ectopic pregnancy mortality ratios for 2009-2010 were significantly higher among women who were non-Hispanic white (2.0 versus 0.3 deaths per 100,000 live births in 1999-2008), Hispanic (3.3 versus 0.0), unmarried (4.8 versus 0.7), without insurance or a health plan (17.6 versus 1.8), and had less than a high school education (6.4 versus 0.8).

During 2009-2010, the women who died were more likely to have collapsed, presumably from hemorrhage associated with acute tubal rupture, before seeking health care, compared with women who died during 1999-2008 (1.8 versus 0.3 deaths per 100,000 live births during 1999-2008). Of the eight women who collapsed during 2009-2010, six tested positive at autopsy for illicit drug use; exposure for one death was unknown. Four women tested positive for cocaine. No comparison could be made between the frequencies of illicit drug use among women who died from ectopic pregnancy during 1999-2008 and 2009-2010 because testing for illicit drug use was performed substantially less often in the earlier period. During 2009-2010, among the three women who sought care before collapse, two experienced a delay in medical diagnosis. Five of six women experienced similar delays in medical diagnosis during 1999-2008.

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CDC Editorial Note: Ectopic pregnancy mortality rates in the United States steadily declined during the late 20th century, through 2007.[4] The decline in these deaths has been attributed to improvements in the sensitivity, accuracy, and use of pregnancy testing, ultrasound for diagnosis, and improvements in therapeutic modalities, including laparoscopic surgery and medical management of ectopic pregnancy. This success relies heavily on access to early care so that women who have signs and symptoms of ectopic pregnancy can be identified, diagnosed, and treated. The contribution of any change in the incidence of ectopic pregnancy to the decline in mortality is unknown. Obtaining a reliable incidence rate for ectopic pregnancy in the United States is difficult. The latest estimate of 19.7 ectopic pregnancies per 1,000 pregnancies in the United States for 1990-1992 was reported using inpatient National Hospital Discharge Survey and outpatient National Hospital Ambulatory Medical Care Survey data.[5] However, hospital discharge data are no longer considered an accurate surveillance data source for all ectopic pregnancies because more of these pregnancies are man-

What is already known on this topic?

Only 1%-2% of pregnancies in the United States are ectopic, yet these pregnancies account for 3%-4% of pregnancy-related deaths. The ectopic pregnancy mortality ratio in the United States decreased from 1.15 deaths per 100,000 live births during 1980-1984 to 0.50 during 2003-2007.

What is added by this report?

Florida's ectopic pregnancy mortality ratio abruptly increased from 0.6 deaths per 100,000 live births during 1999-2008 to 2.5 during 2009-2010. The increase in ectopic mortality appears to be associated with illicit drug use and delays in seeking health care.

What are the implications for public health practice?

State-based pregnancy-related mortality surveillance is needed to guide public health actions to prevent future deaths. Efforts to prevent ectopic pregnancy deaths need to ensure early access to care, promote awareness about early pregnancy testing and ectopic pregnancy risk, and raise public attention about substance abuse health risks, especially during pregnancy.

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aged on an outpatient basis and with nonsurgical interventions. Other surveillance approaches suggest that the frequency of ectopic pregnancy in the United States has not changed substantially in the United States since the early 1990s.[6,7]

The 11 ectopic pregnancy deaths in Florida during 2009-2010 contrast with a total of 14 deaths in the entire United States attributable to ectopic pregnancy identified in national vital statistics for 2007, the most recent year for which national data are available.[8] Compared with the earlier period, this series of ectopic pregnancy deaths in Florida during 2009-2010 is associated with a higher proportion of women who collapsed, which is generally associated with acute tubal rupture and hemorrhage. Based on limited evidence from household and family members and from electronic hospital, outpatient surgery, and emergency department records, these women had not received any health care before collapse. These findings suggest that delays in obtaining care contributed to the deaths of these women. More often, these women were from disadvantaged groups of women who might have experienced difficulties accessing health care, such as women not covered by insurance or a health plan. The high prevalence of illicit drug users among deaths in Florida during 2009-2010 might have been associated with delays in seeking care, receiving care, or both; this presents a challenge for prevention. The lack of drug testing in the earlier period limits the ability to ascertain whether the recent increase was predominantly related to illicit drug use.

This is the first report of an abrupt increase in ectopic pregnancy deaths identified in the United States in recent times. Pregnancy-related mortality surveillance systems previously have identified various clusters, including a cluster of maternal deaths associated with barbiturate anesthetics in New York City[9] and excessive maternal mortality among members of a religious group in Indiana.[10]

The findings in this report are subject to at least four limitations. First, the total number of ectopic pregnancy deaths in Florida was small. Second, complete medical histories were not obtainable for every woman who died, limiting available information on risk factors and services. Third, rates of ectopic pregnancy deaths could not be calculated based on ectopic pregnancies because an accurate system for surveillance for cases of ectopic pregnancy at the population level is not available. Finally, women who nearly died from ectopic pregnancy were not studied.

This report reinforces the need for pregnancy-related mortality surveillance and its potential for guiding public health actions to prevent future deaths. Based on the findings from its review, Florida's PAMR team recommended promoting awareness among women and health-care providers, especially emergency-care providers, about ensuring early access to care and the importance of early suspicion and testing for pregnancy. The high prevalence of illicit drug use among the women who died highlights the need to raise public awareness about health risks associated with drug exposure during pregnancy.

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Announcement: Release of Online US and State Trend Data for Health-Related Quality of Life

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CDC HAS RELEASED 1993-2010 OVERall U.S. and state trend data for Health-Related Quality of Life (HRQOL).* CDC's HRQOL questions ask about recent perceived physical and mental health and activity limitations.[1] Overall U.S. and state estimates are available by sex, age group, and race/ethnicity. *Healthy People 2000*, *2010*, and *2020* identified quality of life improvement as a central public health goal.[2] HRQOL enables health agencies to address broader areas of health-related public policy around a common theme, in collaboration with a wider circle of health partners, including social service agencies, health-care systems, community planners, and business groups. Measuring HRQOL will help monitor progress in achieving the nation's health objectives.

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