Public Health Response to a Potentially Rabid Bear Cub—Iowa, 1999

MMWR. 1999;48:971-973

On August 27, 1999, a 5-6-month-old black bear cub in a petting zoo in Clermont, Iowa, died after developing acute central nervous system signs; the initial direct fluorescent-antibody (DFA) test results available on August 28 indicated the bear had rabies. On August 29, in response to the positive laboratory report, the Iowa Department of Public Health (IDPH) initiated a campaign to identify and inform persons potentially exposed to the bear’s saliva. Within 72 hours, IDPH staff verified contact and exposure information for approximately 350 persons. Subsequent testing found no evidence of rabies virus in brain or spinal cord tissues. This report describes the public health response to this potential rabies outbreak and reviews testing procedures and protocols for rabies.

On August 27, the bear developed acute neurologic signs, progressing from mild tremors and anisocoria to coma and death within 4 hours. The attending veterinarian submitted the bear to Iowa State University’s Veterinary Diagnostic Laboratory (ISU VDL) for a full postmortem examination. On August 28, ISU VDL notified the veterinarian that the bear had tested positive for rabies. The veterinarian immediately alerted IDPH. After consultation with CDC, IDPH established a conservative estimate of the period of potential rabies exposure to humans as 28 days before the bear’s death. IDPH contacted media statewide to help publicize the potential exposures of the zoo visitors.

The local county health department and the area hospital established a rabies exposure assessment and treatment clinic in the emergency department. Based on information from a voluntary sign-in log for visitors, IDPH used a variety of tools (i.e., media campaign, Internet locator sites, directory assistance, and law enforcement) to reach persons from 10 states (Arizona, California, Florida, Illinois, Iowa, Minnesota, New Mexico, New York, Ohio, and Wisconsin) and Australia; 200 visitors were identified. On August 29, IDPH personnel began contacting the 200 visitors. In addition, efforts were made to contact 150 potentially exposed persons who attended an August 14 “barn-warming” at which the bear was present. On September 3, a dispatch was published in MMWR1 to notify other health departments of efforts to locate zoo visitors. By September 1, an estimated 99% of potentially exposed persons had been contacted.

On August 30, IDPH, the Iowa State Veterinarian’s Office, and the U.S. Department of Agriculture visited the petting zoo to assess exposure factors and implement quarantine measures. On August 31, the ISU VDL reported a positive reverse transcriptase polymerase chain reaction (RT-PCR) for rabies† and submitted brain tissues to CDC to identify the potential wildlife reservoir species associated with the virus. During the ISU VDL necropsy, no alternative cause of death was identified; however, pathologic studies were limited by the advanced state of postmortem autolysis. On the evening of September 1, IDPH was notified by CDC that the DFA of the tissues submitted for virus typing were negative for rabies virus. On September 2, brain and spinal cord tissues were submitted to University Hygienic Laboratory (UHL) and CDC. On September 3, DFA testing at UHL was reported as negative; DFA, RT-PCR, and nested PCR tests at CDC on brain and spinal cord tissues also were reported negative.

On September 3, the available information included the bear’s clinical presentation of acute death atypical for but consistent with rabies; the initial positive DFA test and the positive PCR test at ISU VDL; the negative tests conducted by CDC on the bear’s brain and spinal cord; the negative DFA test conducted by UHL on the bear’s brain; a documented case of a rabid bear with a DFA-negative test on brain tissue;2 the paucity of literature on rabies and rabies testing in bears, and follow-up of humans after exposure to animals with negative laboratory results; and the lack of a reasonable alternative explanation for the bear’s neurologic illness and death. IDPH also was aware that the risk for death from symptomatic rabies was 100% and the risk for receiving vaccine was minimal. Consultation with national clinical infectious disease specialists and other medical experts, including epidemiologists, resulted in the conclusion that the vaccine series be continued. IDPH then issued a press release stating that the negative tests made it less likely the bear died from rabies.3 By the end of September, an estimated 150 persons had completed the rabies vaccination series. On approximately October 18, ISU VDL reported mouse inoculation studies negative for rabies.

Reported by: SC Gleason, DO, R Currier, DVM, P Quinlisk, MD, State Epidemiologist, Iowa Dept of Public Health. Viral and Rickettsial Zoonoses Br, Div of Viral and Rickettsial Diseases, National Center for Infectious Diseases; and EIS officers, CDC.

CDC Editorial Note: The false-positive test result for rabies in a bear in Iowa affords an opportunity to review testing procedures and protocols for rabies virus infection, the public health record in the United States resulting from these procedures and protocols, and recommendations for handling inconsistent test results.

The DFA test for detection of rabies virus antigen in brain tissue is used as the primary diagnostic test in all public health laboratories in the United States.
The test has a sensitivity approaching 100%. Rabies diagnosis and administration of prophylaxis to potential human exposures are based on the observation that, in all mammals, rabies virus reaches the salivary glands and is excreted in saliva only after replication in the central nervous system. Absence of rabies virus antigen in the brain of an animal by DFA (i.e., a negative diagnostic test result) essentially precludes the presence of virus in saliva, the risk for rabies transmission, and the need for postexposure prophylaxis. Clinical signs leading to a suspicion of rabies occur only after substantial virus replication. At that time, most tests for rabies reveal considerable amounts of viral antigen in all areas of the brain.

DFA test results in which staining of antigen is weak or that reveals sparse or focal inclusions often are caused by nonspecific antibody binding or less-than-optimum test conditions. Cross-contamination of negative samples at necropsy with material from strong positive samples tested earlier also can cause sporadic staining in a negative sample. DFA tests that are not clearly positive or negative should be repeated by remaking slides from reserved brain tissue and repeating the test, using reagents from two different commercial sources and using additional specificity controls. If test results remain equivocal, alternative confirmatory tests, such as virus isolation (through cell culture or mouse inoculation) or PCR assays, should be performed. Additional amplification, such as a nested RT-PCR assay, is unnecessary and inappropriate for routine diagnostic applications. Postexposure prophylaxis can be initiated during the diagnostic testing process and discontinued if negative results are obtained.

In 1997, approximately 100,000 animal brains were tested for rabies virus antigen by DFA; of these, 8509 (8.5%) were positive. The absolute number of persons potentially exposed to an animal with suspected rabies and who did not receive prophylaxis because of a negative diagnostic test result is unknown. Nevertheless, since the initiation of current rabies testing procedures in 1958, there is no evidence that a false negative laboratory test has ever led to rabies in a person subsequently left untreated.

Each laboratory that provides rabies diagnostic services should plan routine evaluation of its DFA test procedures and should participate in national rabies virus proficiency testing. Negative test results obtained by appropriate and systematic examination of specimens can be interpreted reliably by public health practitioners so that no postexposure prophylaxis is required or postexposure prophylaxis that was initiated pending laboratory evaluation can be curtailed. To assist state and local health departments, national and international reference laboratories, such as the World Health Organization Collaborating Center for Reference and Research on Rabies at CDC, are available to clarify and interpret rabies test results.

### REFERENCES

7 available

† This test was subsequently determined to be a positive DFA test.

† This test was subsequently determined to be a positive nested PCR obtained following a negative primary RT-PCR. Sequencing of the amplified product from the nested PCR did not reveal a rabies gene product.

### Suicide Prevention Among Active Duty Air Force Personnel—United States, 1990-1999

**MMWR. 1999;48:1053-1057**

1 table, 2 figures omitted

**DURING 1990-1994, SUICIDE ACCOUNTED FOR 23% OF ALL DEATHS AMONG ACTIVE DUTY U.S. AIR FORCE (USAF) PERSONNEL AND WAS THE SECOND LEADING CAUSE OF DEATH (AFTER UNINTENTIONAL INJURIES). DURING THOSE YEARS, THE ANNUAL SUICIDE RATE AMONG ACTIVE DUTY USAF PERSONNEL INCREASED SIGNIFICANTLY (P<0.01) FROM 10.0 TO 16.4 SUICIDES PER 100,000 MEMBERS. IN 1993, SENIOR USAF LEADERS INITIATED PREVENTION PROGRAMS IN SEVERAL COMMANDS BECAUSE OF THE INCREASING SUICIDE RATE. IN MAY 1996, AN IN-DEPTH STUDY BY A TEAM OF MEDICAL AND NONMEDICAL CIVILIAN AND MILITARY EXPERTS WAS INITIATED TO PRODUCE A COMPREHENSIVE, COMMUNITY-WIDE PREVENTION STRATEGY THAT VIEWED SUICIDE NOT ONLY AS A MEDICAL BUT A USAF PROBLEM, THUS ADDRESSING OVERALL SOCIAL, BEHAVIOR, AND HEALTH ISSUES. THE PLAN WAS IMPLEMENTED ACROSS THE ENTIRE USAF DURING 1996-1997. THIS REPORT DESCRIBES PROTECTIVE AND PREVENTION STRATEGIES AND SUMMARIZES THE STUDY FINDINGS, WHICH INDICATE THAT A SUBSTANTIAL DECLINE IN THE SUICIDE RATE WAS ASSOCIATED WITH THE COMMUNITYWIDE PROGRAM. THE TEAM’S SUICIDE PREVENTION STRATEGY ENCOMPASSED NEARLY ALL THE USAF COMMUNITY (E.G., INVESTIGATIVE AGENCIES, MILITARY JUSTICE, AND PREVENTION AND TREATMENT SERVICES) AND FOCUSED ON REDUCING SUICIDE BY EMphasIZING EARLY INTERVENTIONS, AND STRENGTHENING PROTECTIVE FACTORS (E.G., A SENSE OF BELONGING AND CARING, EFFECTIVE COPING SKILLS, AND POLICIES THAT PROMOTE HELP-SEEKING BEHAVIOR). THESE GOALS CORRESPOND TO RECOMMENDATIONS MADE BY THE UNITED NATIONS (UN) AND WORLD HEALTH ORGANIZATION (WHO) TO GOVERNMENTS AND LOCAL COMMUNITIES IN DEVELOPING SUICIDE PREVENTION STRATEGIES. THE INITIATIVES WERE DIVIDED INTO THREE CATEGORIES CORRESPONDING TO AREAS IDENTIFIED BY OTHER PREVENTION PROGRAMS: ADAPTING CDC RECOMMENDATIONS FOR YOUTH SUICIDE PREVENTION TO THE USAF ADULT POPULATION, RESTRUCTURING PREVENTION SERVICES OFFERED ON USAF INSTALLATIONS, AND ESTABLISHING A CENTRAL SURVEILLANCE DATABASE FOR FATAL AND NONFATAL SELF-INJURIES.

**Adapting CDC Recommendations**

The team established USAF requirements for annual suicide prevention and awareness training, which was provided to approximately 80% of USAF members. Supervisors and leaders within each military unit, medical providers, attorneys, and chaplains received concentrated training as “gatekeepers” whose role was to channel persons at risk to appropriate agencies. In 1996, the USAF began to
administer a comprehensive health questionnaire, including items about mental health status, when USAF members enrolled in the military health-care plan; an abbreviated version was subsequently administered annually. Questionnaire data were used to determine when referral to a health-care provider was indicated.

The USAF Chiefs of Staff sent service-wide electronic messages, recognizing the courage and sound judgment of persons who confronted difficult issues and sought professional help (e.g., marital, family, legal, financial, mental health, and spiritual counseling). These messages also stated that military leaders must ensure that members facing substantial stress receive the care and support of their military unit (i.e., local community), even when the stress stemmed from violating community norms (i.e., Uniform Code of Military Justice [UCMJ]). The team also established policies that required any USAF agency investigating a member to coordinate with unit leaders to ensure that the leaders carried out their gatekeeping role.

Restructuring of Prevention Services

Prevention services on all USAF installations were restructured by establishing a limited psychotherapist-patient privilege to protect members charged under the UCMJ. Mental health providers were mandated to initiate community-based primary prevention, and the USAF integrated the services of the six agencies involved in prevention services (mental health, family support centers, child and youth development, health and wellness centers, chaplains, and family advocacy). The six agencies in each geographic community were required to conduct an assessment of the risk for suicide and to develop a coordinated prevention plan with measurable goals.

Surveillance

Gathering suicide data from the USAF population is facilitated by standardized data systems that track each member. Each active duty member’s death is investigated by the USAF Office of Special Investigations, a forensic agency autonomous from the local command authority. Since 1997, USAF suicide data (completions, attempts, and gestures) have been collected in a database that includes demographics, details of the events, use of prevention services before the event, and associated psychological, social, behavior, and economic factors.

From 1994 to 1998, the suicide rate among USAF members decreased significantly, from 16.4 suicides per 100,000 members to 9.4 (p<0.002) On the basis of the first eight months of 1999, the 1999 estimated rate is 2.2 suicides per 100,000 members—approximately 80% lower than the lowest annual rate since 1980. The USAF's approach to suicide prevention emphasizes the role of the entire community, not only health care, in reducing and preventing factors thought to contribute to suicide. It also included components that promoted protective factors such as social networks. Readiness to address the suicide problem was established quickly because the leaders involved were easily identified and had substantial influence over the community. A program of education and awareness training for all personnel, combined with integrated prevention services in every community, set out to modify the culture of the USAF community. Initiatives are ongoing, established by official policy requiring annual reporting of performance objectives. Evaluation of the program's effectiveness and its generalizability to other groups is subject to at least two limitations. First, although the decline in the suicide rate among USAF personnel corresponds temporally with the interventions, a causal relation between the decline and the program has not been established conclusively nor have components that might have been responsible for the decline been identified. Second, differences exist in the characteristics of active USAF personnel and the U.S. civilian population. All members of the USAF community have completed secondary school, are employed and housed, and have comprehensive healthcare benefits, including unlimited mental health care. Since 1974, members have been screened for mental illness before entry. Use of illicit drugs, a risk factor for suicide, is approximately 90% less frequent than in the civilian population after adjusting for age and sex. All members have a commander or a first sergeant whose job is to be interested in each member’s health and well being.

This study highlights that suicide is a preventable health problem and demonstrates the importance of using multiple agencies to address the issue. It also indicates that a communitywide, multiprogram strategy can be planned and implemented and can contribute to reducing self-directed violence. The USAF has assigned a team to monitor the ongoing intervention and surveillance activities and to recommend modifications as needed. The USAF suicide prevention strategy should be tested in other occupation-related communities, such as law enforcement or investigative agencies, to determine whether the programs can be effective in other populations.

REFERENCES

6 available

*The 1999 rate was estimated by dividing the number of deaths by the number of months of data to get a monthly average and then multiplied by 12 to get an approximate numerator for the annual rate.
Progress Toward Poliomyelitis Eradication—Eastern Mediterranean Region, 1998-October 1999

MMWR. 1999;48:1057-1071
2 figures, 1 table omitted

IN 1988, THE REGIONAL COMMITTEE FOR the Eastern Mediterranean Region* (EMR) of the World Health Organization (WHO) adopted a resolution to eliminate poliomyelitis from the region by 2000. This report summarizes progress toward this goal in EMR countries through October 1999; all EMR countries, including war-torn and other underdeveloped areas of the region, are conducting essential polio eradication strategies, and eradication activities to rapidly stop poliovirus transmission are under way in countries where polio is endemic.

Routine Vaccination Coverage

In 1998, regional routine coverage with at least three doses of oral poliovirus vaccine (OPV3) by age 1 year was 82% (range: 24%-100%). All member countries reported routine coverage data, and OPV3 coverage was ≥90% in 16 countries. However, reported OPV3 coverage was 86% in Iraq, 79% in Pakistan, 72% in Sudan, 68% in Yemen, 62% in Djibouti, 35% in Afghanistan, and 24% in Somalia. Countries reporting <90% coverage represent more than half of the regional population. Compared with the reported coverage rates, most of which are determined by using target population estimates, population-based surveys in Afghanistan, Iraq, and Pakistan have found lower coverage rates.

Supplementary Vaccination Activities

During 1998 and 1999, National Immunization Days (NIDs)† were conducted in 19 countries. In 1998, Somalia and Sudan conducted the first countrywide campaigns that covered the war-affected southern parts of each country.1 Kuwait did not conduct NIDs in 1998 but will conduct one round in November 1999. Iran and Tunisia conducted targeted Subnational Immunization Days (SNIDs)‡ in provinces at risk for poliovirus importation and/or with suboptimal vaccination coverage. NIDs have not been necessary in Cyprus because routine coverage is high. Poliovirus circulation has persisted or is suspected in seven EMR countries (Afghanistan, Egypt, Iraq, Pakistan, Somalia, Sudan, and Yemen) because of low routine OPV3 coverage and/or pockets of unvaccinated children not reached during NIDs. Accelerated vaccination activities, which include improving the quality of all campaigns, adding rounds of NIDs or SNIDs, and intensifying house-to-house vaccination in high-risk areas, have been initiated in these countries. For example, in early 1999, >11 million children were vaccinated during two rounds of a house-to-house vaccination campaign in three provinces of Pakistan, and Afghanistan and Iraq are conducting two pairs of NIDs in 1999.

Within EMR, campaigns are coordinated among groups of contiguous countries, including Afghanistan, Iran, and Pakistan; Iran, Iraq, and Syria (and Turkey);2 between member states of the Gulf Cooperation Council§; and between Maghrebian Union countries, including Libya, Morocco, and Tunisia. NIDs in several countries have been coordinated with countries in the European region (“Operation MECACAR”) and the African region in the Horn of Africa. NIDs in Pakistan have been synchronized with campaigns in southern Asia.3,4

Surveillance

By mid-1998, all member countries (except Djibouti) had established acute flaccid paralysis (AFP) surveillance. Fifteen countries (Bahrain, Cyprus, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Libya, Oman, Palestine, Qatar, Saudi Arabia, Syria, and Tunisia) had achieved or exceeded the WHO-established minimum AFP reporting rate indicative of a sensitive surveillance system (one or more nonpolio AFP case per 100,000 children aged <15 years) during 1998. Among the eight remaining countries, the annualized nonpolio AFP reporting rates during 1999 have exceeded one case per 100,000 in Afghanistan, Pakistan, United Arab Emirates, and Yemen. The regional average reporting rates for nonpolio AFP in 1998 and 1999 were 0.88 and 1.21, respectively. During 1998 and 1999, two adequate§ stool samples were collected from 64% and 68%, respectively, of the persons with reported AFP in EMR. During 1998 and 1999, seven countries (Cyprus, Kuwait, Oman, Palestine, Saudi Arabia, Syria, and Tunisia) achieved the WHO-recommended target of two adequate stool specimens collected from at least 80% of persons with AFP. An additional five countries (Bahrain, Egypt, Iran, Iraq, and Jordan) collected stool specimens from 71% to 79% of persons with AFP reported during the same period, and six countries (Lebanon, Morocco, Qatar, Somalia, Sudan, and United Arab Emirates) collected adequate specimens from <50% of persons with AFP. Despite high national AFP surveillance performance indicators during 1997 and 1998 in Egypt and Iraq, circulation of wild poliovirus type 3 in Egypt and type 1 in Iraq continued undetected for >2 years.

EMR Laboratory Network

The EMR laboratory network comprises 12 laboratories (eight national and four regional reference laboratories). During 1998, all network laboratories except those in Iraq and Sudan were accredited by WHO. On the basis of their improved performance, the laboratories in Iraq and Sudan received provisional accreditation in 1999. As of October 1999, 3445 stool specimens from 1800 (99%) of 1824 persons with AFP reported from 22 EMR countries underwent laboratory investigation in a WHO network laboratory. Laboratory results were reported on time (within 28 days of rec-
Infectious Diseases; Vaccine Preventable Disease Eradication of Viral and Rickettsial Diseases, National Center for Infectious Diseases; Vaccine Preventable Disease Eradication Division, National Immunization Program, CDC.

Incidence of Polio

From 1988 through October 1999, the number of confirmed polio cases reported in the EMR decreased 81%, from 2342 to 446. Of 23 EMR countries, 15 reported zero cases during 1999. Since 1996, five countries (Afghanistan, Egypt, Iraq, Pakistan, and Sudan) have reported cases with indigenous strains of wild poliovirus. The last virologically confirmed case of polio in Egypt had onset in March 1999. Wild poliovirus has not been isolated in Somalia through a functioning surveillance system in the north or from AFP cases reported in Yemen during 1998 and 1999. During 1998 and 1999, Pakistan continued to report the largest number of cases and contributed nearly 60% of the total number of cases in the region. Wild poliovirus type 2 has not been isolated in EMR since 1997.

Countries with high-quality AFP surveillance that have been polio-free for several years have begun to prepare documentation for review by the Regional Commission for Certification of Polio Eradication. In late 1999, the commission will review documentation from five EMR countries and from an additional 10 countries before the end of 2000.

Reported by: Regional Office for the Eastern Mediterranean Region, Alexandria, Egypt. Vaccine and Biologicals Dept, World Health Organization, Geneva, Switzerland. Respiratory and Enteric Viruses Br, Div of Viral and Rickettsial Diseases, National Center for Infectious Diseases; Vaccine Preventable Disease Eradication Division, National Immunization Program, CDC.

CDC Editorial Note: Member countries of EMR have made remarkable progress toward polio eradication since 1988. Most EMR countries are now polio-free in the presence of high-quality AFP surveillance, and the intensity of virus transmission is decreasing rapidly in countries where polio is endemic. Supplementary vaccination campaigns and AFP surveillance have been implemented in all EMR countries, including areas in conflict, in Afghanistan, Somalia, and Sudan.1–3 Progress made in those countries faced with armed conflict, political instability or economic sanctions, poor health infrastructure, and population displacement is encouraging.

EMR countries have gained sufficient experience in the most challenging circumstances to implement effectively accelerated polio eradication activities. Accelerated activities to stop virus transmission by the end of 2000 have begun in seven countries of EMR where polio is known or suspected to be endemic. Efforts to improve the quality of vaccination campaigns include advanced preparations, better local level planning, extensive supervision, house-to-house vaccination, community mobilization, and heightened political commitment. Additional NIDs, SNIDs, or “mopping-up” will be conducted during the next 18-24 months in these countries. AFP surveillance is being strengthened through regular active surveillance in major health facilities, designation and training of responsible staff, and strong central coordination, supervision, monitoring, and evaluation.

Rapid reduction in virus transmission during summer 1999 in Egypt and parts of Pakistan where additional intensified campaigns were conducted in spring 1999 has provided strong preliminary evidence of the impact of these accelerated vaccination activities. During 1999, training of designated staff followed by implementation of regular active surveillance at lower administrative levels in selected districts and governorates of Pakistan and Yemen, have led to rapid improvements in surveillance performance in these countries. Undetected circulation of wild poliovirus type 3 in Egypt for >2 years highlight the importance of high quality surveillance at subnational levels. Undetected circulation of wild poliovirus type 1 in Iraq indicates the need for ensuring that all components of an AFP surveillance system, particularly stool specimen collection, storage, transport, and testing in a WHO-accredited laboratory, are functioning adequately. A greater emphasis has been placed on improving surveillance performance at subnational levels in these two countries.

Successfully implementing accelerated activities will require strong and more effective political commitment from the highest level within the countries.4,5 Further consolidation is needed among WHO, United Nations Children’s Fund, other United Nations agencies, and nongovernmental organizations (NGOs), particularly in areas of the region without any recognized governments. The intensified campaigns, additional NIDs, and rapid development of surveillance require substantial additional human and financial resources that must be provided jointly by the concerned governments and partner agencies and by the global coalition of partners and local NGOs in areas without a government.

REFERENCES

6 available

*Member countries are Djibouti, Egypt, Libya, Morocco, Somalia, Sudan, and Tunisia in northern and eastern Africa; Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates, and Yemen in the Arab Gulf states; Iraq, Jordan, Lebanon, Syria, and the Palestinian National Authority in the Middle East; Afghanistan, Iran, and Pakistan in Asia; and Cyprus.
†Mass campaigns over a short period (days to weeks) in which two doses of OPV are administered to all children in the target age group (usually aged <5 years) regardless of previous vaccination history, with an interval of 4-6 weeks between doses.
‡Focal mass campaigns in high-risk areas over a short period (days to weeks) in which two doses of OPV are administered to all children in the target age group, regardless of previous vaccination history, with an interval of 4-6 weeks between doses.
§Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and United Arab Emirates.
§†Two stool specimens collected at least 24 hours apart within 1-14 days of onset of paralysis.
§¶EMR polio eradication efforts are supported by its member countries, WHO, United Nations Children’s Fund (UNICEF), Rotary International, CDC, the United Kingdom, Japan, Canada, Denmark, Norway, and Italy.