Ciguatera Fish Poisoning—Texas, 1997

ON OCTOBER 21, 1997, the Southeast Texas Poison Center was contacted by a local physician requesting information about treatment for crew members of a cargo ship docked in Freeport, Texas, who were ill with nausea, vomiting, diarrhea, and muscle weakness. This report summarizes an investigation of this outbreak by the Texas Department of Health (TDH), which indicated that 17 crew members experienced ciguatera fish poisoning resulting from eating a contaminated barracuda.

On October 12 and 13, gastrointestinal illness developed in crew members aboard a Norwegian cargo ship. After the ship had docked, on October 22 interviews were conducted with 23 (85%) of 27 crew members. A case was defined as ciguatera fish poisoning if there was a combination of gastrointestinal symptoms (i.e., nausea, vomiting, diarrhea, or abdominal cramps) and neurologic symptoms (i.e., muscle pain, weakness, dizziness, numbness or itching of the mouth, hands, or feet) in a crew member after eating fish on October 12. Of the 23 interviewed, 17 (74%) crew members reported the following symptoms: diarrhea (17 [100%]), abdominal cramps (14 [82%]), nausea (13 [76%]), and vomiting (13 [76%]). Symptoms occurred within 2-16 hours (median: 4.5 hours) after eating fish at approximately 7 p.m. on October 12. By October 14, all ill crew members had experienced neurologic symptoms characteristic of ciguatera poisoning: 15 (88%) reported muscle weakness and pain; 13 (76%), numbness or itching of the mouth; 11 (65%), pruritus of the feet and/or hands; 11 (65%), temperature sensation reversal; 10 (50%), dizziness; and eight (47%), aching or loose-feeling teeth.

On October 21, all 17 ill crew members sought medical care at a clinic. None of the crew members were hospitalized; treatment consisted of supportive measures to reduce discomfort from symptoms. All patients were men aged 23-46 years.

Based on food histories from the 23 crew members, TDH suspected consumption of a barracuda caught by crew members while fishing near the Cay Sal Bank of the Bahamas on October 11 as the source of illness. Seventeen crew members ate the barracuda, and all became ill. None of the eight crew members who did not eat barracuda became ill. Although crew members also ate red snapper and grouper at the same meal, neither of these fish were linked epidemiologically with illness.

Results of cultures of stool samples from 16 crew members were negative for Salmonella, Shigella, Campylobacter, Yersinia, and Vibrio. Three samples of leftover raw barracuda and red snapper that were caught simultaneously with the barracuda that was eaten were recovered from cold storage and then tested for ciguatoxin using an experimental membrane immunobead assay at the Department of Pathology, University of Hawaii. The samples from both fish tested positive for ciguatoxin.

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CDC Editorial Note: Ciguatera poisoning occurs throughout the Caribbean and tropical Pacific regions, where outbreaks have been reported among both residents and tourists. From 1983 through 1992 in the United States, 129 outbreaks of ciguatera poisoning involving 508 persons were reported to CDC; no ciguatera-related deaths were reported. Most outbreaks were reported from Hawaii (111) and Florida (10), although outbreaks and sporadic cases in California (two), Vermont (one), New York (one), and Illinois (one) also have been associated with consumption of fish imported from tropical waters. Ciguatera toxins are produced by dinoflagellates, which herbivorous fish consume. These fish are then eaten by large, predatory reef fish (e.g., barracuda, grouper, and amberjacks), which appear to be unharmed by the toxin; because the toxins are lipid-soluble, they accumulate through the food chain. The toxin may be most concentrated in the head, viscera, and roe. Ciguatoxin-containing fish may be highly localized; islands may have some reefs where the fish are inedible because of the toxin and other reefs where the fish are unaffected. No deep-sea fish (e.g., tuna, dolphin, or wahoo) have been found to carry ciguatoxin.

As in this outbreak, ciguatera fish poisoning is diagnosed by the characteristic combination of acute gastrointestinal symptoms (developing within 3-6 hours after ingestion of contaminated fish; watery diarrhea, nausea, and abdominal pain occur and typically last 12 hours) and neurologic symptoms (circumoral and extremity paresthesia, severe pruritus, and hot-cold temperature reversal) in persons who eat large, predatory reef fish. Neurologic symptoms may be worsened by alcohol consumption, exercise, sexual intercourse, or changes in dietary behavior, such as dieting or high-protein meals. Occasionally, hypotension, respiratory depression, and coma develop in patients. Mean duration of acute illness is typically 8.5 days, although neurologic symptoms may last for months.

Because there is no approved human assay for ciguatoxin, the diagnosis is based on clinical findings and by the detection of toxin in samples of fish. No known antidote for ciguatoxin poisoning has been proven, and treatment is primarily for relief of symptoms. Intravenous mannitol may be effective early in the course of illness, but the results of a randomized, placebo-controlled trial of mannitol therapy have not been reported.

Ciguatoxins are odorless, colorless, tasteless, and unaffected by either cooking or freezing; therefore, persons living in or traveling to areas where ciguatera toxin is endemic should follow these general precautions: (1) avoid consuming large, predatory reef fish, especially barracuda; (2) avoid eating the head, viscera, or roe of any reef fish; and (3) avoid eating fish caught at sites with known ciguatera toxins. Persons traveling to areas where ciguatera is endemic should contact local health officials for more specific recommendations pertaining to that area. Fishermen should avoid known ciguatera...

IN 1995, residential fires accounted for an estimated 3600 deaths and approximately 18,600 injuries.\(^1\) In addition, property damage and other direct costs have been estimated to exceed more than $4 billion annually.\(^2\) To determine residential fire-related death rates, CDC analyzed death certificate data from 1991 to 1995 from U.S. vital statistics mortality tapes. Data from CDC’s Behavioral Risk Factor Surveillance System (BRFSS) was used to determine the prevalence of smoke alarms in U.S. households. This report presents the findings of these analyses, which indicate a seasonal variation in fire-related deaths and a high prevalence of smoke alarms in residences in the United States.

Deaths from residential fires were classified using International Classification of Diseases, Ninth Revision, external cause of injury codes E890-E899 and the place of occurrence noted as residence on the death certificate. The 1995 BRFSS survey is the only comprehensive survey from which state-specific prevalence rates for smoke alarms can be generated. The BRFSS is an ongoing, state-based, random-digit-dialed telephone survey of the U.S. population aged \(\geq 18\) years. Estimates of the prevalence of smoke alarms were weighted based on the number of telephone numbers per household and the age, sex, and race distribution in each state.

From 1991 to 1995, the U.S. residential fire-related death rate declined from 1.3 per 100,000 population to 1.1. During this time period, residential fire-related death rates were greatest during December-February and lowest during June-August.

The averaged annualized death rates for 1991-1995 showed that children aged \(<5\) years and adults aged \(\geq 65\) years had higher rates than those in other age groups. In 1995, 93.6% of households in the United States reported having at least one smoke alarm. The prevalence of smoke alarms ranged from 78.9% in Hawaii (95% confidence interval [CI] = 78.7%-81.2%) to 98.7% in Maryland (95% CI = 98.3%-99.1%).

Reported by: Div of Unintentional Injury Prevention, National Center for Injury Prevention and Control, CDC.

CDC Editorial Note: During 1991-1995, deaths from residential fires declined, meeting the national health objective for 2000 of 1.2 per 100,000 persons (objective 9.6).\(^3\) The findings in this report suggest that residential fire-related deaths were greatest during December-February, reflecting the seasonal use of heating devices (e.g., portable space heaters and wood-burning stoves). The leading causes of residential fires are due to cooking and heating devices improperly placed and/or left unattended.\(^4\)

Because 81% of fire-related deaths occur in the home, strategies that emphasize residential fire prevention probably will result in the largest reduction in fire-related deaths. To reduce the risk for death or injury resulting from fires, a smoke alarm should be installed outside each sleeping area and on every habitable level of a home.\(^5\) Homes with smoke alarms have almost half as many fire-related deaths compared with homes without smoke alarms.\(^6\) Children aged \(<5\) years and adults aged \(\geq 65\) years have two to six times higher fire-related death rates compared with the national average for all ages.\(^7\) Both young children and older adults who may have physical limitations can benefit from the early warnings provided by smoke alarms.

The findings in this report also indicate that the prevalence of smoke alarms across the United States is high. This is, in part, due to various programs, such as distribution and installation programs, conducted by state and local health departments and fire service personnel and programs that provide smoke alarms to parents of newborns.\(^8\) However, these data do not necessarily reflect the proportion of homes equipped with functional smoke alarms. The effectiveness of smoke alarms is dependent on appropriately installing and maintaining the device,\(^9\) and approximately 50% of smoke alarms are no longer functional 12 months after installation. It is necessary to continue with programs to install smoke alarms in homes to achieve 100% coverage and to implement public health programs that focus on their maintenance.

This analysis has at least one important limitation. Low-income households less likely to have telephones are probably less likely to have smoke alarms. Because the BRFSS excludes households without telephones, the prevalence of smoke alarms may be overestimated.

Effective public health strategies to reduce residential fire-related injuries and deaths should include (1) smoke alarm installation, (2) monthly testing of smoke alarms, (3) reduction of residential fire hazards, (4) the design and practice of fire escape plans, (5) fire-safety education, and (6) the implementation of smoke alarm ordinances. The adoption of these strategies should lead to continued declines in residential fire-related deaths.

References 9 available.

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