Epidemic Pneumonia — Continued

cases of the neuromuscular syndrome continued to occur through September, the acute pneumonic phase of the epidemic ended in June. This suggests that exposure to whatever produced the disease may have ceased in early or mid-June, although its delayed sequelae are still being seen in Spanish hospitals.

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Epidemiologic Notes and Reports

Asthma-Like Illness among Crab-Processing Workers — Alaska

At the request of the Alaska Department of Labor, the National Institute for Occupational Safety and Health (NIOSH) is investigating the incidence of newly developed asthma-like symptoms (marked dyspnea and wheezing) among crab-processing workers in the Dutch Harbor area on the Aleutian island of Unalaska.

Data were collected between March 13 and May 13, 1981, when 46 crab-processing workers with marked dyspnea and wheezing visited the Iliuliuk Family Health Service Clinic, the sole provider of medical care in Dutch Harbor. Of the 46, 10 were from neighboring islands or offshore processing ships; 3 had a history of having had similar symptoms before.

The other 33 workers (mean age 23 years, range 18-30), who were employed in 4 seafood-processing plants in the immediate Dutch Harbor area, gave no history of previously experiencing such symptoms. The combined employment of these 4 plants was approximately 825 crab-processing workers, giving an approximate rate for development of dyspnea with wheeze ("crab asthma") of 2 cases/100 workers/month for the crab-processing season. This is at least 80 times the monthly incidence of new cases of asthma and 8 times the incidence of new cases of bronchitis with wheeze reported for groups of Americans of similar age (*1*).

Many workers reported that symptoms began with an upper respiratory infection that resolved except for a residual, nocturnal cough that became progressively stronger until it severely disturbed sleep. The cough worsened on evenings after the processors had worked near high concentrations of steam from crab-cooking pots and improved when the workers had been away from the crab-processing area for 1 or more days. After experiencing the severe cough at night for 1-4 weeks, the affected individuals became markedly short of breath and sought medical attention.

Asthma-Like Illness – Continued

Several conditions may predispose crab-processing workers to have respiratory infections: the Aleutian weather; the generally cold, damp working conditions; the long working hours (up to 10-16 hours/day for 7 days each week); and the close living quarters (2-5 persons/room). Some workers may also have been suffering from acute asthmatic bronchitis. However, it is unlikely that the high incidence of dyspnea with wheeze was due solely to a high rate of respiratory infection, since few persons other than crab processors were seen at the clinic with asthma-like symptoms, and few were seen during the salmon season when crab was not being processed. Furthermore, the reported worsening of symptoms following exposure to concentrations of steam from the crab-cooking vats suggests that symptoms were secondary to an asthma-like reaction to crab constituents. The common premonitory symptom of severe cough at night is especially interesting since cough may be the sole presenting symptom of asthma.

Reported by the Hazard Evaluations and Technical Assistance Br, Div of Surveillance, Hazard Evaluations, and Field Studies, NIOSH, CDC.

Editorial Note: Several studies, conducted with small groups of workers who reported respiratory symptoms when processing Alaskan crab (*2*), have shown that some workers have positive scratch skin tests, and/or positive radioallergosorbent tests (RAST), and/or positive serum precipitin tests to crab constituents. Several workers have also experienced significant decreases in pulmonary function after bronchial challenge to nebulized juice from crab-cooking vats.

Similar asthma-like reactions among oyster shuckers in Japan were thought to be secondary to an allergic reaction to sea squirts on the clams (*3*), and in Britain, asthma-like reactions among prawn processors were thought to be secondary to an allergic reaction to prawn constituents (*4*). The British workers began having symptoms about 6 weeks after they stopped hand-peeling the prawns and began using air jets to blow meat from the tail. The air jets probably increased the number of airborne prawn particles in the processing area. A British health survey conducted 8 months after the air jets were introduced showed that 18 of 50 workers complained of asthma-like symptoms; 20 other workers with similar respiratory symptoms had reportedly left the factory since the air jets were introduced. Positive RAST to prawn constituents demonstrated the presence of prawn-specific IGE antibodies for 50% of the symptomatic British workers. After the concentration of airborne meat fragments was reduced by a factor of 10 by substituting water jets for air jets, only 3 workers continued to have symptoms.

The crab-processing industry employs approximately 4,000-5,000 people in the Alaska area during the king crab season (September-December), and half that number during the Tanner and Opilio crab season (March-June). Although further investigation is needed to confirm the cause of the respiratory symptoms occurring among crab-processing workers, modifications to the current processing methods, work practices, and environmental controls may be as successful in reducing the incidence of respiratory symptoms among crab-processing workers as were the modifications made in the British prawn-processing plant.

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MORBIDITY AND MORTALITY WEEKLY REPORT

International Notes

Follow-Up on Epidemic Pneumonia with Progression to Neuromuscular Illness — Spain

In May and June 1981, an extensive outbreak of severe respiratory illness occurred in Spain, primarily in Madrid and the northwest regions of the country (*1,2*). Patients initially had the clinical and radiographic findings of atypical pneumonia, but other common findings were fever, rash, myalgia, and marked eosinophilia. About 1% of patients died. Autopsies showed interstitial pneumonitis and widespread vasculitis (*3*). Convalescence was prolonged in many cases and was characterized by diffuse myalgia, non-pitting edema of the limbs, liver-enzyme abnormalities, and sustained eosinophilia (*4*).

Beginning in August, it was recognized that substantial numbers of previously ill patients were developing neuromuscular problems. Clinical manifestations included muscle atrophy, weight loss, weakness, symmetrical sensory loss, and hyporeflexia. Many patients developed keratoconjunctivitis sicca (decreased tearing and salivation) and scleroderma-like changes of the skin. By that time, chest X rays had become normal. Eosinophilia continued, but at somewhat diminished levels. Moderate elevations of liver enzymes persisted (*5*). Electromyograms showed terminal axonal death, with denervation atrophy on muscle biopsy. Some patients had severe muscle weakness that led to failure of respiratory muscles. Most deaths among patients with neuromuscular illness have largely resulted from complications associated with prolonged maintenance on mechanical ventilation. It is estimated that the epidemic to date has affected about 17,000 persons (about 70% in Madrid). As of December 24, 1981, 13,222 patients had been hospitalized (Figure 1), and 246 had died. Morbidity and case-fatality ratios have been somewhat higher for females than for males, especially among persons between the ages of 10 and 50 years (*6*).

Thus far, extensive microbiologic testing has failed to implicate any infectious agent known to cause atypical pneumonia, eosinophilia, or neuromuscular disease. However, epidemiologic studies have uniformly shown a strong association between illness and ingestion of an illegally marketed cooking oil. This product contained rapeseed oil, denatured by the addition of 2% aniline and imported into Spain for industrial use. After the oil was processed in Spain to remove the aniline, it was sold from house to house and in itinerant markets, primarily in Madrid and nearby provinces. As marketed, the product appears to have been a variable mixture of rapeseed oil, other seed oils, and liquefied pork fat (*2*). Small quantities of aniline and fatty acid anilides have been detected in oil samples.

The discovery of an association between illness and consumption of this oil resulted in vigorous efforts by the Spanish government in late June 1981 to remove all implicated oil from the market. At about the time this action was taken, the epidemic occurrence of acute