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## Tuberculin Conversions Among Staff of an Intensive Care Unit

On September 16, 1982, the Epidemiology Office was asked by the infection control committee of an Alaskan hospital to investigate the tuberculin-PPD conversion of four intensive care unit staff members who had been in contact with a known tuberculosis patient two months before. The four converters had been identified on screening tests performed by the hospital infection control nurse on all staff members thought to have been in contact with the known case.

### Our initial recommendation included:

1) additional case finding by retesting all tuberculin negative ICU staff members 90 days after exposure to the tuberculosis patient, and 2) environmental sampling to determine direction and extent of air flow from the ICU room occupied by the patient with active tuberculosis -the presumed source of tubercle bacilli.

The patient who was the presumed source of the five tuberculin conversions was admitted on July 1, 1982 with an initial diagnosis of "sepsis". Although initially dehydrated, with intravenous rehydration her general condition improved considerably, and she began to cough copiously. Chest X-Ray taken on admission showed bilateral cavitory disease, and sputum smears showed tubercle bacilli too numerous to count. Sputum culture grew Mycobacterium tuberculosis. The concentrations of tubercle bacilli in her sputum fell rapidly within three days of the start of anti-tuberculous chemotherapy.

On the second round of skin tests, one more ICU nurse was identified as a tuberculin converter. All five converters had worked in the intensive care unit during the July stay of the sputum-positive patient. Four were nurses; one was a ward clerk. When compared to non-converters, the five tuberculin converters had worked shifts during the earlier part of the patient's stay in the ICU -before and during treatment with anti-tuberculous chemotherapy. The ward clerk claimed never to have been in direct contact with the patient. Three of the four nurses were said to have been wearing masks during direct patient contact.

In the intensive care unit, a central nursing desk is surrounded by individual patient rooms. The room occupied by the tuberculosis patient was directly opposite and about 15 feet away from the seat occupied by the ward clerk. Testing conducted by the hospital confirmed that air pressure was greater inside the patient's room than in the central ICU corridor. Air flow studies using the tracer gas, sulphur hexafluoride, were conducted by engineers from the University of Alaska, Fairbanks. These tests showed that tracer gas released in the patient's room flowed towards the nursing desk with the room door closed or open. With the door open, 66% of the gas released was measured at the nursing station after only twenty minutes.

In this outbreak, the vigilance of an infection control committee and in infection control nurse detected tuberculin conversions among exposed intensive care unit staff before pulmonary disease had time to develop. All converters were treated with isoniazid (INH).

### Recommendations

Based on this investigation of tuberculin conversions among ICU staff, we recommend that:

1. sputum-positive tuberculin patients should be cared for in a room at negative or neutral pressure with respect to the corridor until adequate therapy renders them non-infectious, and
2. on the identification of a sputum positive patient, the tuberculin status of attendants should be reviewed and skin tests should be performed 30 and 90 days after exposure.