controversy between Drs. J.E. Devitt and A.B. Miller (120: 1370, 1372, 1374; 1979).

In listing the categories of women in whom there is a high risk of carcinoma of the breast Dr. Harrison included those who have previously undergone mammography. I believe this inclusion to be inappropriate and unfounded. On the basis of interpretation of data from a different order of magnitude of radiation, papers have been published in the past decade that raise the possibility of mammary cancer occurring as a sequel to mammography. Even if one considers the radiation doses prevalent with equipment and recording media used several years ago, the projected occurrence of mammary cancer has been deemed minimal in view of the expected benefit of early diagnosis with mammography. Placing women who had previously undergone mammography in the high-risk group may cause unnecessary anxiety in such women as well as in their physicians, who may forgo referring women for mammography even if they have proper indications. The advantages of this very valuable diagnostic tool may thereby be diminished unnecessarily.

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Blood lead concentration as an indicator of lead body burden

To the editor: In a previous letter on the implications of lead concentrations in the blood (*Can Med Assoc J* 120: 1485, 1979) Drs. K.S. Brown and W.F. Forbes and I discussed some of the difficulties, with special reference to the editorial by McNeely (118: 478, 1978). Unfortunately, in the course of the editing, several misleading statements were introduced into our letter.

Specifically, we wanted to stress that McNeely's statement "for example, although concentrations of lead in the blood are closely correlated with body burden . . ." should not have appeared without documentation, since definitive statements of this type should, in our view, have a supporting reference.

We also wished to point out that soft tissues as well as blood, urine, hair and nails contain a small fraction of the body burden of lead, and that, because of the shorter half-lives of lead in these tissues, they indicate recent exposure to varying degrees not "various degrees of recent exposure", as the edited letter stated.

The reference to the effect of leaching of lead by formalin was incorrectly ascribed to Vitale and colleagues;[1] in fact, it should have been ascribed to us.[2]

Lastly, in discussing the work of Gross I quoted two sentences from a 1976 article,[3] which the editors paraphrased. The quotation was: "Thus, it was not always possible to predict the lead burden of an individual from his blood lead alone. On an overall statistical basis for large population samples used in environmental surveys, however, blood alone is probably adequate as an indicator for overall *changes* [our italics] in lead body burden."

These comments may assist in the clarification of the main point made in our initial letter — that lead concentrations in the blood have a role in the monitoring of acute exposure in and around industrial lead operations, but that their limitations should be recognized.[2,4-6]

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References

1. VITALE LF, JOSELOW MM, WEDEEN RP, et al: Blood lead — an inadequate measure of occupational exposure. *J Occup Med* 17: 155, 1975
2. BROWN KS, CHERRY WH, FORBES WF: Studies of trace-metal levels in human tissues. 6. Concerning the estimation of lead levels in human lung and vertebra, with particular reference to formalin fixation. *Bull Environ Contam Toxicol* 22: 552, 1979
3. GROSS SB: Classifying lead body burdens using Z scores. *Toxicol Appl Pharmacol* 38: 345, 1976
4. CHISOLM JJ, BARRETT MB, HARRISON HV: Indicators of internal dose of lead in relation to derangement in heme synthesis. *Johns Hopkins Med J* 137: 6, 1975
5. MYLROIE AA, MOORE L, EROGBOGBO U: Influence of dietary factors on blood and tissue lead concentrations and lead toxicity. *Toxicol Appl Pharmacol* 41: 361, 1977
6. ANGLE CR, MCINTIRE MS, BRUNK G: Effect of anemia on blood and tissue lead in rats. *J Toxicol Environ Health* 3: 557, 1977

Brucellosis in a laboratory technologist

To the editor: Brucellosis is rare in North America, occurring in less than 2 per 1 million persons per year.[1,2] It occurs predominantly in men aged 20 to 60 years who have an occupational history of contact with animals, notably cattle, swine and goats, or animal products. *Brucella abortus* is the commonest pathogen and is usually acquired orally, although accidental parenteral infection by live vaccine strain 19 is well recognized. Travellers in foreign countries sometimes acquire the disease from ingestion of raw dairy products such as unpasteurized cheese; when such products are imported to North America the disease occasionally occurs in residents.[2] A small but significant number of persons acquire the infection in laboratories.[3-5] Of the 172 cases of brucellosis reported in the United States in 1978, 2 occurred in laboratory workers.[3] In this letter we draw attention to the hazard of laboratory-acquired brucellosis.

Case report

Early in February 1979 a meddical microbiology technologist telephoned her family physician (R.G.A.) complaining of fever, chills and rigors of several days' duration. Her condition appeared to improve and was therefore attributed to an influenza-like illness. However, the symptoms persisted, and in the second week she visited her family physician, who elicited a history of continuing headaches, myalgia and excessive tiredness. She appeared well but her temperature was 38°C, her pulse rate 88 beats/min and regular, and her blood pressure 120/80 mm Hg. The only abnormality detected by physical examination was minimal posterior cervical lymphadenopathy.

A chest roentgenogram was normal and urinalysis gave negative results. The hemoglobin concentration was 14.4 g/dl and the leukocyte count 8.2 × 10^9/l (38% neutrophils, 20% band cells, 38% lymphocytes and 4% monocytes). These findings remained constant throughout her illness. The initial erythrocyte sedimentation rate was 75 mm/h.

Blood cultures were drawn; after 8 days' incubation gram-negative coccobacilli grew that were subsequently identified as *B. melitensis* biotype 3. The *Brucella* agglutination titre was 1:2560. Acute brucellosis was diagnosed and treatment was begun with tetracycline, 500 mg administered orally four times a day. Two weeks later the fever and myalgia had subsided, but the occipital headaches persisted throughout the 25 days of antibiotic treatment. The fever and myalgia recurred Apr. 17. The symptoms were similar to those she had experienced in the early phase of acute brucellosis, and relapse of the illness was suspected. Blood was drawn for culture, and treatment was begun with tetracycline, 500 mg administered orally four times a day, and streptomycin sulfate, 500 mg administered intramuscularly twice a day. This treatment was continued for 3 weeks. Her condition improved during the first few days of treatment, although the tiredness persisted. Blood drawn on Apr. 20 again yielded *B. melitensis* biotype 3 on culture, which confirmed the clinical diagnosis of brucellosis relapse. At the time of writing, the patient has been well for 12 months and has returned to work.

In September 1978 the patient had been working with blood cultures from a recent emigrant from Portugal; the cultures had yielded *B. melitensis* biotype 3. However, before the diagnosis was made the organism had been Gram-stained, subcultured onto blood agar and then tested in the API 20-*Enterobacteriaceae* system (*Analytab* Products Inc., Montalieu-Vercieu, France). Antibiotic sensitivity tests had also been performed. When brucellosis was suspected all the staff were advised to exercise caution when handling the specimens in view of the recognized hazard of working with cultures yielding *Brucella*.[6]

Discussion

Brucellosis is usually considered in the differential diagnosis of a febrile illness in a person who has an occupation related to livestock or who has travelled to countries where dairy products are not always pasteurized. Before arriving in Canada the patient from Portugal had eaten unpasteurized goat's cheese. However, should a medical laboratory technologist acquire brucellosis the disease may go undiagnosed for some time since it is rare and the occupational risk may not be obvious. In our laboratory *Brucella* species have been isolated from blood cultures only four times in the last 15 years, and this is our first case of laboratory-acquired *Brucella* infection. The circumstances we have described strongly suggest that our patient's infection was acquired in the laboratory, particularly because she had not travelled abroad in the previous year and had not eaten unpasteurized dairy products. However, as is usual with laboratory personnel, it is not possible to document the precise route of infection.[7]

Because of the occupational risks of exposure to potential pathogens in blood, such as *Brucella* and *Francisella*,[4] it might be desirable to control the aerosols created when blood cultures are sampled. In British Columbia in 1978 the rate of asymptomatic carriage of hepatitis B surface antigen in new blood donors was 0.17% (T. Stout: personal communication, 1979). Thus, theoretically, the technologists in our laboratory who handle more than 10 000 blood cultures a year are at risk of contracting hepatitis. These hazards can be avoided through emphasis on laboratory safety precautions, such as no eating, drinking and smoking in the laboratory. Adequate hand washing facilities and disinfectants for accidental spillage should be provided. Tests on highly contagious organisms should be performed only when they are absolutely necessary and in properly equipped laboratories. Mouth-pipetting should be avoided and care must be taken to avoid accidental inoculation or contact with skin, especially diseased skin.[5] Pathologic wastes should be sterilized before disposal. Blood culture testing in our laboratory has always been carried out by skilled technologists working on an open bench, and risks to the staff have always been considered small. However, we believe this premise is no longer tenable and we intend to purchase a biologic safety cabinet for processing blood cultures.

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References

1. Federal list of rare diseases. *Can Dis Wkly Rep* 4: no 50, 1978
2. *Brucellosis Surveillance, Annual Summary, 1978*, US Dept of Health, Education, and Welfare, Public Health Service, Center for Disease Control, Atlanta, Ga, 1979
3. HARRINGTON JM, SHANNON HS: Incidence of tuberculosis, hepatitis, brucellosis, and shigellosis in British medical laboratory workers. *Br Med J* 1: 759, 1976
4. SULKIN SE, PIKE RM: Survey of laboratory-acquired infections. *Am J Public Health* 41: 769, 1951
5. MEYER KF, EDDIE B: Laboratory infections due to brucella. *J Infect Dis* 68: 24, 1941
6. *Report of the Working Party on the Laboratory Use of Dangerous Pathogens*, Dept of Health and Social Security, HMSO, London, May 1975, p 22
7. SPINK WW: Epidemiological studies on human brucellosis, in *The Nature of Brucellosis*, U Minnesota Pr, Minneapolis, 1956, pp 106-108