



## Biosafety Tips

Karen B. Byers

Dana-Farber Cancer Institute, Boston, Massachusetts

Biosafety Tips brings you practical approaches to biosafety or “news you can use.” If you are looking for a useful and sensible solution to a biocontainment problem, or perhaps a reference to help convince a skeptical researcher of the need for caution, this is the place to look. In this column, I share biosafety insights for managing a variety of workplace situations. I welcome feedback and suggestions for future topics. Please e-mail any comments or suggestions to karen\_byers@dfci.harvard.edu or to Co-Editor Barbara Johnson at barbara\_johnson@verizon.net.

### **Transmission of *M. tuberculosis* Attributed to the Use of Compressed Gas Coolant While Processing Infected Tissue in a Cryostat**

Three seroconversions to *Mycobacterium tuberculosis* were attributed to the use of compressed gas coolant in order to snap-freeze tissues from patients who were diagnosed with tuberculosis postmortem. This information may help to prohibit the use of these hand-held coolants in research applications involving infectious tissues.

A histopathology technician’s Mantoux test converted from negative to positive after using a refrigerant coolant to freeze tissue from a pulmonary nodule from a man suspected of having bronchogenic carcinoma. After examination of the frozen sections, the nodule was determined to be a tuberculoma, which was “teeming with acid-fast bacteria.” The State Public Health Laboratory cultured the nodule and confirmed the diagnosis. The technician’s seroconversion was attributed to the heavy aerosol generated during the use of compressed gas coolant (Duray, 1981).

The relevant case study for this exposure was published in *Morbidity and Mortality Weekly Reports* in 1981; however, only MMWR issues published from 1982 to the present are available online at [www.cdc.gov](http://www.cdc.gov). For biosafety professionals who need to evaluate the use of such coolants in their research programs, excerpts from this article are reproduced below.

### **Tuberculosis Infection Associated with Tissue Processing—California (Centers for Disease Control and Prevention, 1981)**

In December 1978, a 62-year-old man was admitted to a community hospital in the East Bay for presumptive bronchiogenic carcinoma. He died less than 48 hours later. No chest X-ray was taken. The patient’s history showed he had been admitted to another hospital eight months earlier because of a fall. A chest X-ray taken at the time showed questionable atelectasis in the right upper lung. A stain revealed very heavy concentration of acid-fast bacilli, which were identified in cultures as *Mycobacterium tuberculosis*.

Seventeen employees who had had contact with the patient before his death and two staff pathologists and a laboratory assistant present at the autopsy were given skin tests—all were negative. Follow-up skin testing three months later showed that the two pathologists had converted. Investigation of family members and other close contacts of these two staff members revealed no other obvious sources of infection.

Only one of the pathologists was present at the autopsy, but both were present when frozen sections of the infected lung were prepared. Tissue was frozen in a cryostat; each frozen piece was then mounted inside the machine on a microtome and sectioned. In order to reduce the freezing time before mounting the tissue, the laboratory sprayed the tissue block with a compressed gas coolant held by hand outside the cryostat. Spraying was continued inside the cryostat after the block was mounted. This maneuver created a heavy aerosol. Masks were not routinely worn during this procedure. Although it cannot be definitively proven, it is suspected that the aerosol promoted the transmission of infection for both pathologists. The use of spray coolant has since been discontinued in the laboratory.

Reported by T. Barrett, RN, Berkeley, and H. A. Rentelin, MD, California State Department of Health Services in the California Morbidity Weekly Report, Number 30, August 1, 1980; and the Tuberculosis Control Division, Center for Prevention Services, CDC.

## Editorial Note

In the United States, approximately 4% of tuberculosis cases reported each year is diagnosed postmortem. Medical personnel are at risk of acquiring tuberculosis infection in the course of their work by inhaling contaminated droplet nuclei, particularly from patients whose disease has not been diagnosed and who are therefore not receiving treatment. The risk can be minimized by a high index of suspicion and appropriate hospital infection control procedures. The patient described above was moribund on admission, was probably not effectively aerosolizing contaminated secretions, and had been in the hospital less than 48 hours; thus, it is not surprising that infection was transmitted only to the two pathologists who were exposed to an artificially created aerosol.

Aerosols from infected tissue specimens of cultures

are created frequently in the laboratory and at autopsy. Processing infected tissue in a cryostat usually produces a certain amount of aerosol; more aerosol is likely to be produced when pressurized spray is used for rapid freezing. The risk of transmission should be reduced if compressed gas coolant is not used on tissue specimens that are potentially infectious.

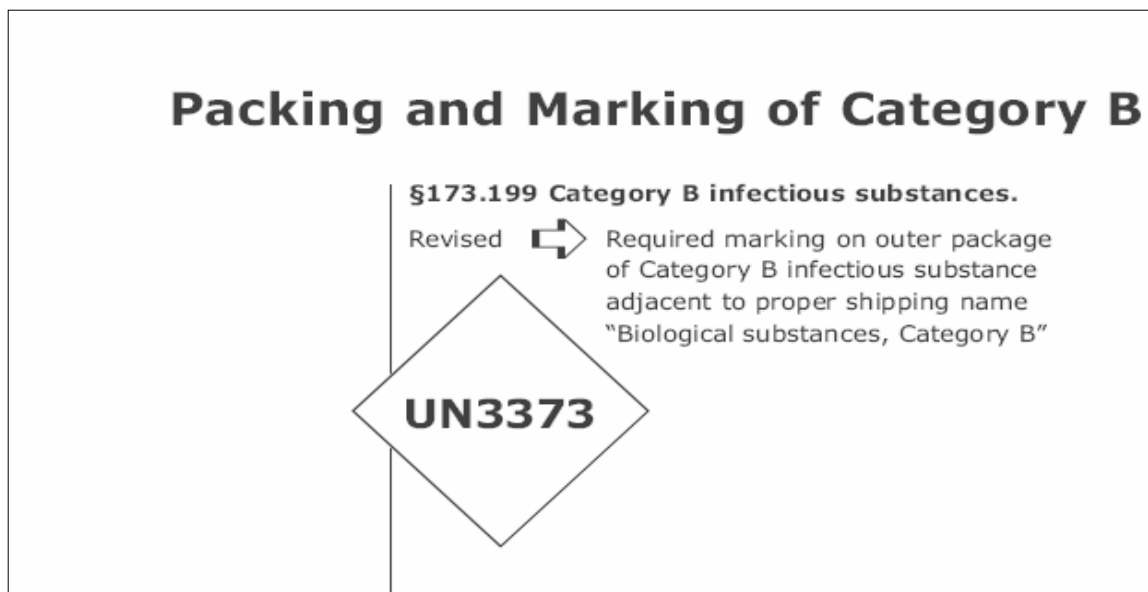
## References

Centers for Disease Control and Prevention (CDC). (1981). Tuberculosis infection associated with tissue processing. *Morbidity and Mortality Weekly Report*, 30(6), 73-74.

Duray, P. H., Flannery, B., & Brown, S. (1981). Tuberculosis infection from preparation of frozen sections. *The New England Journal of Medicine*, 305(3), 167.

## Training Resource

The U.S. Department of Transportation provides a 36-slide Powerpoint training on "Transporting Infectious Substances Safely." Changes in shipping regulations which took effect on October 1, 2006 are explained. The slides may be downloaded from [http://hazmat.dot.gov/training/Transporting\\_Infectious\\_Substances\\_Safely.pdf](http://hazmat.dot.gov/training/Transporting_Infectious_Substances_Safely.pdf)



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