



Federal Indifference to Laboratory-Acquired Infections

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Laboratory-acquired infections have made headlines in the news recently; during Christmas 2003, one such accident made headlines in my family. Five months after accepting a faculty-level position at a federal research facility near Washington, D.C., a close relative and colleague was accidentally exposed to *E. coli* O157:H7 through an experiment performed by a technician from another group. The investigator went on to develop hemolytic uremic syndrome (HUS) with multiple organ failure, fell into a month-long coma, was put on a ventilator, and had life-threatening secondary infections. The investigator somehow survived and is now recovering at home, with some sequelae, the permanent fear of relapse, and her chosen research career all but obliterated.

The experiment that caused this laboratory-acquired infection was an evaluation of the efficacy of various chemical sanitizers on *E. coli* O157:H7-contaminated apple slices. In short, apple slices wrapped in cheesecloth were immersed in a culture, centrifuged in salad spinners, and removed to a different container for further treatment. The spinners were then sprayed with alcohol and rinsed. The whole procedure was performed on the open bench across from where the investigator was working on unrelated experiments. The technician working with *E. coli* O157:H7 was new and had received very little relevant training; his supervisor, a food technologist, had no specific training in infectious disease microbiology; the research leader of the facility was trained as a plant physiologist. The infected investigator, an infectious disease microbiologist with 20 years experience, had repeatedly voiced her concerns

about the safety of this experiment before, concerns that had been dismissed.

A team from the Centers for Disease Control and Prevention (CDC) came on site to investigate and eventually produced a report shockingly replete with inaccuracies and glaring omissions. Above all, the report anoints the infected investigator as the "official supervisor" of the technician performing the *E. coli* O157:H7 experiment and falsely describes the experiment as hers. The 16-page report neither mentions nor alludes to the research team doing this project or to the supervisory structure for this technician. The report is currently being challenged administratively. Another startling revelation of the report is that a second researcher at the facility was also infected with *E. coli* O157:H7 in April 2004, suggesting that the conditions that led to the first laboratory-acquired infection still existed several months after it was reported.

I believe this terrible accident is the latest, most glaring illustration of a much larger problem. The conventional wisdom is that laboratory-acquired infections are kept under control by stringent CDC guidelines first introduced in 1984, at a time when investigations of pathogenic bacteria were just starting to bloom.

The reality is that no one knows what the reality of laboratory-acquired infections is. This is not new. The most recent, 25-year-old quantification of laboratory-acquired infections acknowledges that there is "no way to arrive at an accurate estimate" (RM Pike, *Annu. Rev. Microbiol.* 33:41-66, 1979). A more recent survey of published laboratory-acquired infections further denotes "an indifference to, and fre-

quently, an unwillingness to report these incidents” (A. L. Harding and K. B. Byers, p. 35-54, in *Biological Safety: Principles and Practices*, D. O. Fleming and D. L. Hunt [ed.], ASM Press, Washington, D.C., 2000).

Indifference is however the main factor in the rise of laboratory-acquired infections, particularly that from federal agencies, such as the CDC and USDA, whose function is to safeguard the health of the public, researchers included. The CDC seldom investigates and does not routinely reports laboratory-acquired infections, as these most often do not constitute outbreaks. This look-the-other-way policy is conveniently perpetuated by the myth that laboratory-acquired infections are kept in check by the CDC guidelines. However, no written guidelines can be enforced without a system for biosafety review of experiments. And the continued absence of a surveillance mechanism means that there is no deterrent to reckless experimentation which ignores basic biosafety principles of containment and results in a preventable laboratory-acquired infection.

Accidents do happen, as neither humans nor machines are infallible. Our responsibility as researchers is to minimize the risks by all means possible and when in doubt, to err on the side of too much safety rather than too little. Accidents of the type that afflicted my relative however owe not to fate, but to gross incompetence and negligence. These accidents should never be allowed to happen. A federally sponsored surveillance mechanism for laboratory-acquired infections with systematic reporting and institutional accountability is long overdue. However imperfect, it would be better than nothing, i.e. roughly what we have now. Guidelines, no matter how stringent, are no longer sufficient on their own.

I hope that this letter stimulates discussion. Comments can be posted at www.laboratory-acquired-infections.info.

Editors' Notes

Reprinted “Federal Indifference to Laboratory-Acquired Infections” with permission from the American Society for Microbiology, *ASM News*, 71(1), January 2005, pp. 1-2.

Applied Biosafety reprinted this letter, upon request, to support efforts to prevent laboratory-acquired infections. Dr. Bavoil reported that, after the letter appeared in *ASM News*, researchers established in this field informed him that a less virulent strain should have and, for the purposes of this particular research project, could have been substituted for the virulent *E. coli* 0157. This saddens him. It also provides the biosafety and research community with the lesson that a thorough risk assessment, conducted with an active Institutional Biosafety Committee, would have prevented the infection described above.

The review of experiments using pathogens should include a discussion of the strains used and the feasibility of substituting less virulent pathogens. In some cases, achieving experimental goals requires the use of pathogenic strains. Then the Institutional Biosafety Committee would still have the option of requiring that investigators inexperienced with a given set of procedures (1) do preliminary experiments with a nonpathogenic strain to familiarize themselves with the procedures and (2) identify the potential for contamination of the work area due to those procedures. Personnel and environmental monitoring could be implemented for a pilot experiment to determine the potential spread of the organism (similar to the requirements for work with radioisotopes). Had it been evident that contamination of the open bench occurred, the procedure could have been carried out in an appropriate containment device and the investigators and technicians would have utilized appropriate PPE and post-experiment area decontamination procedures.

Has your Institutional Biosafety Committee (IBC) ever required that an investigator use a non-pathogenic strain for certain experiments? Or required that a set of preliminary experiments be conducted with a non-pathogenic strain, before progressing to work with a pathogen? What were the factors involved in the decisions? Was the outcome satisfactory? Please e-mail comments to ksavage@covad.net. *Applied Biosafety* editors will prepare a table of responses; names, institutions, and other identifiers will be omitted to ensure non-attribution. Prior to publication the table will be individually provided to parties who submitted information for

final approval of presentation of content. Our goal is to provide actual risk assessments and the collec-

tive experience of ABSA members to guide the discussion of protocol review.

Editorial Note

Letters to the Editors (approximately 400 words) discuss information published in *Applied Biosafety* in the past nine months or discuss topic areas of general interest in the biosafety profession. Letters can

be submitted electronically to Karen D. Savage, Production Editor, at ksavage@covad.net or by mail to ABSA National Office, *Applied Biosafety*, 1202 Allanson Road, Mundelein, IL 60060. Letters published in part or whole are subject to editing for clarity and special formatting.

Internet Resource on Biosecurity

Would you like to review an overview of the issues involved in “Academic Freedom and National Security: Biological Research in the Post 9/11 Era”? Just google “Jerome B. Wiesner”, click on the 2005 Symposium series, and then click on “program.” Listed below are the PowerPoint presentations that have been posted.

- **Ronald M. Atlas**, Professor of Biology and Graduate Dean, University of Louisville, President, American Society for Microbiology (2002-2003); delivered the keynote address entitled “Academic Freedom and National Security: Confronting the Dual Use Dilemma”
- **Charles D. Brokopp**, Director, Select Agent Program, Centers for Disease Control and Prevention, “Overview of the CDC Select Agent Program”
- **Thomas Holohan**, Office of Biotechnology Activities, Office of Science Policy, Office of the Director, National Institutes of Health, “Enhancing National Oversight of Dual Use Life Sciences Research”
- **Harry L. T. Mobley**, Frederick G. Novy Collegiate Professor and Chair, Microbiology & Immunology, University of Michigan, “Academic Freedom and National Security: An Academic Researcher’s Perspective”
- **Robert M. Scripp**, Bioterrorism Program Manager, Weapons of Mass Destruction Unit, Federal Bureau of Investigation, “FBI Efforts to Prevent Bioterrorism While Preserving Research”
- **Frederick C. Neidhardt**, Frederick G. Novy Distinguished University Professor Emeritus of Microbiology and Immunology, University of Michigan, Commentary—“Biologists are not Naïve about the Dangers of Research”

The Wiesner Symposium Series is sponsored by the Office of the Vice President for Research (OVPR). The 2005 Wiesner Symposium is co-sponsored by the Institutional Biosafety Committee, Occupational Safety & Environmental Health, Life Sciences Institute, Medical School, Bioterrorism Preparedness Initiative, and the Division of Research Development and Administration.