



NEWS RELEASE

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Managing Occupational Exposures to Potential Bioterrorist Agents: One Laboratory's Experience Offers Guidelines for Others

Laboratories working with biological threat agents must develop comprehensive programs in order to minimize the risk of occupational exposures, according to investigators at the U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID).

In an article published this month in the Journal of Occupational and Environmental Medicine, Janice M. Rusnak, M.D. and colleagues at USAMRIID note that research on agents of bioterrorism is becoming more widespread. At the same time, institutions beginning such work may have limited clinical experience or procedures in place for the medical management of laboratory exposures to these agents. And while information on preventing occupational exposures to high-risk agents is widely available, literature on medical management of these exposures when they do occur is limited.

To assess the effectiveness of the USAMRIID program—and to provide helpful information to other institutions involved in biological threat agent research—Rusnak and her team reviewed potential laboratory exposures at the Institute between 1989 and 2002.

“We chose this time period for two reasons,” said Rusnak. “First of all, treatment protocols can change over time, and we wanted this review to contain more recent information in order to be of use to others in the field. Secondly, the data were most consistent during this timeframe. Prior to 1989, the records were kept in a different format.”

The review noted only five confirmed laboratory-acquired infections, out of 234 evaluations of potential exposures and illnesses, in a fourteen-year period. These confirmed cases involved glanders, Q fever, vaccinia, chikungunya and Venezuelan equine encephalitis. All five individuals made a full recovery.

According to Rusnak, potential exposures fell mainly into two categories: percutaneous and aerosolized. Percutaneous exposures included events such as needlesticks, cuts, and animal bites or scratches. Aerosolized exposures included events such as spills or splashes of agents

outside a biological safety cabinet or during centrifugation when the affected individual was not wearing respiratory protection.

“More than 350 people worked in the laboratories in any given year during this period,” said George V. Ludwig, Ph.D., interim science director for USAMRIID. “The fact that there were only five laboratory acquired infections is an indicator of the success of our biosafety and medical management program. This is an excellent safety record, especially given the inherently hazardous nature of this type of work.”

USAMRIID’s facilities include Biosafety Level 3 containment laboratories and Biosafety Level 4 maximum containment laboratories. All waste streams from these laboratories are sterilized as they leave the facility, and air is filtered by dedicated air handling systems. In addition, a series of work practice controls, barriers, and engineering systems effectively contain infectious materials within the laboratories.

According to the authors, USAMRIID has a long history of working safely with biological agents. Since 1969, the Institute has been the lead medical research laboratory for the U.S. Biological Defense Research Program, playing a key role in national defense and in infectious disease research.

In a related article, also published in the August issue of the Journal of Occupational and Environmental Medicine, Rusnak and her colleagues reviewed the Institute’s policies and management guidelines for occupational exposures to biological agents. Their purpose was to reassess the guidelines for determining the risk of exposure and risk of disease after a potential laboratory exposure; to better define the guidelines for initiating post-exposure prophylaxis (PEP), such as antibiotic therapy; and to evaluate the effectiveness of the USAMRIID policies.

“With diseases such as Hepatitis B, there are established medical management guidelines—based on risk assessment—for occupational exposures,” Rusnak said. “These guidelines take into consideration factors such as the circumstances of the exposure and the individual’s immunization status. We saw a need for such guidelines with regard to laboratory exposures to agents of bioterrorism.”

According to the authors, the review demonstrated an average of 19 evaluations per year; however, the majority of these were low risk, as USAMRIID policy has been to evaluate promptly even the most minor laboratory incident, such as a paper cut, to minimize the potential of anyone becoming ill or spreading diseases to the community.

Early evaluation of potential occupational exposures at USAMRIID allowed early intervention with post-exposure antibiotics. No individuals who were evaluated to determine their need for antibiotics subsequently became ill. Based on the success of this practice, the Rusnak team developed a flow chart for evaluation of potential exposures and determination of the need for antibiotic prophylaxis. The group emphasized, however, that these are guidelines only, and that each case must be evaluated individually.

The USAMRIID team also compared their recent experience with data on laboratory acquired infections during the offensive biological warfare research program conducted by the

U.S. between 1943 and 1969. During those years, 452 infections were diagnosed, for an average of 16 laboratory acquired infections per year.

“Vaccination of laboratory workers against agents such as tularemia, Q fever, and Venezuelan equine encephalitis contributed to a notable decrease in infection rates during the offensive biological warfare program,” Rusnak said, adding that immunization remains an important component of the medical management program at USAMRIID.

Additionally, “Changes in how research has been conducted may... explain the decrease in occupational illnesses,” the authors wrote, explaining that research conducted during the offensive program often involved high concentrations of organisms. When that program ended in 1969, the focus shifted to defensive research, which involves less frequent use of high concentrations of agent.

Also, laboratory practices and safety measures have evolved over time, bringing improvements in engineering controls (such as directional airflow), advances in biosafety equipment (such as biological safety cabinets), and vaccines.

A multifaceted policy of continued safety training, careful laboratory practices and procedures, use of personal protective equipment, vaccination, and early assessment of potential exposures (with the initiation of antibiotic prophylaxis as needed), has been successful in minimizing the risk of disease in laboratory workers at USAMRIID. This policy may be useful to other institutions with at-risk laboratory personnel as they begin to work with these agents.

USAMRIID, located at Fort Detrick, Maryland, is a subordinate laboratory of the U.S. Army Medical Research and Materiel Command. The Institute’s mission is to conduct basic and applied research on biological threats resulting in medical solutions (such as vaccines, drugs and diagnostics) to protect the warfighter.

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For more information on USAMRIID:

www.usamriid.army.mil