



# FOCUS on Field Epidemiology

## DISCUSSION QUESTIONS: INTRODUCTION TO FORENSIC EPIDEMIOLOGY

1. This issue of FOCUS has presented some of the differences between scientific/epidemiologic evidence and legal evidence. How are these differences highlighted in the following scenario?

*An industrial worker is suing his company because he believes his occupational exposure to benzene caused him to become ill with acute myeloid leukemia (AML). Several epidemiologic studies of leukemias in general and AML in particular have implicated benzene as the cause.*

### Discussion cues:

Science is a developing process, whereas law is final. Scientific evidence depends on improvements in technology, such as measurement of actual biological doses of exposure to an agent such as benzene and methods of identifying the biological mechanism by which cancers occur. A lawyer may argue that you can't prove benzene caused AML unless you know *how* it caused AML, even if benzene is recognized as the cause.

Also, epidemiology studies disease in populations, but the law is concerned with individuals. Epidemiologic evidence would show that more AML occurs in a population of people exposed to benzene than would otherwise be expected. But epidemiology cannot say for sure that benzene caused AML in one specific individual. Perhaps that individual had other risk factors, and would have been diagnosed with AML whether or not he had occupational exposure to benzene.

Finally, the law requires a cause-effect relationship, whereas most epidemiologic methods cannot prove causality. In this case, benzene is generally accepted as a cause of AML. However, earlier in the investigation of the association between benzene and AML, it would have been difficult to say whether benzene was the *only* chemical responsible for causing the disease, whether other chemicals that are often used by the same workers could have been the cause, or whether some other characteristic of people who work with industrial solvents put them at higher risk of AML.

2. Following an intentional biological attack, many different disciplines and agencies would become involved in the investigation. In a case in which a local water supply has been determined to have been intentionally contaminated with a disease agent, what disciplines/agencies do you think would be involved in the investigation, and what might their roles be?

### Discussion cues:

Your discussion group could probably think of numerous agencies that might be involved. A few ideas are given here.

Local and state health departments are involved in case-finding, defining (creating criteria for) the outcome, defining the exposure, and potentially interviewing cases.

The Federal Bureau of Investigation (FBI) is the lead for any investigation of potential terrorist activity. The FBI would interview cases and witnesses, pursue suspects, collect evidence and run any appropriate laboratory tests.

State bureaus of investigation would support the FBI with manpower, state resources, laboratories, and other available capacity.

Emergency management services would respond to 911 calls, triage patients to clinics and hospitals, and organize forward emergency treatment centers if necessary.

Hospitals and health clinics would triage patients, work in forward treatment centers if needed, and establish tertiary care facilities.

Pharmacists would allocate available antibiotics and counsel patients on the risks and benefits of take treatment.

Police and firefighters would respond to 911 calls, establish public safety measures, and provide investigative support (police) or patient emergency care support (firefighters).

Other agencies might include the National Guard and other military units, the Centers for Disease Control and Prevention, state laboratories, the US Department of Agriculture, the Department of Homeland Security, and the Attorney General's Office.

Your group should come to the conclusion that planning, coordination, and communication are needed **BEFORE** such an event occurs!



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