9 OCCUPATIONAL MEDICAL SURVEILLANCE

ANSWERS—QUIZ 1

1. b
2. a
3. a
4. d
5. d
6. a
7. Medical surveillance is an organized system for collecting and using information on diseases, injuries, or hazards to help prevent accidents and illnesses.
8. Sensitivity, specificity, and positive predictive value are the three factors that determine the quality of screening tests.
9. Early detection is beneficial only when the treatment used will likely improve the disease outcome as compared to conventional treatment administered when the disease would be diagnosed without screening.
10. The underlying assumption of the mixture rule is that the "combined" chemicals act on the same end-organ.
11. The two main legal issues are the rights of the people being monitored and the use of monitoring as a primary control strategy.
12. When designing a medical surveillance program, the following data need to be analyzed:
    - OSHA standards and surveillance requirements related to the hazardous substance
    - the worker's job description
    - the worker's exposure history and industrial hygiene monitoring data
    - data showing the use of personal protective equipment
    - data from prior medical examinations

    The analysis should aim to answer questions regarding the significance and extent of exposure and the exposure dose as well as the toxicity of the hazard(s) and the seriousness of the target condition(s). Once the analysis is complete the health professional must consider the balance of risks and benefits of surveillance.

ANSWERS—QUIZ 2

1. b
2. a
3. b
4. c
5. b
6. d
7. The main purpose of surveillance is to detect changes in trends or distributions in order to initiate investigative or control measures.
8. Screening is more accurate because it does not involve epidemiologic analysis of data, the data collected is not used, and no changes are made in preventive policies.
9. Medical history/questionnaire, examination, and biological monitoring are three ways to clinically evaluate exposure to hazardous agents.
10. BEIs are biological exposure indices, reference values developed as guidelines to help health professionals evaluate potential health hazards.
11. The reason is because, given current state-of-the-art treatment, early detection of lung cancer does not appear to alter the course of the disease and a false positive test result can represent risks of its own.
12. Three fundamental issues need to be taken into account when implementing a medical surveillance program. First, the nature of the disease or "target condition." The safety and health professional needs to consider whether any known and proven medical treatments exist for the disease and whether early detection will result in improved health. Second, the accuracy, reliability, and acceptability of early detection tests need to be considered. Finally, the safety and health professional needs to examine the expected prevalence of the disease in the population that will be monitored. If the condition is rare, then most positive screening results will be false, reducing the benefits and increasing the costs and risks of surveillance.

ANSWERS—CASE STUDY

1. Biological monitoring has many limitations. In general, it is a poorly understood science and the ability to identify and analyze biomarkers often far exceeds knowledge of how they affect humans. Once biological monitoring detects exposure, it is difficult to correlate health risks associated with that exposure. The short biological half-lives of some substances make it impossible to accurately assess exposure except

within a limited period of time. Biological monitoring is not useful for surface active agents, such as hazards that cause skin or upper airway irritation. Tobacco, alcohol, and other agents may interfere with test results and, in some cases, measurements can reflect multiple exposure sources (air, food, water, soil, and skin contact), preventing an accurate determination of occupational exposure. It is also difficult to assess the environmental contribution of some substances commonly found in the body, such as copper or zinc. Biomarkers of effect are often not specific to a particular substance and abnormalities may reflect causes other than the substance being monitored. Biomarkers that are used to predict possible future conditions need to be validated with longitudinal studies. Finally, using biological monitoring in populations with low levels of exposure and low incidence of disease is a problem.