

DESCRIPTION: Epidemiology is the scientific study of disease, injury, health, and disability in populations (including "outbreaks") and entails: reasoning skills, such as those used by "disease detectives"; a quantitative view of risks; survey methods to study opinions, behaviors, or other aspects of populations, including school classes; and interdisciplinary links between medicine, statistics, and laboratory sciences.

EVENT PARAMETERS: Non-programmable calculators are permitted, but not reference materials. References and training resources are available on the CDC website at www.cdc.gov/excite and the Official Science Olympiad Web Page at <http://www.soinc.org>.



A TEAM OF UP TO: 2

APPROXIMATE TIME: 50 minutes

THE COMPETITION: This event requires students to apply principles of epidemiology to a published report of a real-life health situation or problem. The competition will require the students to use the scientific and systematic approach to investigating epidemics and other public health problems (e.g., finding and counting cases, comparative reasoning, hypothesis generation, hypothesis testing). Related task and knowledge areas of epidemiology and other biomedical sciences include: Basic definitions of epidemiological terms (e.g., epidemiology, epidemic, outbreak, incidence, rates, public health surveillance); Categories of disease-causing agents (e.g., bacteria, toxins, mechanical forces, behavior); Modes of disease spread (e.g., person-to-person, foodborne, airborne, vectorborne); The triads of elements of analysis of epidemiological data collected to investigate outbreaks and other problems (e.g., time/place/person, and agent/host/environment); Fundamental analysis of epidemiological data (e.g., case-control and cohort analyses); and the basis for taking action to control and prevent the spread of disease.

SAMPLE PROBLEMS: The students will read a report adapted from a newspaper, a scientific publication, or an Internet site (e.g., www.cnn.com (see health) or www.cdc.gov (see MMWR which is CDC's weekly bulletin called the *Morbidity and Mortality Weekly Report*) on an outbreak or other public health condition in a community or population. It is recommended that students review www.cdc.gov/excite for excellent sample questions with suggested answers. Students will answer questions relating to determining and describing the epidemiology of the problem and potential interventions or prevention activities. Possible tasks might include:

- Given the scenario of the outbreak or condition, explain why you might consider this an important problem, and give at least three general reasons why you should respond to the problem.
- Briefly describe the initial steps of an investigation to respond to this problem. For example, develop a case definition, determine the data needed for the initial steps, and give some examples of possible sources of such data in a community or study population.
- Construct or interpret relevant charts, graphs, or tables used to describe the problem.
- Calculate measures of disease risk (e.g., incidence rate, odds ratio, or relative risk).
- Develop and specify probable hypotheses to explain the cause/source/spread of the outbreak.
- Describe approaches to testing alternative hypotheses (e.g., case-control, cohort, or other study).
- Apply principles of causation to a public health problem.
- Develop suitable recommendations and/or interventions for controlling the problem; if recommendations already have been made, then evaluate the advantages and disadvantages of the recommendations.

SCORING: Depending on the problem, scoring may be based on a combination of answers, including graphs/charts, explanations, analysis, calculations, and closed-ended responses to specific questions. Points should be awarded for both quality and accuracy of answers, the quality of supporting reasoning, and the use of proper scientific methods: each completed graph or table is worth up to five points; open-ended questions that require a paragraph of explanation to report the proper interpretation are worth up to ten points; closed-ended responses are worth up to five points each. **Highest number of points will determine the winner. Selected questions may be used as tiebreakers.**

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