DISEASE DETECTIVES

See General Rules, Eye Protection & other Policies on www.soinc.org as they apply to every event.

1. **DESCRIPTION:** Participants will use their investigative skills in the scientific study of disease, injury, health, and disability in populations or groups of people.

   A TEAM OF UP TO: 2 **APPROXIMATE TIME:** 50 minutes

2. **EVENT PARAMETERS:**
   Each team may bring one 8.5" x 11" sheet of paper that may contain information on both sides in any form and from any source along with two **stand-alone non-programmable, non-graphing** calculators.

3. **THE COMPETITION:**
   a. **This event has been reorganized into three parts with each part counting approximately equally towards a team's final score.**

   Part I: Background & Surveillance
   a. Understand the Clinical Approach (health of individuals) and Public Health Approach (health of populations)
   b. Understand the roles of epidemiology in public health and the steps in solving health problems
   c. Understand the Natural History and Spectrum of Disease and the Chain of Infection
   d. Understand the basic epidemiological and public health terms (e.g., outbreak, epidemic, pandemic, surveillance, risk, vector)
   e. Understand the role of Surveillance in identifying health problems, the 5 step Process for Surveillance and the types of Surveillance

   Part II: Outbreak Investigation
   a. Analyze an actual or hypothetical outbreak
   b. Understand the Types of Epidemiological Studies – Experimental and Observational
   c. Be able to identify the Steps in an Outbreak Investigation
   d. Identify the problem using person, place, and time triad – formulate case definition
   e. Interpret epi curves, line listings, cluster maps, and subdivided tables
   f. Generate hypotheses using agent, host, and environment triad
   g. Recognize various fundamental study designs and which is appropriate for this outbreak
   h. Evaluate the data by calculating and comparing simple rates and proportions as attack rate, relative risk, odds-ratio, and explaining their meaning
   i. Apply the Bradford Hill Criteria for Verifying the Cause of this outbreak
   j. **Division C Only**: Recognize factors such as study design/biases, errors, and confounding variables that influence results
   k. **Division C, Nationals Only**: Suggest types of control & prevention measures for this outbreak

   Part III: Patterns, Control, and Prevention
   a. Identify patterns, trends of epidemiologic data in charts, tables, and graphs
   b. Using given data, calculate disease risk and frequencies as a ratio, proportion, incidence proportion (attack rate), incidence rate, prevalence, or mortality rate
   c. Understand the Strategies of Disease Control
   d. Understand Strategies for Prevention - the Scope and Levels of Prevention
   e. **Division C Only**: Propose a reasonable set of prevention strategies for a public health problem once the cause has been determined
   f. **Division C, Nationals Only**: Identify the strengths and weaknesses of a set of proposed prevention strategies

4. **SCORING:**
   a. High score wins. Selected questions may be used as tiebreakers.
   b. Points will be assigned to the various questions and problems. Both the nature of the questions and scoring will emphasize an understanding that is broad and basic rather than detailed and advanced.
   c. 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.
   d. Points will be awarded for both quality and accuracy of answers, the quality of supporting reasoning, and the use of proper scientific methods.

Recommended Resources: The Science Olympiad Store (store.soinc.org) carries the **updated** Disease Detectives CD and Bio/Earth Science CD; other resources are on the event page at soinc.org.

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