

Southern Utah University Practical Guide to Science Olympiad DISEASE DETECTIVES Division B/C Event 2020

Disclaimer: *The information in this guide is designed to provide a helpful breakdown of the Science Olympiad Event Manual. This guide is not meant to replace the official Science Olympiad Event Manual. Rather, it is intended to aid user comprehension of the official manual. Event staff and competitors are responsible for familiarizing themselves with the official Science Olympiad Event Manual and event manual updates prior to the SUU Science Olympiad. The SUU Science Olympiad will defer to the official Science Olympiad Event Manual and event updates during competition.*

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

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

EVENT PARAMETERS:

Each team may bring one 8.5" x 11" sheet of paper, which may be in a sheet protector sealed by tape or laminated, that may contain information on both sides in any form and from any source without any annotations or labels affixed along with two stand-alone non-programmable, non-graphing calculators.

THE COMPETITION:

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 basic epidemiological and public health terms (e.g., outbreak, epidemic, pandemic, surveillance, risk, vector, etc.)
- 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, 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, confounding that influence results
- K. **Division C - Nationals Only:** Suggest types of control & prevention measures for this outbreak

Part III: Patterns, Control, and Prevention

- 1. Identify patterns, trends of epidemiologic data in charts, tables and graphs.
- 2. Using given data, calculate disease risk and frequency ratio, proportion, incidence proportion (attack rate), incidence rate, prevalence and mortality rate
- 3. Understand the Strategies of Disease Control
- 4. Understand Strategies for Prevention-the Scope and Levels of Prevention
- 5. **Division C Only:** Propose a reasonable set of prevention strategies for a public health problem once the cause has been determined
- 6. **Division C - Nationals Only:** Identify the strengths and weaknesses of a set of proposed prevention strategies

SCORING:

- 1. High score wins. Selected questions may be used as tiebreakers.
- 2. 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.
- 3. 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.
- 4. 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 Disease Detectives CD and Bio/Earth Science CD; other resources are on the event page at soinc.org.