

MY SO STEM SHOWDOWN

CONTENT, RECOMMENDED MATERIALS & SCORING

STEM SHOWDOWN CONTENT

The STEM Showdown will consist of a series of online multiple-choice questions across **three major topic areas** in Epidemiology. A showdown participant will have **50-minutes** to answer as many questions as possible.

The content covered by the Showdown this month is as follows:

Topic I: Background & Surveillance

- a. Understand the Clinical Approach (health of individuals) and Public Health Approach (health of populations)
- b. Understand the role 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

Topic 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 Identify the problem using person, place, and time triad – formulate case definition
- d. Interpret epi curves, line listings, cluster maps, and subdivided tables
- e. Generate hypotheses using agent, host, environment triad
- f. Recognize various fundamental study designs and which is appropriate for this outbreak
- g. Evaluate the data by calculating and comparing simple rates and proportions as attack rate, relative risk, odds-ratio and explaining their meaning
- h. Apply the Bradford Hill Criteria for Verifying the Cause of this outbreak
- i. High School (Division C) Only: Recognize factors such as study design/biases, errors, confounding that influence results
- j. High School (Division C) Only: Suggest types of control & prevention measures for this outbreak

Topic 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 frequency ratio, proportion, incidence proportion (attack rate), incidence rate, prevalence and mortality rate
- c. Understand the Strategies of Disease Control
- d. Understand Strategies for Prevention-the Scope and Levels of Prevention
- e. High School (Division C) Only: Propose a reasonable set of prevention strategies for a public health problem once the cause has been determined
- f. High School (Division C) Only: Identify the strengths and weaknesses of a set of proposed prevention strategies



Recommended Materials

- Each Showdown participant will need a computer with internet access, scratch paper, something to write with, and a stand-alone, non-programmable, non-graphing calculator (e.g., a TI-83 or NSPIRE)
- Showdown participants may use resources available to help them answer the questions asked during the Showdown. These resources could be a collection of notes on the topics listed below, copies of magazine or journal articles, a textbook, or any combination of these items.

Scoring

- High score wins.
- Ties will be broken using:
 - a. The time it takes to complete the test; and
 - b. The results to the questions indicated as tiebreakers.

Additional Resources

- The CDC Science Olympiad Disease Detectives page (<https://www.cdc.gov/careerpaths/diseasedetectives/index.html>)
- The Science Olympiad Store (store.soinc.org) carries the Disease Detectives CD and Bio/Earth Science CDs.
- Other resources can be found on the Disease Detective Events Pages at soinc.org.