



New Jersey Science Olympiad Trial Event  
High School Division, 2010-2013  
Instructions for *Think Like an Epidemiologist Challenge (Epi Challenge)*

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## **A. Overview**

Since 1985 Science Olympiad has been challenging young adults to become inspired to help improve the quality of science education in their school system. Students are encouraged to collaboratively apply the core principles of science to develop a hypothesis and form an experiment. Working together in teams, they can build off of each other's ideas and make a simple concept come to life.

Within more recent years, the concept of epidemiology has been applied to high school science education classes in New Jersey. It stimulates the minds of students who are passionate about science to think epidemiologically by training young adults to identify patterns in populations, formulate hypotheses, develop experiments, and compare their findings. Incorporating Science Olympiad with epidemiology allows the instructors and students to view science in a different light, which can spark a new interest and love for science and epidemiology.

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## **B. Goals**

1. Create awareness of the science of epidemiology among students in grades 9-12
2. Provide opportunities for students to experience authentic scientific research
3. Increase scientific literacy
4. Increase knowledge about ethical testing with human subjects.

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## **C. Objectives**

***Upon completion of the NJSO Think Like an Epidemiologist Challenge Event, Students will:***

1. Complete and be certified in the National Institutes of Health: Protecting Human Subjects Research
2. Demonstrate how to develop a hypothesis, conduct a survey, and collect and analyze data about health-related issues
3. Communicate research experiences and results via scientific poster presentations

### ***Statement of Objectives for Potential Participants***

The *Think Like an Epidemiologist Challenge (Epi Challenge)* is an event for which points will be awarded at both the regional and state competitions. The *Epi Challenge* will ask teams of four students each to test a hypothesis epidemiologically. This Science Olympiad (SO) event has been designed to be realistic and require you to "do" epidemiology so that you experience some of the challenges that epidemiologists face when testing hypotheses in the real world. It will require you to develop and use a variety of epidemiologic skills efficiently and effectively. It will require you to use judgment and innovation. And by posting this event at the beginning of the school year, it provides you with the time for learning, rehearsal, practice, consultation, feedback, and refinement.

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## **D. Overview of *Epi Challenge* Process for Science Olympiad**

Similar to other events that are publicized and made available through the Science Olympiad, all schools are required to register in order to participate in the *Epi Challenge*.

The process for participating study teams consists of several steps:

- Part 1 submission of proposed hypothesis to be tested – with review by Event developers/judges
- Part 2 submission of proposal to design, conduct, analyze and interpret a cross-sectional epidemiological survey in their school (the proposal is the Regional Competition with review and scoring by Event developers/judges)
- If proposal is approved and school is going to SO finals, the team conducts the study in their school and prepares a poster for presentation at State Finals (the posters and accompanying presentations are judged by a larger panel of epidemiologists and other public health professionals)

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## **E. Part 1 Submission**

### ***Team Assembly and Hypothesis Selection***

Identify four SO team members to work on this event together. One member of the team will be considered the leader and this person will receive all email correspondence from the SO judges.

Select a **health-related hypothesis** you wish to test using observational epidemiologic methods. Please note the following important information:

- Make sure that the hypothesis that you choose is of genuine interest to you because you will be spending a great deal of your time and energy exploring it.
- The hypothesis that you choose **MUST NOT** require the collection of any information that might be considered embarrassing, sensitive or illegal.
- Hypotheses should be testable using a one-time survey instrument.
- You may not use an experimental design or intervention to test your hypothesis. In other words, there can be no manipulation of the exposure.
- All data must be collected anonymously (without anything that could link the student to their responses – such as race or ethnicity).
- Your hypothesis statement should state the hypothesized relationship, including direction, between an exposure variable and an outcome variable.
- Hypotheses that have been evaluated by your school's SO team in the Epi Challenge event in a prior year may not be repeated.

*Examples of hypotheses that were approved for this event in the past:*

- Students who regularly eat school cafeteria food have a higher-fat diet.
- Students who participate in team sports get a better night's rest.
- Students who have a low-fat diet are more physically active.
- Students who regularly watch TV evening news or regularly read a major newspaper (hard copy or online) know more facts about the H1N1 pandemic.
- Students who exercise regularly have higher academic performance.

## ***Elements of Part 1 Submission\* – Participant Information and Hypothesis***

1. State
2. Name of School
3. School Location (Town or Township)
4. Regional Competition (Camden, NJIT, or Union County)
5. Student Leader of Study Team
6. Student Leader email address
7. Names of Team Members 2-4
8. Through 10. SO Coach name,
9. SO Coach email address
10. SO Coach phone number
11. **HYPOTHESIS:** Clearly state the hypothesis your team proposes to test. State it in a manner that suggests that the outcome under study will vary in light of the presence or absence of (or greater or lesser amounts of) the exposure under study. To repeat, the hypothesis that is chosen **MUST NOT** require the collection of any information that might be considered embarrassing, sensitive or illegal.
12. Briefly explain why your study team thinks this is an important hypothesis to test.
13. Discuss reason(s) why testing this hypothesis will be possible in your school.

\* Allow about 2 months to submit Part 1. Grace periods are developed for late registrants. .

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## **F. Review of Part 1 Submissions by Event Developers/Judges**

*Sample email:*

Dear Science Olympiad Teams and Coaches,

Thank you for submitting a hypothesis for the ***Think Like an Epidemiologist Challenge*** 2013 Science Olympiad Event. The event developers have reviewed your hypotheses. Unless your coach or team captain has received an additional call or additional email from one of the event developers stating that you must change your study hypothesis, you may assume that your hypothesis has been accepted.

As you begin to work on your Part 2 submissions, all teams should be sure to consider the following:

First, you will be conducting a cross-sectional study. This means that your data collection activities will take place at one point in time. Teams that want to look at change over a period of time must work on how to ask the questions in such a way that this information is collected during the one-time survey.

Second, the statement of your hypothesis needs to describe the direction of the hypothesized relationship between an exposure variable and an outcome variable. For example, “students who regularly eat school cafeteria food have a higher-fat diet.” When you are asked to re-state your hypothesis in the second on-line submission (your full proposal), be sure to remember this.

Third, as was stated in the directions for submitting your hypothesis, remember that your stated hypothesis **MUST NOT** require the collection of any information that might be considered embarrassing, sensitive or illegal. In addition, all data must be collected anonymously (without anything that could link a student to her/his responses). **Teams studying variables such as stress, self esteem, body weight, body image and health topics, should be aware that these may be sensitive topics for some people; therefore be careful how you ask these questions.**

If you have questions while you are completing Part 2 of your submission, please send them to \_\_\_\_\_.

Good Luck!

Developers of the 2012 *Think Like an Epidemiologist Challenge* event

## G. Part 2 Submission

The proposal is the most important part of the event. At this point teams will have approximately **six weeks to submit Part 2** of the event. This submission will consist of several steps to develop a cross-sectional study based upon their proposed and approved hypothesis. Teams are required to apply any feedback that they received from Part 1 to the proposal.

### *Required Elements of Part 2 of Proposal*

1. State
2. Name of School
3. School Location (Town or Township)
4. Your school's assigned SO State Finals number (example C-09)
5. Name of Student Leader of Study Team (first name, last name)
6. Student Leader email address
7. HYPOTHESIS: If your hypothesis was approved as stated in your Part 1 online submission, re-type it here. If you have made changes to your hypothesis that was subsequently approved, state your new hypothesis here.
8. JUSTIFICATION: Based on a review of literature, explain why the testing of your hypothesis is important in terms of existing knowledge and / or scientific questions about possible relationships between this exposure and outcome, or new questions based on intuition and logic. Cite scholarly sources (author and date) within the text, and list the full references at the end of your justification.
9. STUDY VARIABLES AND SURVEY QUESTIONS: a. Name your exposure variable and describe what it means; b. What question(s) will be used to measure your exposure variable; c. Describe any challenges you might have in measuring the exposure variable; d. Name your outcome variable and describe what it means; e. What question(s) will be used to measure your outcome variable; f. Describe any challenges you might have in measuring the outcome variable; g. Will you collect information on variables which may modify the relationship between the exposure and outcome? If yes, please provide a list of these variables.
10. STUDY DESIGN: Provide a description of the cross-sectional study design and explain why your proposed study is a cross-sectional epidemiologic study.
11. SOURCE POPULATION: Describe the source population from which your study sample will be selected. Describe who is, and is not eligible to be part of the source population and the approximate size of the source population. Describe the likelihood that you will have access to this source population
12. STUDY SAMPLE: Describe how you will select your study sample from the source population, the approximate size of your study sample, and a brief justification for this selection method and the sample size chosen.
13. RECRUITMENT AND INFORMED CONSENT: Describe the process by which potential participants will be contacted and invited to participate. Also describe the process by which the informed consent script will be administered so any possible coercion is avoided and the protection of participants' privacy is ensured. (Note that your informed consent script is required in the Appendix, and it should be an adaptation of the template script that is provided on page 8 of this document.
14. DATA COLLECTION AND DATA MANAGEMENT: Describe a practical and realistic plan for data collection in your high school setting. Include a description of the mode of administration of the survey (school mail, one-on-one interview, or self-administered in a

classroom) that will assure anonymity, privacy, and data integrity. Also describe data management plans for handling survey forms, data storage, and the destruction of electronic and paper copies after the NJ State SO event.

15. ANALYSIS PLAN: Describe how your data will be analyzed. Be sure to include information on the following:
  - CONTINGENCY TABLE: Fill in the two boxes in a mock table to show how your exposure and outcome variables will be analyzed in a contingency table in order to test your hypothesis.
  - PREVALENCE: Describe how you will calculate the prevalence of your outcome variable. Provide the formula for this calculation.
  - PREVALENCE COMPARISONS: Describe how you will compare the prevalence's of your outcome variable among the exposed and unexposed groups, provide the formula for this calculation, and name any statistical test(s) you plan to use to determine the likelihood that the differences between prevalence among the exposed and unexposed groups could have occurred by chance.
16. STUDY LIMITATIONS: Consider potential limitations of your study as related to study design, selection of your sample of participants, and/or measurement issues. (If you do not think there are limitations in one or more of these areas, state that there are no limitations.)
17. STUDY STRENGTHS: Describe the strengths of your study.
18. TIME LINE (sample): Provide planned dates of completion for key study activities.
  - Receive review of full Proposal: Scores will be available at Regional SO
  - Pre-test survey
  - Finalize survey
  - Finalize study procedures
  - Execute plans to sample the source population to obtain study participants
  - Recruit potential study participants and obtain informed consent
  - Collect data with administration of questionnaire survey according to plans
  - Organize data and double check for possible errors in transfer from paper questionnaire to summary sheets and/or to computerized databases
  - Perform analyses
  - Discuss results and presentation of results among study team
  - Prepare /Complete PowerPoint poster slides
  - Email PowerPoint slides to judges on or before March 1, 2013
  - Present 48 x 36 inch poster for SO State Finals on March 12, 2013 (poster to venue by 8 AM)
  - Submit all paper records to SO Judges for disposal: March 12, 2013

***For Students, Rubric for Evaluation of Part 2 of Proposal***

Submit Part 2 of your proposal no later than midnight, December 15, 2012. Proposals submitted after December 15, 2012 will not be evaluated. Your proposal will be evaluated in its entirety according to the following rubric:

Proposal Exceeds Expectations	Proposal Meets Expectations	Proposal Fails to Meet Expectations
Proposal is complete, thoughtful, and	Proposal is complete but does not provide evidence of intellectual	Proposal is incomplete, naïve, and/or superficial.

intellectually rigorous. Justifications are insightful and persuasive. Everything that is written is correct and needed. Proposal illustrates a good understanding of epidemiological concepts.	rigor. Justifications are correct, but are not entirely persuasive. While everything that is written is correct and there are no serious misunderstandings of any epidemiological concepts, some information is provided which is not relevant to the study hypothesis.	Justifications are weak. There are incorrect and/or superfluous statements. There are misunderstandings of key epidemiological concepts.
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## H. Ethics

Team members are required to demonstrate and utilize their knowledge about ethics and informed consent in relationship to the survey development and implementation. Team members will be required to complete the Protecting Human Subjects training and submit completion certificates for each team member to the event developers/judges.

### *Background*

When conducting research – academic or professional- with human subjects, it is critical to be aware of your rights as a researcher and the rights of participants. Conducting research with the intent of publication, researchers must abide by the three main ethical principles:

- **Respect for persons** - which includes the requirement of a voluntary informed consent process
- **Beneficence** – which entails an obligation to protect persons from harm by minimizing risks and maximizing benefits
- **Justice** – which requires that selection of subjects be fair and equitable and that particular care be taken when working with populations (i.e. children, impaired) whose status puts them in a vulnerable position. (<http://www.research.fsu.edu/humansubjects/>)

### *NIH: Protecting Human Subjects Training*

Although involvement in the Science Olympiad would be considered simulated research rather than actual research, **ALL team members who are enrolled in the Epidemiology Challenge are required to complete the NIH: Protecting Human Subjects training.** This online training explains the history of ethical misconduct and ethical reform. It allows the students to develop and design their cross-sectional studies within the legal requirements.

**IMPORTANT NOTE:** To ensure that all studies are being conducted within those guidelines, team members should not start collecting data until the judges have all required NIH certificates from EACH person within the group.

Team members can register and complete the following three of the seven training modules: **History, Codes and Regulations**, and **Respect for Persons** (accessed via the link below)

<http://phrp.nihtraining.com/users/login.php>

## ***Informed Consent***

Informed consent is a statement that allows the participant to understand his/her rights as a subject in a study. The script should be understandable to all potential student participants. It should provide all the relevant information needed to make a decision about participating in the research simulation based on their own values and goals. An accurately formatted consent form should include the following:

- Purpose of the research simulation
- Reasonably foreseeable risks
- Potential benefits to participants
- Potential benefits to others
- Confidentiality protections
- Contact information for questions
- Right to refuse or withdraw without consequence. There should be no attempt to coerce students into participating

Each team will be required to develop and read aloud an informed consent form to all potential participants of the survey. This form **MUST** be read prior to any distribution of the survey.

### *Think Like an Epidemiologist Challenge*

#### Informed Consent Script

My name is \_\_\_\_\_ and I am participating in the Science Olympiad *Think Like an Epidemiologist Challenge* trial event.

We would like to ask you some question regarding \_\_\_\_\_ (insert exposure and outcome).

This is simulation of an epidemiological investigation that is being carried out for educational purposes only. It is not an actual study from which generalizations will be made.

To conduct this study, I would like you to consider completing a brief survey. It has \_\_\_\_\_ questions and will take approximately \_\_\_\_\_ minutes to complete.

If there are any risks assumed by participating, they are no greater than those you encounter in daily life. There are no benefits to you for participating and there is no compensation.

Your answers will be handled anonymously to protect your privacy. You will not write your name on the survey. All surveys and any grouped data that are generated will be destroyed at the end of the SO event.

The study team wants you to know that your participation is voluntary and that you can stop participating at any time without consequence. You can refuse to participate now; you can change your mind after starting to participate; or, after completing the survey, you can decide not to submit it.

Do you have any questions?

Would you like to participate?



## I. Review of Part 2 Submissions by Event Developers/Judges

Developers of the event (and or other judges) review the proposals to be sure the instructions have been followed and that the students have designed a study that is ethical as well as feasible to conduct in the school. Each proposal is ranked and scored for purposes of allowing decisions to be made regarding which overall school SO teams have qualified to go to the state finals. Equally importantly, the judges must go through this process to be sure there are no problems before the teams actually conduct their studies. In some cases, a proposal may not be acceptable, but in most cases, suggestions can be made to remedy potential problems.

### *Follow-up Email*

After all the data has been finalized, schools have been ranked, and teams have been contacted to make appropriate changes to their proposals, a follow-up email should be sent out to all participants to notify them about whether they will continue onto the next phase of the event which is the state finals.

The group email should carefully outline any issues that have surfaced during the review process of all the proposals. Separate, individual team emails may have to be sent to teams that have specific problems that need to be addressed.

#### *sample follow-up email*

Dear Participants in the Science Olympiad's *Epi Challenge*,

We recognize that the format of this event provides some unique challenges for Science Olympiad teams around the state. The developers of the event reviewed each application, scored them independently, and then met to discuss the results prior to providing the final ranks to the SO Regional Coordinators.

Teams that did not participate in the regional Epidemiology Challenge event and those that did participate but received a "participation only" grade are not eligible to participate in the State Epidemiology Challenge event.

There are some important issues that we would like to make clear to all of those who submitted applications, received a ranking, and are advancing to the SO State finals. One extremely important aspect of epidemiologic research is the protection of human subjects. So, we ask that each of you review your plans to obtain informed consent and to protect the rights of those individuals whom you approach to participate in your research. The following guidelines related to Human Subjects protection must be followed in this competition:

1. You must use the Human Subjects Informed Consent script provided for this competition.
2. Be sure that when you ask for the consent of potential study participants that you do not identify participants and non-participants. For example, asking people to raise their hands if they wish to participate is not appropriate, since this identifies non-participants as well. In addition, this may be considered coercive because it may embarrass people into participating. Individuals must feel comfortable choosing NOT to participate or to change their minds once they begin the

survey. As such, non-participants should not be singled out in any way. Therefore, if you are in a classroom situation, you should distribute your survey to all students and those who do not wish to participate can simply return a blank survey to you.

3. Do not use exclusion criteria, unless it is based on responses to particular non-sensitive survey questions. For example, if you wish to exclude those who drink coffee from your study, you may ask a question about coffee consumption on your survey and then, afterward, choose to only analyze those who do not drink coffee. In other words, avoid excluding students during the phase when you are approaching students and obtaining their consent to participate, since such action would single out certain students and could result in failure to protect their anonymity and/or confidentiality.

4. Be sure that respondents do not put their names or other identifying information on either the informed consent form or the survey, since this is a way that participants can be identified. This data collection activity is meant to be “totally” anonymous, not just confidential. (Student participants can simply be reminded not to fill in more than one survey, to avoid duplication.)

5. Since data should be collected anonymously, person-to-person interviews should not be used in your study.

6. You may not ask teachers or use school electronic or paper records to collect information on particular students, such as their grades, SAT scores, or reasons for absences, because this would require that you identify students by name. If you wish to collect this information, you must ask students to provide it on their survey.

7. If a school’s email system is used to contact students and collect data, students’ responses should not be linked in any way to the students.

Other important precautions pertain to questions on your surveys. After reviewing all the proposals, we ask that you make sure of the following:

8. Questions about a person's health history, including allergies, confidential medical conditions, and medications taken should be removed from these surveys. You may not ask questions about a person's confidential health or health history. If you are asking about body weight or BMI, please be sure to do this in as sensitive a way as possible. It is all right to ask non-sensitive health questions such as how many colds someone had or whether they wear eyeglasses or contact lenses.

9. Students should not be able to be identified based on their responses, for example race/ethnicity. Therefore do not ask about race/ethnicity.

10. Data on these surveys should be self-reported data. This is not an experimental study where participants are asked to complete tasks and have the results recorded by the researchers.

Additionally, the formatting of your survey is important and can impact how well and if students fill out the survey. Always provide clear instructions for completing the survey items. Response choices should be mutually exclusive and exhaustive, with no overlap. Remember to thank all

participants in writing at the end of your survey form, and repeat instructions for returning completed surveys to you.

Finally, please note that you should not begin data collection at your school until your ethics training documentation and permission from your school or school district have been emailed to us at [epichallenge.scienceolympiad@gmail.com](mailto:epichallenge.scienceolympiad@gmail.com)

We wish you the best as you begin to implement your studies.

Developers of the *Think Like an Epidemiologist Challenge* event

## J. Preparation for State Finals

### *Timing*

At this point, teams who have been approved to continue to the state finals will have about **two months** to **implement their proposals and submit their presentations to the judges**. Judges must follow up with any teams who may have made it to the finals, but are still missing documentation such as the NIH training or school consent. It is also important that teams submit their **presentations** at least **one week before the finals**. This allows the judges to review the presentations, formulated questions, and score it prior to the event to save time.

### *Poster Preparation and Presentation*

At the State Finals on \_\_\_\_\_, your four-student SO team will respond to questions from individual SO judges as they circulate around the poster session room. Judges will engage the presenters with questions and discussion. Poster presentations and scoring will take place during one or more morning sessions at the State Finals. At least two members of your team must be present to respond to questions during each of the morning sessions. The purpose of your poster is to compliment and facilitate your presentations and conversations with the SO judges. Note: Posters should be brought to the poster session venue no later than 8 AM.

Posters should be organized using the following 4 major headings:

- **Introduction** (include the HYPOTHESIS and JUSTIFICATION for the study.)
- **Methods** (include description of STUDY VARIABLES AND SURVEY QUESTIONS, STUDY DESIGN, SOURCE POPULATION, STUDY SAMPLE, RECRUITMENT AND INFORMED CONSENT and DATA COLLECTION AND DATA MANAGEMENT. List analysis methods used.)
- **Results** (include CONTINGENCY TABLE(s), PREVALENCE and PREVALENCE COMPARISONS.)
- **Discussion** (Indicate whether or not your data support your hypothesis. Include interpretation of study findings, discussion of STUDY LIMITATIONS and STUDY STRENGTHS.)

Be sure to include the following at the top of your poster: 1) title of poster; 2) school name; and 3) names of students on your team.

Your Poster elements and your responses to the judges' questions will be evaluated according to the following rubric:

Poster Elements and Responses to the Judges' Questions Exceed Expectations	Poster Elements and Responses to the Judges' Questions Meet Expectations	Poster Elements and Responses to the Judges' Questions Fail to Meet Expectations
<p>Poster elements and responses to the judges' questions are complete, thoughtful, and intellectually rigorous. Justifications are insightful and persuasive. Everything that is stated is correct and needed. Poster elements and responses to the judges' questions demonstrate a good understanding of epidemiological concepts.</p>	<p>Poster elements and responses to the judges' questions are complete but do not provide evidence of intellectual rigor. Justifications are correct, but are not entirely persuasive. While everything that is stated is correct and there are no serious misunderstandings of any epidemiological concepts, some information is provided which is not relevant.</p>	<p>Poster elements and responses to the judges' questions are incomplete, naïve, and/or superficial. Justifications are weak. There are incorrect and/or superfluous statements. There are misunderstandings of key epidemiological concepts.</p>

During the morning session, the judges will be interested in exploring your study design as well as your study findings. You should be prepared to answer questions about your epidemiologic study, including but not limited to the following questions:

- How well did your study design and methods test your hypothesis?
- How well did you follow the study design and methods described in your original proposal?
- If you made any changes, on what basis do you justify them?
- How did you analyze your data?
- What can your data tell you about your hypothesis?
- What can't your data tell you about your hypothesis?
- If you were going to test your hypothesis again, how would you change your approach?

Your poster must be displayed on a standard size, 48 x 36 inch, tri-fold, white corrugated display board that is available at most office supply stores.

## Judging for State Finals:

During the two months that teams will be working on their proposal, the coordinators must recruit additional judges for the finals. This event is multidimensional; therefore, judges should have various professional backgrounds that would help provide additional insight into the competition.

Although judges will have the opportunity to use rubrics similar to the one below to score the presentations, the scores can be changed during the event because judges will have an opportunity to interact with the teams.

### *Judging Rubric Sample*

#### 2013 SO Poster Presentation Scoring Rubric Form

School Name: \_\_\_\_\_ Judge's # and name: \_\_\_\_\_

Instructions: Please review your assigned posters and score them based on the rubric below.

Poster Elements and Responses to the Judges' Questions <b>Fail to Meet Expectations</b>	Poster Elements and Responses to the Judges' Questions <b>Meet Expectations</b>	Poster Elements and Responses to the Judges' Questions <b>Exceed Expectations</b>
Poster elements and responses to the judges' questions are incomplete, naive, and/or superficial. Justifications are weak. There are incorrect and/or superfluous statements. There are misunderstandings of key epidemiological concepts.	Poster elements and responses to the judges' questions are complete but do not provide evidence of intellectual rigor. Justifications are correct, but are not entirely persuasive. While everything that is stated is correct and there are no serious misunderstandings of any epidemiological concepts, some information is provided which is not relevant.	Poster elements and responses to the judges' questions are complete, thoughtful, and intellectually rigorous. Justifications are insightful and persuasive. Everything that is stated is correct and needed. Poster elements and responses to the judges' questions demonstrate a good understanding of epidemiological concepts.

**Please note: The highest and lowest scores are indicated for each "expectation category" below. However, you may assign an item any score from 0-10.**

	<u>Fails to Meet Expectations</u>	<u>Meets Expectations</u>	<u>Exceeds Expectations</u>
<b>Poster Appearance</b>			
1. Physical appearance of poster	0	3 7	10
<b>Introduction</b>			
2. Hypothesis and study rationale	0	3 7	10
<b>Methods</b>			
3. Description of study population	0	3 7	10
4. Appropriate analytic methods	0	3 7	10
5. Extent to which analysis addressed the study hypothesis/research question	0	3 7	10
6. Consideration of confounders	0	3 7	10
<b>Results</b>			
7. Description of study findings	0	3 7	10

8. Interpretation of statistical analyses	0	3	7	10
<b>Discussion</b>				
9. Interpretation of study findings	0	3	7	10
10. Description of study strengths/limitations	0	3	7	10
<b>Overall Quality of Responses to Questions at Event</b>	0	3	7	10

Total Points

### *A Few Comments about Poster Session Judging*

- 15 minutes is a reasonable and sufficient amount of time to interact with a team
- Breaks in between sessions
- For every 16 teams attending, it is ideal to have 12 Guest Judges plus the Developer Judges – this yields 4 teams for Guest Judges, and 4 encounters for each team (including the D Judges interaction)
- Sending PPT posters to Guest Judges 8 days before Finals appeared to be sufficient
- Give points for innovation, more creative hypotheses and approaches - Give awards for innovation.
- Developer and Guest Judges noted different impression between reading the posters beforehand and talking with the teams – usually much more impressive when hearing the information from the students
- Dedicate at least one hour for all-team feedback on event. Hand out evaluation for students to fill out
- Create gallery for team members
- Time constraints minimize discussion
- Consider decreasing time teams get to talk to each judge and increase the number of judges per team