

# Hawaii State Science Olympiad

**Disease Detectives: Increasing awareness of public health and  
medical laboratory science professions through competitive events**

Sheri M. Gon, MPH, MLS

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# International comparisons of 15 year olds (2003)

- Mean Performance on Science
  - Finland ranks number 1
  - US ranks 20
- Mean Performance on Reading
  - Finland ranks number 1
  - US ranks 12
- Mean Performance on Math
  - Hong Kong ranks number 1
  - US ranks 25

# Local News Headlines

- ***Students score poorly in science exams***, Star Advertiser (July 28, 2011)
  - 22% of 10<sup>th</sup> graders score proficient in biology
- ***Hawaii falls behind nation in science knowledge***, Star Advertiser (January 25, 2011)
  - Hawaii 8<sup>th</sup> graders lower than 41 states

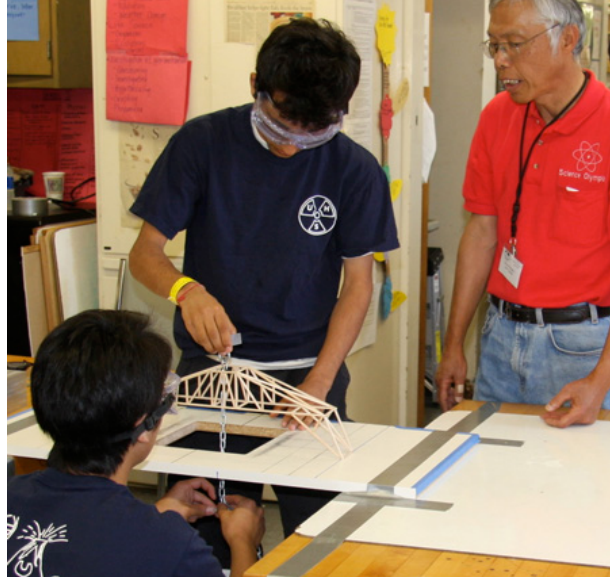
# We need STEM education!

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- Lack of interest in STEM
- Poor scores in math and science
- No awareness of public health and medical laboratory careers

# Science Olympiad in 1984

- Dr. Gerard J. Putz, Regional Science Consultant for Macomb County Intermediate School District in Michigan
- John C. "Jack" Cairns, State Science Supervisor for Delaware Department of Instruction



# HSSO begins in 2008


- Franklin Allaire (State Coordinator)



<http://honolulusunsethi.clubwizard.com/PhotoAlbums.cfm?AlbumID=11588&PhotoID=132225>

# HSSO 2008

# ■ Anatomy 2008

- Majority of questions were recall, identify, find
  - Too much memorization
  - Not enough critical thinking
- 
- A black and white line drawing of a human head in profile, focusing on the ear and brain. The ear is large and detailed, with sound waves or lines radiating from it. The brain is visible behind the ear, with lines connecting it to the ear. The drawing is stylized and artistic.





# HSSO 2009

- Anatomy abandoned
- Disease Detectives adopted
- [www.soinc.org](http://www.soinc.org)
- Based on public health incidents
  - Food borne illness
  - Infectious disease
- Denise Nelson recruited to assist with DD





# What is Disease Detectives?

- An annual competitive event for middle school and high school students.
- Teams of two students apply mathematical concepts and deductive skills to analyze a public health scenario.
- Teams are scored in a 50 minute competition.

# The competition is fierce!



# What does Disease Detective do?

- Makes STEM relevant
- Brings the concepts to life
- Engages students
  - Competitive event
  - Involves critical thinking
  - Involves team work

# Making STEM Relevant

- Use case scenarios depicting real events
  - Influenza outbreak
  - Food borne illness



# Bringing the Concepts to Life

- Case scenarios are fictional but realistic
- Applies concepts that are in current use



[http://www.ehow.com/how\\_7374174\\_do-calculate-age\\_adjusted-incidence\\_.html](http://www.ehow.com/how_7374174_do-calculate-age_adjusted-incidence_.html)

# Increasing Student Engagement

- Competition makes learning fun and exciting
- Students want to excel vs meet expectations





# Increasing Student Awareness

- Connects science to the event scenario.
- Connects math concepts to analyze situation.
- Connects to careers involved in scenario.





# How do you get started with HSSO?

- Competitive events are announced in fall.
- Students select competitive event(s).
- Coaches download instructions from SO site.
- Coaches conduct practice sessions.
- Students are allowed a non-programmable calculator and one sheet with notes and formulaes into the competitive event.
- State competition held in March.

# Design of Disease Detectives

- Format was intentionally made to encourage critical thinking.
- Answer sheets are collected at strategic points and then story/slides continue.
- Allows for students to learn during the competitive event regardless of correct or incorrect answers.

# Promoting the Professions

- There are professionals in healthcare other than RNs and MDs
- Professionals exist that are trained to respond to large scale events
- Only trained professionals are qualified to perform diagnostic testing in med labs
- Specific knowledge, attitudes, and skills are needed in PH work and med labs

# The Sheri, Denise, and Eric Disease Detectives Show



HSSO at LCC, March 2010

# Examples of PP Slides from DD

- For the next nine slides, pretend you are the student participants in Disease Detectives.



# Monday morning and students are sick!

- Unusually large numbers of sick students reported at 3 high schools on Oahu
  - Farrington High School
  - Roosevelt High School
  - Kahuku High School



# Route of Entry

## Question #1a:

- Name the three routes of entry into a person's body for microorganisms or chemicals.





# Reports from School Nurses

- Most students are reporting symptoms of fever, cough and malaise

## Question #1b:

- Indicate which one is the most likely route of entry for this case (***circle one in #1a***).



# Farrington High School

- Total Student Population: 2579 Students
- Number of students called in sick: 638
- Number of students exhibiting fever, cough & malaise: 582



# Roosevelt High School

- Total Student Population: 1672 Students
- Number of students called in sick: 481
- Number of students exhibiting fever, cough & malaise: 397



# Kahuku High School

- Total Student Population: 1879 Students
- Number of students called in sick: 246
- Number of students exhibiting fever, cough & malaise: 217



# Incidence Rate

## Question #2:

An incidence rate is the number of people exhibiting an illness of interest divided by total at risk for the illness. ***Calculate the incidence rates*** for the following three schools using the information provided...



<http://www.guardian.co.uk/technology/blog/2009/oct/15/texas-instruments-calculator>

# Question #2 Incidence Data

- *Farrington High*
  - Total Student Population: 2579 Students
  - Number of students called in sick: 638
  - Number of students exhibiting fever, cough & malaise: 582
- *Kahuku High*
  - Total Student Population: 1672 Students
  - Number of students called in sick: 481
  - Number of students exhibiting fever, cough & malaise: 397
- *Roosevelt High*
  - Total Student Population: 1879 Students
  - Number of students called in sick: 246
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# Question #3

- What other diseases present with these symptoms?  
(*List 2*)

Please turn in page one when completed!





# Participation at HSSO

YEAR	NUMBER OF STUDENTS
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■ 2008	■ 272
■ 2009	■ 512
■ 2010	■ 374
■ 2011	■ 816
■ 2012	■ 1,190



<http://www.hawaii.edu/news/article.php?ald=4248>

# Participation in Disease Detectives

YEAR	NUMBER OF TEAMS
------	-----------------

- |        |                   |
|--------|-------------------|
| ■ 2009 | ■ 9 HS            |
| ■ 2010 | ■ 10 HS           |
| ■ 2011 | ■ 11 HS and 13 MS |
| ■ 2012 | ■ 13 HS and 13 MS |



# DD does the following:

- Presents public health issues and medical laboratory services in the context of HSSO Disease Detectives event
- Describes role of public health and med lab professionals
- Explains academic preparation
- Notes current and future workforce shortages
- Emphasizes job opportunities

# What's next?

- If DD is a method of recruitment for PH and med lab science, what's next?
- Is there a measurable increased interest in PH and med lab professions after DD?
- What mechanisms/tools are there to measure impact of DD on students perception of PH and med lab professions?
- What are strategic metrics that can measure these aforementioned points?

# Questions?

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- Sheri M. Gon, MPH, MLS
  - Department of Medical Technology
  - [sgon@hawaii.edu](mailto:sgon@hawaii.edu)