

Math 2: Graphing the Statistics of Chlamydia

Aim/Rationale

Students will use data obtained from Statistics Canada to evaluate the incidence of chlamydia and develop their understanding of how graphs are used to present data.

Competencies

- 1) *Solves a situational problem*
- 2) *Uses mathematical reasoning*
- 3) *Communicates by using mathematical language*

Lesson

Materials

- Students are expected to come to class with writing utensils and paper
- Graph paper
- Blackboard, whiteboard, or SMARTboard
- Handout with relevant data tables
- Optional:
 - Instead of creating these graphs by hand, students may be asked to create them using computer software

Hook [5-10 min]

Give some review/background information on chlamydia, including what it is, how it is transmitted, common symptoms, treatment, how chlamydia tests are administered, and the effects of untreated chlamydia.

Some resources for information on STIs and chlamydia:

- The Public Health Agency's 2012 Report on STIs in Canada
 - <http://www.catie.ca/sites/default/files/Report-on-STIs-in-Canada-2012.pdf>
- Chlamydia Among Young Women: A Resource for Population-Specific Prevention, from The Public Health Agency of Canada
 - <http://www.catie.ca/sites/default/files/Chlamydia-among-young-women.pdf>
- <http://www.sexandu.ca/stis/chlamydia/>
- <http://www.catie.ca/en/fact-sheets/sti/chlamydia>
- http://www.scarleteen.com/article/sexual_health/the_sti_files_chlamydia
- <http://goaskalice.columbia.edu/answered-questions/cmon-tell-me-about-chlamydia>

Development/Teaching Methods [15-20 min]

Distribute photocopies of the data tables and allow students a few minutes to look over the data.

As a class, discuss what types of graphs would be best suited to present information. Sketch what the graphs would look like on the board if students have difficulty visualizing the graphs. Some examples of graphs that students may be asked to produce:

- Reported rates of chlamydia from 2003-2013 by sex
- Reported rates of chlamydia from 2002-2013 by age group
- Reported rates of chlamydia in 2013 by age group
- Reported rates of chlamydia in 2013 by province

Students then work either alone or in small groups to produce the graphs by hand. Also have students identify any trends they see in the data, what groups of people in Canada they think are most at-risk for chlamydia infection, and any predictions for future chlamydia rates.

For discussion purposes, the teacher may project computer-generated graphs for students to verify that their data presentation is approximately similar.

Culmination [15-20 min]

Discuss what these statistics mean for the population, and specifically, what it means for your students. Some topics of discussion may include:

- What are the trends in Canadian chlamydia rates?
 - The highest rates of chlamydia are reported in people aged 20-24
 - Overall, the rates of chlamydia reported in females is around twice that of males
 - Over the age of 40, reported rates of chlamydia are higher in males than females
 - Highest rates of chlamydia are observed in Northwest Territories, Manitoba, Saskatchewan, Yukon, and Alberta; highest increase in chlamydia rates were observed in Ontario and Northwest Territories
- Why might some groups of people appear to be experiencing increased chlamydia rates than others?
 - Allow students to discuss the possible causes of any observed trends, but remind students that ultimately these are all only speculations based on raw data
- How do you think Statistics Canada collects this data?
 - Statistics Canada collects STI data from all Canadian doctors. The patients who see any doctors for STI screening have their data anonymously collected by local and provincial public health agencies.
- How might this method of data collection affect how well these numbers reflect how many people in Canada actually have chlamydia?
 - Chlamydia (and many STIs) often doesn't present with symptoms, and many people will not think to get tested unless they show symptoms
 - Some provinces (like Yukon) may screen more people in their population than other provinces, meaning that they would appear to have higher rates of chlamydia
 - Some doctors may be more reluctant to suggest STI screening for patients who they deem to be "low risk"
 - It is a well-documented effect that males are less likely than females to get STI testing
 - Increased awareness or advertising campaigns can lead more people to get tested, which can increase the reported rates.
- Are there other groups of people that might have higher or lower rates of chlamydia, and that aren't examined in this data?
 - Homeless people, people living in remote regions, people living on Aboriginal reserves, people who do not have access to education or healthcare, etc.
- Are there any parts of this data and these graphs that may be misleading? How?
 - A decrease in chlamydia rates may be due to less rigorous testing and reporting practices, just as an increase may be partially due to improved testing methods
 - A higher rate of chlamydia does **not** correlate with more promiscuity in any population, though it may correlate with more unprotected sexual contact
- What can we do to decrease the rates and spread of chlamydia (and all STIs) in Canada?
 - Encourage regular STI testing in everyone who is sexually active, regardless of how "risky" they believe their sexual behaviour
 - Decrease the stigma surrounding STI testing and treatment, and make STI resources more accessible

- Create a culture of safer sex practices and skills (e.g. condom/dental dam use)

Performance Objectives

By the end of this lesson, students will have practiced:

- Choosing appropriate methods to organize and present data.
- Presenting data using a broken line graph and/or a bar graph.
- Presenting data grouped into classes using a histogram.
- Interpreting data presented in a table or graph.

Assessment Ideas

1. Students may be asked to submit their graphs so that the teacher can formally evaluate students' good graphing practices.
2. Students may be asked to write down and submit their answers to some discussion questions to evaluate their statistical thinking and interpretation.
3. The teacher will informally assess student participation during group work. Students may also be asked to evaluate their group members' participation.

Note:

While this lesson plan is targeted towards rates of chlamydia in Canada, this lesson plan may be modified, adapted, or repeated for any STI, disease, or public health issue, as well as for any other country or region.

The Public Health Agency's 2012 Report on STIs in Canada provides similar data for rates of gonorrhea and syphilis in Canada, and statistics for other diseases may be found in the databases of the Public Health Agency of Canada or Statistics Canada.



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