

LESSON:

Impaired Fecundity: Examining Data for Trends

Summary: Students read part of an extensive news article and review data from the Centers for Disease Control and Prevention's National Survey of Family Growth to determine whether they agree with the statement that "the fastest-growing segment of U.S. women with impaired fecundity (the capacity to conceive and carry a child to term) is those under 25."

Lesson Type: Short Lesson—This lesson will take 30 minutes to implement.

EHP Article: "Fertile Grounds for Inquiry: Environmental Effects on Human Reproduction" *EHP Student Edition*, February 2007, p. A645–A649
<http://www.ehponline.org/docs/2006/114-11/focus-abs.html>

Objectives: By the end of this lesson, students should be able to

1. review survey data to examine trends over time;
2. draw a conclusion about the accuracy of a statement made in the article; and
3. explain why it is important to look at data from various perspectives.

Class Time: 30 minutes

Grade Level: 10–12

Subjects Addressed: Biology, General Science, Mathematics

► Prepping the Lesson (10 minutes)

INSTRUCTIONS:

1. Download the entire February 2007 *EHP Student Edition* at <http://www.ehponline.org/science-ed/>, or download just the article "Fertile Grounds for Inquiry: Environmental Effects on Human Reproduction" at <http://www.ehponline.org/docs/2006/114-11/focus-abs.html>.
2. Review the Background Information, Instructions, and Student Instructions.
3. Make copies of the Student Instructions and the article.
4. Decide how much of the article you want your students to read. The first section (down to the subhead "Foundations of Fertility") is suggested to complete the lesson. The remainder of the article may be age-inappropriate for your students, depending upon their reading level.

MATERIALS (per student):

- 1 copy of *EHP Student Edition*, February 2007, or 1 copy of "Fertile Grounds for Inquiry: Environmental Effects on Human Reproduction," preferably in color
- 1 copy of the Student Instructions
- Calculators

VOCABULARY:

- fecundity
- fertility
- impaired fecundity
- infertility
- reproduction



BACKGROUND INFORMATION:

The National Survey of Family Growth is conducted by the Center for Disease Control and Prevention's National Center for Health Statistics (NCHS) to collect data on factors that influence the American family. The survey collects data on marriage, divorce, and cohabitation; contraceptive use; infertility; and pregnancy outcomes and births. Data are collected in household interviews with a nationally representative sample of women (since 1982) and men (since 2002) aged 15 to 44.

According to the NCHS, fecundity is defined as "the physical ability of a woman or couple to have a child." Impaired fecundity is having "physical difficulties in conceiving or carrying a baby to term." Infertility is a measure of impaired fecundity, and is defined as "the inability to conceive after a year or more of unprotected intercourse," reflecting only inability to conceive.

Because the topic of reproduction may be sensitive for this age group, use your best judgment on how to approach the issue. It is important to note that many teenagers who have not been accurately educated about sex and its associated risk of pregnancy have the misconception that they are infertile and will not become pregnant from unprotected sex. Reading this article and doing this activity may reinforce these inaccurate ideas. Although impaired fecundity rates appear to be increasing and it is important to identify possible environmental contributions contributing to this phenomenon, the probability of getting pregnant from unprotected sex is still quite high—25% within one month and 85% within one year.

RESOURCES:

Environmental Health Perspectives, Environews by Topic page, <http://ehp.niehs.nih.gov/>. Choose Reproductive Toxicity and Health Centers for Disease Control and Prevention, National Survey of Family Growth homepage, <http://www.cdc.gov/nchs/nsfg.htm>

NCHS. 2002. Cycle 6 NSFG public use data file FemResp.dat, downloaded 11/22/06 from <http://www.cdc.gov/nchs/about/major/nsfg/nsfgcycle6.htm> and SPSS Cycle 6 program statements file FemResp.sps, downloaded 11/22/06 from <http://www.cdc.gov/nchs/nsfg.htm>.

NCHS. 2005. Fertility, family planning, and reproductive health of U.S. women: data from the 2002 national survey of family growth. *Vital Health Stat* 23(25); available at http://www.cdc.gov/nchs/data/series/sr_23/sr23_025.pdf.

NCHS. 1997. Fertility, family planning, and women's health: new data from the 1995 National Survey of Family Growth. *Vital Health Stat* 23(19); available at http://www.cdc.gov/nchs/data/series/sr_23/sr23_019.pdf.

NCHS. 1995. Advance data from Vital and Health Statistics: numbers 191–200. *Vital Health Stat* 16(20); available at http://www.cdc.gov/nchs/data/series/sr_16/sr16_020.pdf.

► Implementing the Lesson

INSTRUCTIONS:

1. Hand out the article and the Student Instructions.
2. Have students complete the Student Instructions, working either individually or in small groups.
3. Discuss what trend is shown by the National Survey of Family Growth and how statistics can be interpreted.
4. Discuss the implications.

NOTES & HELPFUL HINTS:

1. As fecundity will be an unfamiliar word, go to the online Merriam-Webster dictionary (<http://www.m-w.com/cgi-bin/netdict?fecundity>) to hear a pronunciation of the word.
2. An extension of this lesson would be to have the students look at the national census data for the number of women in each age group and, using the percentages of impaired fecundity provided in this lesson, calculate the estimated number of women in each age group with impaired fecundity. Looking at actual numbers, as opposed to percentages, provides an interesting perspective and still another way the information could be used or reported.

► Aligning with Standards

SKILLS USED OR DEVELOPED:

- Classification
- Communication
- Comprehension
- Computation
- Critical thinking and response
- Graphing
- Graph reading
- Tables and figures



SPECIFIC CONTENT ADDRESSED:

- Fertility
- Data trends
- Rate change (slopes)

NATIONAL SCIENCE EDUCATION STANDARDS MET:

Science Content Standards

Unifying Concepts and Processes Standard

- Evidence, models, and explanation
- Change, constancy, and measurement

Science as Inquiry Standard

- Abilities necessary to do scientific inquiry
- Understanding about scientific inquiry

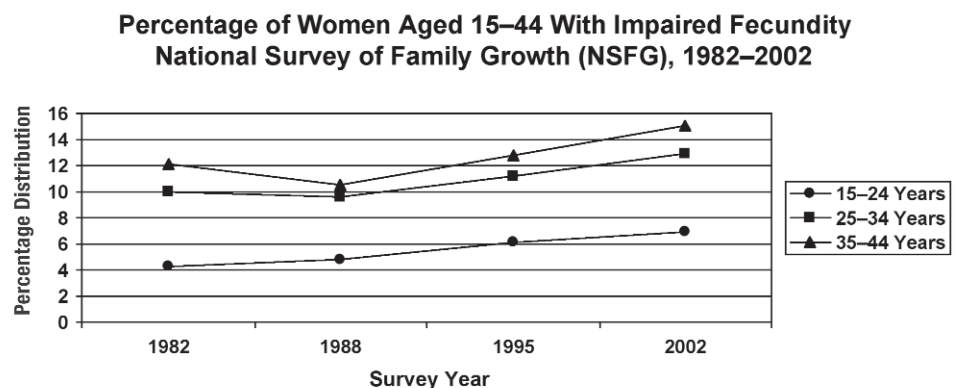
Science in Personal and Social Perspectives Standard

- Personal and community health
- Population growth

▶ **Assessing the Lesson**

Step 2: In the first paragraph of the article, it states that “the fastest-growing segment of U.S. women with impaired fecundity (the capacity to conceive and carry a child to term) is those under 25.” The National Survey of Family Growth (NSFG) is cited as the source of this figure. This survey is conducted periodically to collect data on factors affecting childbearing, contraceptive use, infertility, and related aspects of maternal and infant health. Presented in the table and graph below are data on the percentage of women with impaired fecundity based on NSFG survey data from 1982 through 2002.

Percentage of Women Aged 15–44 With Impaired Fecundity National Survey of Family Growth (NSFG), 1982–2002				
Age Range	Survey Year			
	1982	1988	1995	2002
15–24 years	4.3%	4.8%	6.1%	6.9%
25–34 years	10.0%	9.6%	11.2%	12.9%
35–44 years	12.1%	10.6%	12.8%	15.1%



Looking at the data in the table and in the graph and not doing any calculations, do you agree or disagree with the article's statement that women under 25 are the fastest-growing segment with impaired fecundity? Explain.

Students may agree, disagree, or even say they are unable to draw a conclusion by just looking at the table or graph. The percentage of women with impaired fecundity increases for all three age ranges from 1982 to 2002. It is difficult to compare changes over time between the three age range groups when not doing any calculations to judge the size of the changes. The 25–35 and 35–44 year groups decrease from 1982 to 1988, and then increase again with the next survey. Just looking at the size of the numbers, the 35–44 group has the largest percentage of women with impaired fecundity. The line graph provides a clearer picture of the changes over time and differences between groups. The slopes of the lines (change in y over change in x) for each age range group provide some indication of the rate of change. The slopes of the lines for each age range group are still very similar, however, with perhaps the appearance of a steeper slope in the 35–44 group. However, because of the drop in percentages for two of the groups with the 1988 survey, it is difficult to judge the actual slopes of the lines over the entire period of time. The article's statement talks about the "fastest-growing segment" which implies a rate of change rather than an absolute number.

Step 3: Calculate the overall change in percentage and the percentage change of women with impaired fecundity between the first survey year (1982) and the last survey year (2002).

Survey Year	Age Range		
	15–24 years	25–34 years	35–44 years
1982	4.3%	10.0%	12.1%
2002	6.9%	12.9%	15.1%
Change <small>(2002 data minus 1982 data)</small>	+2.6%	+2.9%	+3.0%
Percentage Change <small>(change/1982 data)</small>	60%	29%	25%

Looking at your calculations, do you want to change your position on the article's statement that women under 25 are the fastest-growing segment with impaired fecundity? Explain.

Students' answers will vary. The change values represent the slope or rate of change for each group between 1982 and 2002. The group with the greatest change is the 35–44 group. Therefore this group has the steepest slope or biggest rate of change over time. The percent change, however, is largest for the women in the 15–4 group, increasing 60% since 1982, compared to an increase of less than 30% for the 25–34 and 35–44 groups. Depending on how you interpret "fastest-growing segment" and which numbers you use, you can have different positions on the accuracy of the article's statement. It would have been helpful if "fastest-growing segment" was defined in the article.

Step 4: Why is it important to look at data from various perspectives (e.g., in a table, in a graph, or by change in percentage)?

The data generated by research studies are often difficult to interpret and describe to others. Examining and displaying data in different formats helps provide a clearer picture of the data's meaning and significance. Because it is not always obvious which data analysis and display technique is the most helpful, analyzing and displaying data in different formats is sometimes a matter of trial and error combined with some thoughtful reflection. The data analysis, display method, and explanation are often chosen to best reflect what the researchers think is the significance of their research results.

► Authors and Reviewers

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Give us your feedback! Send comments about this lesson to ehpscienced@niehs.nih.gov.

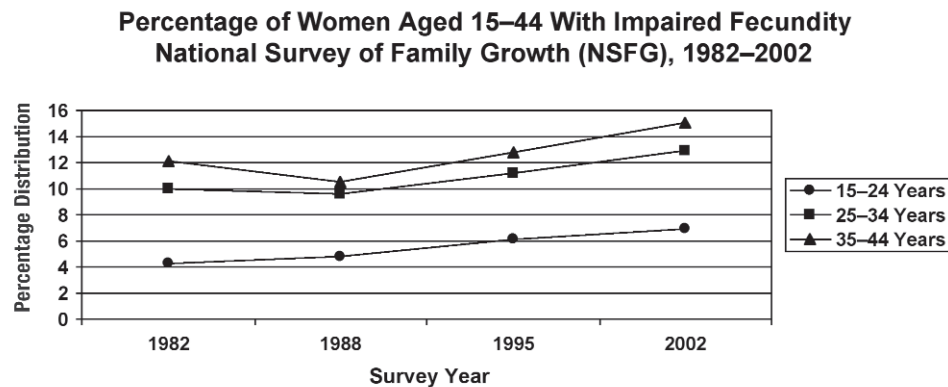


STUDENT INSTRUCTIONS: Impaired Fecundity: Examining Data for Trends

Step 1: Read the sections of the article "Fertile Grounds for Inquiry: Environmental Effects on Human Reproduction" as instructed by your teacher.

Step 2: In the first paragraph of the article, it states that "the fastest-growing segment of U.S. women with impaired fecundity (the capacity to conceive and carry a child to term) is those under 25." The National Survey of Family Growth (NSFG) is cited as the source of this figure. This survey is conducted periodically to collect data on factors affecting childbearing, contraceptive use, infertility, and related aspects of maternal and infant health. Presented in the table and graph below are data on the percentage of women with impaired fecundity based on NSFG survey data from 1982 through 2002.

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Step 3: Calculate the overall change in percentage and the percentage change of women with impaired fecundity between the first survey year (1982) and the last survey year (2002).

Survey Year	Age Range		
	15–24 years	25–34 years	35–44 years
1982	4.3%	10.0%	12.1%
2002	6.9%	12.9%	15.1%
Change <small>(2002 data minus 1982 data)</small>			
Percentage Change <small>(change / 1982 data)</small>			

Looking at your calculations, do you want to change your position on the article's statement that women under 25 are the fastest-growing segment with impaired fecundity? Explain.

Step 4: Why is it important to look at data from various perspectives (e.g., in a table, in a graph, or by change in percentage)?

