**The Young Epidemiology Scholars Program (YES) is supported by
The Robert Wood Johnson Foundation and administered by the College Board.**

Descriptive Epidemiology of Births to Teenage Mothers

Mark A. Kaelin
Department of Health Professions
Montclair State University
Upper Montclair, New Jersey

and

Diane Marie M. St. George
Chair, Master's Programs in Public Health
Walden University
Minneapolis, MN

Contents

Lesson Plan

TITLE: Descriptive Epidemiology of Births to Teenage Mothers

BRIEF DESCRIPTION: Epidemiology is the study of the distribution and determinants of health-related states or events in specified populations and the application of this study to the control of health problems.

In this instructional unit students will study the distribution of a particular health-related event, teenage births, by exploring data from birth certificates, natality data compiled by the National Center for Health Statistics and census data compiled by the U.S. Census Bureau. By exploring these data sources, students will uncover the challenges of collecting accurate data about a health-related event and appreciate the value and limitations of understanding how it is distributed—its descriptive epidemiology.

HIGH SCHOOL CURRICULUM FIT: Courses in social science, mathematics, and health

GOALS AND OBJECTIVES OF INSTRUCTIONAL UNIT: At the end of this unit, the student will:

- Appreciate the challenges of creating a uniform case definition for a health-related event and accurately counting the event
- Appreciate the need for combining data from multiple sources in order to generate meaningful measures of the frequency of a health-related event
- Count and calculate the rate of a health-related event
- Appreciate the value of counts and rates of a health-related event
- Appreciate the sources of error for counts and rates of a health-related event
- Identify and display unique distributions of a health-related event
- Demonstrate the ability to communicate, in writing, the descriptive epidemiology of a health-related event
- Formulate hypotheses based on the descriptive epidemiology of a health-related event
- Appreciate the role of descriptive epidemiology in formulating hypotheses
- Distinguish between the goals of descriptive and analytical epidemiology
- Appreciate the role and limitations of descriptive epidemiology in formulating and evaluating public health policy

EPIDEMIOLOGIC CONCEPTS TO BE COVERED:

- Case definitions
- Counts
- Rates
- Descriptive epidemiology
- Sources of data
- Hypotheses
- Public health policy

PREREQUISITES: None

MATERIALS NEEDED/WHERE OBTAINED:

- U.S. Standard Certificates of Live Birth
- Data Tables and Worksheet A
- Data Tables and Worksheet B

DATA SET: None.

WEB LINKS (OPTIONAL ADDITIONAL RESOURCES FOR TEACHERS):

- U.S. National Vital Statistics System: available at www.cdc.gov/nchs/births.htm
- Current status of U.S. teenage births: available at www.cdc.gov/nchs/data/nvsr/nvsr50/nvsr50_10.pdf
- Trends in teenage births: available at www.cdc.gov/nchs/data/nvsr/nvsr49/nvsr49_01.pdf
- Alan Guttmacher Institute research: available at www.agi-usa.org/pubs/teen_preg_stats.html
- Health and Human Services fact sheet: available at www.hhs.gov/news/press/2002pres/teenpreg.html

RELATION TO NATIONAL STANDARDS:

This unit would relate to the following standards of the National Council of Teachers of **Mathematics:**

- Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them;
- Create and use representations to organize, record, and communicate mathematical ideas;

- Select, apply, and translate among mathematical representations to solve problems;
- Use representations to model and interpret physical, social, and mathematical phenomena.

This unit would relate to the following standards of the National **Science** Teacher Association:

- Identify questions and concepts that guide scientific investigations.
- Design and conduct scientific investigations.
- Formulate and revise scientific explanations and models using logic and evidence.
- Recognize and analyze alternative explanations and models.
- Communicate and defend a scientific argument.

This unit would relate to the following **Social Studies** standards of the National Council for the Social Studies' Curriculum Standards for Social Studies:

- Social studies programs should include experiences that provide for the study of interactions among individuals, groups, and institutions.
- Social studies programs should include experiences that provide for the study of global connections and interdependence.

This unit would relate to the following standards of the Joint Committee on National **Health Education** Standards:

- Comprehend concepts related to health promotion and disease prevention.
- Demonstrate the ability to access valid health information and health-promoting products and services.
- Analyze the influence of culture, media, technology, and other factors on health.
- Demonstrate the ability to use goal-setting and decision-making skills to enhance health.
- Demonstrate the ability to advocate for personal, family, and community health.

Acknowledgments: Ms. Stephanie Ventura, Dr. Paul D. Sutton, and others at National Center for Health Statistics.

Teacher's Narrative

Class 1

Birth Certificates

Epidemiology is the study of the distribution and determinants of health-related states or events in specified populations and the application of this study to the control of health problems. **(Transparency 1)**

Epidemiology is also defined as the study of how and why diseases are distributed in the population the way they are—in other words, the study of why some get sick and some don't. **(Transparency 2)**

(Transparency 3) The Robert Wood Johnson Foundation and the College Board are currently collaborating to develop a Young Epidemiology Scholars (YES) program to integrate epidemiology into the school curriculum and enhance students' ". . . skills in critically evaluating complex problems . . . " (and for some students to) ". . . continue their studies in epidemiology, eventually making important contributions to the nation's health." In addition, scientists believe ". . . the skills and orientation of epidemiology—critical thinking and a problem solving mentality—are relevant across all sciences." (*Epidemiology Monitor*, April 2002, page 1)

In this instructional unit students will study the distribution of a particular health-related event, teenage births, by exploring data from birth certificates, natality data compiled by the National Center for Health Statistics and census data compiled by the U.S. Census Bureau. By exploring these data sources, students will uncover the challenges of collecting accurate data about a health-related event and appreciate the value and limitations of understanding its descriptive epidemiology.

Give each student a blank U.S. Standard Certificate of Live Birth. **(Transparency 4)** Compare this birth certificate with the one students needed to show sports league officials to play sports. **(Transparency 5)**

Read the following scenario aloud to the class.

> The Springfield, Massachusetts, Town Council thinks that the city may have a serious teenage pregnancy problem. The council wants to know how many children were born to Springfield's teenagers during 2001. As the director of the Springfield's Office of Vital Statistics, you have the responsibility of answering this question. Your assistant has combed through copies of the 1,673 Certificates of Live Birth that were issued for children born at 11 hospitals in western Massachusetts during 2001. He has made copies of all the birth certificates that he thought were issued for

> children born to Springfield's teenagers. When he was in doubt, he made a copy of the certificate so that others could decide. These copies were placed on your desk at 2 p.m. You will meet with your staff in 15 minutes to review the certificates and prepare a 10-minute presentation for the Town Council meeting tomorrow. **(Transparency 6)**

Divide the class into four groups and give each group a set of partial U.S. Standard Certificates of Live Birth. (pages 84–134)

(Ensure that students know that these are not real birth certificates. Although the form is authentic, the information was created as an example for this class activity. Real birth certificates, unlike the ones students used for sports participation, are confidential documents and would not ever be shared with members of a town council, journalists or the general public.)

Ask each group to assume the role of the Office of Vital Statistics staff and

- *Create* a case definition of a teenage birth. (A case definition is a way to describe who has the health-related state by identifying what happened, where it happened and when it happened.) **(Transparency 7)**
- *Count* the number of teenage births that occurred in Springfield in 2001.
- *Prepare* a 10-minute presentation for the Town Council meeting that includes responses to the following questions:

  1. How many children were born to Springfield's teenagers during 2001?
  2. Does Springfield have a serious problem with children being born to teenage mothers?
  3. What sources of error may have affected their answers to Questions 1 and 2? (A source of error is a limitation in a procedure or an instrument that causes an inaccuracy in the quantitative results.) **(Transparency 8)**

Tell students that they will make these presentations to the class.

Allow groups 15 minutes to prepare their presentations for the class. **(Transparency 9)**

Before beginning the presentations, tell the students that *when they are not presenting*, they should try to assume the roles of various stakeholders who would be likely to attend the Town Council meeting. (A stakeholder is someone who represents a group of people and their interests.) **(Transparency 10)** Tell students that they should listen to the presentations from what they think would be that stakeholder's perspective.

Select one group to present first. Shuffle a deck of index cards on which the following stakeholders (pages 186–204) have been written:

- Town Council member
- Newspaper reporter for the *Springfield Herald*
- Advocate for abstinence-based sex education
- President of the local chapter of Mothers Against Drunk Driving (MADD)
- High school principal
- High school student assistance counselor
- High school health teacher
- High school principal at a school for pregnant teenagers
- High school teacher at a school for pregnant teenagers
- 46-year-old woman who had her first child at 15
- 21-year-old husband with an 18-year-old wife who is pregnant
- Friend of a pregnant teenager
- Pregnant teenager
- Father of a pregnant teenager
- Mother of a pregnant teenager
- Local parish priest
- Family Planning Association representative
- Local health department director
- Right-to-life activist

Distribute a card to all nonpresenting students. Tell students that after the presentation you will ask them to discuss the presentation, with the presenters and the other individuals who attended the Town Council meeting, from the perspective of their assigned roles. Encourage students to stay "in role" during discussion.

Before the first presentation, ask selected students, assuming their roles, to introduce themselves to their classmates and explain the perspective from which they would view the problem of children being born to teenage mothers in Springfield.

Ask the first group to present.

After the presentation, allow students 10 minutes to discuss the first group's responses to the following three questions:

1. How many children were born to Springfield's teenagers during 2001?
2. Does Springfield have a serious problem with children being born to teenage mothers?
3. What sources of error may have affected their answer? **(Transparency 11)**

Encourage students to stay "in role."

Select a second group of students to present.

Shuffle the deck of index cards. Distribute a card to all non-presenting students. Ask selected students, assuming different roles, to introduce themselves to their classmates and explain the perspective from which they would view the problem of children being born to teenage mothers in Springfield.

After the second presentation, allow students 10 minutes to discuss the group's responses to the following three questions. Encourage students to stay "in role."

Continue the above process until all four groups have presented.

At the appropriate times during the four presentations and discussions, probe until students uncover the following:

1. Accurately counting health-related events requires a precise case definition.

The groups of students may not count the same number of teenage births in Springfield. This may be due to different definitions of a teenage birth. In epidemiology, these definitions are called case definitions, where a case is a person in a population with a particular disease, disorder or condition (teenage birth) that is being investigated.

The National Center for Health Statistics defines a teenage birth as a live birth to a woman 15–19 years old, but do not tell students this until after the presentations. **(Transparency 12)** Let students experience the need for and the challenge of creating a precise case definition.

Case definitions are manmade. Help students realize that case definitions can and do vary based on the needs of various researchers. As scientific knowledge about a health-related event increases, case definitions can change. Advocates may define a health-related event more conservatively or liberally depending on their position. Nevertheless, the more precise a case definition is, the easier it will be to create replicable counts.

2. Even with a precise case definition, criteria must be consistently applied when the accuracy of information is in question.

The birth certificates used in this lesson have been prepared to present students with the need to create and apply criteria.

For example, according to the National Center for Health Statistics, a municipality's births are defined as the births to women who *reside in* that municipality, not the births that *occur in* it. A birth that occurs in Holyoke, Massachusetts, to a woman who lives in Springfield, Massachusetts, is Springfield's birth. **(Transparency 13, Certificate 51)** However, a birth that occurs in Springfield, Massachusetts, to a woman who lives in Palmer, Massachusetts, is Palmer's birth. **(Transparency 14, Certificate 40)**

Again, do not tell students this. Let students experience the need for and the challenge of creating and applying these criteria.

Other factors in the birth certificates that require the need to create and apply criteria are

- Illegible entries
- Missing data
- Obvious inconsistencies in the data

3. Although it may not be possible to eliminate sources of error, they must be considered.

Given this scenario, whatever count the students arrive at would probably be inaccurate. For example, it is unlikely that all the births to Springfield's teenagers during 2001 occurred at the 11 hospitals in western Massachusetts.

The criteria used would depend on the question that is being asked and the purpose for which the data are being gathered. For instance, should a pregnancy with a teenage mother and an older father be considered equivalent to a pregnancy in which both the mother and the father are teenagers? **(Transparency 15, Certificate 32)** If we use the National Center for Health Statistics' definition of live births to women 15–19 years old, should a preteen be considered a teenager for this purpose? **(Transparency 16, Certificate 25)** What if the mother conceived at 12 and gave birth at 13? Should a female who conceived when she was 19 but delivered when she was 20 be counted? **(Transparency 17, Certificate 5)** Should a pregnancy of a teenager who became pregnant while living in another town but who moved to Springfield before giving birth be considered equivalent to a pregnancy of a teenager who conceived and gave birth in Springfield?

Other possible sources of error include

- Births to Springfield teenagers that occurred out of state
- Births to Springfield teenagers that occurred at home or in other hospitals
- Misplaced or lost birth certificates (Teachers' Note: This is probably a very rare occurrence.)

If students have not identified these sources of error during the four presentations and discussions, identify them for the class.

It is important for the students not only to identify these sources of error but also to place their importance in context. Complete and accurate data may not be attainable. But even if they were, one must consider the value and cost of attaining that accuracy.

Let the students explore the sources of error in light of why the Town Council members may have asked for the information. Are they trying to determine whether or not they have a teenage pregnancy problem? Do they want to use this measure as a baseline for evaluating the effectiveness of a program aimed at reducing teenage pregnancy? Do they want to be seen as doing something in response to a highly publicized instance of teenage pregnancy in a politically powerful family?

4. The "seriousness" of a health-related event is sometimes determined by comparing its frequency in one place with its frequency in another.

Some municipalities may have more teenage births than others simply because they have more teenagers. Ask students what needs to be done to meaningfully compare the frequency with which a health-related event occurs in two places (or at two times). Do not tell students that by calculating a rate they can do this. Probe until students uncover that they need to know the population "at risk" of teenage pregnancy. Ask students who is at risk of teenage pregnancy. Are all teenagers at risk? Are only sexually active teenagers at risk? Are only sexually active teenagers who are not using reliable contraceptives at risk?

Tell students that the National Center for Health Statistics defines teenage birth rate as the number of live births to women 15–19 years old divided by the number of women 15–19 years old multiplied by 1,000. **(Transparency 18)** Ask students what they think of this definition. Is everyone in the denominator at risk of giving birth?

5. Even with complete and accurate data, the degree of seriousness of a health-related event is a value judgment that often transcends science.

Explore with students how the seriousness of a health problem can be determined. Is the seriousness of a problem determined solely by the frequency with which it occurs? Ask students to identify seriousness criteria. With limited resources, decision-makers must set priorities. Time, energy and money invested in one problem cannot be invested in another.

If the following points have not been brought to light during the four presentations and discussions, have students consider them when judging the seriousness of the problem of teenage births:

- Comparison of teenage births with other problems in Springfield
- Comparison of teenage births with other health problems in Springfield

- Comparison of teenage births with other teenage health problems in Springfield
- Comparison of teenage birth rates in Springfield with rates in other places
- Ease with which teenage births can be prevented as compared with the ease of preventing other health problems
- Cost of preventing teenage births as compared with the cost of preventing other health problems
- Likelihood that intervening with teenage births will alleviate other health problems
- Consequences of teenage births

Encourage students, staying "in role," to consider the pressure that might be exerted and felt by the different stakeholders.

6. Teenage pregnancies and teenage births are not synonymous.

If the difference between teenage pregnancies and teenage births has not been addressed during the four presentations and discussions, probe until students uncover that an examination of the birth certificates alone will not adequately address the issue of teenage pregnancy. Keep the discussion going until students realize that the number of teenage pregnancies is equal to:

Number of Live Births (birth certificates) + Number of Stillbirths + Number of Pregnancies Electively Terminated + Number of Pregnancies Spontaneously Miscarried **(Transparency 19)**

Note that there are sources of error in these numbers too. Elective terminations can be documented or undocumented, spontaneous miscarriages can be known or unknown, and known spontaneous miscarriages can be underreported.

Teachers' Note: The data explored in the next part of the unit are real. However, these are national data and in no way are meant to reflect Massachusetts statistics. The number of teenage births was abstracted from the *National Center for Health Statistics* CD-Rom containing all births for 2000. The size of that dataset is enormous, and so only data for births from January 1 to January 31, 2000, are included in the tables provided. The population sizes are also real. They were abstracted from the U.S. Census population estimates for January 2000.

Give each student Worksheet A (pages 217–218) and data tables (pages 205–216).

Ask each group, collectively, to use the data tables to complete the Worksheet A tasks for homework.

End of Class 1

Class 2

Lead discussion of students' responses to **Worksheet A** tasks. Compare students' answers and probe until students uncover the points, identified below, after each task.

1. How many teenage births were there in January 2000?

   To answer this question, the group needs to decide on a case definition. Varying case definitions will yield different responses to the question of the number of teenage births.

   If the National Center for Health Statistics' case definition were used, the answer would be 39,972 teenage births. (Transparencies 20, 21)

2. What is the distribution of teenage mothers by race/ethnicity? Use a graph/chart to answer this question.

   Basic descriptive epidemiology considers person, place and time as key elements in characterizing a health event. This question helps students to think about the "person" element of teenage births. There are many different graphics that would be appropriate to describe the racial/ethnic distribution. Some of the more common graphics that would be appropriate would be bar graphs or pie charts. The objective is to have students use graphics to display numeric data. (Transparencies 22–24)

3. What is the distribution of births by birth weight? Use a graph/chart to answer this question. (Note: BW = birth weight; LBW = low birth weight; VLBW = very low birth weight.)

   Again, various graphics could be appropriate here. (Transparencies 25–27)

4. In a short paragraph describe the data that you see in the table titled Age of Father and Age of Mother.

   This question prompts students to think about what impact the age of the father may have on the definition of teenage birth. Some of the students may have wanted to include the father's age as part of the case definition. Students may also begin to wonder whether there is discordance in ages between mother and father and what this may mean. The data on age of father is cross-tabulated with age of mother. (Transparency 28) However, the groupings have been predetermined for them. Some students may see this as a weakness in the data. This is a good opportunity to highlight what can be done when the data we may want are unavailable or not in the format that we may like. The data tables were constructed for this module. However, we may have constructed them differently if we wanted to answer different questions or make different points.

   Two notable points about those data on the father are (1) a large proportion of the data are missing—the most likely reason being that the father was not included on

the birth certificate at all (Transparency 29, Certificate 51) and (2) most of the fathers are in the 21 or older category. (Transparency 30)

5. Place states in rank order (from highest to lowest) by number of teenage births. **(Transparency 31)**

Rank	State	Number of Births to 15- to 19-Year-Olds
1.	California	4,640
2.	Texas	4,582
3.	Florida	2,086
4.	New York	1,817
5.	Illinois	1,814
6.	Ohio	1,654
7.	Georgia	1,472
8.	North Carolina	1,313
9.	Michigan	1,241
10.	Pennsylvania	1,165
11.	Tennessee	1,016
12.	Arizona	1,033
13.	Louisiana	999
14.	Indiana	948
15.	Virginia	826
16.	Missouri	821
17.	Alabama	816
18.	New Jersey	699
19.	South Carolina	745
20.	Mississippi	706
21.	Oklahoma	687
22.	Washington	679
23.	Kentucky	642
24.	Maryland	624

(Continued)

Rank	State	Number of Births to 15- to 19-Year-Olds
25.	Wisconsin	616
26.	Colorado	613
27.	Arkansas	550
28.	Massachusetts	480
29.	Minnesota	459
30.	Oregon	424
31.	Kansas	399
32.	New Mexico	363
33.	Utah	349
34.	Iowa	331
35.	Nevada	311
36.	Connecticut	270
37.	West Virginia	241
38.	Nebraska	203
39.	Idaho	192
40.	Hawaii	156
41.	Delaware	108
42.	Maine	108
43.	Rhode Island	101
44.	Alaska	99
45.	South Dakota	98
46.	Montana	92
47.	New Hampshire	88
48.	Wyoming	80
49.	North Dakota	56
50.	Vermont	40

6. Which state has the biggest problem with teenage births? If you were in charge of deciding which states needed teenage pregnancy prevention programs and you were allowed to select only three, which states would you select and why?

   This and the previous question help students consider the "place" component of teenage births. The most natural response to this question would be to select the top three states (California, Texas and Florida). This question also encourages students to consider prioritization and allocation of scarce health resources.

7. List at least three reasons why different states have such different numbers of teenage births.

   The variation in numbers of teenage births is in part a result of the varying population sizes of the states. This point becomes the basis on which students will complete the Worksheet B tasks. Engage students in a discussion about numerators and denominators. What would be the numerator? Why do we need to look at denominators? For the teenage birth *rate,* the numerator is births to teenagers, but who is the population at risk, i.e., who is the denominator? All persons in the state? All teenagers? All persons of childbearing age? All women? All teenage females? Only persons who are sexually active? Only persons who are sexually active and do not use contraception? Have them grapple with that a bit. Then, distinguish between the ideal denominator and the denominator that is generally used in research (population of females within the relevant age group). Have them uncover that the latter is a much easier number to obtain.

Give each student Worksheet B and data tables.

Ask each group, collectively, to use the data tables to complete the Worksheet B tasks for homework.

Assign each group one of the following roles to complete Task 5 **(Transparencies 32–35):**

- National newspaper journalist for the leading newspaper in Missouri: What do journalists look for in a news story? What will they want to portray for their readers? What will sell their newspapers?
- State senator seeking reelection in your state: The senator ran on a ticket to reduce teenage pregnancy. Her campaign speeches highlighted the problem of teen pregnancy in your state, and the senator claimed to have a surefire way to solve the problem.
- A member of a team writing a grant application to get funding to implement a teenage pregnancy prevention program in your state: What information would they wish to cite in order to justify the need for funds for the program?
- A federal epidemiologist from the Centers for Disease Control and Prevention (CDC): She is responsible for providing monthly state-by-state reports of teen birth rates.

End of Class 2

Class 3

Lead discussion of students' responses to **Worksheet B** tasks. Probe until students uncover the points, identified below, after each task.

1. Which state had the highest teenage birth rate? Which state had the lowest teenage birth rate?

   This worksheet allows students to practice using rates and to learn how population size can impact an estimate of the "size" of a health problem.

2. Place states in rank order from highest to lowest by teenage birth rates. (**Transparencies 36–44**)

Rank	State	Number of Births to 15- to 19-Year-Olds	Number of 15- to 19-Year-Olds	Birth Rate	Birth Rate ×1,000*
1.	Arkansas	550	67,376	.0081631	8.1631
2.	Missouri	821	108,275	.0075825	7.5825
3.	Oklahoma	687	106,737	.0064363	6.4363
4.	Texas	4,582	724,203	.0063269	6.3269
5.	Maryland	624	100,825	.0061889	6.1889
6.	Tennessee	1,016	164,404	.0061798	6.1798
7.	Nevada	311	53,090	.0058579	5.8579
8.	Mississippi	706	122,902	.0057444	5.7444
9.	New Mexico	363	64,692	.0056112	5.6112
10.	Delaware	108	21,287	.0050735	5.0735
11.	Arizona	1,033	206,466	.0050032	5.0032
12.	Indiana	948	191,235	.0049572	4.9572
13.	North Carolina	1,313	269,050	.0048801	4.8801
14.	Louisiana	999	206,773	.0048313	4.8313
15.	Wyoming	80	16,673	.0047981	4.7981
16.	Colorado	613	132,143	.0046389	4.6389
16.	South Carolina	745	161,962	.0045998	4.5998
18.	Georgia	1,472	327,712	.0044917	4.4917
19.	Alabama	816	190,987	.0042725	4.2725
20.	Kentucky	642	150,943	.0042532	4.2532
21.	West Virginia	241	58,067	.0041503	4.1503

(Continued)

Rank	State	Number of Births to 15- to 19-Year-Olds	Number of 15- to 19-Year-Olds	Birth Rate	Birth Rate ×1,000*
22.	Florida	2,086	513,308	.0040638	4.0638
23.	Rhode Island	101	25,125	.0040199	4.0199
24.	Illinois	1,814	453,540	.0039996	3.9996
25.	Alaska	99	24,881	.0039789	3.9789
26.	California	4,640	1,170,979	.0039624	3.9624
27.	Iowa	331	84,407	.0039214	3.9214
28.	Ohio	1,654	442,599	.0037370	3.7370
29.	Virginia	826	222,455	.0037131	3.7131
30.	Oregon	424	117,013	.0036235	3.6235
31.	Utah	349	97,542	.0035779	3.5779
32.	Hawaii	156	45,694	.0034140	3.4140
33.	Idaho	192	58,792	.0032657	3.2657
34.	Michigan	1,241	391,731	.0031679	3.1679
35.	Washington	679	229,294	.0029612	2.9612
36.	Kansas	399	135,127	.0029527	2.9527
37.	Connecticut	270	94,552	.0028555	2.8555
38.	Wisconsin	616	220,983	.0027875	2.7875
39.	New York	1,817	659,261	.0027561	2.7561
40.	Pennsylvania	1,165	430,015	.0027092	2.7092
41.	Minnesota	459	171,303	.0026794	2.6794
42.	Nebraska	203	84,597	.0023996	2.3996
43.	South Dakota	98	41,148	.0023816	2.3816
44.	Massachusetts	480	206,497	.0023244	2.3244
45.	New Jersey	699	306,608	.0022797	2.2797
46.	Montana	92	40,941	.0022471	2.2471
47.	New Hampshire	88	39,665	.0022185	2.2185
48.	Maine	108	48,752	.0022152	2.2152
49.	North Dakota	56	27,311	.0020504	2.0504
50.	Vermont	40	23,731	.0016855	1.6855

Compare these ranks with the ranks for Task 5, Worksheet A.

3. Which state has the biggest problem with teenage births? If you were in charge of deciding which states needed teenage pregnancy prevention programs and you were allowed to select only three, which states would you select and why? Is this the same answer that you had for Task 6 in Worksheet A? What additional information would be helpful in making your decision?

   Rates and counts are *both* important. Ask students to think of why locating a teenage pregnancy prevention program may be important in terms of rates and counts (one tells how pervasive the problem is in the state, and the other tells the magnitude of the impact that a program can have, i.e., the numbers of births that can be prevented).

4. Identify which information would be needed to answer the following questions:

   a. Where should a teenage pregnancy prevention program be located? Count Rate Both Neither **(Transparency 45)**

   Count would be the more appropriate answer. A count would identify the potential impact of the problem in terms of number of teenage births that could be prevented if the program were successful. On the other hand, rates would be important in terms of considering the relative priority of that problem versus any other health concerns.

   b. Was a teenage pregnancy prevention program successful? Count Rate Both Neither **(Transparency 46)**

   Rates could be appropriate here. One could compare preprogram rates with post-program rates. Counts would not be a good answer given that the denominator population could change from preprogram to postprogram, so one would not want to muddle those two issues (changes in numerators with changes in denominators).

   c. Is watching R-rated movies associated with teenage births? Count Rate Both Neither **(Transparency 47)**

   To answer this question, one would need to identify additional information. One method that we may use to answer this question is to compare birth rates among the group of teenagers who watch R-rated movies with the birth rates among the group of teenagers who do not watch R-rated movies.

   d. Which ethnic group has the most teenage births? Count Rate Both Neither **(Transparency 48)**

Rates would be the appropriate answer, because again one must consider the denominator. The larger ethnic groups would have more numbers, but the rates may indeed be lower.

5. Assume that you were a (insert student role here) and wanted to create a five-colored map showing the distribution of teenage birth rates across the country. Use the blank map provided to create the colored map. **(Transparencies 49, 50)**

   Some key issues that will arise with this question include the fact that the map will lead you to different conclusions based on the cut-points that are used to make the five categories.

6. Can you think of three reasons why the top three states have such high rates?

   Have the groups explain the logic behind the various reasons they chose. What made them choose those reasons? Do they have data to support their choices, or are their choices based on what they have heard, know from personal experience, etc.? Do sources such as personal experience, media reports, and anecdotes provide convincing evidence?

7. List five things that can be done to reduce the rates in those three states.

   In this question we are looking for creativity. The goal is to have students brainstorm ideas and come up with innovative solutions based on the reasons or risk factors they identified. This instructional unit is about descriptive epidemiology. However, in Questions 6 and 7, students begin to think about analytical epidemiology, the study of relationships between health concerns and possible causes.

Summary

Conclude by pointing out to students that they have uncovered the following:

- How a health-related event is distributed in terms of person, place and time—its descriptive epidemiology—is useful for generating hypotheses.
- Descriptive epidemiology does not test hypotheses. Other epidemiologic tools, called analytical epidemiology, are used to test hypotheses.
- Without testing hypotheses and identifying the cause of the distribution of a health-related event, it is unlikely that effective preventive policies or programs to reduce them can be created. **(Transparency 51)**

End of Class 3