

Infant mortality

In this module, we will look at the Infant Mortality Rate and some of the factors related to infant mortality. The Infant Mortality Rate (IMR) refers to the number of infants less than one year old who died in a year, compared to the number of births in that year. It is a rate per 1000. For example, a rate of 7 means that 7 infants died for every 1000 babies born.

1. For this exercise, we begin by comparing the IMR in the United States to that in other countries. These data can be found at the Population Reference Bureau web site (www.prb.org). Go to that website and click on "World Population Data Sheet". Then, click on the "pdf" file. Scroll down to answer the following questions. What is the IMR in the United States? As you continue scrolling down, answer the following questions.
 - a. Do any countries in the Caribbean have an IMR lower than that found in the United States? If so, which ones?
 - b. Do any countries in Europe have an IMR lower than that found in the United States? (Be sure to look at all the regions of Europe.) If so, which ones?
2. Next, go to the Annie E. Casey Kids Count web site (www.kidscount.org), click on "2002 Kids Count Data Book Online" and look at how the IMR varies across the states. To get this information, do the following: (1) Click on "Maps"; (2) Select "Infant mortality rate" as the Indicator; (3) Follow the rest of the steps (use 1999 data).

Eyeballing the map, can you generalize what regions of the country or what states seem to have higher rates of infant mortality?

Looking at the map, how does Virginia compare to other states in terms of the infant mortality rate?

3. Which state has the lowest Infant Mortality Rate, and what is the IMR in that state? Which state has the highest IMR, and what is the IMR in that state? What is the IMR in Virginia? What is the IMR in the United States? (To get this information, do the following: (1) Click on "Rankings"; (2) Select "Infant mortality rate" as the Indicator; (3) Follow the rest of the steps; (4) Use 1999 data; (5) Do not "Choose a region".
4. Next, look at the trend in the Infant Mortality Rate over the decade of the 1990s. For this part, we will not look at the trend for each of the 50 states. Instead, select Virginia, the two states you already identified as having the highest and lowest IMR, and the United States as a whole. To get this information, do the following. (1) Click on "Line graphs"; (2) Click on the boxes for the United States, Virginia, and the two states you identified as

having the highest and lowest infant mortality rate; (3) Select “Infant mortality rate” as the Indicator; (4) Follow the rest of the steps.

Did these three states and the United States overall follow the same trend over the 1990s? How would you summarize the trends?

5. Next, let’s get some idea of why states vary in the level of infant mortality. What are some of the factors that might be related to infant mortality? Many different factors might be related, the following is a short list of factors that might be related to variations in the level of infant mortality:
 - Babies that have low weight when they are born
 - Babies born into poverty
 - Babies born to teenagers
 - Babies born to African-Americans

If these factors are important, then we might expect that states where a higher percent of births are of low weight will also have a higher infant mortality rate, and so forth.

We already looked at the infant mortality rate in Virginia. What is the low birthweight rate in Virginia? To find out, go to the Annie E. Casey Kids Count web site (www.kidscount.org), click on “2002 Kids Count Data Book Online” and look at how “Percent low-birthweight babies” varies across the states. To do this, follow these steps: (1) Click on “Maps”; (2) Select “Percent low-birthweight babies” as the Indicator; (3) Follow the rest of the steps (use 1999 data).

Looking at the map, how does Virginia compare to other states in terms of the percent of families with children headed by a single parent?

What is the actual percent of low-birthweight babies in Virginia? To find out, (1) Click on “Rankings”; (2) Select “Percent low-birthweight babies” as the Indicator; (3) Follow the rest of the steps; (4) Use 1999 data; (5) Do not “Choose a region”. Scroll down to find the data for Virginia.

6. To examine the relationship between infant mortality and other various factors, we will look at several scatter plots A scatter plot is a simple graph that shows the relationship between two variables by showing a point for each case on a two-dimensional graph (in this situation, each case is a state or the District of Columbia). Looking at a scatter plot, we can get an idea about whether the two variables are related and, if so, how strong the relationship is.

To examine the scatter plot, we have to use the file “tool_us.xls” from the SSDAN KidsCount web site (www.ssdan.net/kidscount). If you have not already done so, go to that web site, click on “Data Resources and

Analysis Tools” and download “tool_us.xls” (instructions for downloading are given on the web site, after you click “Data Resources and Analysis Tools”; downloading is straight forward).

Open the file “tool_us.xls” (click on “Enable Macros” – SSDAN is a reliable source) and click on “Chart”. Then, make “InfantMortality” the Y variable and make “LowBirthweight” the X variable. (Do this by clicking on the X variable box and Y variable box, respectively, and scrolling down to select the specified variable.) For both variables, select the most recent data available, which is 1999.

After you select the two variables and the years, “tool_us.xls” will automatically display a scatter plot showing the relationship between the two variables.

Would expect that the percent of births that involve low birth weight to be related to infant mortality rate. Why or why not? If you do expect a relationship, in what direction?

One measure of the strength of the relationship between two variables is called a “correlation coefficient”. The correlation coefficient can vary from -1.0 to 1.0 . 1.0 means the two variables are perfectly related to each other in a positive direction; in other words, if one variable increases, the other one increases by a corresponding amount. -1.0 also means the two variables are perfectly related to each other, but in a negative direction; if one variable increases, the other one decreases by a corresponding amount. 0.0 means that the two variables are not related; a change in one variable is not predictably related to a change in the other variable. In practice, correlations are usually not close to 1.0 or -1.0 . A correlation of $.2$ is usually considered a weak relationship; a correlation of $.6$ is strong; a correlation of $.8$ is extremely strong.

“tool_us.xls” automatically reports the correlation between the two variables in the scatter plot. What is the correlation between infant mortality and low birth weight?

Are there any “outliers”? “Outliers” are points that are not close to the other points. If there are outliers, what areas are outliers? (You can find out by putting the cursor on top of a point. After a second, the name of the geographic area will appear, as well as the X and Y value for that area.) What are the values of the two variables for the outliers?

7. Next, let’s see if poverty is related to the infant mortality rate. Would you expect the child poverty rate to be related to the infant mortality rate? If so, how? Why do you expect such a relationship? Or, why do you expect no relationship?

To examine the relationship, we use the “tool_us.xls” file from the SSDAN Kids Count web site (www.ssdan.net/kidscount). Make “Poverty” the X variable and make “InfantMortality” the Y variable. Is the pattern shown in the scatter plot generally consistent with or inconsistent with your expectation, as you expressed it above? (Please write a full sentence.)

What is the correlation between child poverty and infant mortality?

Are there any “outliers”? If there are outliers, what areas are outliers?
What are the values of the two variables for the outliers?

8. Next, let’s look at the teen birth rate. What is the teen birth rate in Virginia? To find out, go to the Annie E. Casey Kids Count web site (www.kidscount.org), click on “2002 Kids Count Data Book Online” and look at how “Teen birth rate” varies across the states. To get this information, do the following: (1) Click on “Maps”; (2) Select “Teen birth rate” as the Indicator; (3) Follow the rest of the steps (use 1999 data).

Looking at the map, how does Virginia compare to other states in terms of the teen birth rate?

What is the actual teen birth rate in Virginia? To find out, (1) Click on “Rankings”; (2) Select “Teen birth rate” as the Indicator; (3) Follow the rest of the steps; (4) Use 1999 data; (5) Do not “Choose a region”. Scroll down to find the data for Virginia.

9. Would you expect the teen birth rate to be related to infant mortality rate? If so, how? Why do you expect such a relationship? Or, why do you expect no relationship?

To examine the relationship, we use the “tool_us.xls” file from the SSDAN Kids Count web site (www.ssdan.net/kidscount). Make “TeenBirthRate” the X variable and make “InfantMortality” the Y variable. Is the pattern shown in the scatter plot generally consistent with or inconsistent with your expectation, as you expressed it above? (Please write a full sentence.)

What is the correlation between the teen birth rate and the infant mortality rate?

Are there any “outliers”? If there are outliers, what areas are outliers?
What are the values of the two variables for the outliers?

10. Low birthweight, child poverty rate, and teen birth rate are **independent** variables that may affect infant mortality, the **dependent** variable. Do you expect that these three independent variables are related to each other?

Given these three independent variables, there are three pairs of independent variables. Write your expectations about the relationship between each of these three pairs of independent variables. Specifically, for each pair, do you expect they are positively related, negatively related, or unrelated? (You are not required to create the scatter plot or the correlation coefficient.)