# Science TODAY™
## Challenge
### Student Edition

**USA TODAY**

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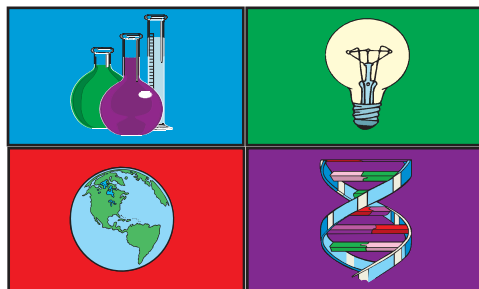
# Breast Cancer Risks



USA TODAY Snapshots

**Breast cancer risks**

A woman has a 12.5% lifetime risk of developing breast cancer. Risk of having breast cancer in the following 10 years for a woman at these ages:

.04% — 20
.40% — 30
1.49% — 40
2.54% — 50
3.43% — 60

Age

Source: American Cancer Society
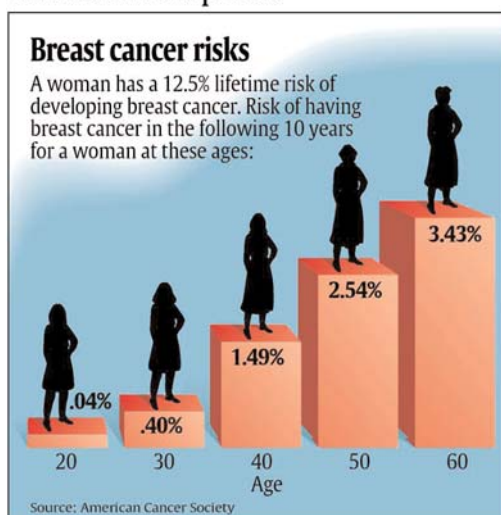
By Cindy Hall and Marcy E. Mullins, USA TODAY

**Focus Questions:**

- What is the probability that a woman will develop breast cancer during her lifetime?
- Is the probability of developing breast cancer the same for all age groups?
- Who is at greatest risk for developing breast cancer?How can the risk of cancer be reduced?
- What are the common treatments for cancer? What is the purpose of each form of treatment?
- Is there a correlation between breast cancer and obesity?

## Activity Overview:

There are three words that nobody ever wants to hear: "You have cancer." Even though there has been amazing progress in the diagnosis, treatment and cure rates of cancer, too many people continue to develop this disease. People develop cancer for many reasons. Lifestyle choices can certainly contribute to a person's cancer risk. What we eat, what we drink, what we smoke and how much time we spend in the sun certainly are all significant when considering the causes of cancer. In addition, heredity plays a very important role in the tendency to develop certain types of cancers. Be careful not to confuse "genetic" with "hereditary," however. All cancer is genetic, because it always involves a malfunction of the genetic material-DNA. After all, cancer is sometimes described as cell division, or mitosis, that has gone out of control. When we say that a certain type of cancer is hereditary, it means that the tendency to develop that type of cancer can be inherited from parents. Colon cancer and breast cancer are two types of cancer that are known to have hereditary tendencies. In this activity, you will examine data related to the tendency for a woman to develop breast cancer during her lifetime. Are certain people in a higher risk group than others? Does the probability of developing breast cancer change with age? What is the probability that you will develop breast cancer? How can you reduce your risk of cancer? How is cancer treated?

## Breast Cancer Risks

## Procedure:

**Step 1**
Enter the data from the USA TODAY Snapshot "Breast cancer risks" into the Lists of your graphing calculator. Enter the ages shown in L1 and the corresponding percent risk for that age group in L2.

**Step 2**
Graph the data with a scatter plot.

**Step 3**
Create a linear regression line (line of best-fit) for the data.

**Step 4**
Create a logistic regression line for the data. Answer questions in the "Assessment and Evaluation" section below.

## Assessment and Evaluation:

1. What is the independent variable in your graph?

2. What is the dependent variable in your graph?

3. Does the graph most closely resemble a linear model? Explain.

4. Carefully read the information in the USA TODAY Snapshot. During which age span does a woman have a 1.49% chance of developing breast cancer?

5. Use the regression model to predict the percent chance that a woman in her 70s will develop breast cancer.

## Data Source:

American Cancer Society

## Materials:

● TI-83 Plus family or TI-84 Plus family
● Computers with Internet access
● TI-Navigator™ Learning System, if available
● USA TODAY newspapers (recommended)

## Additional Information:

● **The Imaginis website offers statistical information on breast cancer.**

  http://imaginis.com/breasthealth/statistics.asp

**Breast Cancer Risks**

## Assessment and Evaluation (continued):

6. Use the regression model to predict the percent chance that a woman who is 35 years old will develop breast cancer.

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7. Why do you think the risk of developing cancer increases with increasing age?

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8. In the "Activity Overview," cancer was described as cell division that has become uncontrollable. What is this type of cell division called, whether it is under control or not?

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9. Explore the Imaginis website. Their web address is listed under "Additional Information" on this page. What was the death rate of people diagnosed breast cancer in the year 2000 in North America? To calculate this, divide the number of deaths by the number of new cases. Then multiply your answer by 100 to express your final answer as a percentage.

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10. What was the death rate of people diagnosed with breast cancer in South Central Asia in the year 2000?

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11. Explain why these death rates are so different.

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**Student Notes:**

**Breast Cancer Risks**

### Study suggests child obesity may play role in breast cancer

**LIFE SECTION -MONDAY - OCTOBER 13, 2003 - 6D**

By Nancy Hellmich
USA TODAY

Women who were overweight at 8 years old or younger may be at increased risk of dying from breast cancer, a new study suggests. This adds to the growing concern over the long-term health consequences of childhood obesity. About 20% to 30% of U.S. kids are overweight or at risk of becoming so.

Researchers at Tufts University in Boston analyzed height and weight data for 1,877 schoolchildren collected from 1922 to 1935 in three midsize cities north of Boston. The researchers were able to determine the cause of death for 858 of the females in the study and found that 29 of them died of breast cancer. The scientists couldn't determine how many women developed breast cancer and survived or died from other causes. They found that the women who were overweight when they were 8 or younger had a two times greater risk of dying of breast cancer than those who weren't overweight as children.

On average, women have a 3% risk of dying from breast cancer over their lifetime, according to the National Cancer Institute. So if this latest study is confirmed by other research, it might mean that the risk for women who were overweight as children could be 6%, says Aviva Must, an associate professor of Family Medicine and Community Health at Tufts University School of Medicine in Boston.

The explanation for the increased risk might have to do with starting to menstruate at an early age. Excess weight in childhood often leads to earlier maturation, she says.

This doesn't mean that if you were overweight as a child that you are going to develop breast cancer, Must says. But it does underscore that childhood obesity should be taken seriously.

She's presenting her research today in Fort Lauderdale at the annual meeting of the North American Association for the Study of Obesity.

## Assessment and Evaluation Pertaining to Article

1. In the study done on the females who were in school between the years 1922 to 1935, what percentage of those women died as a result of breast cancer?

2. According to the data in the USA TODAY article, if a town had a population of 50,000 women, how many of them, on average, would be expected to die of breast cancer?

3. Assume that all 50,000 of the women in the town were overweight as children. Now how many would be statistically expected to die from breast cancer?

4. Assume that there are 100 million women living in the United States right now. If half of them were overweight as chil dren and half were not, how many of these 100 million women would be expected to die of breast cancer?