How Often Will a Drug Test Be WRONG?

Suppose when you go to take a drug test, you have a 50/50 chance of testing positive whether or not you have taken any drugs. What would that look like?

|  |  |  |  |
| --- | --- | --- | --- |
| Test Result |  | Has the person taken drugs? | |
|  | YES | NO |
| POSITIVE |  |  |
| NEGATIVE |  |  |

1. After performing the simulation, write down the appropriate values in the 2-way table below.
2. When prompted by the teacher, put your group’s results in the Excel file.
3. After all groups have put their results in the Excel file, record the **class** values in the 2-way table below.

|  |  |  |  |
| --- | --- | --- | --- |
| Test Result |  | Has the person taken drugs? | |
|  | YES | NO |
| POSITIVE |  |  |
| NEGATIVE |  |  |

1. Find the marginal counts for each row and each column in the class’ table. Write those on your 2-way table.
2. How often was the test WRONG? Explain.

Let’s be more specific…

1. What percent of people THAT HAVE TAKEN DRUGS tested negative (FALSE-NEGATIVE) ? \_\_\_\_\_\_\_\_\_
2. What percent of people that HAVE NOT TAKEN DRUGS tested positive (FALSE-POSITIVE)? \_\_\_\_\_\_\_\_\_\_
3. In this simulation, does it look like it mattered if you took drugs or not when testing positive? In other words, does it look like there is an association between whether or not a person took drugs and what the test result showed? Explain

Now let’s be a little more realistic in our test results. Based on an article from CBS News, let’s assume that the drug tests generally produce false-positive results in 10% of cases and false-negatives in 12% of cases. Use the spinners provided to perform a new simulation with these more realistic probabilities.

(Note: Use the PINK spinner for the pink cards and the GREEN spinner for the green cards)

**CLASS RESULTS**

|  |  |  |  |
| --- | --- | --- | --- |
| Test Result |  | Has the person taken drugs? | |
|  | YES | NO |
| POSITIVE |  |  |
| NEGATIVE |  |  |

1. What percent of people THAT HAVE TAKEN DRUGS tested negative? (FALSE-NEGATIVE)
2. What percent of people that HAVE NOT TAKEN DRUGS tested positive? (FALSE-POSITIVE)
3. In this simulation, does it look like it mattered if you took drugs or not when testing positive? In other words, does it look like there is an association between whether or not a person took drugs and what the test result showed? Explain. Sketch a graph to justify your answer.

Drug Use

Use drugs

Don’t Use Drugs

100%

50%

Now let’s be a little more realistic in our test results. Based on an article from CBS News, let’s assume that the drug tests generally produce false-positive results in 10% of cases and false-negatives in 12% of cases. The data below was created from a simulation using these percentages.

|  |  |  |  |
| --- | --- | --- | --- |
| Test Result |  | Has the person taken drugs? | |
|  | YES | NO |
| POSITIVE | 22 | 12 |
| NEGATIVE | 3 | 113 |

1. What percent of people THAT HAVE TAKEN DRUGS tested negative? (FALSE-NEGATIVE)
2. What percent of people that HAVE NOT TAKEN DRUGS tested positive? (FALSE-POSITIVE)
3. In this simulation, does it look like it mattered if you took drugs or not when testing positive? In other words, does it look like there is an association between whether or not a person took drugs and what the test result showed? Explain. Sketch a graph to justify your answer.

Drug Use

Use drugs

Don’t Use Drugs

100%

50%