Case Study: Using Stents to Prevent Strokes

Colby Community College

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The question researchers need to answer is:

Does the use of stents reduce the risk of stroke?

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Treatment group (224 patients)

These patients received a stent and medical management.

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Control group (227 patients)

These patients received the same medical management, but did not receive a stent.

Data Gathering

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Patient	group	0-30 days	0-365 days
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2	treatment	stroke	stroke
3	treatment	no event	no event
4	treatment	no event	stroke
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Note

Listing each patient line-by-line is very cumbersome.

Descriptive Statistics

	0-30 days		0-365 days	
	stroke	no event	stroke	no event
treatment	33	191	45	179
control	13	214	28	199
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$$\frac{\text{number of control group that had a stroke}}{\text{total size of control group}} = \frac{28}{224} = 0.12 = 12\%$$

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2. Does the data show a "real" difference between the groups?

Note

The second question is a real subtle one and most of the statistical tools we discuss will be used to address this question.

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Theoretically it is 50%. But if you flip a large number of coins, you rarely get exactly half heads and half tails.

heads		tails		total
5,045	50.4%	4,955	49.5%	10,000
4,969	49.7%	5,031	50.3%	10,000
5,064	50.6%	4,936	49.4%	10,000
5,091	50.9%	4,909	49.1%	10,000
4,972	49.7%	5,028	50.3%	10,000
5,021	50.2%	4,979	49.8%	10,000
5,007	50.1%	4,993	49.9%	10,000
5,031	50.3%	4,969	49.7%	10,000
5,056	50.6%	4,944	49.4%	10,000
5,006	50.1%	4,994	49.9%	10,000

Note

The published results of the study were:

There was compelling evidence of harm by stents in this study of stroke patients.

Chimowitz MI, Lynn MJ, Derdeyn CP, et al. 2011. Stenting versus Aggressive Medical Therapy for Intracranial Arterial Stenosis.

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- There are many types of stents and this study only considered the self-expanding Wingspan stent.

Percentages Review

- **Percentage of:** To find a percentage of an amount, replace the % symbol with division by 100 and multiply by the amount.

  Example: 6% of 1200 responses is $\frac{6}{100} \cdot 1200 = 72$

- **Decimal to Percentage:** To convert from a decimal to a percentage, multiply by 100%.

  Example: $0.25 \rightarrow 0.25 \cdot 100\% = 25\%$

- **Fraction to Percentage:** To convert from a fraction to a percentage, divide the denominator into the numerator and multiply by 100%.

  Example: $\frac{3}{4} = 0.75 \rightarrow 0.75 \cdot 100\% = 75\%$

- **Percentage to Decimal:** To convert from a percentage to a decimal number, replace the % by division by 100.

  Example: $85\% \rightarrow \frac{85}{100} = 0.85$