WHAT ARE CONFIDENCE INTERVALS?

- Suppose that a 90% confidence interval states that the population mean weight is greater than 50 and less than 70 kg.

  How would you interpret this statement?

There is a 90% chance that the population mean weight falls between 50 and 70.	True or False?
90% of the samples will have a weight between 50 and 70.	True or False?
We expect 90% of the confidence interval estimates to include the population mean weight.	True or False?

WHAT ARE CONFIDENCE INTERVALS?

- Suppose that a 90% confidence interval states that the population mean weight is greater than 50 and less than 70 kg.

  How would you interpret this statement?

There is a 90% chance that the population mean weight falls between 50 and 70.	**False!**
90% of the samples will have a weight between 50 and 70.	**False!**
We expect 90% of the confidence interval estimates to include the population mean weight.	**True.**

WHAT ARE CONFIDENCE INTERVALS?

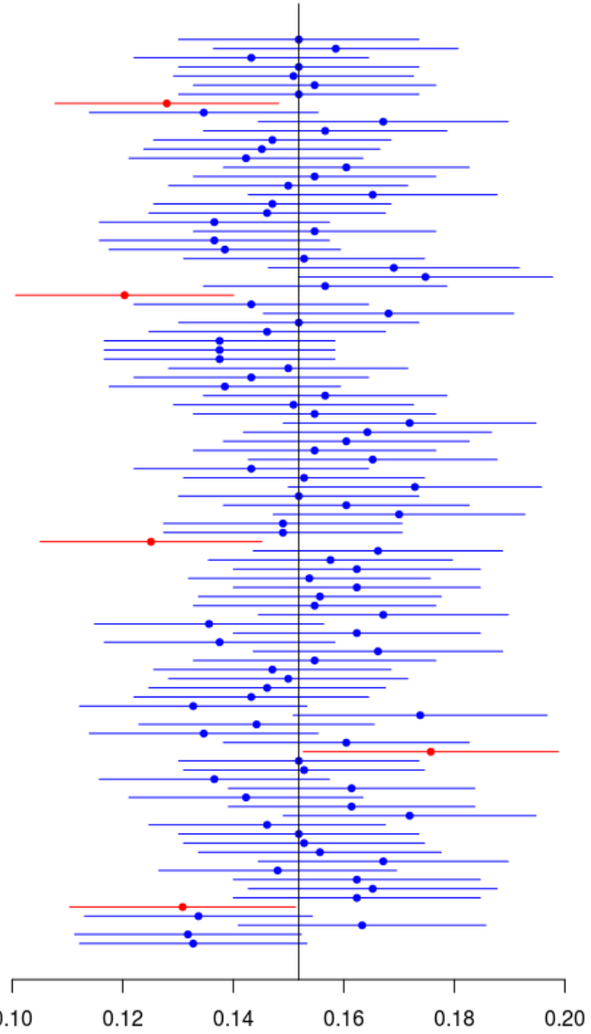
- Suppose that a 90% confidence interval states that the population mean weight is greater than 50 and less than 70 kg.

  How would you interpret this statement?

The confidence level describes the uncertainty associated with a sampling method. Suppose we used the same sampling method to select different samples and to compute a different interval estimate for each sample. Some interval estimates would include the true population parameter and some would not.

https://en.wikipedia.org/wiki/Confidence_interval

WHAT ARE CONFIDENCE INTERVALS?



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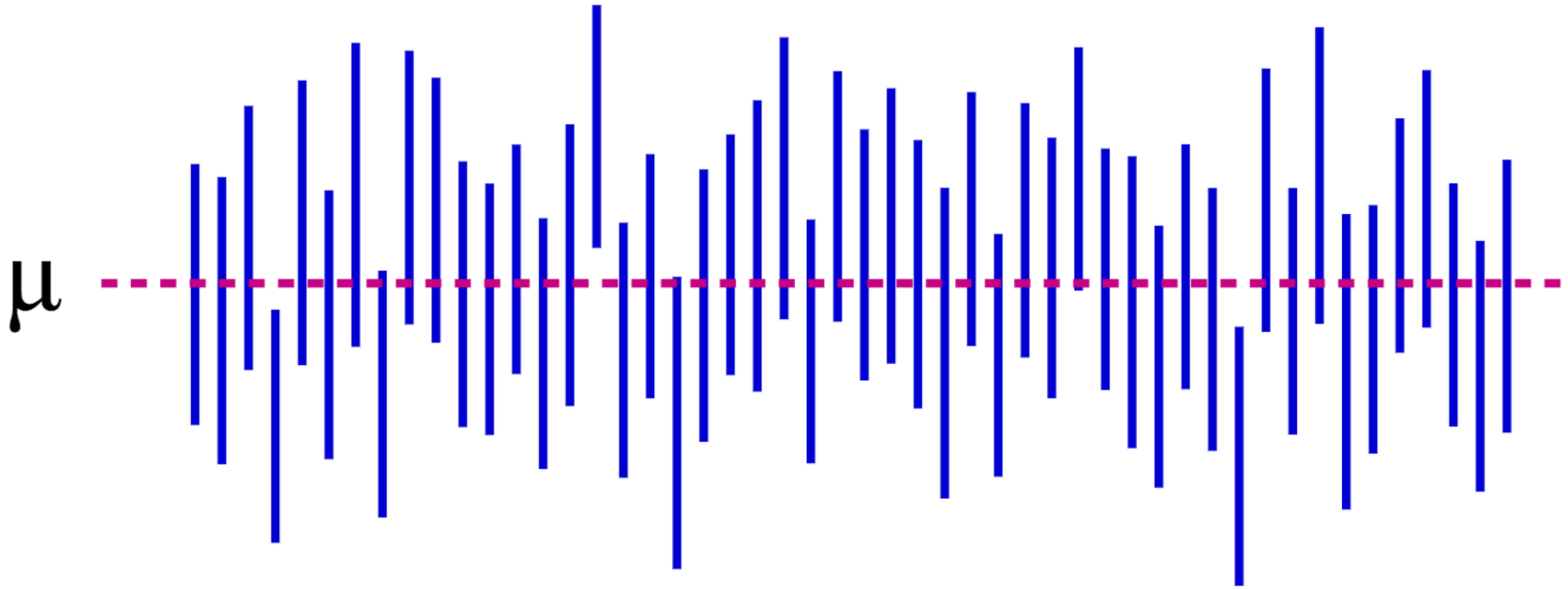


If we have 90% confidence interval, 90% of the confidence intervals of the samples will contain the true, unknown population mean μ. 10% of the confidence intervals will *not* contain μ.

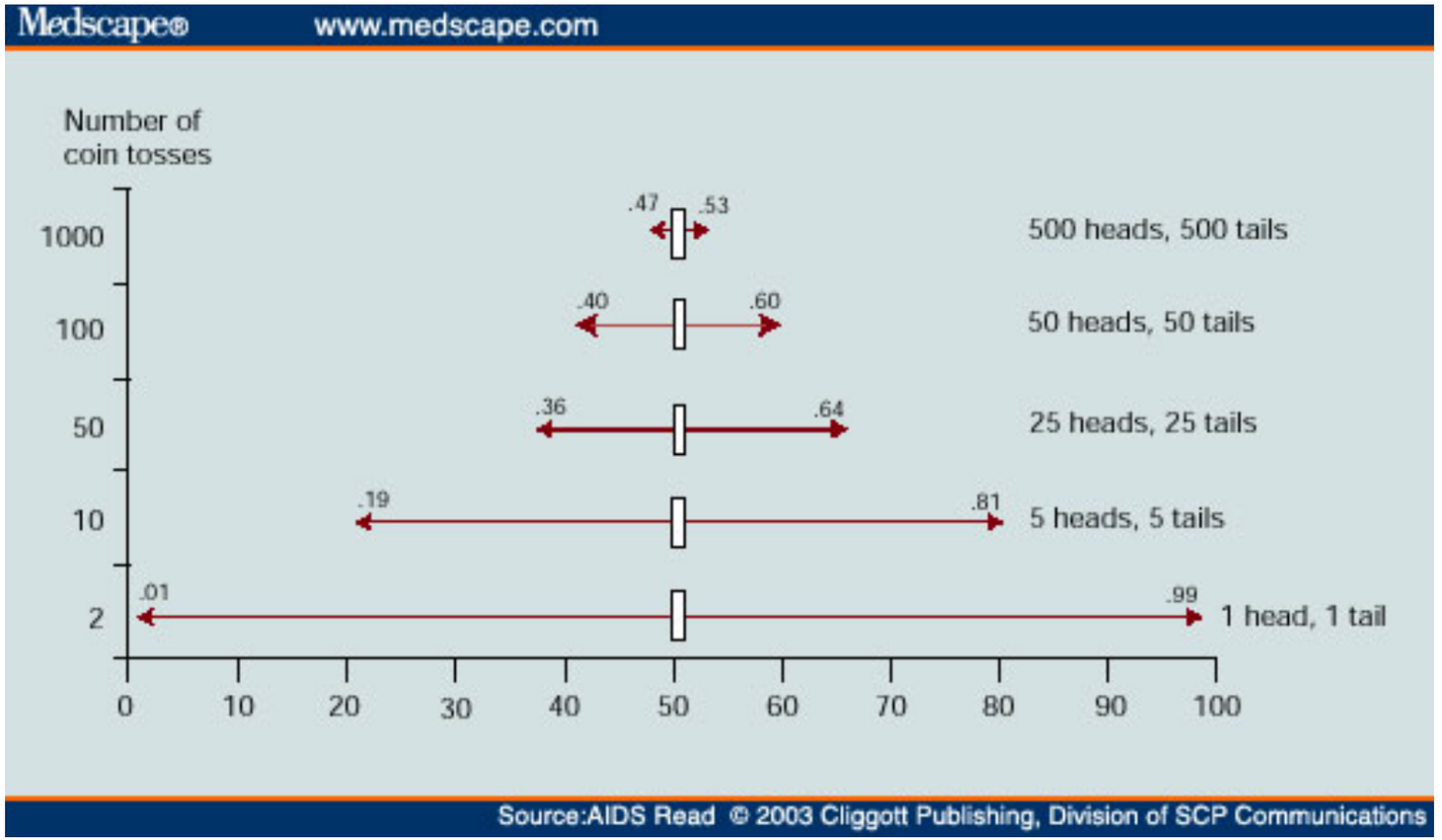
The blue vertical line segments represent the confidence intervals created from 50 samples for the population mean μ, represented as a red horizontal dashed line; note that some confidence intervals do not contain the population mean, as expected.

WHAT AFFECTS CONFIDENCE INTERVALS?

- sample size
- level of confidence

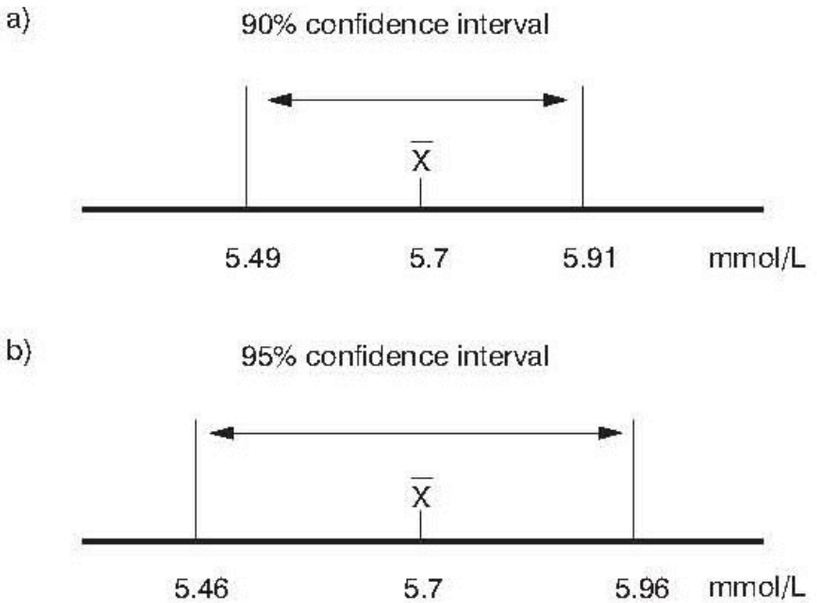
WHAT AFFECTS CONFIDENCE INTERVALS?

- Larger sample size —> narrower confidence intervals



WHAT AFFECTS CONFIDENCE INTERVALS?

- Higher confidence —> need to include a larger range of values.



a) 90% confidence interval;
b) 95% confidence interval;
c) 99% confidence interval of mean cholesterol concentration (*N*=121)

WHAT ARE CONFIDENCE INTERVALS?

- Suppose that a 90% confidence interval states that the population mean is greater than 100 and less than 200. How would you interpret this statement?
- Some people think this means there is a 90% chance that the population mean falls between 100 and 200. **This is incorrect.**
- Like any population parameter, the population mean is a constant, not a random variable. It does not change. The probability that a constant falls within any given range is always 0.00 or 1.00.
- The confidence level describes the uncertainty associated with a sampling method. Suppose we used the same sampling method to select different samples and to compute a different interval estimate for each sample. Some interval estimates would include the true population parameter and some would not.
- **A 90% confidence level means that we would expect 90% of the interval estimates to include the population parameter; A 95% confidence level means that 95% of the intervals would include the parameter; and so on.**