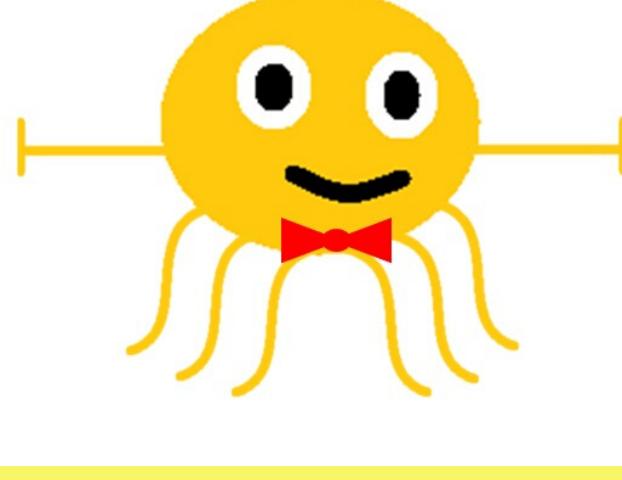


UNDERSTANDING CONFIDENCE INTERVALS

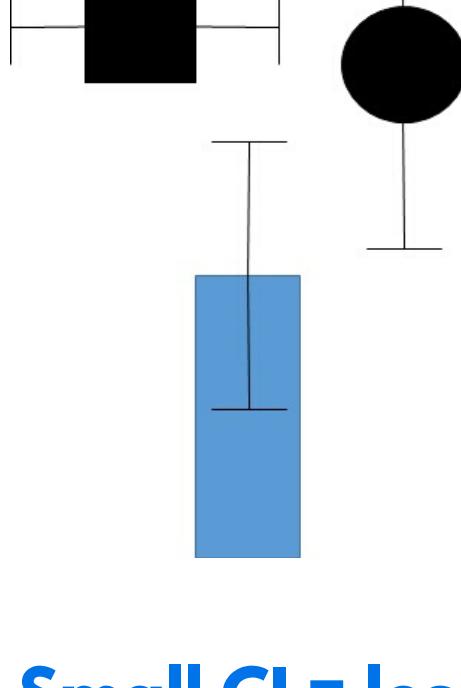
with octopuses*



An infographic by [@DrRoseStewart](#)

*Octopuses is definitely the plural of octopus. I checked.

What is a confidence interval?



A confidence interval (CI) is very basically a way of showing how reliable data is. When we're doing studies, they're on a sample of people and then we apply what we learned about that sample to a wider population. Although scientists try to make studies as reliable as possible, we can't always be 100% sure that what we found in our sample will be exactly the same in the real world.

So our data is really a 'ballpark figure' and we use CIs to demonstrate how big the ballpark is. The size of the ballpark depends on how much variation we found in our sample to begin with. We usually use 95% CIs which means we're 95% sure the real answer is somewhere in our CI ballpark.

Small CI = less variation

This is Clarence the CI octopus, and he is very reliable - just look at his tie! Clarence is a very tidy and precise chap, so his CI tentacles are short. We can tell that the sample Clarence represents didn't have much variation in it, so the results he gives us are likely to be pretty accurate.



Large CI = more variation

This is Clarence's cousin Sid and he's not as well behaved or reliable as Clarence. Sid's CI tentacles are really long, so we know the data from the sample Sid represents is messier and more varied. That doesn't mean Sid's data is useless, but it does mean that 'ballpark' for where the real answer lies is a lot bigger, so it's harder to draw conclusions from what Sid tells us.

Sneaky extra tips

- The bigger a sample size is, the more statistically powerful it is. CIs for big samples will tend to be smaller
- If you're looking at charts for pre/post data and the CIs for each condition cross over (see picture) it almost certainly means the difference is not significant
- If you're looking at hazard ratios or odds ratios and the CIs cross 1, this almost certainly means there is no significant difference

