

# Chapter 10: Confidence Intervals

Wednesday, November 27, 2019 10:50 AM

## Section 10.1: Estimating with Confidence

Statistical inference: making predictions (estimates) about populations based on samples

example: Globe and Mail newspaper polls 1000 Canadians, and based on this poll, says

"68% of Canadians went ..."



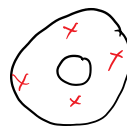
did they measure all Canadians? No!  
this is an estimate, based on their sample

note: statistical inference also makes decisions about populations based on samples, but that's beyond the scope of this course

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### precision vs. accuracy

precise and accurate



accurate but not precise

precise but not accurate



neither precise nor accurate



how do you get good accuracy?

- you make sure that as much as possible that your sample is representative

how do you get good precision?

- good measuring instruments and a large sample size

for example: you measure a sample of five-year-old Douglas fir trees and find that the mean diameter is 85 cm.

what can you say about the entire population of five-year-old Douglas fir trees?

answer: if your sample is representative (which we're going to assume from now on), you can estimate that the mean diameter of all five-year-old Douglas fir trees is about 85 cm

but what does "about 85 cm" mean?

85 cm  $\pm$  1 cm?      from 84 to 86 cm  
85 cm  $\pm$  5 cm?      from 80 to 90 cm

  
this is an interval

and we're going to learn in the next section how to calculate it

but is it not also true that occasionally the sample may contain an outlier? or have more individuals above the mean rather than below it?

occasionally, your sample will, due to random variation, not predict the population mean accurately

how do we handle this? we say something like:

"Based on our sample, we have determined that the mean diameter of five-year-old Douglas fir trees is between 80 and 90 cm, with 95% confidence"

Douglas fir trees 13 between  
80 and 90 cm, with 95% confidence