As we make plans to collect data, we should have some idea of how large a margin of error we need to be able to draw a conclusion or detect a difference we want to see. If the size of the effect we're studying is large, then we may be able to tolerate larger ME. If we need great precision, however, we'll want a smaller ME, and, of course that means a larger sample size. But more data cost money, effort, and time (relate to A26 3,4), so how much is enough?

The good news is that, just like with proportions, we have an equation we can use to determine the sample size:

$$ME = t^*_{n-1}\frac{s}{\sqrt{n}}$$

The bad news is that we won't know most of the values we need to solve it. At times we have a similar problem with proportions. Sometimes we need to guess a value for *p*, 0.5 was the most conservative. Unfortunately the problem is more severe with means. We don't know *s* until we get some data, but we want to calculate the sample size *before* collecting the data. Similarly, we can guess a value for *s* or conduct a small pilot study to get an estimate.

That's not all. Without knowing *n*, we don't know the degrees of freedom and we can't find the critical value, t^*_{n-1}. We resort to using the corresponding z* value from the Normal model knowing it will always underestimate the sample size we should use.

If this calls for a very large sample, $n \geq 60$, that's fine. But if it points to a small sample, then we need to use that first estimate for *n* to determine a critical *t* and rerun the calculation.