

7: The Central Limit Theorem

Before we can learn about confidence intervals in Chapter 8 and hypothesis testing in the Chapter 9, we need a couple of results that form the foundation of the usefulness of the normal distribution. We have mentioned that the normal distribution can be derived as a limit of binomial distributions. This fact can be used in reverse and we can use the normal distribution to approximate the binomial distribution. This approximation will be useful for inferences (confidence intervals and hypothesis testing) on proportions. The second result is the *very important* central limit theorem where the normal distribution pops out as the answer to the characterization of random sample means. The central limit theorem gives us the *sampling theory* for all statistical inference procedures involving means.

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