In a recent Gallup poll 423 of 940 (45%) respondents favored Pres. Obama’s health care plan.

1. Summary of yesterday, \( \hat{p} \) has a distribution (in all possible samples) that is modeled by the normal model with mean \( p \) and standard deviation \( \sqrt{\frac{pq}{n}} \). (This is called the sampling distribution of \( \hat{p} \).)

2. The probability is .95 that \( \hat{p} \) will be within 2 standard deviations of \( p \). (1.96 really). This would be nice but we don’t know the standard deviation of \( \hat{p} \) (since we don’t know \( p \)).

3. An estimate of a standard deviation of a statistic is called a standard error.

\[
\text{SE}(\hat{p}) = \sqrt{\frac{\hat{p}\hat{q}}{n}}
\]

4. The probability is approximately .95 that \( p \) will be within 1.96\( \sqrt{\frac{\hat{p}\hat{q}}{n}} \) of \( \hat{p} \).

5. A 95% confidence interval for \( p \)

\[
\hat{p} \pm 1.96 \text{SE}(\hat{p})
\]

\[
\begin{align*}
> \text{phat} &= 423/940 \\
> \text{se} &= \text{sqrt}(\text{phat} \times (1-\text{phat}) / 940) \\
> \text{phat} \; ; \; \text{se} \\
[1] \; 0.45 \\
[1] \; 0.01622646 \\
> \text{phat} \; + \; 1.96 \; * \; \text{se} \\
[1] \; 0.4818039 \\
> \text{phat} \; - \; 1.96 \; * \; \text{se} \\
[1] \; 0.4181961
\end{align*}
\]

6. Words: margin of error, critical values, one-proportion \( z \) interval

7. Assumptions and conditions. All statistical procedures have conditions to check before it is safe to use them.

   Assumption: Independence assumption, Sample size assumption

   Conditions: Randomization Condition, the 10% Condition, the Success/Failure Condition

**Homework**

1. Read pages 460–470.

2. Problems to turn in (Due Friday, March 19): 19.22,24,28