Does cell phone use while driving cause accidents?

1. The two-by-two table.

<table>
<thead>
<tr>
<th></th>
<th>Error</th>
<th>No Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distracted</td>
<td>7</td>
<td>17</td>
</tr>
<tr>
<td>Not Distracted</td>
<td>2</td>
<td>22</td>
</tr>
</tbody>
</table>

2. The $2 \times 2$ table.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Success</td>
<td>Failure</td>
</tr>
<tr>
<td>A</td>
<td>$p_1$</td>
</tr>
<tr>
<td>B</td>
<td>$p_2$</td>
</tr>
</tbody>
</table>

3. Same three data collection paradigms as in the case of two means.

4. Confidence interval for $p_1 - p_2$:

(a) Standard interval ($R$ command `prop.test`)

\[
\hat{p}_1 = \frac{x_1}{n_1}, \quad \hat{p}_2 = \frac{x_2}{n_2}, \quad (\hat{p}_1 - \hat{p}_2) \pm z^* \sqrt{\frac{\hat{p}_1(1 - \hat{p}_1)}{n_1} + \frac{\hat{p}_2(1 - \hat{p}_2)}{n_2}}
\]

(b) Plus-4 interval (add one success and one failure to each group)

\[
\hat{p}_1 = \frac{x_1 + 1}{n_1 + 2}, \quad \hat{p}_2 = \frac{x_2 + 1}{n_2 + 2}, \quad (\hat{p}_1 - \hat{p}_2) \pm z^* \sqrt{\frac{\hat{p}_1(1 - \hat{p}_1)}{n_1 + 2} + \frac{\hat{p}_2(1 - \hat{p}_2)}{n_2 + 2}}
\]

5. Odds ratios and relative risk.

(a) Odds for each population (rows) \( \frac{p_i}{1 - p_i} \)

(b) Odds ratio: \( \frac{p_1/(1 - p_1)}{p_2/(1 - p_2)} \) (1 means no difference)

(c) Relative risk: \( \frac{p_1}{p_2} \) (1 means no difference)
Homework

1. Read Chapter 22, pages 526–530.
2. For practice do problem 22.3.
3. To turn in (Due Tuesday, April 20) do Problem 22.6.

Test Friday. Take-home portion handed out Tuesday and due Friday. In-class portion covers Chapters 18, 19, 20, 21, 23, 24. More details Tuesday.