Chapter 4: Screening for Disease

Reproducibility statistics

\[
\begin{array}{cccc}
\text{Rater A} & + & - \\
+ & a & b \\
- & c & d \\
\end{array}
\]

\[
p_1 \\
q_1 \\
p_2 \\
q_2 \\
N
\]

\[
\kappa = \frac{2(ad - bc)}{p_1 q_2 + p_2 q_1}
\]

Despite what the book says, you do not have to convert counts into percents to use this formula. \(\kappa\) quantifies the percent agreement that is above that due to chance. See Table 4.4 (p. 82) for interpretation guidelines.

Validity statistics

<table>
<thead>
<tr>
<th>Disease +</th>
<th>Disease -</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test +</td>
<td>TP</td>
<td>FP</td>
</tr>
<tr>
<td>Test -</td>
<td>FN</td>
<td>TN</td>
</tr>
<tr>
<td>Total</td>
<td>TP + FN</td>
<td>FP + TN</td>
</tr>
</tbody>
</table>

\[
\text{SEN} = \frac{TP}{\text{(those with disease)}}
\]

\[
\text{SPEC} = \frac{TN}{\text{(those without disease)}}
\]

\[
PVP = \frac{TP}{\text{(those who test positive)}}
\]

\[
PVN = \frac{TN}{\text{(those who test negative)}}
\]

\[
\text{True prevalence} = \frac{TP + FN}{N} \quad \text{[True prevalence also known as prior probability]}
\]

See text for Bayesian equivalents for determining predictive value based on prior probabilities and test parameters.