ASSIGNMENT 1

Due date: 10:30am, Wednesday, September 27, 2006

1. Exercise 3.4.2 on page 71 of the 8th edition of Biostatistics. A Foundation for Analysis in the Health Sciences (please note that this exercise in the 8th edition is different from that in the 7th edition).

2. Exercise 3.4.4 on page 72 of the 8th edition of Biostatistics. A Foundation for Analysis in the Health Sciences (please note that this exercise in the 8th edition is different from that in the 7th edition).

3. Exercise 3.4.6 on page 72 of the 8th edition of Biostatistics. A Foundation for Analysis in the Health Sciences (which is the same question as on page 70 of the 7th edition).

4. Suppose that SCM offers a blood test for Chiu’s disease. The sensitivity of the test is 99% and the specificity is 95%. The prevalence of Chiu’s disease is 1 in 1000. What is the probability that a person has Chiu’s disease,
   (a) given a positive result on the test ?
   (b) given positive results on two independent tests ?

5. The following data are taken from a study investigating the use of radionuclide ventriculography in detecting coronary artery disease (Begg, C. B. and McNeil, B. J., Assessment of radiologic tests: control of bias and other design considerations, Radiology 167, May 1988, pp. 565-569).

<table>
<thead>
<tr>
<th>Test</th>
<th>Disease</th>
<th>Present</th>
<th>Absent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>302</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>Negative</td>
<td>179</td>
<td>372</td>
<td></td>
</tr>
</tbody>
</table>

(a) What is the sensitivity of radionuclide ventriculography in this study ?
(b) What is its specificity ?
(c) For a population in which the probability of having coronary artery disease is 10%, estimate the probability that an individual has the disease given that he or she tests positive using radionuclide ventriculography.
(d) What is the predictive value of a negative test ?

6. Dr Chiu is not dependable; the probability that he will forget to water the rosebush during Mrs Chiu’s absence is 2/3. The rosebush is in questionable condition anyhow; if watered, the probability of its withering is 0.5, but if it is not watered, the probability of its withering is 0.75. Upon returning, Mrs Chiu finds that the rosebush has withered. What is the probability that Dr Chiu did not water the rosebush ?