

Chapter 4

- 4-1. a. neither more likely nor less likely (Note follow-up with students. Discuss the probability of observing 11 heads when tossing a fair coin.)
- b. skewed to the left
- c. detecting patients with the disease
- d. less than
- e. conditional probability
- f. less than 1/2 year
- 4-2. a. 0.685
- b. 0.524
- c. $(0.426) \cdot (0.524) = 0.223$
- d. $(0.372 - 0.223) / (1 - 0.524) = 0.313$
- 4-3. a. $(0.0005) \cdot (0.0005) = 0.00000025$
- b. $(1 - 0.0005) \cdot (1 - 0.0005) = 0.9990$
- c. $2 \cdot (1 - 0.0005) \cdot (0.0005) = 0.0009994$
- 4-4. $1 - (1 - 0.2) \cdot (1 - 0.2) = 0.36$
- 4-5. $1 - \{1 - (1 - 0.99) \cdot (0.2)\}^{120} = 0.2136$
Stata v11 command:
`display 1 - (1 - (1 - 0.99) \cdot (0.2)) ^ 120`
- 4-6. a. predictive value positive = $(73/100) = 0.73$

- b. predictive value negative = $(100 - 13)/100 = 0.87$
- c. prevalence = $(0.73)*(640/5500) + (0.13)*(1 - (640/5500)) = 0.085 + 0.115 = 0.200$
- d. sensitivity = $0.085/0.2 = 0.425$
- e. specificity = $((1 - (640/5500)) - 0.115)/(1 - 0.2) = 0.961$