Exercise 8

a) Not shown.
b) Since \( P(A) \times P(B) = 0.0072 \neq P(A \cap B) = 0.031 \), these two events are not independent.
c) \( P(A \cup B) = 0.162 \)
d) \( P(A|B) = 0.608 \)

Exercise 10

a) \( P = 0.387 \)
b) \( P(\text{Medicare} \cup \text{Medicaid} \cup \text{other}) = 0.494 \)
c) \( P(\text{Medicare} | \text{government program}) = 0.698 \)

Exercise 12

a) \( P(X \geq 5) = 0.990 \) (X = “number of years a newborn lives”)
b) \( P(60\text{-}year\text{-}old lives to age 70) = P(X \geq 70 | X \geq 60) = 0.838 \)
c) \( P(W \cap M) = 0.702 \)
d) \( P((W \cap M^C) \cup (M \cap W^C)) = 0.272 \)

Note: changed the notation in d) above from previous version.

Exercise 14

a) \( P(T^+ | \text{cts}) = 0.67 \); \( P(T^+ | \text{no cts}) = 0.42 \); \( P(\text{cts} | T^+) = 0.22 \)
b) If the prevalence is 10% \( \rightarrow P(\text{cts} | T^+) = 0.15 \);
   If the prevalence is 5% \( \rightarrow P(\text{cts} | T^+) = 0.08 \). As the prevalence of cts decreases, the
   predictive value of a positive test decreases as well.
c) Not shown.

Exercise 16

a) As the cutoff point is raised, the specificity increases and the probability of a false
   positive result decreases. Furthermore, the sensitivity decreases and the probability of a
   false negative result increases.
b) Not shown.
c) In this instance, the sensitivity and specificity will both be high no matter which cutoff
   value we select. A level of 9 ng/ml is probably best for maximizing sensitivity and
   specificity simultaneously.
Exercise 18

RR(Diaphragm) = 0.346
RR(Condom) = 0.246
RR(IUD) = 0.165
RR(Pill) = 0.086

Exercise 20

a) As the cutoff point is raised, the sensitivity decreases and the specificity increases.
b) Not shown.
c) The point closest to the upper left-hand corner of the graph represents an FCG level of 5.6 mmol/liter; therefore, this does seem to be the best choice of a cutoff point.