**1.**

**Table 3.5** Prevalence of Alzheimer’s disease

(cases per 100 population)

Age group Males Females

65–69 1.6 0.0

70–74 0.0 2.2

75–79 4.9 2.3

80–84 8.6 7.8

85 + 35 .0 27.9

**3.16** What is the probability that all three of these individuals

have Alzheimer’s disease?

**3.17** What is the probability that at least one of the women

has Alzheimer’s disease?

**3.18** What is the probability that at least one of the three

people has Alzheimer’s disease?

**3.19** What is the probability that exactly one of the three

people has Alzheimer’s disease?

**3.20** Suppose we know one of the three people has

Alzheimer’s disease, but we don’t know which one. What is the

conditional probability that the affected person is a woman

2. Otolaryngology

The data set in Table 3.11 is based on 214 children with acute otitis media (otitis media with effusion, or OME) who participated in a randomized clinical trial [12]. Each child

had OME at the beginning of the study in either one (unilateral cases) or both (bilateral cases) ears and was randomly assigned to receive a 14-day course of one of two antibiotics,

either cefaclor (CEF) or amoxicillin (AMO). The data here concern the 203 children whose middle-ear status was determined during a 14-day follow-up visit. The data

in Table 3.11 are presented in data set EAR.DAT (See attached excel file).

3. Infectious Disease

One hypothesis is that gonorrhea tends to cluster in central

cities.

**4.25** Suppose 10 gonorrhea cases are reported over a 3-month period among 10,000 people living in an urban county. The statewide incidence of gonorrhea is 50 per

100,000 over a 3-month period. Is the number of gonorrhe cases in this county unusual for this time period?

4.

Hypertension

A national study found that treating people appropriately for high blood pressure reduced their overall mortality by 20%. Treating people adequately for hypertension has been difficult

because it is estimated that 50% of hypertensives do not know they have high blood pressure, 50% of those who do know are inadequately treated by their physicians, and 50% who are appropriately treated fail to follow this treatment by taking the right number of pills.

**4.34** What is the probability that among 10 true hypertensives

at least 50% are being treated appropriately and are

complying with this treatment?

5.

Cancer, Epidemiology

An experiment is designed to test the potency of a drug on 20 rats. Previous animal studies have shown that a 10-mg dose of the drug is lethal 5% of the time within the first

4 hours; of the animals alive at 4 hours, 10% will die in the next 4 hours.

**4.46** What is the probability that 3 or more rats will die in

the first 4 hours?

**4.48** What is the probability that 0 rats will die in the 8-hour

period?

**4.50** What is the probability that 2 rats will die in the 8-hour

period?

6.

Pulmonary Disease

Many investigators have studied the relationship between asbestos exposure and death from chronic obstructive pulmonary disease (COPD).

**5.10** Suppose that among workers exposed to asbestos

in a shipyard in 1980, 33 died over a 10-year period from

COPD, whereas only 24 such deaths would be expected

based on statewide mortality rates. Is the number of deaths

from COPD in this group excessive?

**5.11** Twelve cases of leukemia are reported in people living

in a particular census tract over a 5-year period. Is this number

of cases abnormal if only 6.7 cases would be expected

based on national cancer-incidence rates?

7.

Blood Chemistry

In pharmacologic research a variety of clinical chemistry measurements are routinely monitored closely for evidence of side effects of the medication under study. Suppose

typical blood-glucose levels are normally distributed, with mean = 90 mg/dL and standard deviation = 38 mg/dL.

**5.31** If the normal range is 65−120 mg/dL, then what percentage

of values will fall in the normal range?

**5.34** Frequently, tests that yield abnormal results are repeated

for confirmation. What is the probability that for a

normal person a test will be at least 1.5 times as high as the

upper limit of normal on two separate occasions?

8.

Hypertension

The Fourth Task Force Report on Blood Pressure Control in Children [2] reports blood-pressure norms for children by age and sex group. The estimated mean ± standard deviation for 17-year-old boys for DBP is 67.9 ± 11.6 mm Hg, based on a large sample.

**5.53** One approach for defining elevated blood pressure

is to use 90 mm Hg—the standard for elevated adult

DBP—as the cutoff. What percentage of 17-year-old boys

would be found to have elevated blood pressure, using this

approach?