EXERCISES

In the exercises that follow perform the test at the indicated level of significance and determine the p value.

12.4.1 In the study by Silver and Aiello (A-4) cited in Example 12.4.2, a secondary objective was to determine if the frequency of falls was independent of wheelchair use. The following table gives the data for falls and wheelchair use among the subjects of the study.

	Wheelchair Use	
	Yes	No
Fallers	62	121
Nonfallers	18	32

Source: J. K. Silver and D. D. Aiello, "Polio Survivors: Falls and Subsequent Injuries," *American Journal of Physical Medicine and Rehabilitation*, *81* (2002), 567–570.

Do these data provide sufficient evidence to warrant the conclusion that wheelchair use and falling are related? Let $\alpha = .05$.

12.4.2 Sternal surgical site infection (SSI) after coronary artery bypass graft surgery is a complication that increases patient morbidity and costs for patients, payers, and the health care system. Segal and Anderson (A-5) performed a study that examined two types of preoperative skin preparation before performing open heart surgery. These two preparations used aqueous iodine and insoluble iodine with the following results.

Prep Group	Comparison of Aqueous and Insoluble Preps	
	Infected	Not Infected
Aqueous iodine	14	94
Insoluble iodine	4	97

Source: Cynthia G. Segal and Jacqueline J. Anderson, "Preoperative Skin Preparation of Cardiac Patients," *AORN Journal, 76* (2002), 821–827.

Do these data provide sufficient evidence at the $\alpha = .05$ level to justify the conclusion that the type of skin preparation and infection are related?

12.4.3 The side effects of nonsteroidal antiinflammatory drugs (NSAIDs) include problems involving peptic ulceration, renal function, and liver disease. In 1996, the American College of Rheumatology issued and disseminated guidelines recommending baseline tests (CBC, hepatic panel, and renal tests) when prescribing NSAIDs. A study was conducted by Rothenberg and Holcomb (A-6) to determine if physicians taking part in a national database of computerized medical records performed the recommended baseline tests when prescribing NSAIDs. The researchers classified physicians in the study into four categories—those practicing in internal medicine, family practice, academic family practice, and multispeciality groups. The data appear in the following table.

Practice Type	Performed Baseline Tests	
	Yes	No
Internal medicine	294	921
Family practice	98	2862
Academic family practice	50	3064
Multispecialty groups	203	2652

Source: Ralph Tothenberg and John P. Holcomb, "Guidelines for Monitoring of NSAIDs: Who Listened?," *Journal of Clinical Rheumatology*, 6 (2000), 258–265.

Do the data above provide sufficient evidence for us to conclude that type of practice and performance of baseline tests are related? Use $\alpha = .01$.

12.4.4 Boles and Johnson (A-7) examined the beliefs held by adolescents regarding smoking and weight. Respondents characterized their weight into three categories: underweight, overweight, or appropriate. Smoking status was categorized according to the answer to the question, "Do you currently smoke, meaning one or more cigarettes per day?" The following table shows the results of a telephone study of adolescents in the age group 12–17.

	Smoking	
	Yes	No
Underweight	17	97
Overweight	25	142
Appropriate	96	816

Source: Sharon M. Boles and Patrick B. Johnson, "Gender, Weight Concerns, and Adolescent Smoking," *Journal of Addictive Diseases, 20* (2001), 5–14.

Do the data provide sufficient evidence to suggest that weight perception and smoking status are related in adolescents? $\alpha = .05$.

12.4.5 A sample of 500 college students participated in a study designed to evaluate the level of college students' knowledge of a certain group of common diseases. The following table shows the students classified by major field of study and level of knowledge of the group of diseases:

Major	Knowledge of Diseases		
	Good	Poor	Total
Premedical	31	91	122
Other	19	359	378
Total	50	450	500

Do these data suggest that there is a relationship between knowledge of the group of diseases and major field of study of the college students from which the present sample was drawn? Let $\alpha = .05$.

12.4.6 The following table shows the results of a survey in which the subjects were a sample of 300 adults residing in a certain metropolitan area. Each subject was asked to indicate which of three policies they favored with respect to smoking in public places.

12.5.2 Coughlin et al. (A-10) examined breast and cervical screening practices of Hispanic and non-Hispanic women in counties that approximate the U.S. southern border region. The study used data from the Behavioral Risk Factor Surveillance System surveys of adults ages 18 years or older conducted in 1999 and 2000. The following table shows the number of observations of Hispanic and non-Hispanic women who had received a mammogram in the past 2 years cross-classified by marital status.

Marital Status	Hispanic	Non-Hispanic	Total
Currently married	319	738	1057
Divorced or separated	130	329	459
Widowed	88	402	490
Never married or living as an unmarried couple	41	95	136
Total	578	1564	2142

Source: Steven S. Coughlin, Robert J. Uhler, Thomas Richards, and Katherine M. Wilson, "Breast and Cervical Cancer Screening Practices Among Hispanic and Non-Hispanic Women Residing Near the United States–Mexico Border, 1999–2000," *Family and Community Health, 26*, (2003), 130–139.

We wish to know if we may conclude on the basis of these data that marital status and ethnicity (Hispanic and non-Hispanic) in border counties of the southern United States are not homogeneous. Let $\alpha = .05$.

12.5.3 Swor et al. (A-11) examined the effectiveness of cardiopulmonary resuscitation (CPR) training in people over 55 years of age. They compared the skill retention rates of subjects in this age group who completed a course in traditional CPR instruction with those who received chest-compression–only cardiopulmonary resuscitation (CC-CPR). Independent groups were tested 3 months after training. Among the 27 subjects receiving traditional CPR, 12 were rated as competent. In the CC-CPR group, 15 out of 29 were rated competent. Do these data provide sufficient evidence for us to conclude that the two populations are not homogeneous with respect to competency rating 3 months after training? Let $\alpha = .05$.

12.5.4 In an air pollution study, a random sample of 200 households was selected from each of two communities. A respondent in each household was asked whether or not anyone in the household was bothered by air pollution. The responses were as follows:

Community	Any Member of Household Bothered by Air Pollution?		Total
	Yes	**No**	
I	43	157	200
II	81	119	200
Total	124	276	400

Can the researchers conclude that the two communities differ with respect to the variable of interest? Let $\alpha = .05$.

12.7.2 The objective of a prospective study by Stenestrand et al. (A-20) was to compare the mortality rate following an acute myocardial infarction (AMI) among subjects receiving early revascularization to the mortality rate among subjects receiving conservative treatments. Among 2554 patients receiving revascularization within 14 days of AMI, 84 died in the year following the AMI. In the conservative treatment group (risk factor present), 1751 of 19,358 patients died within a year of AMI. Compute the relative risk of mortality in the conservative treatment group as compared to the revascularization group in patients experiencing AMI.

12.7.3 Refer to Example 12.7.2. Toschke et al. (A-17), who collected data on obesity status of children ages 5–6 years and the smoking status of the mother during the pregnancy, also reported on another outcome variable: whether the child was born premature (37 weeks or fewer of gestation). The following table summarizes the results of this aspect of the study. The same risk factor (smoking during pregnancy) is considered, but a case is now defined as a mother who gave birth prematurely.

	Premature Birth Status		
Smoking Status During Pregnancy	**Cases**	**Noncases**	**Total**
Smoked throughout	36	370	406
Never smoked	168	3396	3564
Total	204	3766	3970

Source: A. M. Toschke, S. M. Montgomery, U. Pfeiffer, and R. von Kries, "Early Intrauterine Exposure to Tobacco-Inhaled Products and Obesity," *American Journal of Epidemiology*, *158* (2003), 1068–1074.

Compute the odds ratio to determine if smoking throughout pregnancy is related to premature birth. Use the chi-square test of independence to determine if one may conclude that there is an association between smoking throughout pregnancy and premature birth. Let $\alpha = .05$.

12.7.4 Sugiyama et al. (A-21) examined risk factors for allergic diseases among 13- and 14-year-old schoolchildren in Japan. One risk factor of interest was a family history of eating an unbalanced diet. The following table shows the cases and noncases of children exhibiting symptoms of rhinitis in the presence and absence of the risk factor.

	Rhinitis		
Family History	**Cases**	**Noncases**	**Total**
Unbalanced diet	656	1451	2107
Balanced diet	677	1662	2339
Total	1333	3113	4446

Source: Takako Sugiyama, Kumiya Sugiyama, Masao Toda, Tastuo Yukawa, Sohei Makino, and Takeshi Fukuda, "Risk Factors for Asthma and Allergic Diseases Among 13–14-Year-Old Schoolchildren in Japan," *Allergology International, 51* (2002), 139–150.

What is the estimated odds ratio of having rhinitis among subjects with a family history of an unbalanced diet compared to those eating a balanced diet? Compute the 95 percent confidence interval for the odds ratio.

12.7.5 According to Holben et al. (A-22), "Food insecurity implies a limited access to or availability of food or a limited/uncertain ability to acquire food in socially acceptable ways." These researchers