
Master in Pharmacy

Introductory Course in Applied Biostatistics in Clinical Research

EXERCISES: Qualitative Data

1. Mannan and Meslow (1984) studied bird foraging behavior in a forest in Oregon. In a managed forest, 54% of the canopy volume was Douglas fir, 40% was ponderosa pine, 5% was grand fir, and 1% was western larch. They made 156 observations of foraging by red-breasted nuthatches; 70 observations in Douglas fir, 79 in ponderosa pine, 3 in grand fir, and 4 in western larch. The biological null hypothesis is that the birds forage randomly, without regard to what species of tree they're in; the statistical null hypothesis is that the proportions of foraging events are equal to the proportions of canopy volume. What do you conclude using a 5% significance level?
2. Shivrain *et al.* (2006) crossed clearfield rice, which are resistant to the herbicide imazethapyr, with red rice, which are susceptible to imazethapyr. They then crossed the hybrid offspring and examined the F2 generation, where they found 772 resistant plants, 1611 moderately resistant plants, and 737 susceptible plants. If resistance is controlled by a single gene with two co-dominant alleles, you would expect a 1:2:1 ratio.
3. Consider the following data for the abundance of a certain species of bird:

Test the hypothesis that the proportion of males and females is the same in all four seasons.

4. The results of a multicenter clinical trial to determine the safety and efficacy of the pancreatic lipase inhibitor, Xenical, was reported (Ingersoll, 1997). Xenical is used to block the absorption of dietary fat. The

Sex	Spring	Summer	Fall	Winter
Males	163	135	71	43
Females	86	77	40	38

article reported that more than 4000 patients in the U.S. and Europe were randomized to receive Xenical or a placebo in a parallel groups study. After one year, 57% of those receiving Xenical had lost at least 5% of their body weight, as opposed to 31% of those receiving a placebo. Assume that exactly 4000 patients were in the study, and that 2000 were randomized to receive a placebo and 2000 received Xenical. Test if the loss of body weight has the same behaviour across both groups.

5. In Lister's study of the effects of antiseptic in amputations, he stated that amputations in the upper limb were quite different, and that in these cases "if death does occur, it is commonly the result of the wound assuming unhealthy characters" (Lister, 1870). Thus, he felt that the best way to determine antiseptic's efficacy was to compare the outcomes of upper limb surgeries separately. Is there any association between treatment and surgical outcome?

		Surgical Outcome		
		Death	No Death	
Treatment	Antiseptic (E)	1	11	12
Group	Control (\bar{E})	6	6	12
		7	17	24