

## Some Further Uses of Statistics

Here we give further examples of problems and questions arising in various subject areas. Statistical studies have been done or are required to answer each of them. These examples supplement the discussion in Section 1.4 under “(a) Problems.”.

**Agriculture.** What varieties of plant should we grow? What are the best combinations of fertilizers, pesticides and densities of planting? How does changing these factors affect the course of the growth process?

**Anthropology.** How old is an archaeological site? What difference in physical size was there between ancient Celts and modern day English people? Does the percentage of body fat differ between urban and rural dwellers in India?

**Business and economics.** How should options to buy shares be priced? Which companies are likely to go out of business in the next year? What is the likely tourist flow next year? What causes companies to choose a particular method of accounting? Do inducements (e.g. prizes) to open bank accounts produce any long term business? Is it true that the companies most likely to be taken over are those that have been achieving poor returns? How have living standards changed over the last six months? Should shoplifting (shop theft) detection devices be hidden or should their presence be made obvious?

**Education.** Does a course on classroom behavior for teachers purchased by the Department of Education have a measurable effect on the teacher’s classroom performance? Do boys perform better than girls in Mathematics examinations? Is there evidence of sex bias in admissions to the University of California at Berkeley? What proportions of graduates of various programs are subsequently employed in their field of study?

**Environmental studies.** What impact will a proposed industrial plant have on the surrounding ecology? Is there an increase in birth defects near nuclear power plants? Do strong electric or magnetic fields induce higher cancer rates among people living close to them?

**Fisheries.** How many fish of a given species are in the fishing grounds? What level of quotas imposed on fishermen will maintain the fish stocks? Does anti-fouling paint contaminate the fish supply? What is the distribution of deep demersal fish in the North Atlantic Basin?

**Forestry.** How much wood is there in a forest due to be felled? When should we fell trees in order to maximize economic return?

**Genetics.** Does the data support genetic theories about how various characteristics are inherited?

**Geography.** How variable are the phosphate levels in the Waikato farming area? Can one predict the average yearly rainfall of districts in California from longitude, latitude and distance from the sea?

**Literature.** Did Sir Francis Bacon write the works of Shakespeare? How does style change with the age of an author?

**Manufacturing.** What should be done to improve the quality of a manufactured product? When should we stop a manufacturing process and reset the machines?

**Medicine.** What are the important risk factors for heart disease, for bone cancer, for cot (crib) death? What determines long term survival after open heart surgery? Would nationwide screening for breast cancer be effective? What projections can we make about the course of the AIDS epidemic? Does drinking cause birth defects? Is a new drug more effective than standard treatments? Are the side effects too hazardous? Does aspirin prevent heart attacks? Does diet affect intelligence? Is vitamin C effective in preventing colds? Is there a relationship between drinking alcohol and breast cancer in women or between drinking during pregnancy and birth defects?

**Marketing Research.** What makes advertisements irritating? Is an irritating ad a bad ad? Are telephone polls the best way to collect market data? What share of the television market does Sony have? Do higher prices signal higher quality? (See also the marketing research paragraph in Section 1.1.3.)

**Meteorology.** How well can we predict weather patterns? How fast is the ozone layer depleting? Is global warming a reality?

**Psychology.** Do the children of alcoholic parents perceive their life's circumstances differently from the children of nonalcoholic parents? Is there an increase in mental hospital emergency room admissions at the time of a full moon? Is marijuana use related to an increase in schizophrenia? Does Transactional Analysis increase an individual's sense of wellbeing? Can the existence of extrasensory perception be demonstrated? How are shyness and loneliness related?

**Sociology.** How have drinking patterns changed this century? What are the chances of a major war in the next 5 years? Are the number of wars in a period random? Are marriages failing more often? Which prison inmates are most likely to reoffend?

**Physics.** When can you say that an apparent increase in the density of cosmic rays signals the presence of a supernova? How many sunspots will there be next year?

**Zoology.** Do caged orangutans behave differently indoors and outdoors? What type of pine trees do red-cockaded woodpeckers prefer for constructing nest and roost cavities? Are aerial photographs effective in counting geese?

What regulations need to be enforced to lower the grizzly bear mortality in Montana?