

Example 1.10 Diverticular disease

Diverticular disease and carcinoma of the colon are amongst the most common diseases of the large intestine in the population of the United Kingdom and North America. Diverticular disease is estimated to be present in one third of the population over forty years of age, while carcinoma of the colon accounts for about 10 000 deaths in the United Kingdom per annum. It has been found that there is a geographical association between the prevalence of the two diseases in that their world-wide incidence tends to go hand in hand. In order to investigate whether the two conditions tend to be associated in individual patients, a case-control study was carried out and reported by Berstock, Villers and Latta (1978).

A total of eighty patients, admitted to the Reading group of hospitals between 1974 and 1977 with carcinoma of the colon, were studied and the incidence of diverticular disease in each patient was recorded. A control group of 131 individuals were randomly selected from a population known not to have colonic cancer, and were similarly tested for the presence of diverticular disease. Table 1.10 gives the proportions of individuals with diverticular disease, classified by age, sex and according to whether or not they had colonic cancer.

Table 1.10 Proportion of individuals with diverticular disease (DD) classified by age, sex and the presence of colonic cancer

Age interval	Midpoint of age range	Sex	Proportion with DD	
			Cancer patients	Controls
40-49	44.5	M	0/3	0/7
		F	0/6	1/15
50-54	52.0	M	1/2	1/7
		F	0/0	0/0
55-59	57.0	M	2/5	3/15
		F	1/7	4/18
60-64	62.0	M	1/5	5/18
		F	0/2	2/8
65-69	67.0	M	1/4	6/11
		F	0/5	7/17
70-74	72.0	M	0/5	1/4
		F	3/13	2/6
75-79	77.0	M	1/3	0/0
		F	5/9	0/0
80-89	84.5	M	1/2	4/5
		F	4/9	0/0

By classifying the individuals according to a number of distinct age groups, the relationship between the proportion of individuals with diverticular disease and the midpoint of the age range can easily be examined using graphical methods. One could then go on to investigate whether the relationship is the same for patients of each sex, with and without carcinoma of the colon.

An epidemiological study is usually designed to examine which of a number of possible factors affect the risk of developing a particular disease or condition. In this study, the disease of primary interest is colonic cancer, and the epidemiologist would want to look at whether the occurrence of diverticular disease in a patient increased or decreased the risk of colonic cancer, after making any necessary allowances for the age and sex of the patient. When looked at in this way, the probability that a given individual has colonic cancer cannot be estimated. This is because the experimental design that has been used does not ensure that the relative numbers of cases and controls of a given sex in a particular age group match the corresponding numbers in the population being sampled. For example, the overall proportion of colonic cancer patients in the case-control study is 80/211 which is a gross overestimate of the proportion of individuals with colonic cancer in the general population. Nevertheless, it is possible to estimate the risk of colonic cancer in a patient with diverticular disease relative to a patient without diverticular disease, and to explore the strength of the association between the occurrence of colonic cancer and age, sex and the presence of diverticular disease.