

## Which test should I use?

### Question 1

In a study that investigates the accuracy of death certificates at two different hospitals, A and B, the results of 575 autopsies were compared to the causes of death listed on the certificates. Of the 575 death certificates, 425 were confirmed to be accurate (157 of these were in hospital A), 62 either lacked information or contained inaccuracies but did not require recoding (18 of these were from hospital A) and the remainder were inaccurate and required recoding (54 of these were from hospital A).

- (a) We would like to determine whether the results of the study suggest different practices in completing death certificates at the two hospitals.
- (b) In this data set:
  - If a death certificate was issued at hospital A, what were the odds of it being accurate?
  - If a death certificate was issued at hospital B, what were the odds of it being accurate?
  - Is there any evidence that there is a difference between the odds of a death certificate being accurate when issued at hospital B relative to being issued at hospital A?

### Question 2

(from Howell, Statistical methods for Psychology, pp178-9)

In a study of low birth weight (LBW) infants, data on Psychometer Development Index (PDI) were obtained and are shown in the table below. 'Normal' infants have, on average, a PDI of 100. Do these LBW infants differ from the 'normal' infants?

#### Stem and Leaf Display

Stem	Leaf
8	3
8	6 6 9 9 9 9 9 9
9	2 2 2 2 2 2
9	5 6 6 6 6 8 8
10	0 0 0 0 2 2 2 2 4 4 4
10	8 8 8 8 8
11	2 2 2
11	6 6 7
12	0 0 0 0 0 0 4 4 4
12	5 6 7

key: 10 | 8 = 108

#### Question 4

A car manufacturer believes that the annual repair costs for a popular model of car is strongly influenced by the age of the car. To investigate this, a random sample of 15 cars of varying ages is chosen and the repair costs for the previous twelve months recorded.

Age of car (years)	3	1	5	8	7	12	8	4	6	3	2	9	10	1	5
Repair Costs (\$)	140	70	230	350	300	610	380	200	280	120	120	400	450	50	220

What test will we be using?

#### Question 5

A cheese manufacturer wants to investigate the effectiveness of two different plastic rinds for the packaging of its cheese. Fifty identical cheeses were selected and 25 randomly chosen and wrapped in rind A. The other 25 were wrapped in rind B. The number of days until the first mould appeared on each cheese was recorded. In analysing the data, the experimenter was unsure what the correct test procedure should be. What procedure would you advise the experimenter to use?

#### Question 6

In tossing a dice 300 times, the frequency of occurrence of 1, 2, 3, 4, 5, 6 are, respectively 45, 51, 44, 55, 49, and 56. Is there any evidence that the dice is biased?

#### Question 7

In a study of the genetics of eye colour of fruit flies, there is a theory that the numbers of red-eyed and white-eyed flies will be in the ratios of 1:3. If the number of red-eyed flies in our sample is 1981, and of white-eyed flies is 7712, does this theory of inheritance hold for these flies?

#### Question 8

At a local high school there was an outbreak of gastroenteritis, and it was thought to be associated with sandwiches served at the school canteen. The investigation showed that of 263 students who bought lunch that day, 225 ate a prepared sandwich and 38 did not. Of those who ate a sandwich, 109 became ill; of those who did not eat a sandwich, only 4 became ill. We would like to test whether there is an association between the consumption of a sandwich and the onset of gastroenteritis.

Which test should I use..?

Question 1:  $\chi^2$  test of independence.

Question 2: t-test for the mean  
 $H: \mu_0 = 100$

Question 3: 1 sample t-test on differences  
 $H: \mu_d = 0.$

Question 4: linear regression (2 continuous variables)  
NOTE: You would not be expected to do this question with only this level of information in the exam.

Question 5: 2 sample t-test - no attempt to match individuals

Question 6:  $\chi^2$  goodness of fit.  
 $H: \pi_1 = \frac{1}{6} \quad \pi_2 = \frac{1}{6} \quad \pi_3 = \frac{1}{6} \quad \pi_4 = \frac{1}{6} \quad \pi_5 = \frac{1}{6} \quad \pi_6 = \frac{1}{6}$

(probability of throwing any number with a fair dice =  $\frac{1}{6}$ )

Question 7: either z-test on proportions or  $\chi^2$  goodness of fit  
 $H: \pi_0 = 0.25$  (proportion of red eyed fish) or  $\pi_r = 0.25 \quad \pi_w = 0.75$   
 $= \frac{1}{4}$

Question 8:  $\chi^2$  test of independence.