Medical Statistics (MATH38071) - Exercise Sheet 3
(Analysis of Binary Outcome Measures)

Question 1 – 5 data from Critical Appraisal Exercise 1 [Quist-Paulsen P Gallefoss F Randomised controlled trial of smoking cessation intervention after admission for coronary heart disease BMJ 2003;327:1254.]

1. Using a z-test of proportions check the analysis in table 2 of the paper comparing the smoking cessation rates at 12 months.

2. Calculate the point estimate and the 95% confidence interval of the difference in smoking cessation rates at 12 months.

3. Concisely, summarize the results of this analysis in a narrative format giving (i) the rates for each treatment, (ii) the point estimate of the treatment effect and its 95% confidence interval and (iii) the p-value of the z-test.

4. In the paper (page 3, para 4) a statistical analysis, sometimes called a *sensitivity analysis*, has been carried out by making assumptions regarding the missing data using all patients except those who have changed address or died. Death or change of address could in theory be due to the intervention and so could be considered as adverse outcomes.

    a. Carry out a sensitivity analysis using the z-test of proportions and the associated confidence interval for the validated smoking cessation rate using **all randomised** patients by assuming that all missing data are adverse outcomes.

    b. Considering the follow-up rates and the sensitivity analysis of part b, what conclusion do you draw from this analysis?

5. The number needed to treat (NNT) is a measure used to assess the effectiveness of a health-care intervention. The NNT is the average number of patients who need to be treated to prevent one additional adverse outcome, in this case the number of patients who need to receive the smoking cessation intervention for one person to stop smoking.

    a. Write down an algebraic expression for NNT.

    b. Calculate the NNT and its 95% confidence interval for the smoking cessation rates at 12 months calculated in Q2.

    c. For the sensitivity analysis in Q4 calculate the NNT and its 95% confidence limits.

    d. What is the confidence interval for NNT from part c.

6. The table below gives data from the randomised component of the Salk Polimyelitis (Polio) Vaccine Field Trials

I		Number	Polio Cases	Rate/100,000
Intervention	Placebo(Saline)	201,229	115	57.1
	Vaccinated	200,745	33	16.4

Calculate the point estimate and the 95% confidence of the odds ratio.