London School of Hygiene & Tropical Medicine

ASSESSMENT FEEDBACK
2022 - 2023

<u>1st Marker only</u>: Please put your comments on this sheet which will be returned to the student together with their assessment grade.
Please do not write the grade on this sheet.

LSHTM Candidate No	**221162**	**Module Code**	**2038**

Summary of the main characteristics of the work *(strengths and weaknesses) plus* ***specific comments*** *(illustrated with reference to the student's work; comments may refer to the work's content, structure, use of literature, understanding, rigour of argument, presentation etc). Be sure to include an* ***Explanation of the grade given*** *(refer to grade criteria, explain why it is not better) and* ***how the work might have been improved***

This coursework was excellent with the exception of part 3c) where you didn't seem to certain as to why a parameter transformation was required.

In this case the reason was that a variance can only take positive values. This means that there is a boundary to the possible values that the variance can take (i.e. it must be non-negative). The Wald test approximates the true log-likelihood function using a symmetric function. This is likely to be inappropriate here because if the estimated variance is close to 0 then it is quite likely that the likelihood function will be skew, because larger values of variance may be plausible but we know for sure that the variance cannot be <0. A parameter transformation can help to resolve this problem because, (e.g.) the log of the variance can take any value. You will see from the previous year's exam questions that parameter transformations comes up fairly regularly in the summer exams for the Inference question.

There were a few other minor mistakes.
1) There is an error in the lower confidence interval for the risk difference in Q2b.
2) In Q2) part b) you did not fully describe the nature of the approximation. There are two approximations- a quadratic approximation to the true log likelihood ratio, and an approximation of the variance (which uses the point estimate at the MLE for its calculation rather than the true proportions).
3) In part 3b) the distribution is only exactly chi-square for estimates of the normal mean, not the normal variance. This applied also to the Wald statistic.
4) In Q3a you should note that we have previously shown v^2 to be biased when the mean is unknown (almost all scenarios) but it is not biased here because the mean is known to be 0, so n is the correct degrees of freedom to use in the denominator (see Lecture 2 practical session if this is unclear).
5) In Q4c) you didn't fully justify your choice of rejection region, omitting to show clearly that a larger region was not possible given the constraint imposed.
6) In Q4c) you said that that because the hypothesis of no difference was not rejected, you could conclude that A and B had the same effect. Instead you should have concluded that you were unable to reject the null hypothesis (you can not be sure they are the same, only that you do not have strong evidence that they are different). Think of a t-test between two groups with 2 and 3 subjects respectively, giving (not surprisingly) a rather large p-value and therefore failing to provide evidence of a difference. You would not from this non-significant result reasonably conclude that there was no difference between the population groups from which this tiny sample was drawn.

GRADE 3