

## MTH6157 Survival Models – Assessed Coursework 1

This is the first of two assessed courseworks, each of which count towards 15% of your total module mark. The deadline for submission is 5pm UK time Wednesday 18 October (week 4). Late submissions will not be accepted and if you fail to submit by the deadline and do not have an accepted EC claim your mark will be zero. You should submit your solution in a MS Word document. Please paste all R code and R output into the document along with any typed answers. You should ensure that you submit your own work and that your submission complies with QMUL policies on plagiarism and collusion.

### Question

Medical researchers are looking to assess a new pharmaceutical treatment for a certain virus. They conduct a trial with 120 patients, half taking an existing medication and the other half taking the new drug. The researchers measure the number of days before all virus symptoms are gone.

The file `Coursework1Data.csv` available on QM Plus contains the results of this trial with the following data recorded:

<code>patient</code>	a patient number from 1 to 120
<code>treatment</code>	1 if the patient was given the existing medication, 2 if the patient was given the new drug
<code>delta</code>	1 if all virus symptoms were recorded as gone, 0 if the patient left the trial before all symptoms were gone
<code>time</code>	the number of days before either all symptoms were recorded as gone or the patient left the trial

- (a) Load the `Coursework1Data.csv` file into R and install the `survival` package. [1]
- (b) Give an example of how informative right censoring might be present in this trial. [2]
- (c) Construct R code to calculate the Kaplan Meier Estimate of the survival function separately for patients on the existing medication and those given the new drug. [7]
- (d) Plot the two survival functions on one graph with a different colour for each using R, making sure you add suitable title, axis labels and legend. [6]
- (e) What does your plot in (d) say about which treatment is better? [5]
- (f) What concerns might the researchers have about the trial results? [4]

[Total 25]

*Your mark out of 25 will be converted to a % to be comparable with the second coursework.*