

You should now have a file of deaths and a file of exposures separated by age basis, gender, smoking status and underwriting class in an R Data Frame.

1. Your first assignment over the next week is to transfer the information currently in R to the Summary Template in Excel provided on the website. You should create two large workbooks. One for exposures and one for deaths. Note that the Template has 48 sheets. One for each category – ANB v. ALB; Male v. Female; N v. T v. C; and 0 v. 1 v. 2 v. 3.

Most likely, you will not need all 48 sheets. **Please do not change the order of the sheets or delete any sheets. For combinations where you have no data, just leave the sheet empty.**

Your group needs to send Lusine and I the two spreadsheets (one with exposures and one with deaths) no later than Noon on Monday.

2. Your second assignment is to create a spreadsheet in the same format that represents the probability of death for each of these cells. The probability of death is calculated by dividing the number of deaths by (the days of exposure divided by 365.25)

$$\text{Probability of death} = \frac{\text{Number of Deaths}}{\text{Days of Exposure} \div 365.25}$$

We need to do this for each cell for each sheet. For example, if we had the following for exposure:

Issue Age↓↓↓	Duration		
	1	2	3
0	36000	50000	70000
1	100000	200000	98000

and the following for deaths:

Issue Age↓↓↓	Duration		
	1	2	3
0	1	2	2
1	1	3	0

Then the probabilities would be equal to:

Issue Age↓↓↓	Duration		
	1	2	3
0	0.010146	0.01461	0.010436
1	0.003653	0.005479	0

Calculate probabilities of death for each cell where there is exposure. **Review them to make sure they are correct.**

Send to your TA before Midnight on Wednesday night.

- Your third assignment is to calculate expected deaths for each of the 48 sheets in the exposure spreadsheet. If there is no exposure in a sheet, there are no expected deaths. Expected deaths are determined by multiplying the expected mortality rate by the (exposure days divided by 365.25)

$$\text{Expected deaths} = \text{Mortality rate} \left(\frac{\text{Exposure Days}}{365.25} \right)$$

We need to do this for each cell for each sheet. For example, if we had the following for exposure:

Issue Age↓↓↓	Duration		
	1	2	3
0	36000	50000	70000
1	100000	200000	98000

and the following for expected probabilities of death:

Issue Age↓↓↓	Duration		
	1	2	3
0	0.010	0.015	0.020
1	0.005	0.007	0.010

Then our expected deaths would be:

Issue Age↓↓↓	Duration		
	1	2	3
0	0.986	2.053	3.833
1	1.369	3.833	2.683

The expected probabilities of death are provided in the Expected Mortality workbook on the class website.

Bring your results to class as we will be working with this in class.

- During class on October 31, we will have a quiz on this material. I will give you data and you will get to do the calculations in items 2 and 3.