

## MD115 course assignment

The provided dataset includes patients with laboratory-confirmed influenza that were hospitalized in an ICU during eight seasons. The drug oseltamivir was given to all patients.

The goal is to investigate whether early oseltamivir treatment (within 48 days from symptom onset) reduces the mortality of these patients. Also, whether seasonal influenza vaccination reduced their mortality.

The variables in the dataset are as follows:

season	Winter season (2010-11 until 2017-18)
age	Age (years)
gender	Gender (male/female)
vacc	Seasonal influenza vaccination (0/1)
flutype	Type/subtype of influenza virus: A (unsubtyped) / A(H1N1)pdm09 / A(H3N2) / B
com.respir	Comorbidities: chronic respiratory disease
com.cardio	Comorbidities: chronic cardiovascular disease
com.renal	Comorbidities: chronic renal disease
com.immun	Comorbidities: immunosuppression
com.metab	Comorbidities: chronic metabolic disease (incl. diabetes mellitus)
com.neuro	Comorbidities: chronic neurologic disease
com.obes	Comorbidities: obesity
early	Oseltamivir administration within 48 hours of symptom onset (0/1)
los	Length of hospital stay (days)
died	Death (0/1)

(1) Compare the frequency distribution of the following variables: age, gender, vaccination, influenza type/subtype, comorbidities, early oseltamivir, length of stay, between patients who died and patients who survived. For numeric variables use the median and interquartile range, and for categorical variables use frequency tables. Include the p-value from the appropriate statistical test in each case.

(2) Explore the association between outcome (death) and each of the two exposures (early oseltamivir and seasonal influenza vaccination) and calculate the appropriate effect measure (Odds Ratio), including a 95% Confidence Interval. Then use logistic regression to calculate Odds Ratios adjusted for the following covariates: age group (<60 years, 60-79 years, 80+ years), gender and comorbidities.

(3) Explore the association between outcome (death) and each of the two exposures (early oseltamivir and seasonal influenza vaccination), taking into account patients' length of hospital stay, using survival analysis. In particular, draw and compare Kaplan-Meier curves between early and late oseltamivir, and between vaccinated and unvaccinated. Also perform Cox regression adjusting for age group, gender and comorbidities. Compare the calculated adjusted Hazard Ratios (including 95% Confidence Intervals) with the adjusted Odds Ratios from question (2).

You will need to submit two files:

- an R script performing the above analyses
- a Word document with the results of the above analyses and associated brief comments

The deadline for submission of the assignment is **Friday 14 January, at 22:00**.

For any technical/procedural questions, send e-mail to [t.lytras@euc.ac.cy](mailto:t.lytras@euc.ac.cy)