Mini-project: risk factors for influenza infection in tropical Singapore

ST3242: Introduction to Survival Analysis

Influenza is an acute infection of the upper respiratory tract, responsible for considerable morbidity every year across the globe. In temperate regions, outbreaks of influenza are associated with winter, though in the tropics, such as in Singapore, influenza transmission occurs year round (Chow et al, 2006). The disease is caused by several viruses, in humans mostly by influenza A and B, and infection can manifest a range of symptoms, ranging from none for asymptomatic infection, to non-specific symptoms such as a runny nose, to febrile acute respiratory symptoms. Rarely, complications lead to death, usually associated with co-morbidities.

Influenza A viruses are prone to genetic drift and shift. Drift occurs continuously, with a range of viruses co-circulating in human populations and different selective pressure caused by heterogeneous virulence of the pathogens and and varying host herd immunity levels; these encourage new strains to evolve. Periodically, shift occurs, an entirely novel strain emerges to which the population has little existing immunity, and an influenza pandemic results (Potter, 2001). Pandemics are associated with substantial mortality—the 1918 influenza A-H1N1 pandemic killed more people than the great war it ended (Murray et al, 2006; Vynnycky et al, 2007). There have been three other influenza pandemics during the last 100 years (Potter, 2001), of which the latest originated in North America in 2009 to cause another influenza A-H1N1 pandemic.

In Singapore, various studies were performed to evaluate the local epidemiology of the disease. In one of the largest serological studies in the world, Chen et al (2010) took blood samples from adults frequenting a community centre in western Singapore at several time points in the epidemic. Associated with this was a series of repeat telephone surveys, which were used to obtain demographic data, social exposure data, and self-reported symptom data.

Since the data on risk factors has not yet been published, I have “tweaked”
them somewhat pending full peer review of the work. The modified data have been uploaded to
http://blog.nus.edu.sg/alexcook/files/2010/12/flu.txt (see also flu_readme.txt). These primary outcome of interest is the time from start of the study in late June 2009 to first reported “influenza-like illness”, defined to be an acute respiratory infection and self-diagnosed fever. As well as times and a censoring variable, a variety of additional covariates that may influence the risk of influenza infection were recorded, as described in the readme.

Using these data, write a report on risk factors for pandemic influenza in Singapore.

References:


Note:

• Ensure you do not plagiarise others’ work. If you take any ideas from the literature, you must cite them.

• You may discuss the project with your colleagues and may do any computer analyses with them. However, the report must be completely written in your own words. If you do discuss the project with or work alongside your colleagues, you must name them in the acknowledgements.

• The deadline for submission of your projects shall be noon on 17 March 2011.

• You should submit both paper and electronic copies of your work. The electronic copy may be checked for plagiarism. The electronic copy should be in pdf format.