# Is the seasonal variation in hospitalisations rates of atrial fibrillation induced strokes in Denmark and New Zealand dynamic?

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Atrial Fibrilation (AF) is the most common cardiac arrythmia Friberg et al. (2003) and the hospitalisations rates of AF have increased during the last two decades; in fact AF is considered an epidemic. The frequency of AF increases with age and considering the population demographic it is expected that the number of people with AF will be increasing remarkably. Having AF often leads to palpitations, respiratory distress, and fatigue. Furthermore, AF is considered an independent risk factor for stroke Wolf et al. (1991). The consequences of stroke on patients are crucial and may be a considerable burden on society regarding rehabilitation of stroke patients. It has been reported that hospitalisations with stroke exhibit seasonal variation during the calendar year, however seasonal variations in AF induced strokes have not been investigated. Furthermore, it has not been investigated whether there has been changes in the seasonal variation of stroke hospitalisations. Knowledge of the seasonal variation of AF induced stroke, and possible changes over time, may contribute to knowledge of the etiology of AF and may improve prophylaxis treatment in AF patients, which may lead to improved prognoses for AF patients.

Using a state space model to fit daily incidence rates of AF induced strokes, accounting for a secular trend and modelling the seasonal variation as a sum of sinusoids with different frequencies, it is possible to investigate whether hospitalisations of AF induced strokes exhibit seasonal variation. Furthermore, performing model selection we may be able to investigate the dynamic nature of the seasonal variation over time. However, modelling the daily incidence rates of AF induced strokes as being Poisson distributed using a state space model, as proposed by Lundbye-Christensen et al. Lundbye-Christensen et al. (2009), is not trivial in regards to estimation algorithms and especially performing model selection.

We identified daily hospitalisations in Denmark using the Danish National Patients Registry, and in New Zealand using the National Minimum Data Set. Both registries hold records of all hospitalisations, each record includes information on date of hospitalisation and primary diagnosis as well as secondary diagnoses. Analyses will be performed on data sets from each country separately, to make comparisons of seasonal variation in incidence rates of AF induced strokes between the two countries. All analyses will be performed in *R* using the package **sspir**.

## References

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