Bayesian model in JAGS

Tutorial 3 for transition

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Outline

- Section 1: Background knowledge of estimating disease burden (hospitalizations/mortality etc) with statistical models.
- Section 2: Background knowledge of Hierarchical Bayesian regression.
- Section 3: Background knowledge of using Hierarchical Bayesian regression to estimate RSV attributable hospitalizations.
- Section 4: R code for running the Hierarchical Bayesian regression to estimate RSV attributable hospitalizations in older adults by age and risk groups.

Section 1: Background knowledge of estimating disease burden with statistical models.

There are 5 main statistical methods to estimate the hospitalization/mortality attributable to respiratory virus infection. In Dan's class, Public Health Surveillance, he teaches all four methods in details. Here, we will only give a brief introduction to each of the method and provide the link to the initial publications.

1. **Serfling regression**
2. **Periseason differences**
3. **Poisson regression with log link**
4. **Negative binomial regression with identity link**
5. **Box-Jenkins transfer function**

Initial publications of the method

1. *Serfling regression*

- Methods for Current Statistical Analysis of Excess Pneumonia-influenza Deaths
- The impact of influenza epidemics on mortality: introducing a severity index
- Impact of Influenza Vaccination on Seasonal Mortality in the US Elderly Population

2. *Periseason differences*

- The effect of influenza on hospitalizations, outpatient visits, and courses of antibiotics in children
- Respiratory illness associated with influenza and respiratory syncytial virus infection
- Influenza and the Rates of Hospitalization for Respiratory Disease among Infants and Young Children

Initial publications of the method (continued)

3. *Poisson regression with log link*
   - ()
4. *Negative binomial regression with identity link*
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5. *Box-Jenkins transfer function*
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Other useful references

- []
- The Need for Validation of Statistical Methods for Estimating Respiratory Virus–Attributable Hospitalization