



UNIVERSITY OF
BATH

Bayesian Hierarchical Models

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BAYESIAN DISEASE MAPPING

INTRODUCTION

- ▶ In this session, we will work through an example of hospital admissions for chronic obstructive pulmonary disease (COPD) for England between 2001–2010.
- ▶ Using this example, we will see how to calculate smoothed SMRs and plot them on a map.

DATA

- ▶ The data required for these examples can be found in the folder Data.
- ▶ This contains the following files
 - ▶ shapefiles and information for England split by local authorities ('englandlocalauthority.shp', 'englandlocalauthority.dbf')
 - ▶ observed numbers of hospital admissions by local authority ('copdmortalityobserved.csv')
 - ▶ expected numbers of hospital admissions by local authority ('copdmortalityobserved.csv').

PRELIMINARIES

- ▶ We need the following packages
 - ▶ `spdep` - Package to create spatial objects (such as neighbourhood matrix)
 - ▶ `rgdal` - Package to create spatial objects
 - ▶ `rgdeos` - Package to create spatial objects
 - ▶ `shapefiles` - Package to read and write shapefiles
 - ▶ `CARBayes` - Package to fit spatial GLMMs.
 - ▶ `R-INLA`

CREATING AND MAPPING RISKS

- ▶ Now we will calculate raw and smoothed SMRs and plot them on a map.
- ▶ We will examine hospital admissions of chronic obstructive pulmonary disease (COPD), a respiratory condition, in England (2001–2010).
- ▶ We have observed and expected numbers of cases and want to calculate the SMR for each area.

CREATING AND MAPPING RISKS

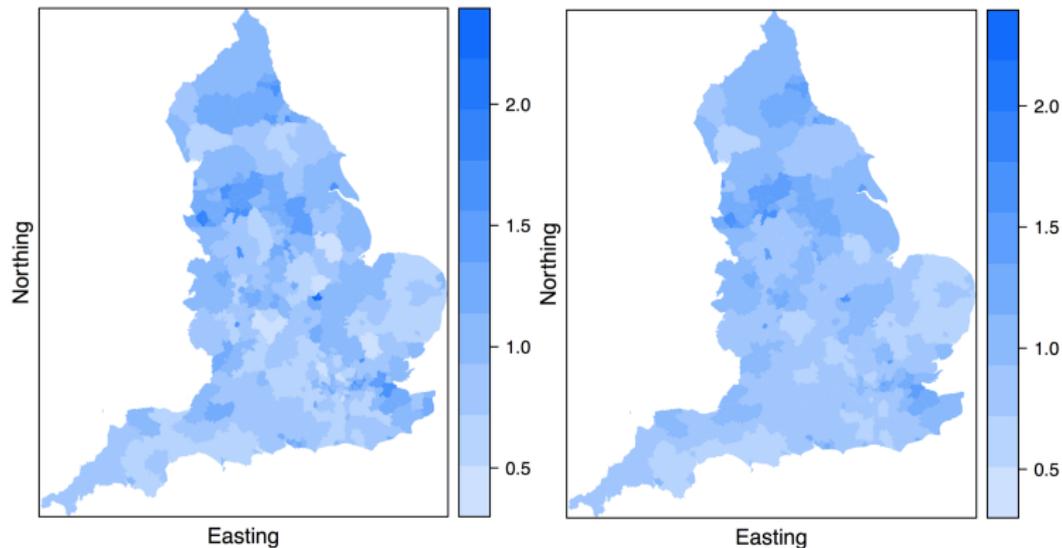


Figure: (Left) Raw SMRs. (Right) Smoothed SMRs.