

2018 APA Short Course on “Bayesian Small Area Estimation using Complex Data”

Introduction and Overview

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Introductions

Sam is a demographer with interest in population health in Africa

- ▶ Mortality and its determinants and Verbal Autopsy
- ▶ Epi-demographic transitions
- ▶ Experience with demographic surveillance system data collection
- ▶ Interests in population indicator measurement

Richard is a statistician, completing his thesis at UW, with interests in

- ▶ Verbal autopsy
- ▶ Bayesian methods and computation
- ▶ Estimation of subnational variation in U5MR
- ▶ Led the computational aspects of the U5MR project, including the creation of the SUMMER package

Jon is a statistician with longstanding interests in

- ▶ Bayesian statistics
- ▶ Geospatial models and applications in spatial epidemiology
- ▶ Survey sampling and design effects
- ▶ Small-area estimation

All three work with IGME group on estimating subnational variation in U5MR

Demonstrations of methods via R implementations will be carried out in class. Students are encouraged to follow along.

Code and other materials (course notes, papers) are available at the course website:

<http://www.samclark.net/apa-sae/index.html>

Slightly longer version of this course previously taught at PAA:

<http://faculty.washington.edu/jonno/PAA-SAE.html>

Day 1

9:00 – 9:05	Sam	0. Introduction
9:05 – 9:45	Sam	1. Motivation & Bayes
9:45 – 10:30	Richard	2. Introduction to R
10:30 – 11:00	Coffee Break	
11:00 – 12:30	Sam	3. Bayes and Hierarchical Bayes Modeling Binomial and normal distributions in detail; non-spatial hierarchical models
12:30 – 13:30	Lunch Break	
13:30 – 15:00	Richard	4. Hierarchical Bayes Modeling in R Esti- mation of hierarchical Bayes models; intro- duction to INLA
15:00 – 15:30	Coffee Break	
15:30 – 17:00	Richard	5. Spatial Bayes Modeling & Introduction to Small-area Estimation Spatial hierarchi- cal models for normal and binomial data; discrete spatial modeling with INLA

Day 2

9:00 – 9:15	Sam	6. Sample Surveys Motivation and examples
9:15 – 10:30	Richard	7. Complex Surveys Simple random sampling; stratified sampling; cluster sampling; multistage sampling; survey sampling in R
10:30 – 11:00	Coffee Break	
11:00 – 12:30	Richard	8. Simple Small-area Estimation in R using SUMMER Discrete spatial modeling with survey data
12:30 – 13:30	Lunch Break	
13:30 – 15:00	Richard	9. Space-time Modeling using SUMMER Space-time modeling with survey data
15:00 – 15:30	Coffee Break	
15:30 – 17:00	Richard	10. Hands-on Exercises Spatial modeling and space-time exercises