Bayesian spatio-temporal methods
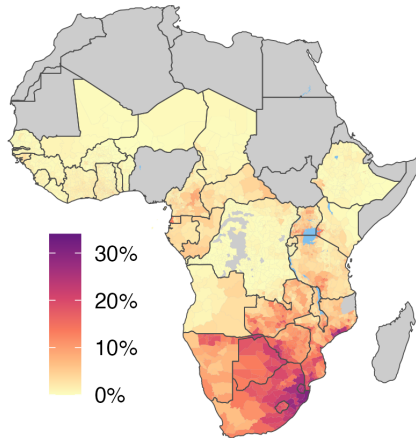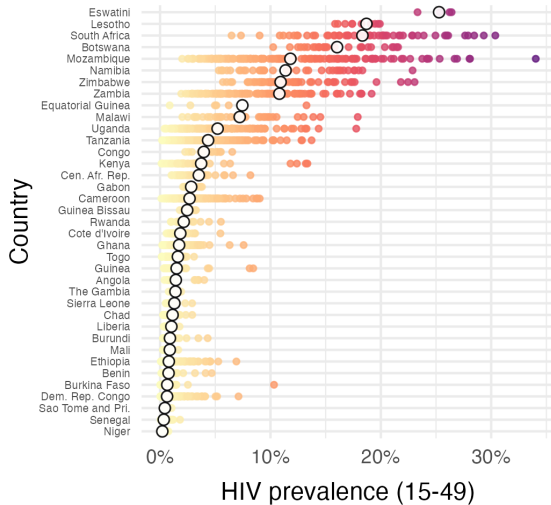# for small-area estimation of HIV indicators

Adam Howes

Imperial College London

December 2023

HIV prevalence (15-49)

Source: UNAIDS Naomi model estimates, 2023

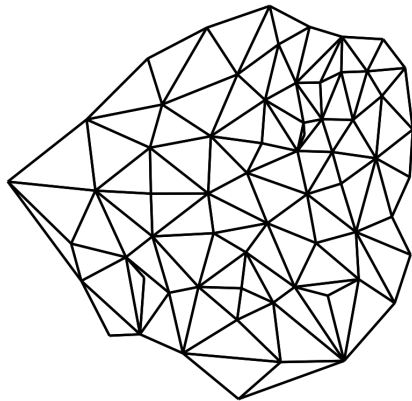Proportional to number of neighbours

Average of neighbours

$$u_i \mid \mathbf{u}_{-i} \sim \mathcal{N}\left(\frac{1}{n_{\delta i}} \sum_{j:j\sim i} u_j \,,\, \frac{1}{n_{\delta i}\tau_u} \right)$$
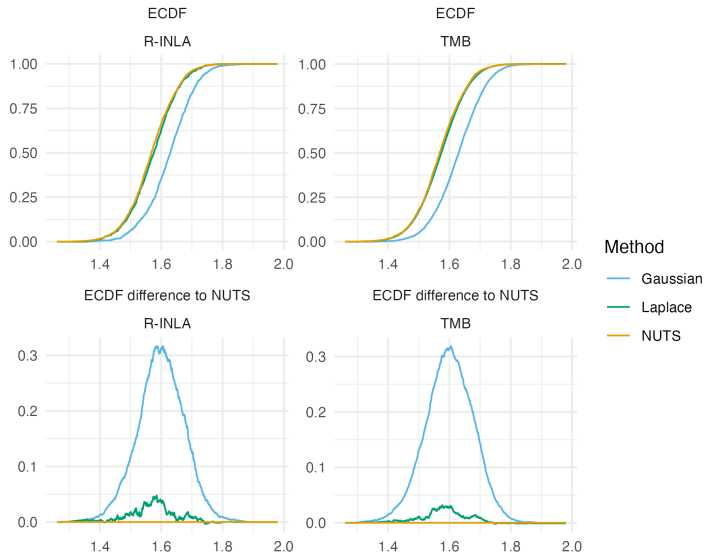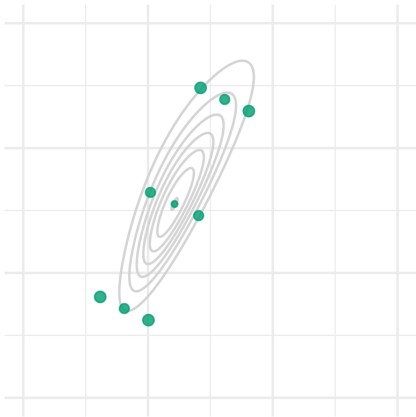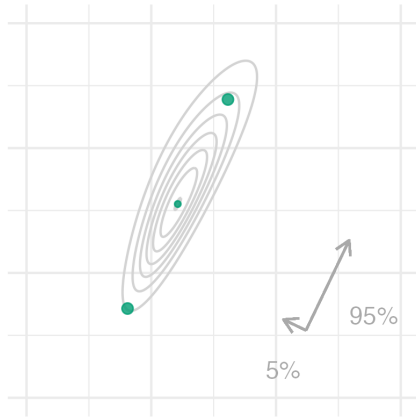
ith full conditional

3

A

B

ECDF

R-INLA

ECDF

TMB

ECDF difference to NUTS

R-INLA

ECDF difference to NUTS

TMB

Method

Gaussian
Laplace
NUTS

A

AGHQ (spectral)

B

PCA-AGHQ

95%

5%

References I