

Why do we use spatial models?

Zambia HIV Estimates Technical Working Group

Adam Howes

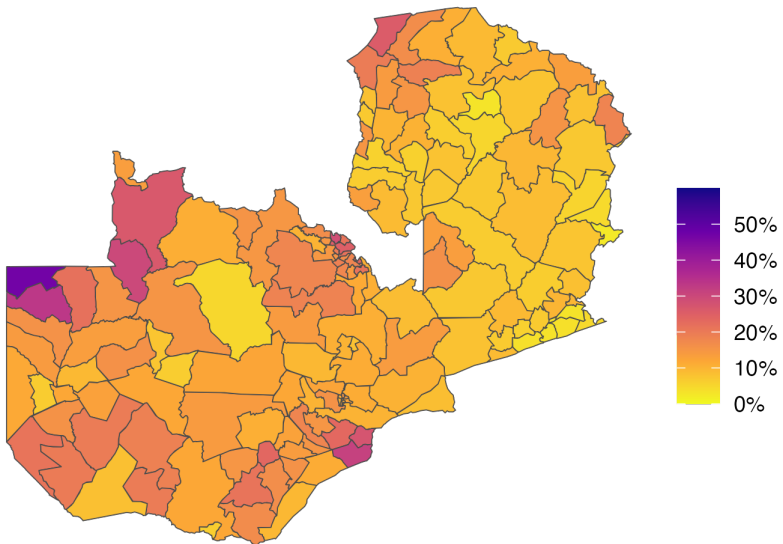
Imperial College London

August 2023

The 156 constituencies of Zambia

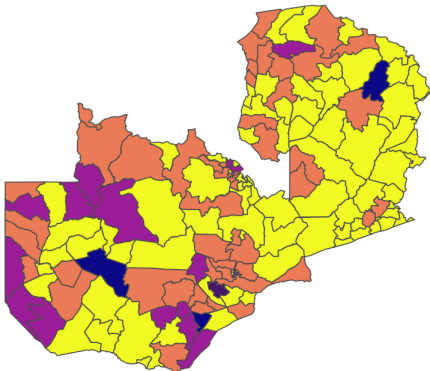


Underlying truth

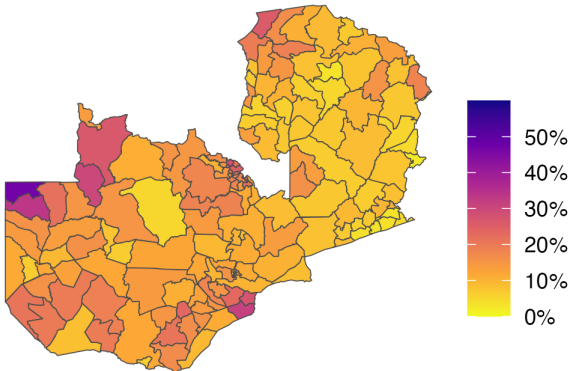


Survey of size 5

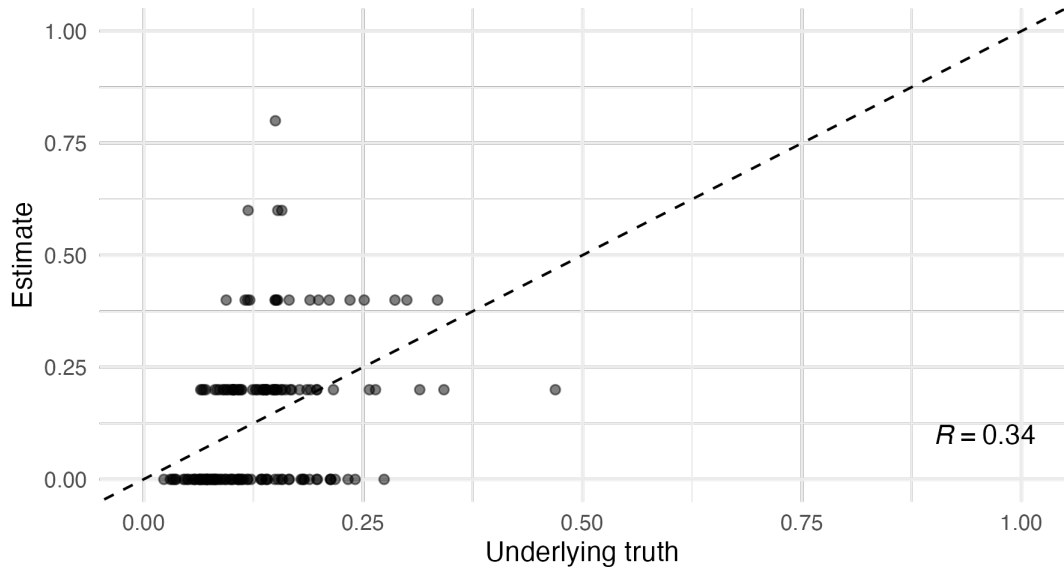
Direct estimates



Underlying truth

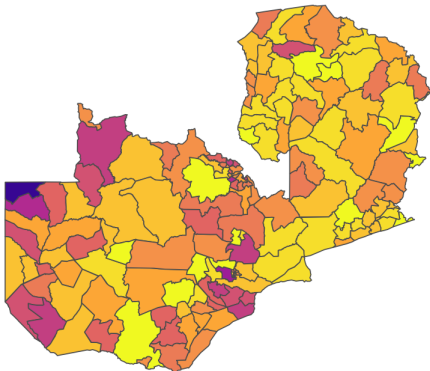


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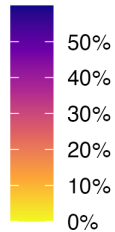
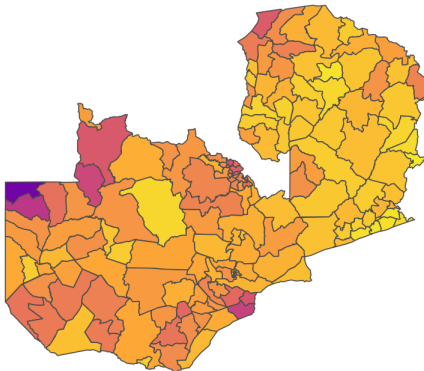


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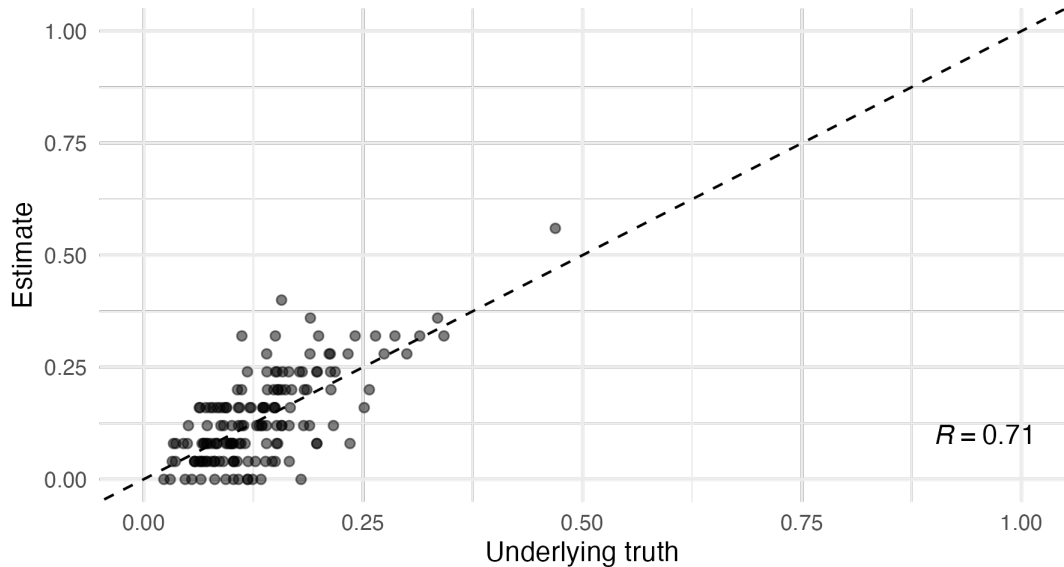
Direct estimates



Underlying truth

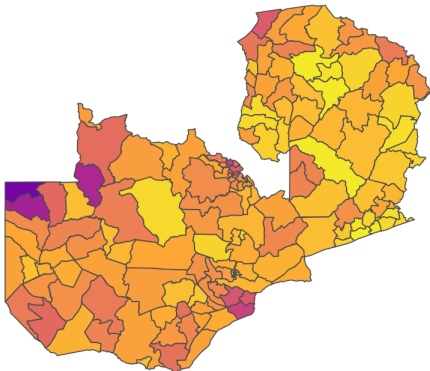


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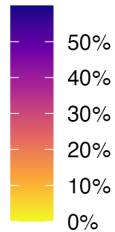
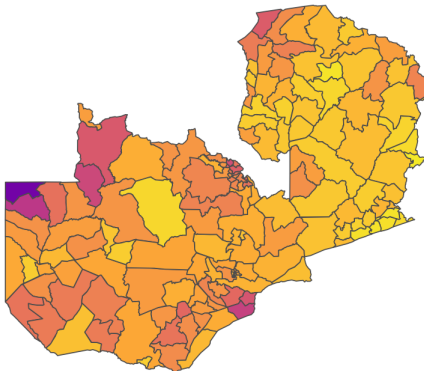


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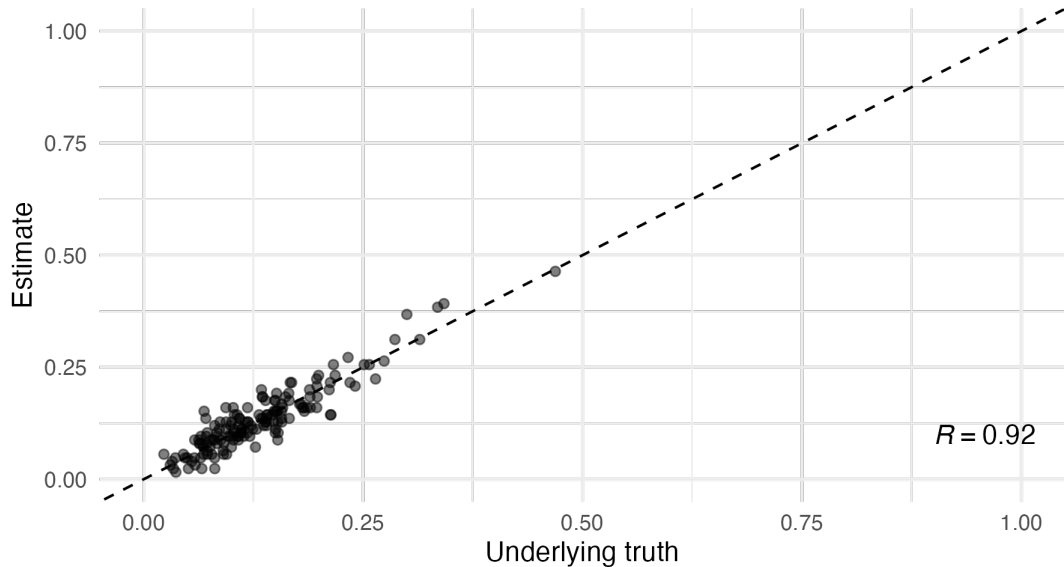
Direct estimates

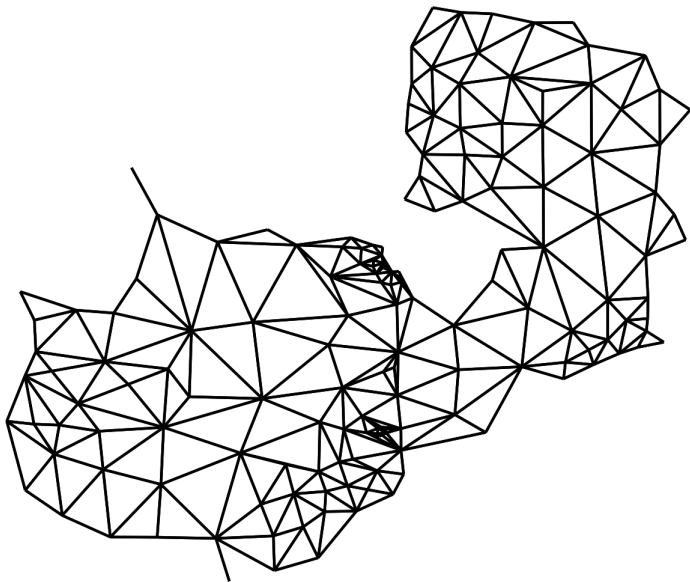


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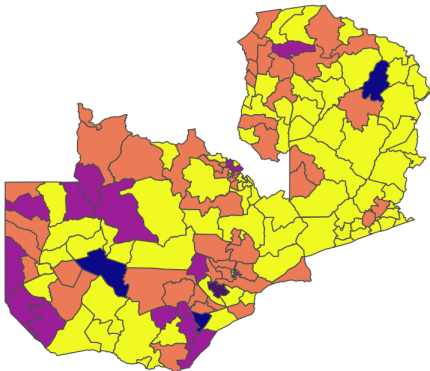
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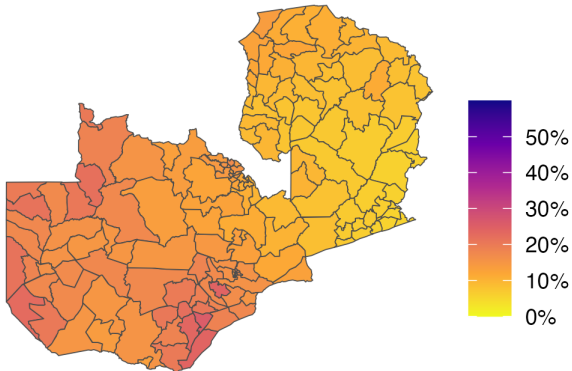


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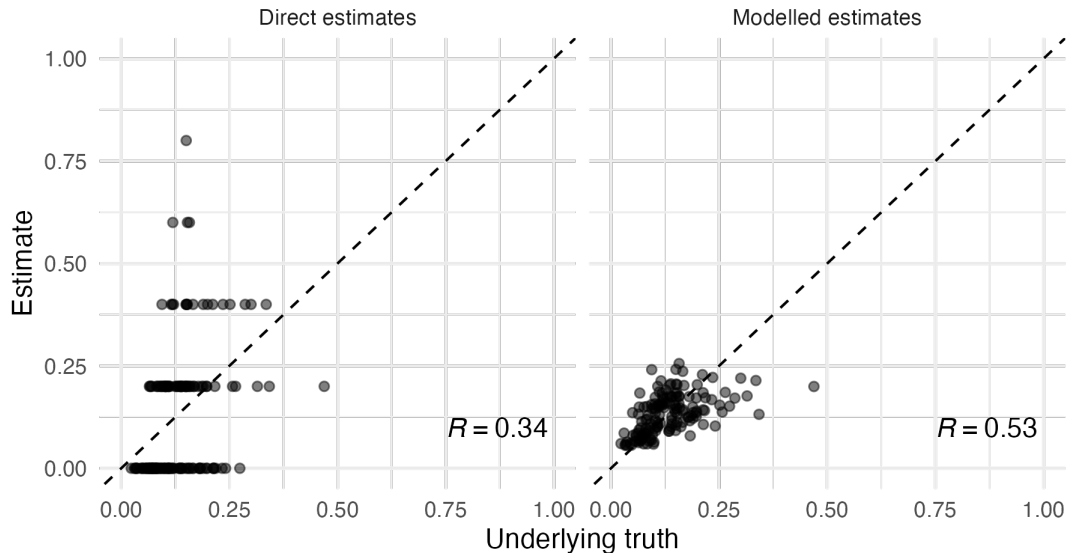
Direct estimates



Modelled estimates

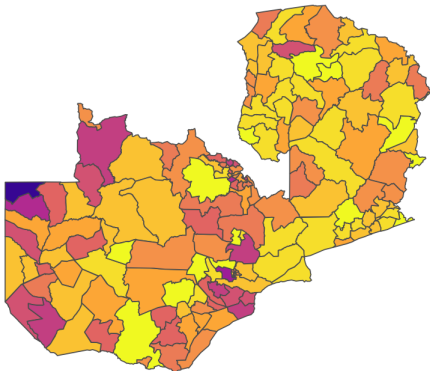


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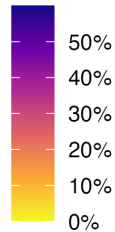
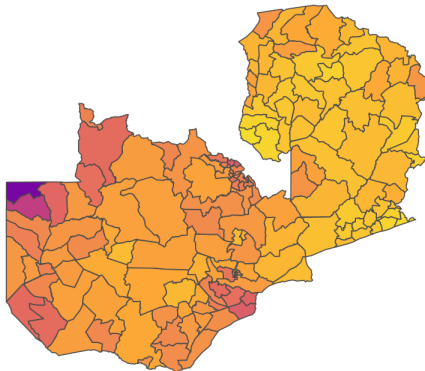


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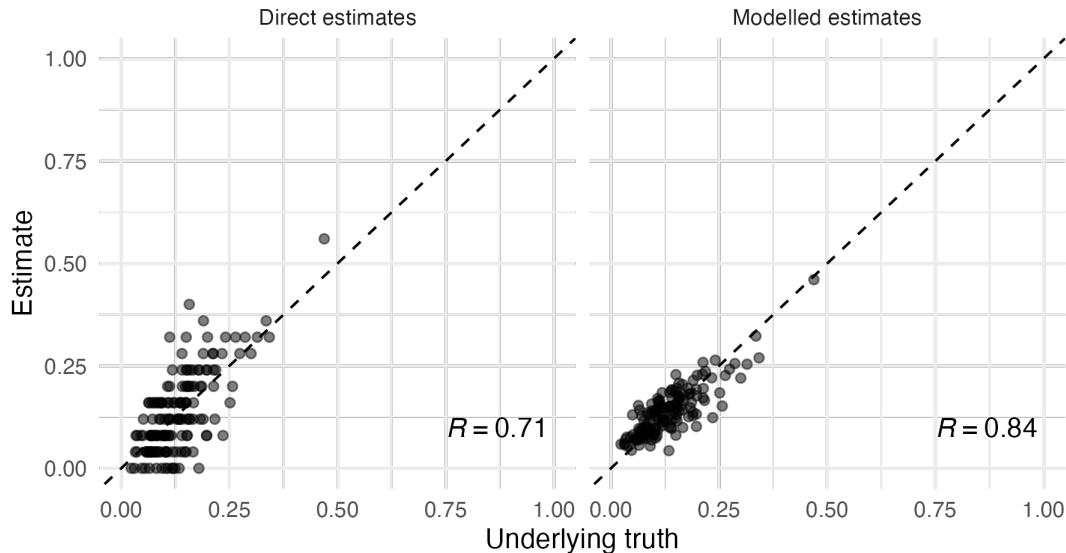
Direct estimates



Modelled estimates

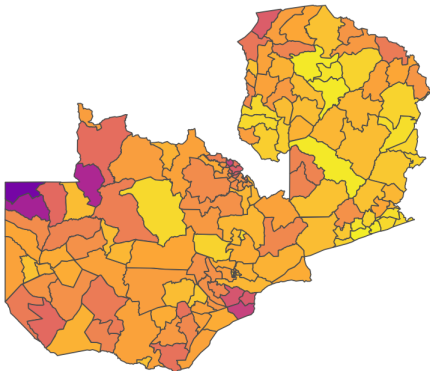


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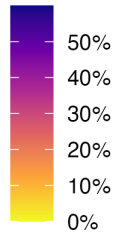
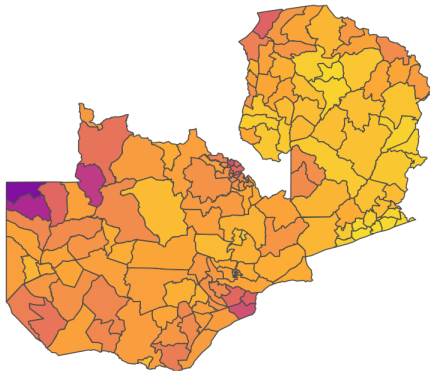


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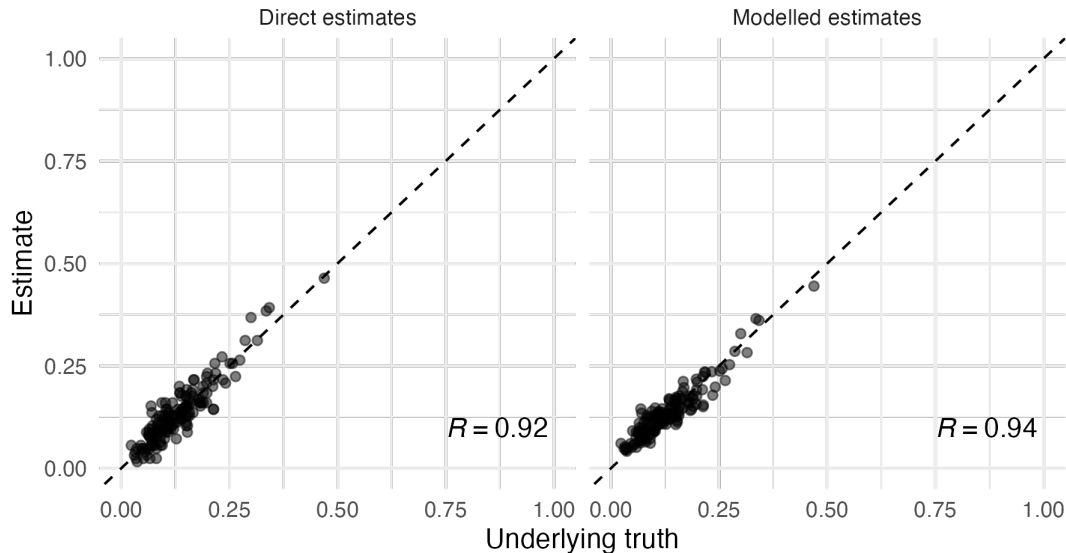
Direct estimates



Modelled estimates



Survey of size 125



- Besag, York, and Mollié (1991)
- Simpson et al. (2017)

Thanks for listening!



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MACHINE LEARNING
& GLOBAL HEALTH NETWORK

References I

- Besag, Julian, Jeremy York, and Annie Mollié. 1991. "Bayesian image restoration, with two applications in spatial statistics." *Annals of the Institute of Statistical Mathematics* 43 (1): 1–20.
- Simpson, Daniel, Håvard Rue, Andrea Riebler, Thiago G Martins, and Sigrunn H Sørbye. 2017. "Penalising Model Component Complexity: A Principled, Practical Approach to Constructing Priors." *Statistical Science* 32 (1): 1–28.