

Supplementary material to accompany: The Role of Spatially Varying Loadings in Dynamic Spatial Factor Models for Modeling the Opioid Syndemic

Eva Murphy*, David Kline†, Staci A. Hepler‡

In this supplementary material we present supplementary graphs to our manuscript titled: The Role of Spatially Varying Loadings in Dynamic Spatial Factor Models for Modeling the Opioid Syndemic.

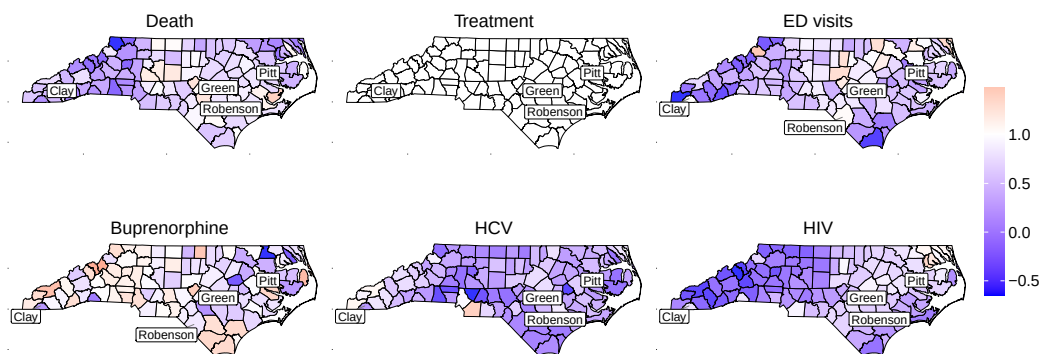


Figure SM1: Posterior mean estimates of the raw, not centered, spatially varying loadings.

*Wake Forest University. E-mail: murphye@wfud.edu

†Wake Forest University School of Medicine. E-mail: dkline@wakehealth.edu

‡Wake Forest University. E-mail: heplersa@wfu.edu

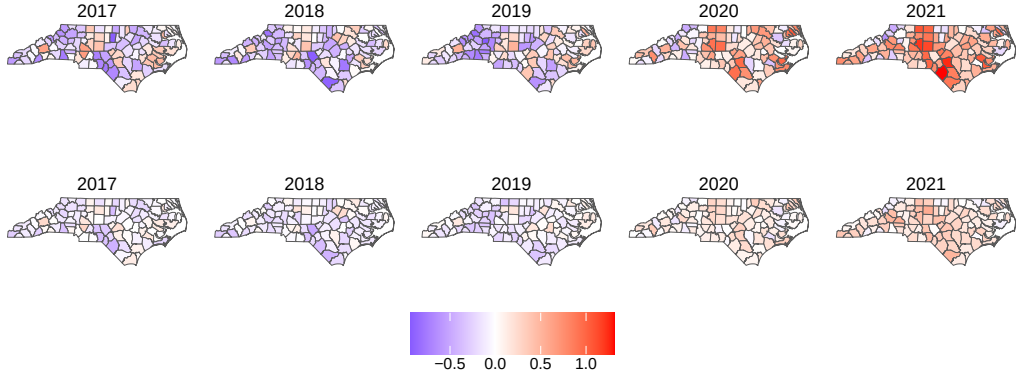


Figure SM2: Posterior mean estimates of the $\varepsilon^{(D)}$ with spatially constant loadings (**top row**) and with spatially varying loadings (**bottom row**).

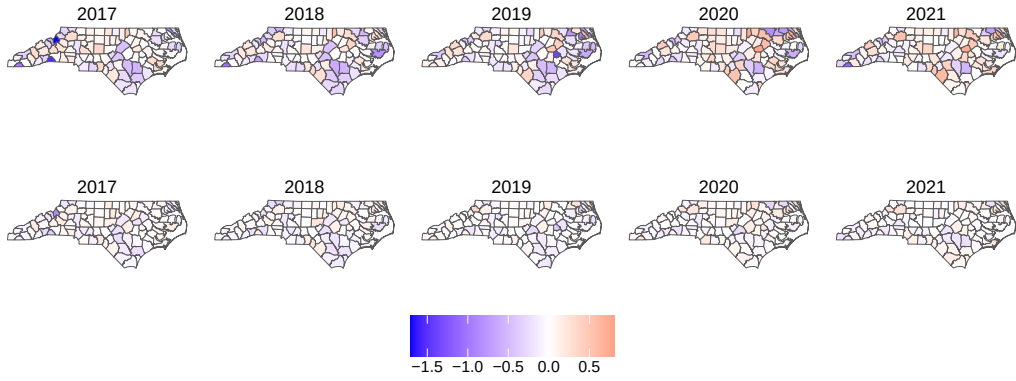


Figure SM3: Posterior mean estimates of the $\varepsilon^{(T)}$ with spatially constant loadings (**top row**) and with spatially varying loadings (**bottom row**).

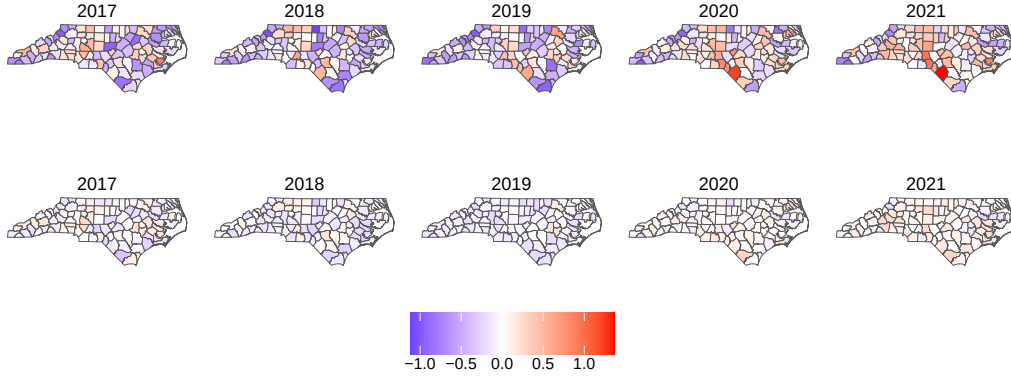


Figure SM4: Posterior mean estimates of the $\varepsilon^{(E)}$ with spatially constant loadings (**top row**) and with spatially varying loadings (**bottom row**).

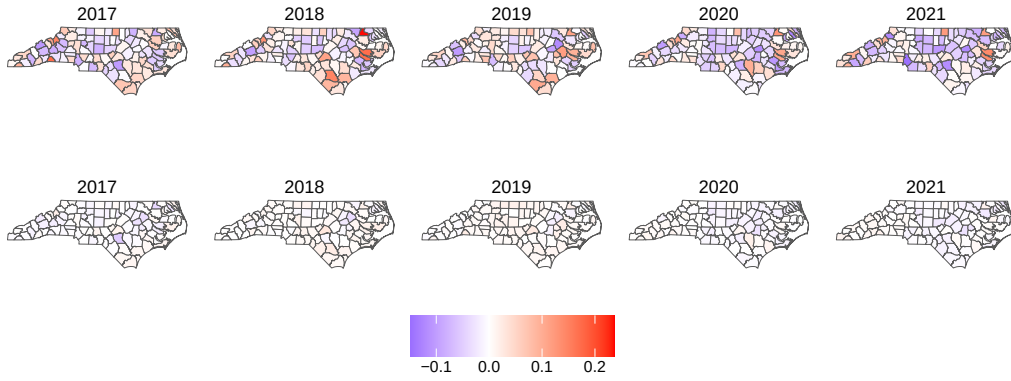


Figure SM5: Posterior mean estimates of the $\varepsilon^{(B)}$ with spatially constant loadings (**top row**) and with spatially varying loadings (**bottom row**).

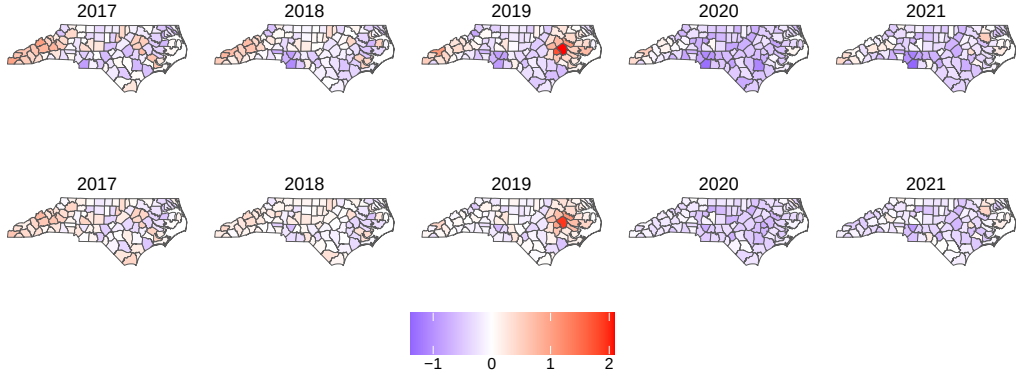


Figure SM6: Posterior mean estimates of the $\varepsilon^{(C)}$ with spatially constant loadings (**top row**) and with spatially varying loadings (**bottom row**).

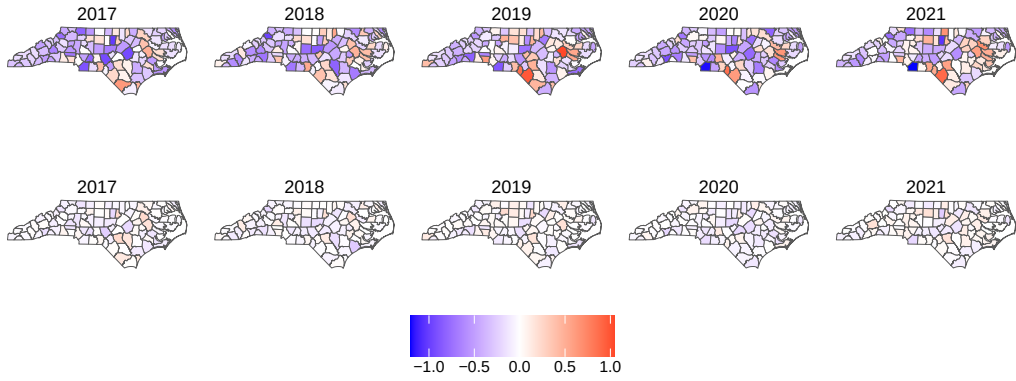


Figure SM7: Posterior mean estimates of the $\varepsilon^{(I)}$ with spatially constant loadings (**top row**) and with spatially varying loadings (**bottom row**).

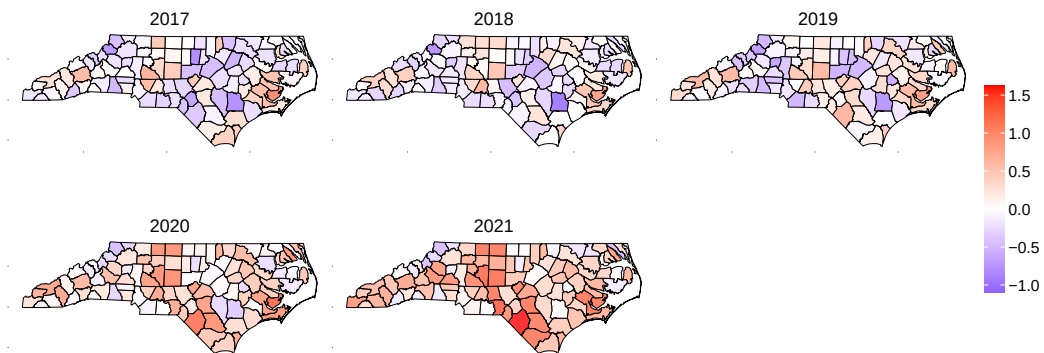


Figure SM8: Posterior mean estimates of the log relative risk death counts with spatially varying loadings.

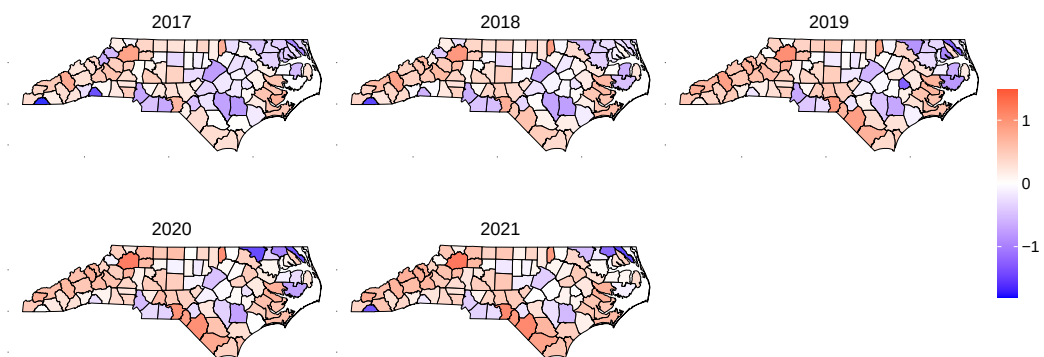


Figure SM9: Posterior mean estimates of the log relative risk of treatment counts with spatially varying loadings.

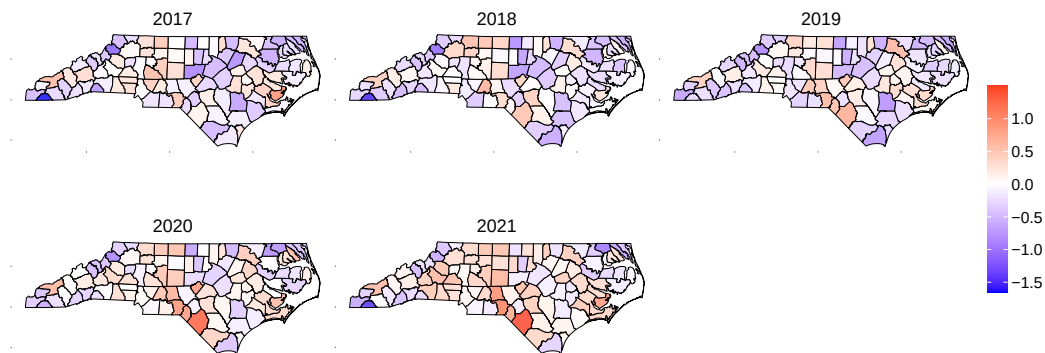


Figure SM10: Posterior mean estimates of the log relative risk of emergency visit counts.

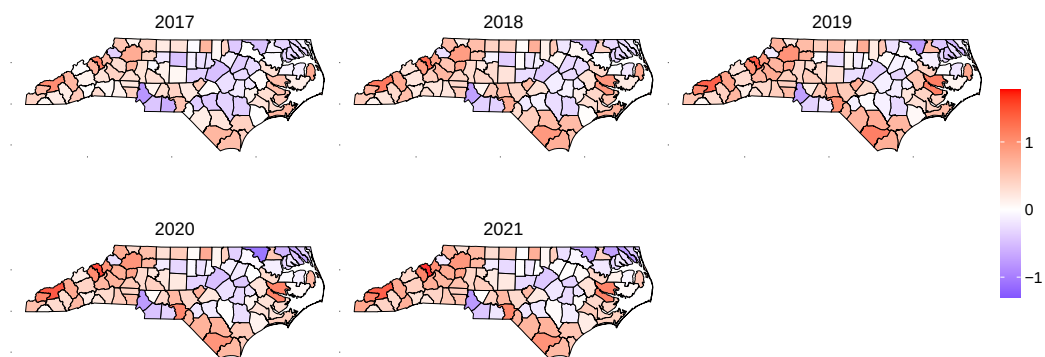


Figure SM11: Posterior mean estimates of the log relative risk of buprenorphine prescription counts with spatially varying loadings.

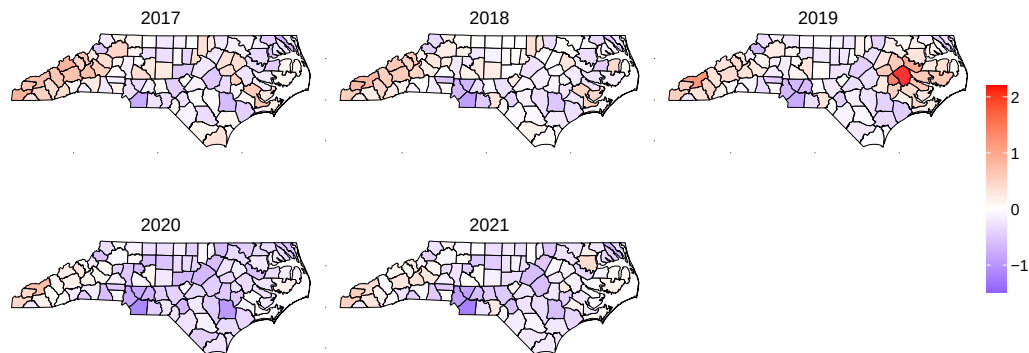


Figure SM12: Posterior mean estimates of the log relative risk of HCV infection counts with spatially varying loadings.

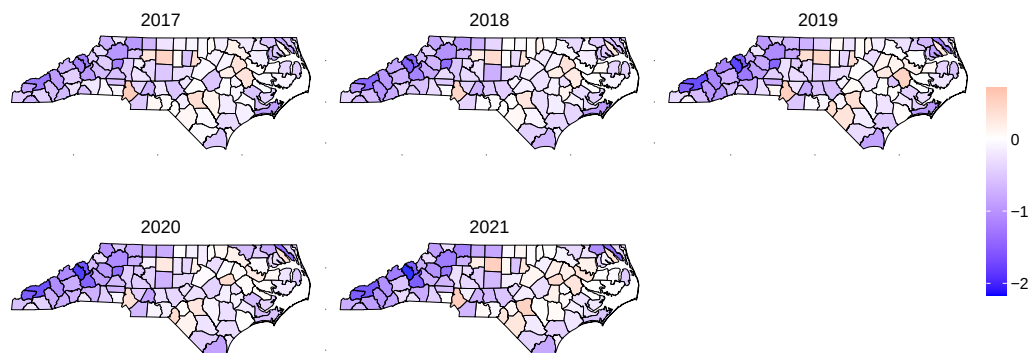


Figure SM13: Posterior mean estimates of the log relative risk of HIV infection counts with spatially varying loadings.

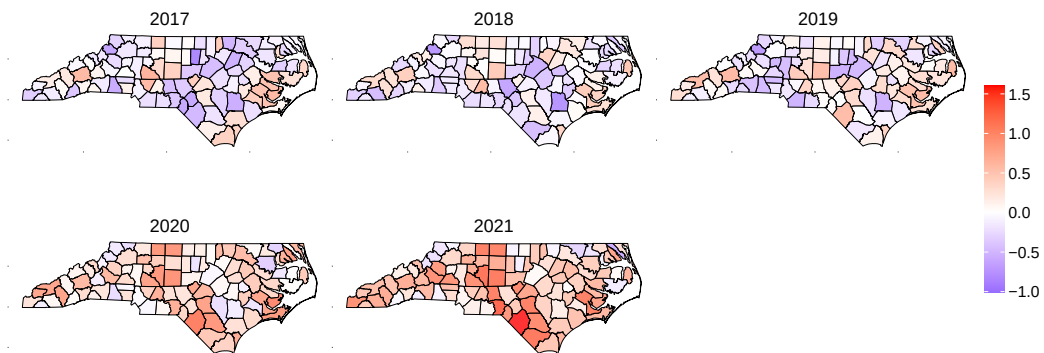


Figure SM14: Posterior mean estimates of the log relative risk death counts with spatially constant loadings.

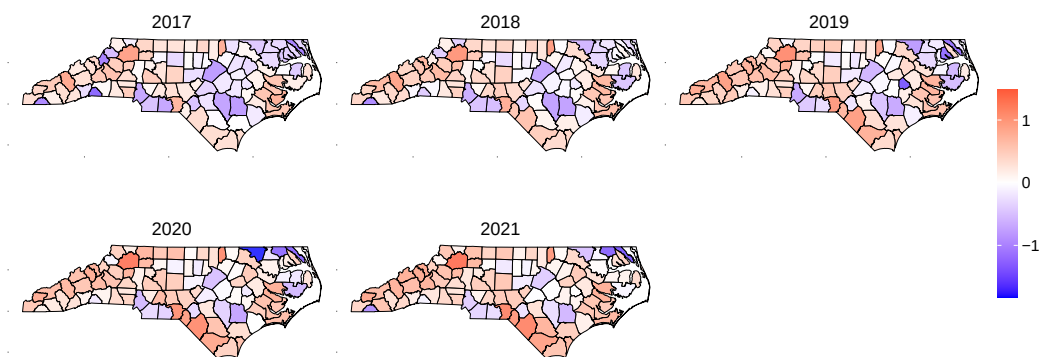


Figure SM15: Posterior mean estimates of the log relative risk of treatment counts with spatially constant loadings.

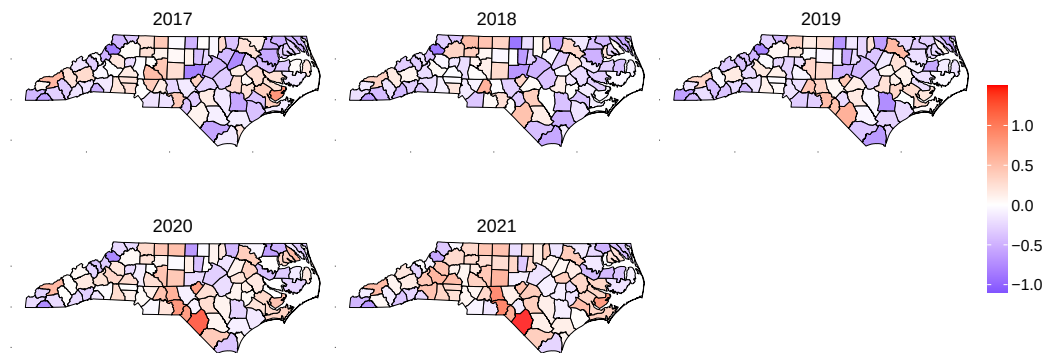


Figure SM16: Posterior mean estimates of the log relative risk of emergency visit counts with spatially constant loadings.

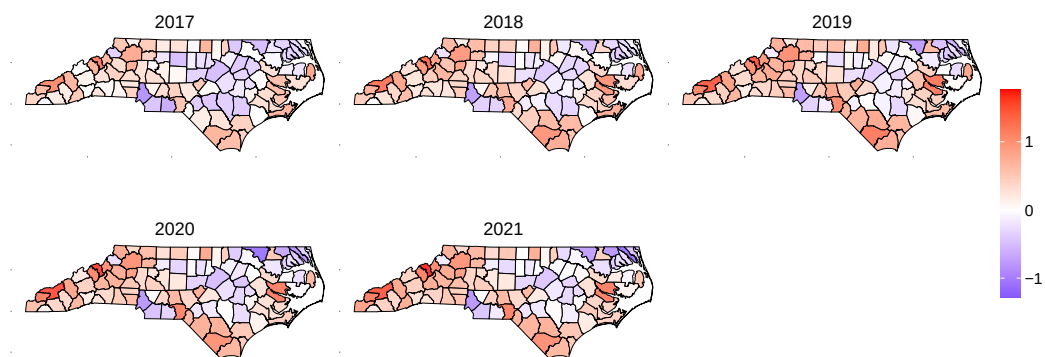


Figure SM17: Posterior mean estimates of the log relative risk of buprenorphine prescription counts with spatially constant loadings.

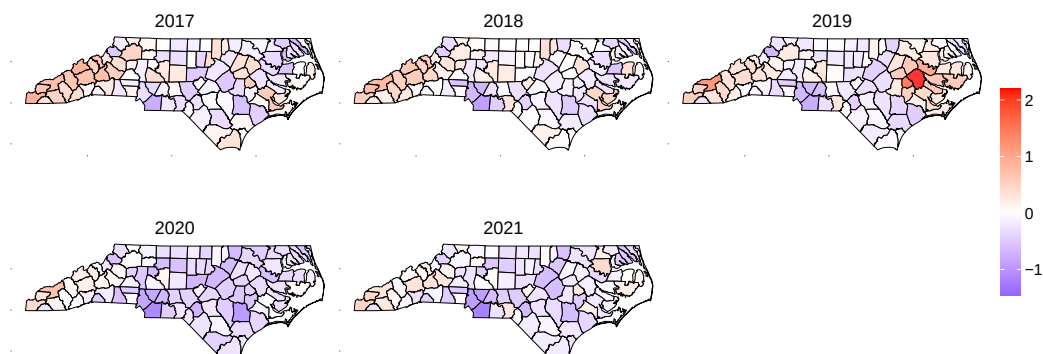


Figure SM18: Posterior mean estimates of the log relative risk of HCV infection counts with spatially constant loadings.

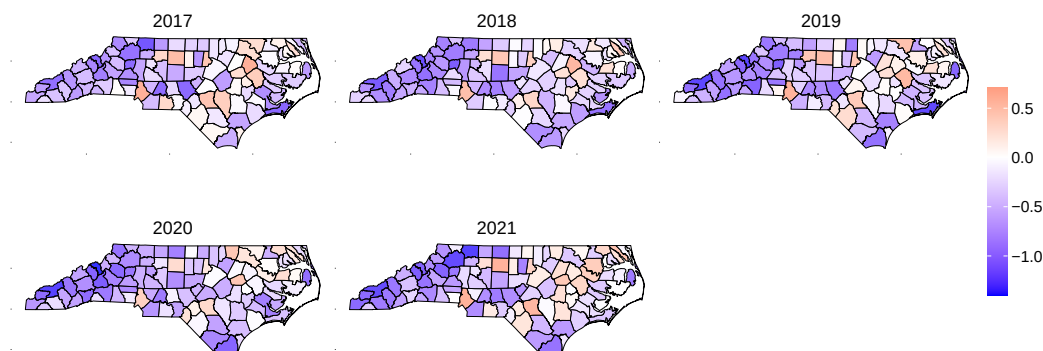


Figure SM19: Posterior mean estimates of the log relative risk of HIV infection counts with spatially constant loadings.

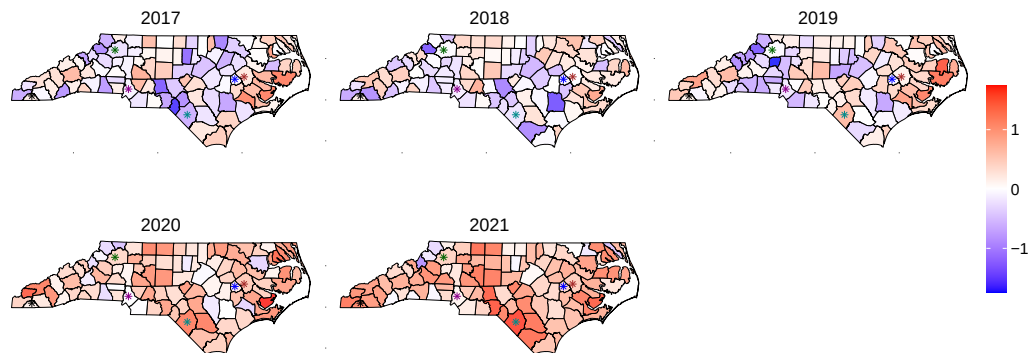


Figure SM20: Observed log standardized relative risk for death counts.

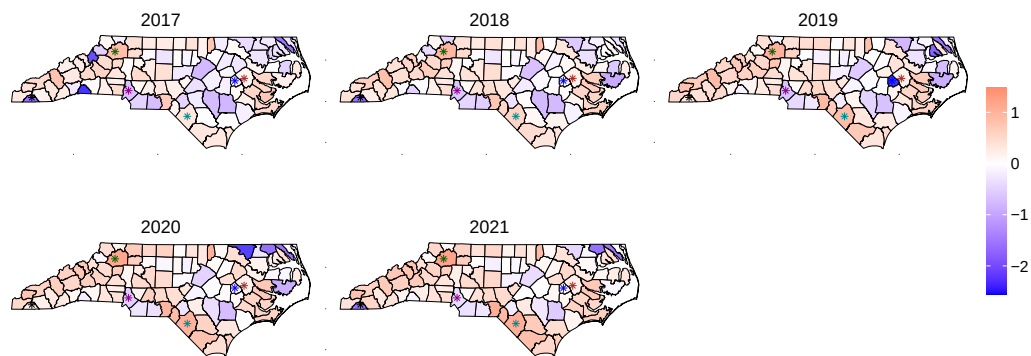


Figure SM21: Observed log standardized relative risk for treatment counts

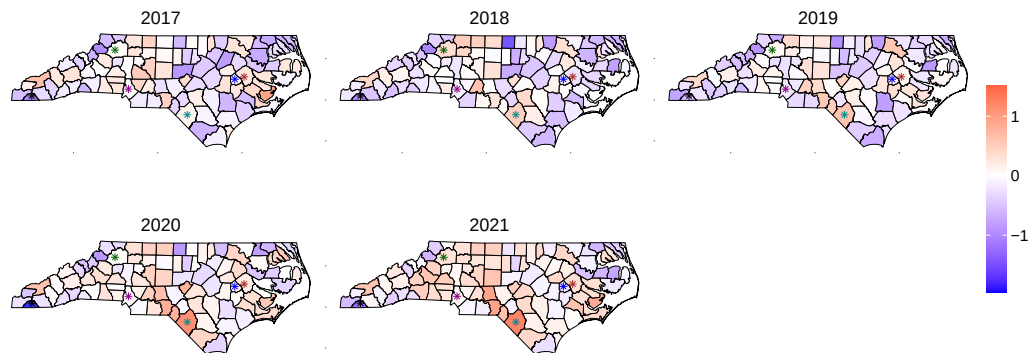


Figure SM22: Observed log standardized relative risk for E.D. visits.

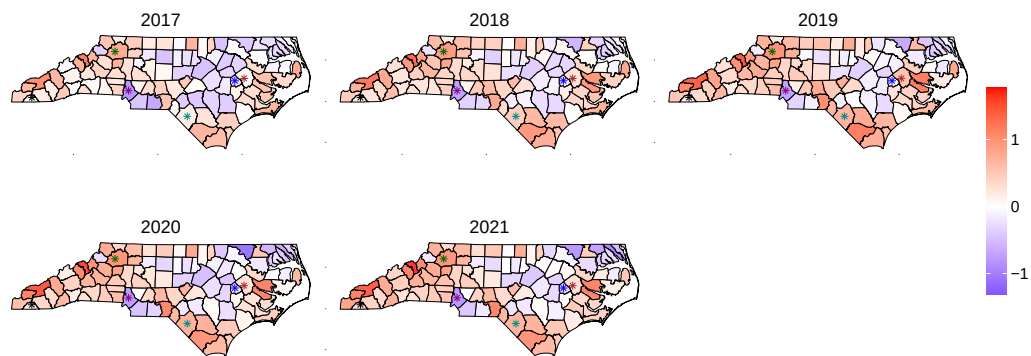


Figure SM23: Observed log standardized relative risk for buprenorphine prescriptions.

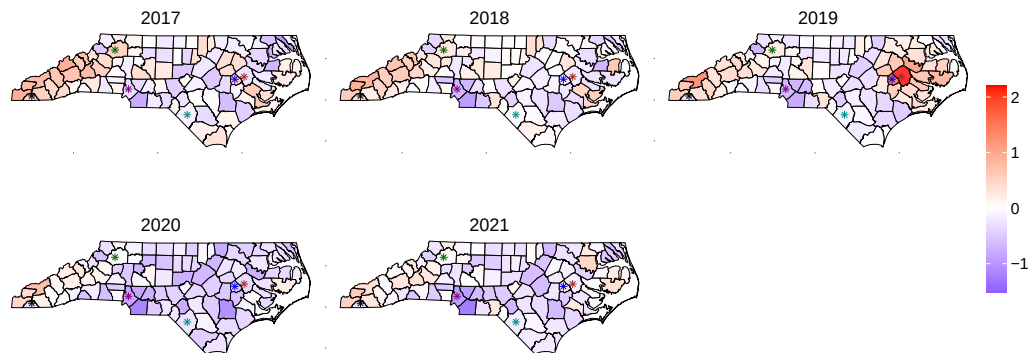


Figure SM24: Observed log standardized relative risk for HCV infection counts.

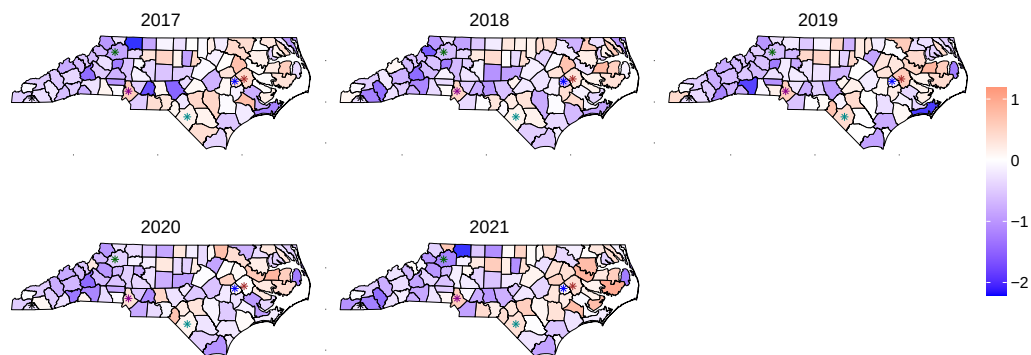


Figure SM25: Observed log standardized relative risk for HIV infection counts.

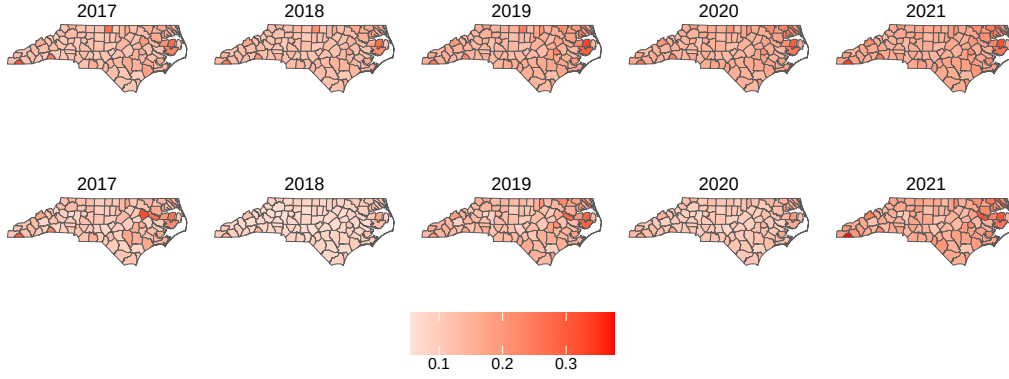


Figure SM26: Posterior standard deviation estimates of the latent factor under Gamma(5,2) (**top row**) and Gamma(0.5, 0.5) (**bottom row**) prior distributions for the precision parameters.

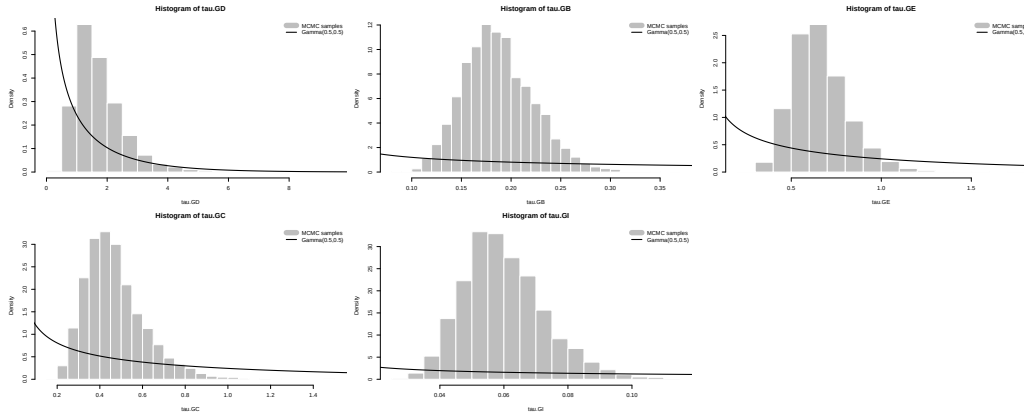


Figure SM27: Posterior distributions of precision parameters for the loadings (tau.GD: precision for loadings pertaining to D; tau.GB: precision for loadings pertaining to B; tau.GE: precision for loadings pertaining to E; tau.GC: precision for loadings pertaining to C; tau.GI: precision for loadings pertaining to I, where D, E, B, C, I are defined in the main text) with Gamma(0.5, 0.5) prior densities overlaid (**black curves**).

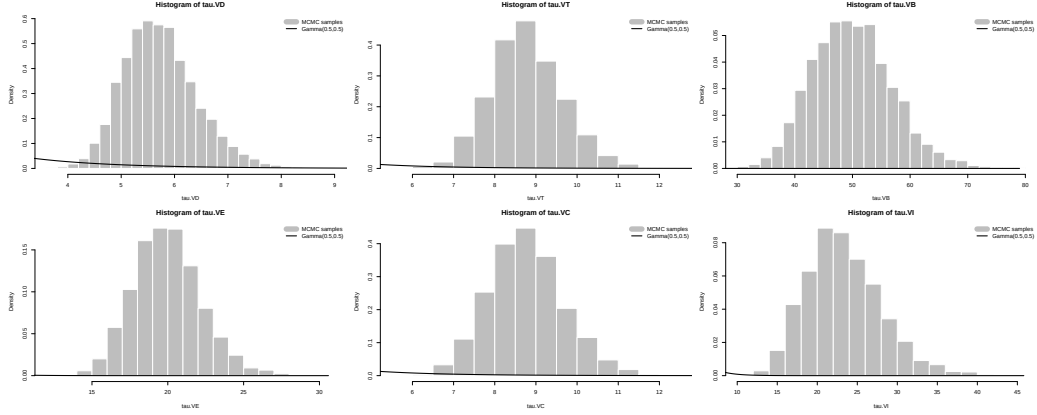


Figure SM28: Posterior distributions of precision parameters for the $\varepsilon^{(k)}$ (tau.VD: precision pertaining to $\varepsilon^{(D)}$; tau.VT: precision pertaining to $\varepsilon^{(T)}$; tau.VB: precision pertaining to $\varepsilon^{(B)}$; tau.VE: precision pertaining to $\varepsilon^{(E)}$; tau.VC: precision pertaining to $\varepsilon^{(C)}$; tau.VI: precision pertaining to $\varepsilon^{(I)}$, where D, T, E, B, C, I are defined in the main text) with Gamma(0.5, 0.5) prior densities overlaid (**black curves**).

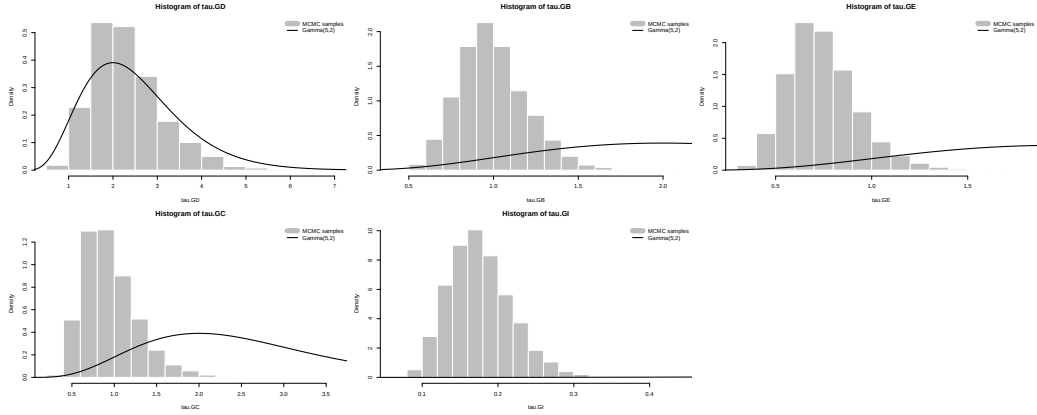


Figure SM29: Posterior distributions of precision parameters for the loadings (tau.GD: precision for loadings pertaining to D; tau.GB: precision for loadings pertaining to B; tau.GE: precision for loadings pertaining to E; tau.GC: precision for loadings pertaining to C; tau.GI: precision for loadings pertaining to I, where D, E, B, C, I are defined in the main text) with Gamma(5, 2) prior densities overlaid (**black curves**).

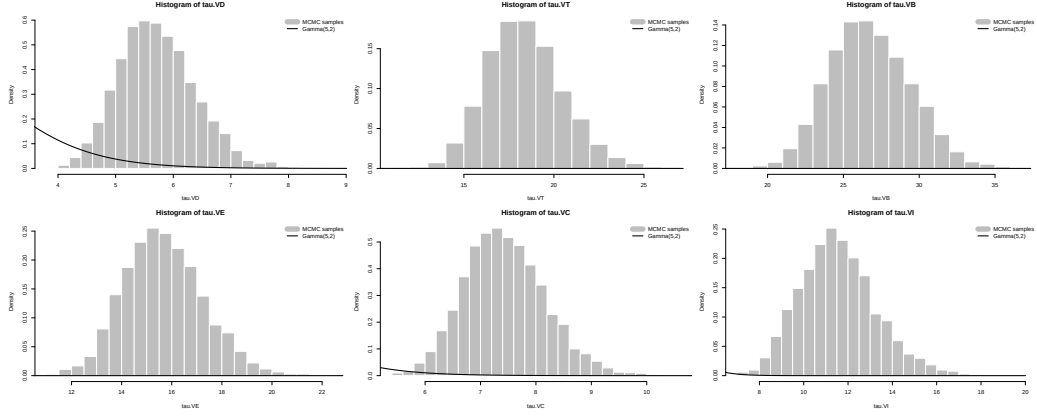


Figure SM30: Posterior distributions of precision parameters for the $\varepsilon^{(k)}$ (tau.VD: precision pertaining to $\varepsilon^{(D)}$; tau.VT: precision pertaining to $\varepsilon^{(T)}$; tau.VB: precision pertaining to $\varepsilon^{(B)}$; tau.VE: precision pertaining to $\varepsilon^{(E)}$; tau.VC: precision pertaining to $\varepsilon^{(C)}$; tau.VI: precision pertaining to $\varepsilon^{(I)}$, where D, T, E, B, C, I are defined in the main text) with Gamma(5, 2) prior densities overlaid (**black curves**).