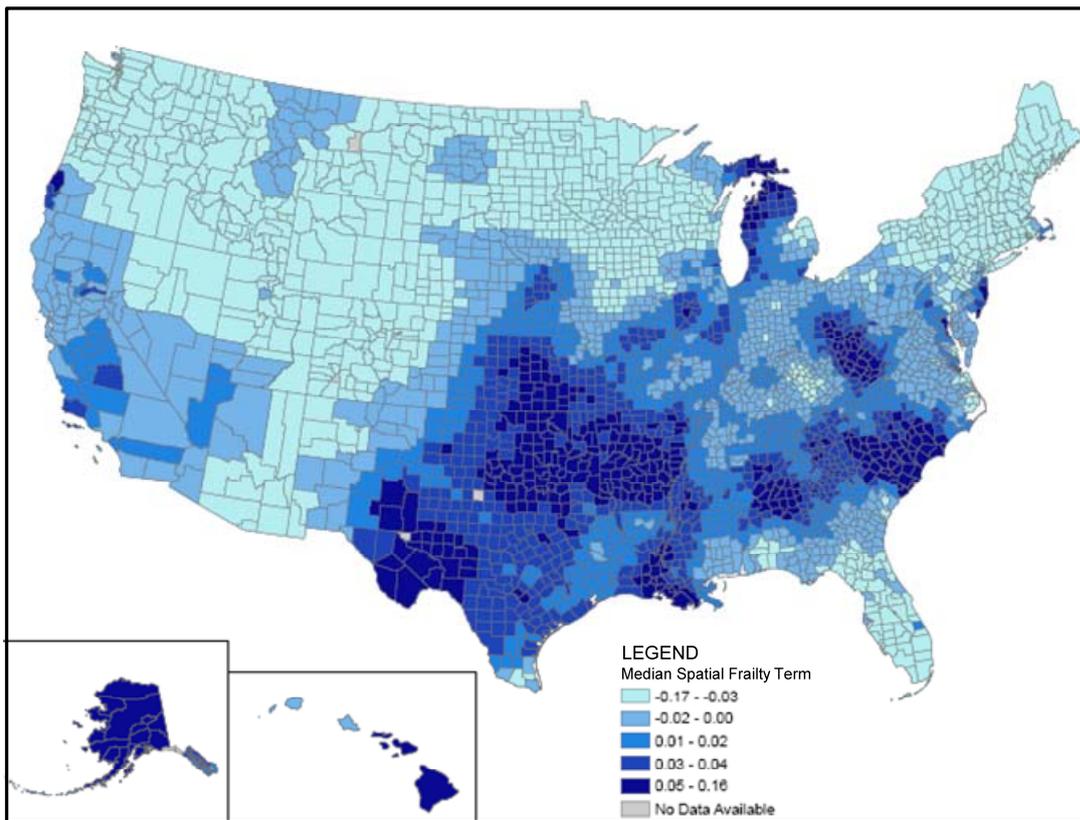


Online Figure 1. Smoothed, Age-Adjusted 1-Year Recurrent Ischemic Stroke Rates by US County, 2000-2003



Online Figure 2. Posterior Median Spatial Frailties from Conditionally Autoregressive Model

Supplemental Text:

Modeling

The CAR model smooths county risk estimates towards the mean risk of the adjacent counties to provide more precise and reliable estimates, especially for counties with small sample sizes.¹ All covariates found to be statistically significant in bivariate analyses were included as fixed-effects in the model and standardized as the difference from the national mean, providing risk standardized 1-year recurrent ischemic stroke rates for each county.

Model parameters were estimated using Markov Chain Monte Carlo (MCMC) simulation. We incorporated an uncorrelated (heterogeneity) random effect into the model to control for any extra-Poisson variation due to omitted variables. The adjacency matrix used in the spatial random effect was created using GeoDa first order queens contiguity weights.² The Deviance Information

Criteria (DIC)³ determined that the CAR model had a better goodness-of-fit than the simple Bayesian Poisson model.

Models were run on three parallel Gibbs sampler chains and monitored using sample autocorrelations within the chains, plots of sample traces and plots of the Gelman-Rubin reduction factor.⁴ Each chain was run for 50,000 iterations. Based on diagnostic tools, we discarded the first 20,000 iterations as pre-convergence burn-in and retained every 10th iteration to reduce autocorrelation. Relative risk estimates and 95% credibility intervals were identified for all covariates. All Bayesian modeling was done in the 64-bit version of WinBUGS 1.4.3.⁵

Cartographic Displays

We mapped 1-year recurrent ischemic stroke rates by county. Rates were indirectly age-adjusted and smoothed using a weighted head-banging algorithm (Fig. 1-2).^{6,7} Risk standardized rates were smoothed as part of the statistical model (Fig. 3). Rates were classified by quintile. The quintile ranges identified for the total population were used for the maps of recurrent rates by gender and race/ethnicity. All maps were created using ArcGIS 9.2 by ESRI. Maps were drawn using an Albers equal area projection.

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