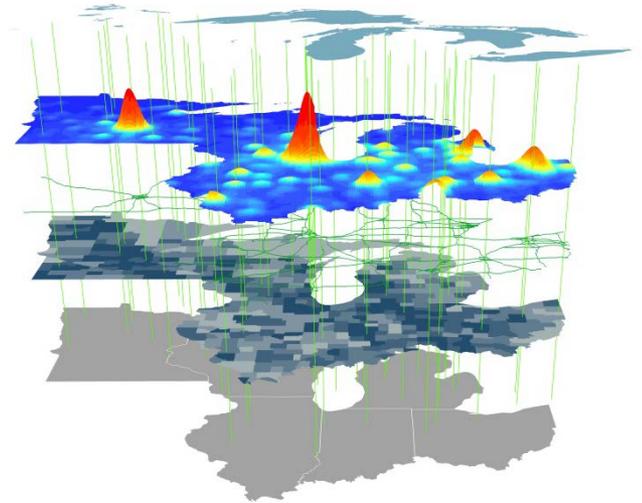


Modeling Spatial Data

Council for State and Territorial Epidemiologists
November 21, 2013

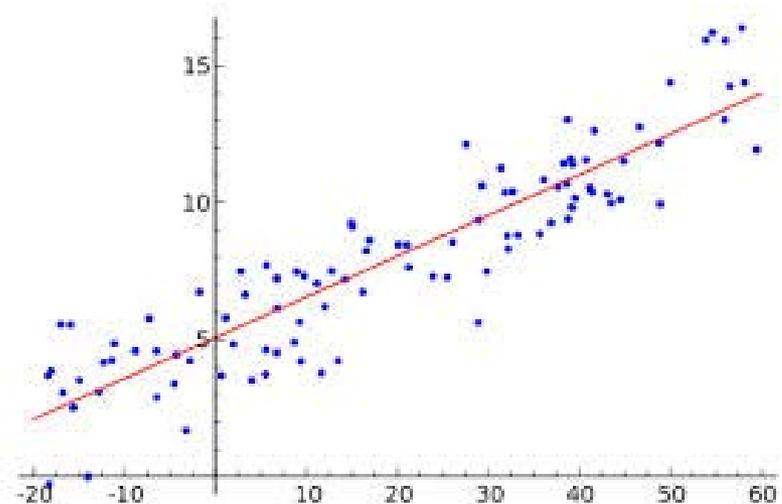


- Understand the challenges of linear regression when considering spatially explicit data
- Become familiar with a set of tools offered by ArcGIS desktop to:
 - Build an OLS model,
 - Perform model diagnostics for spatial autocorrelation, and
 - Evaluate spatial variation in the model terms



OLS Model Assumptions

- Observations of both the dependent and explanatory variables are from a random sample
- Residuals have a mean of zero, are normally distributed and independent from the explanatory variables
- Residuals have equal variance and are independent from each other

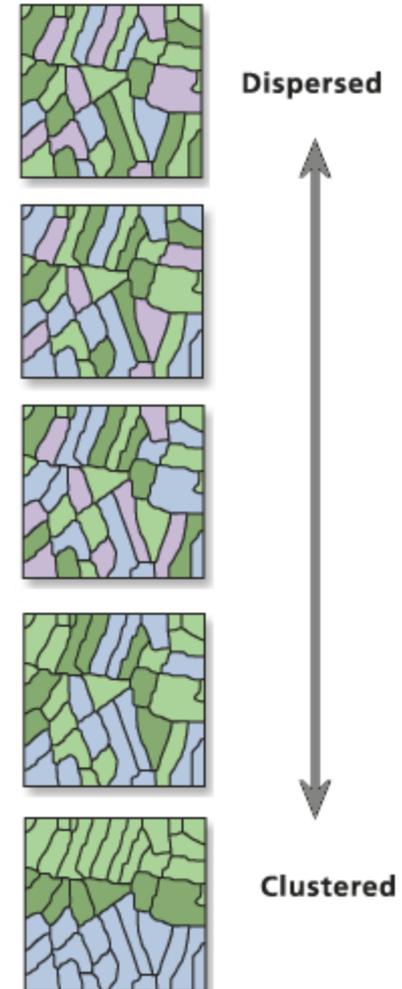


$$y_i = \alpha + \beta x_i + \epsilon_i.$$

Tobler's first law of geography: *Everything is related to everything else, but near things are more related than distant things...*

- **Spatial Autocorrelation (Moran's I)**

- **Moran's I measures the strength and significance of this relationship**
- **Tool for diagnosing potential problems with OLS model**



$$y_i = \alpha + \beta x_i + \varepsilon_i.$$

- Allows the relationship between model explanatory variables and dependent variable to vary over space
- Constructs a separate model for every feature in the dataset
- Another useful tool for diagnosing potential problems with OLS model

