

Explaining the Effect of Current U.S.
Region of Residence on Health
Expectancies:
The Role of Health Care Infrastructure

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Background

- Regional disparities in health across the U.S. are commonly noted in the literature
 - Usually focused on American South vs. other regions
 - Rarely the focus measure (usually a control)
 - Disparities often attributed to two causes:
 - differences in dietary and other “cultural” factors
 - differences in health infrastructure/policy

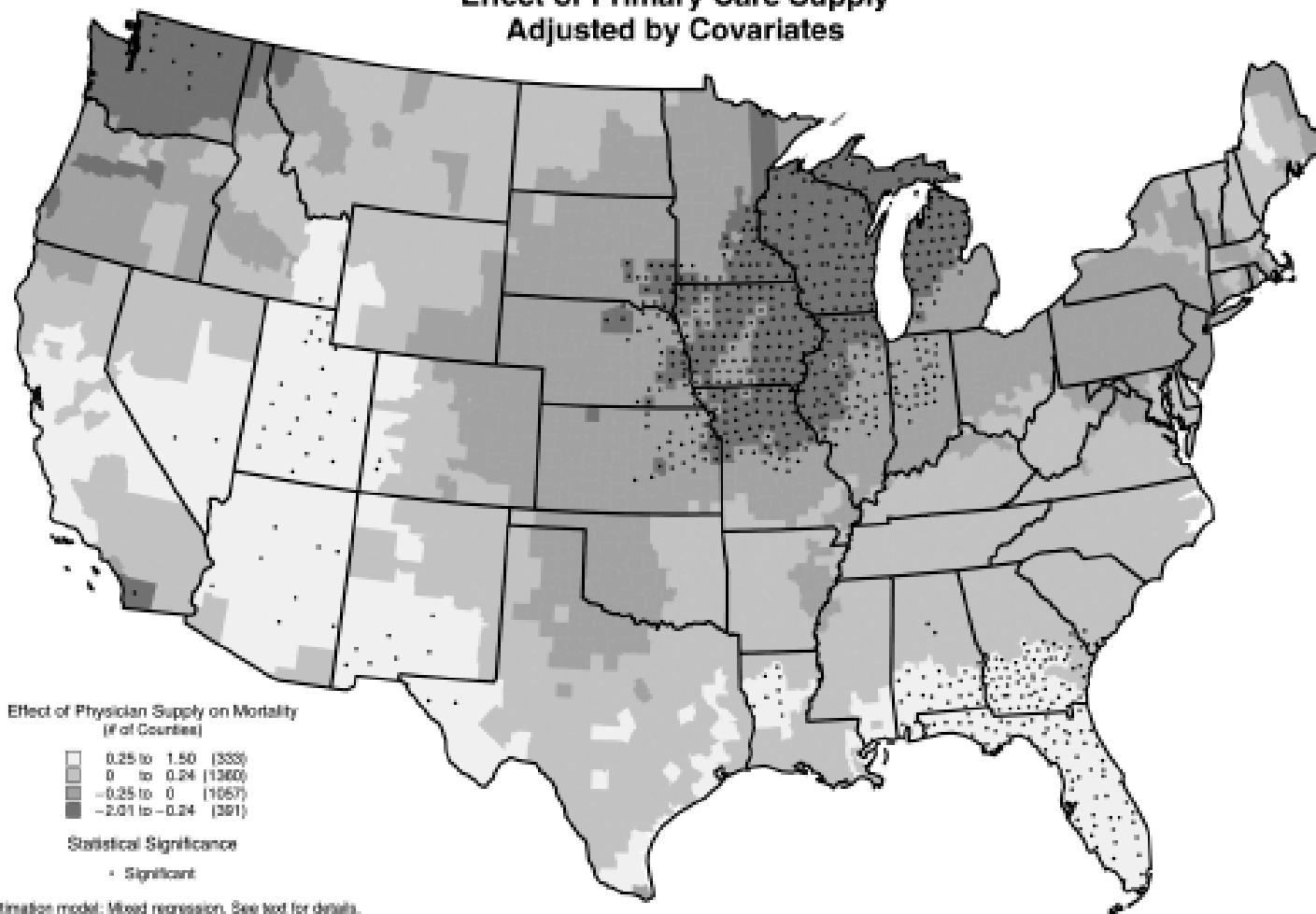
Background

- Healthcare Infrastructure related to health and mortality outcomes (see Macinko, Starfield, and Shi 2007)
 - Physician Supply is noted as especially relevant to better health outcomes including:
 - All-cause mortality, cancer, heart disease, stroke, infant mortality, life expectancy, self-rated health
 - An increase of one physician per 10,000 population associated with 5% reduction in average mortality

Region and Physician Supply

- Physician Supply effects are robust across various geographic levels including:
 - State, County, MSA, Non-MSA
- Regional Clustering of Physician Supply and mortality (Ricketts & Holmes, 2007), but examination of HLE is largely absent.

All Cause Age-Adjusted Mortality, 1996-2000
Effect of Primary Care Supply
Adjusted by Covariates



Effect of Physician Supply on Mortality
 (# of Counties)

- 0.25 to 1.50 (333)
- 0 to 0.24 (1360)
- -0.25 to 0 (1657)
- -2.01 to -0.24 (391)

Statistical Significance
 • Significant

Estimation model: Mixed regression. See text for details.
 Values are estimates of the local effect of the physician supply on mortality (i.e. the regression coefficient on physician supply).
 Positive means greater physician supply is associated with increased mortality.
 Negative means greater physician supply is associated with decreased mortality.

Source: Area Resource File, Various Years.
 Produced By: Southeast Regional Center for Health Workforce Studies, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.

Research Questions

- What are the regional differences in HLE across the 9 U.S. Census divisions?
- What effect does physician supply have on regional HLE differences, if any?

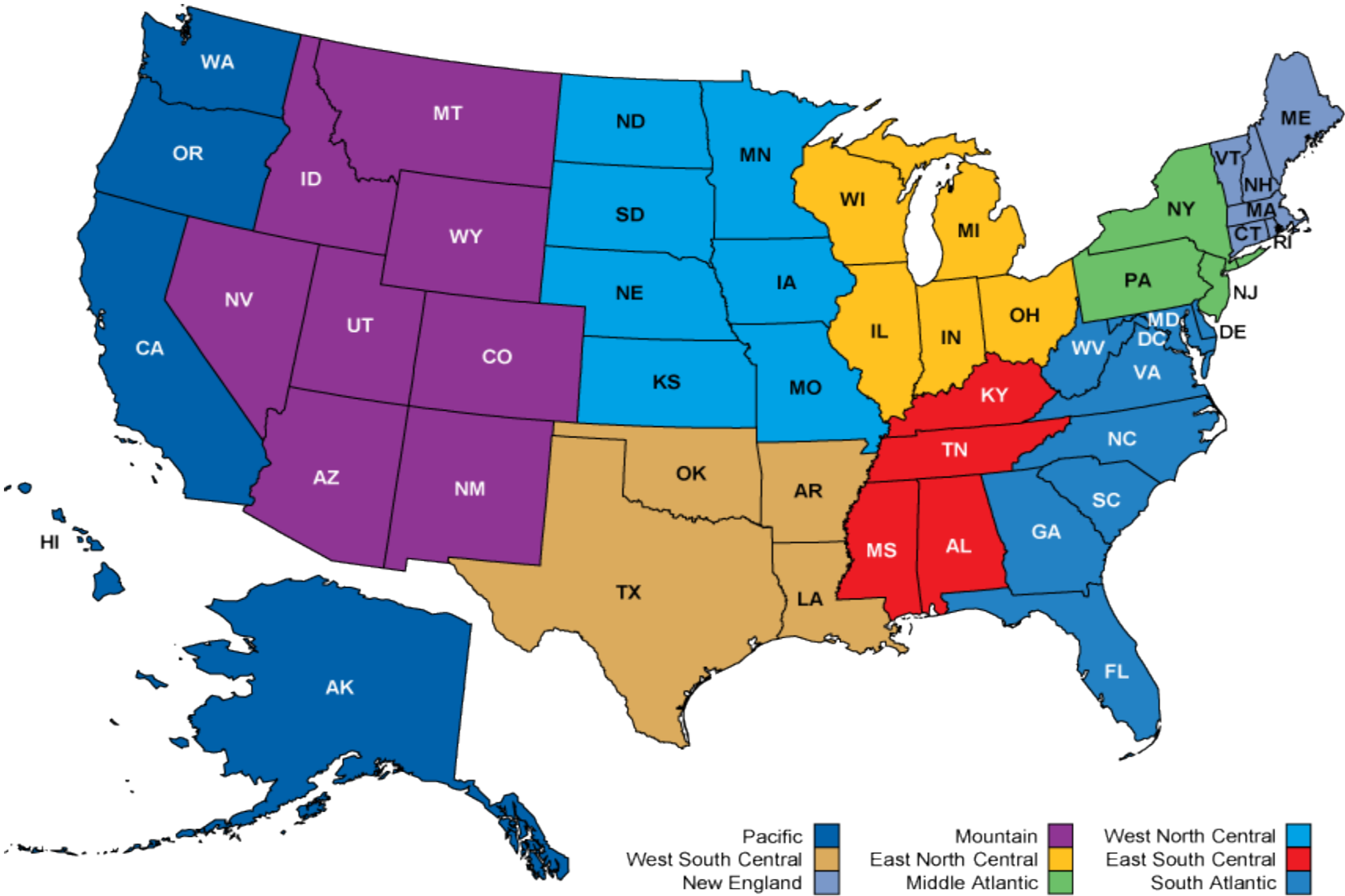
Data

- Individual data come from the HRS 1998-2008
 - N = 15,150
 - About 43% Male, 15% Nonwhite
 - Mean Age 67.2 (s.d.= 10.5)
- Structural data come from the Area Resource Files 1998-2008
 - 3,075 counties
 - Exclude Hawaii & Alaska

Data

- Self-Rated Health is measured with traditional categories: Excellent, Very Good, good, Fair, Poor.
- Collapsed to dichotomous measure for life tables
 - Fair and Poor vs. Good, Very Good, and Excellent
- Physician supply measured as a ratio of count of physicians to population

9 U.S. Census Region Divisions



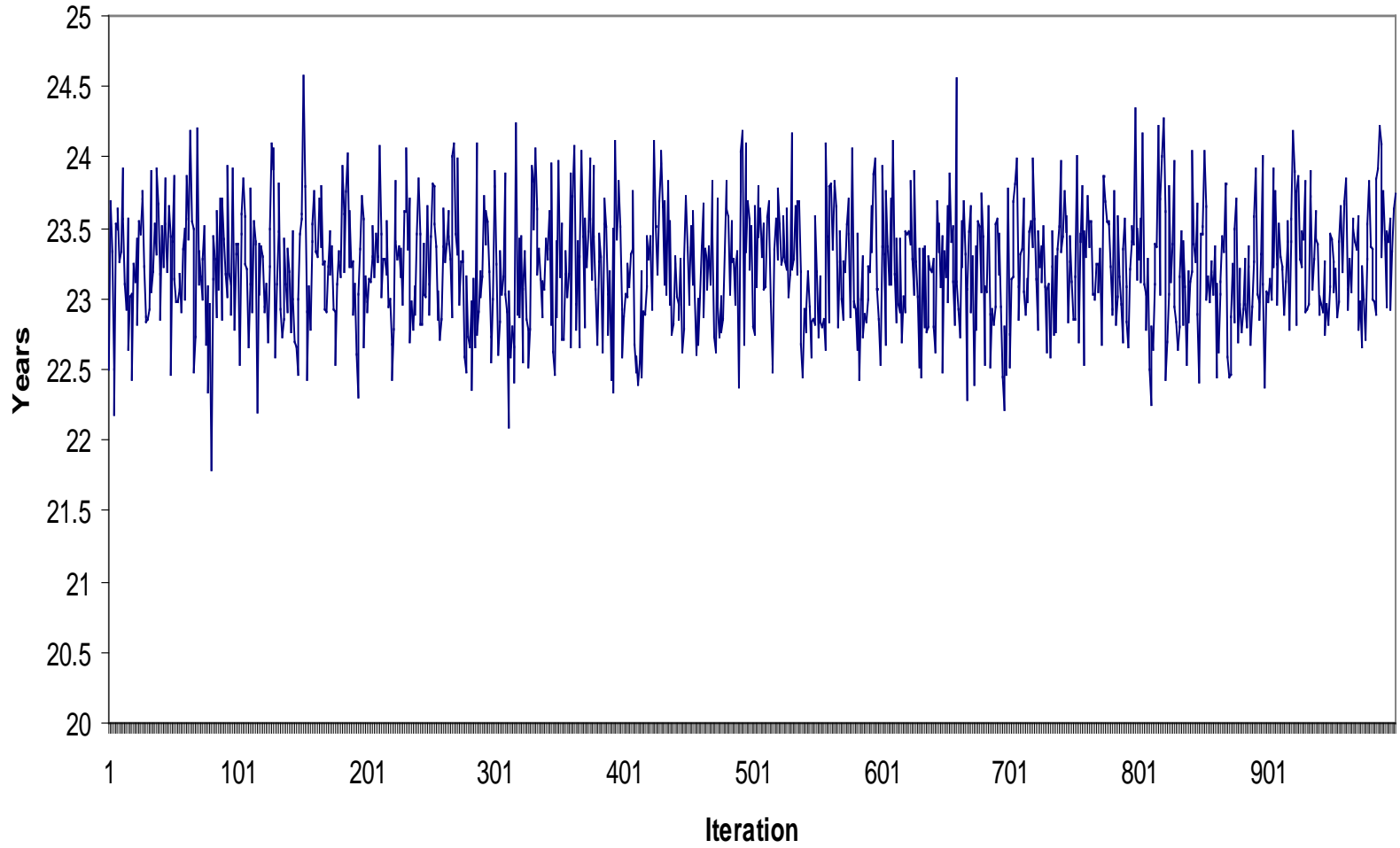
Analytic Method

- Bayesian Multi-state Life Tables (Sociological Methodology, Lynch & Brown 2005)
 - Estimate a probit model via MCMC methods to obtain simulated draws from the posterior densities for the parameters of the model.
 - Construct life tables using each simulated set of parameters applied to specific covariate profiles.
 - Order the resulting life table quantities to construct empirical intervals on any desired life table quantity.

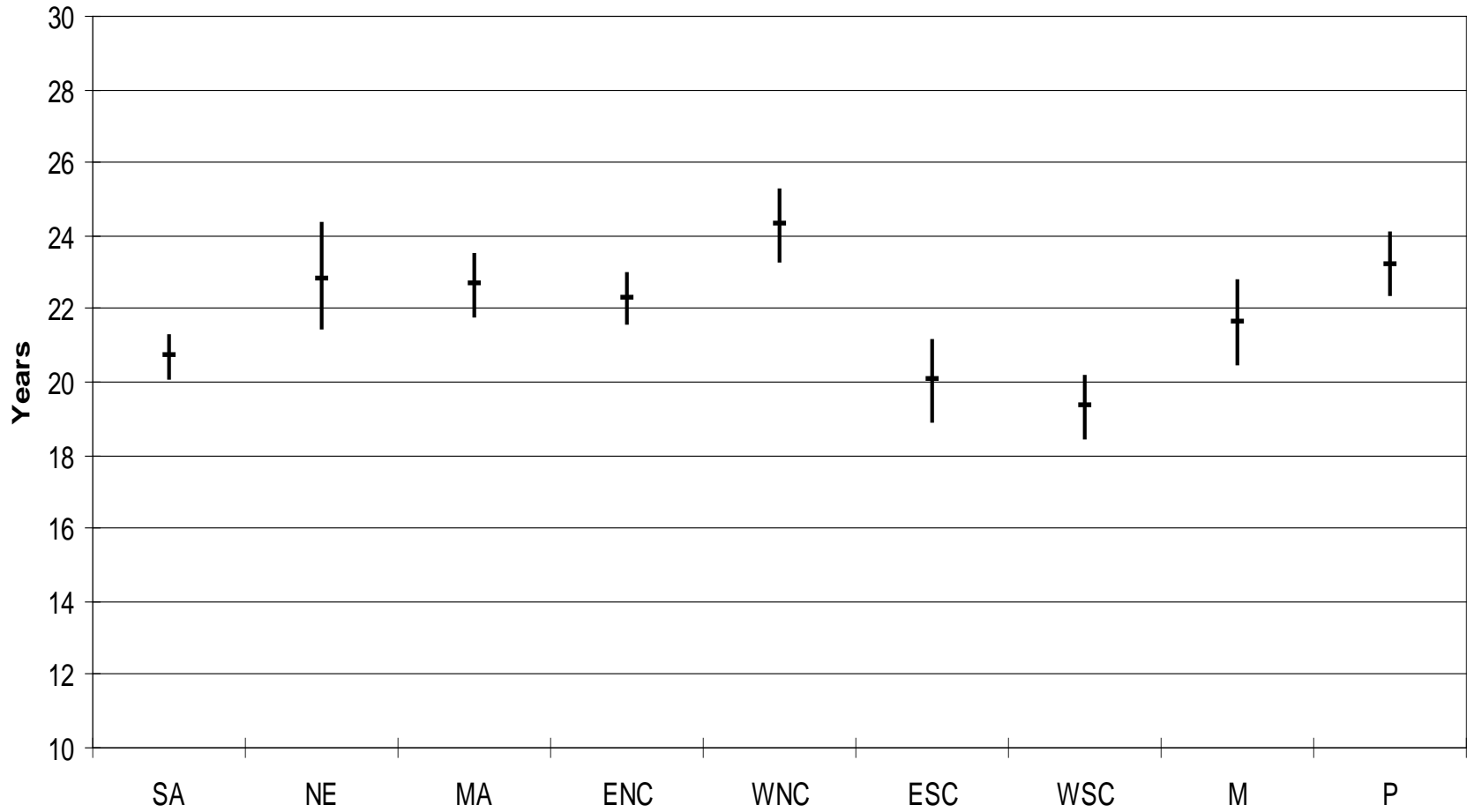
Analytic Strategy

- Estimate an initial model including mortality, health status, region, age, sex, and race.
- Estimate a second model adding physician supply
- Produce life tables for each region holding sex and non-white at constant values of 0.5 and 0.15, respectively.
- Life tables with physician supply set that measure to its mean value (0.0028) across regions

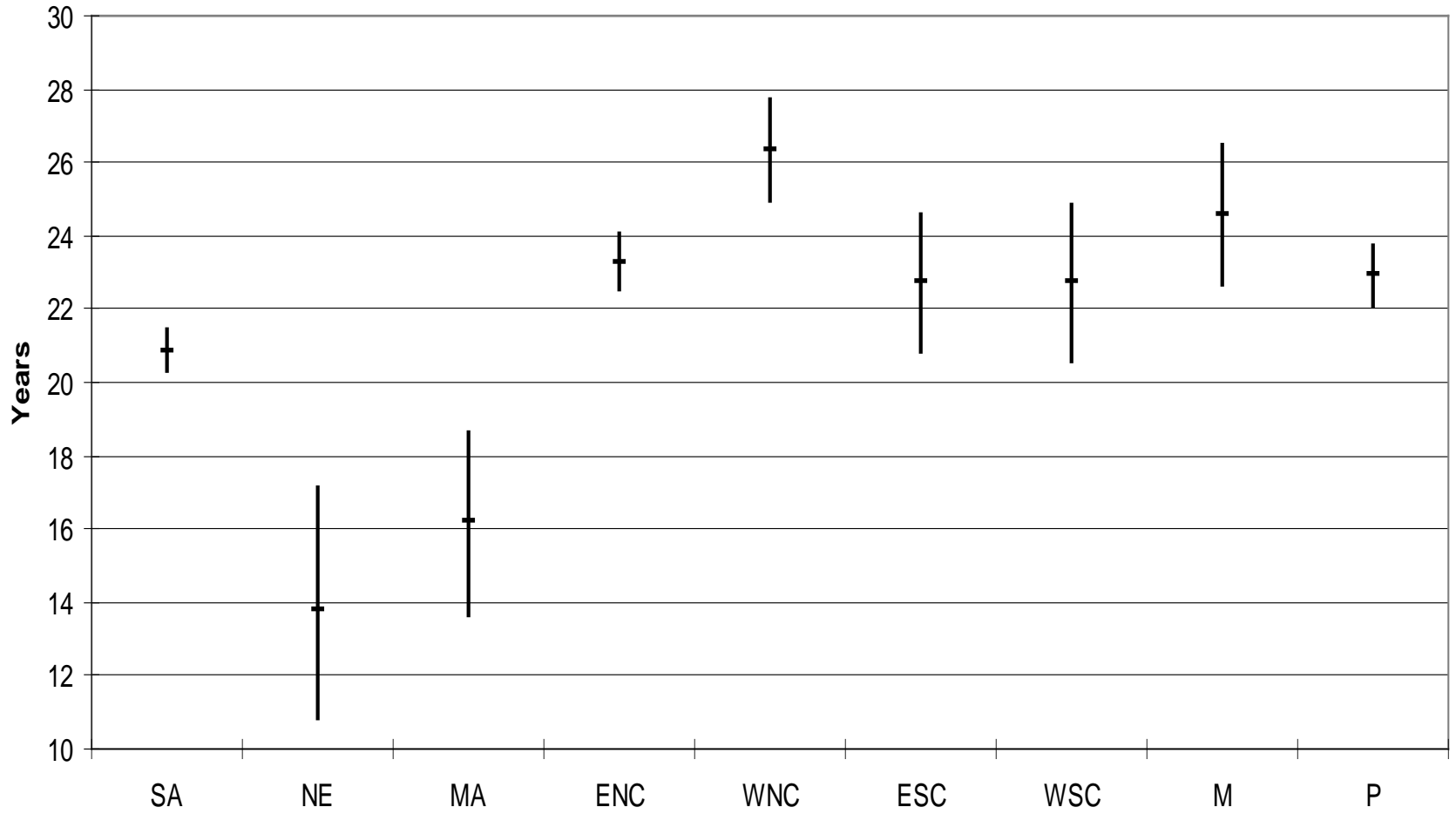
Convergence Plot: HLE at Age 50, Pacific Region



HLE at Age 50 by U.S. Region



HLE at Age 50 by U.S. Region: Physician Density Adjusted



Additional Results

- Within region effects of accounting for physician supply are highly varied:
 - Pacific and South Atlantic have no change
 - East North Central, West North Central, East South Central, and Mountain have a positive shift, but not significant
 - West South Central has significantly higher HLE with mean physician supply
 - New England and Mid-Atlantic have significantly lower HLE with mean physician supply

Conclusions

- HLE differs across region in the U.S.
- Physician supply contributes significantly to these differences for some regions, but not for all.
- Other health infrastructure measures to be examined (e.g., Hospitals, Medical Expenditures, etc.)
- Other rate denominators? (e.g., area)

Thank You!

- Contact Information:

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