Geographic Disparities in Health and Health Care

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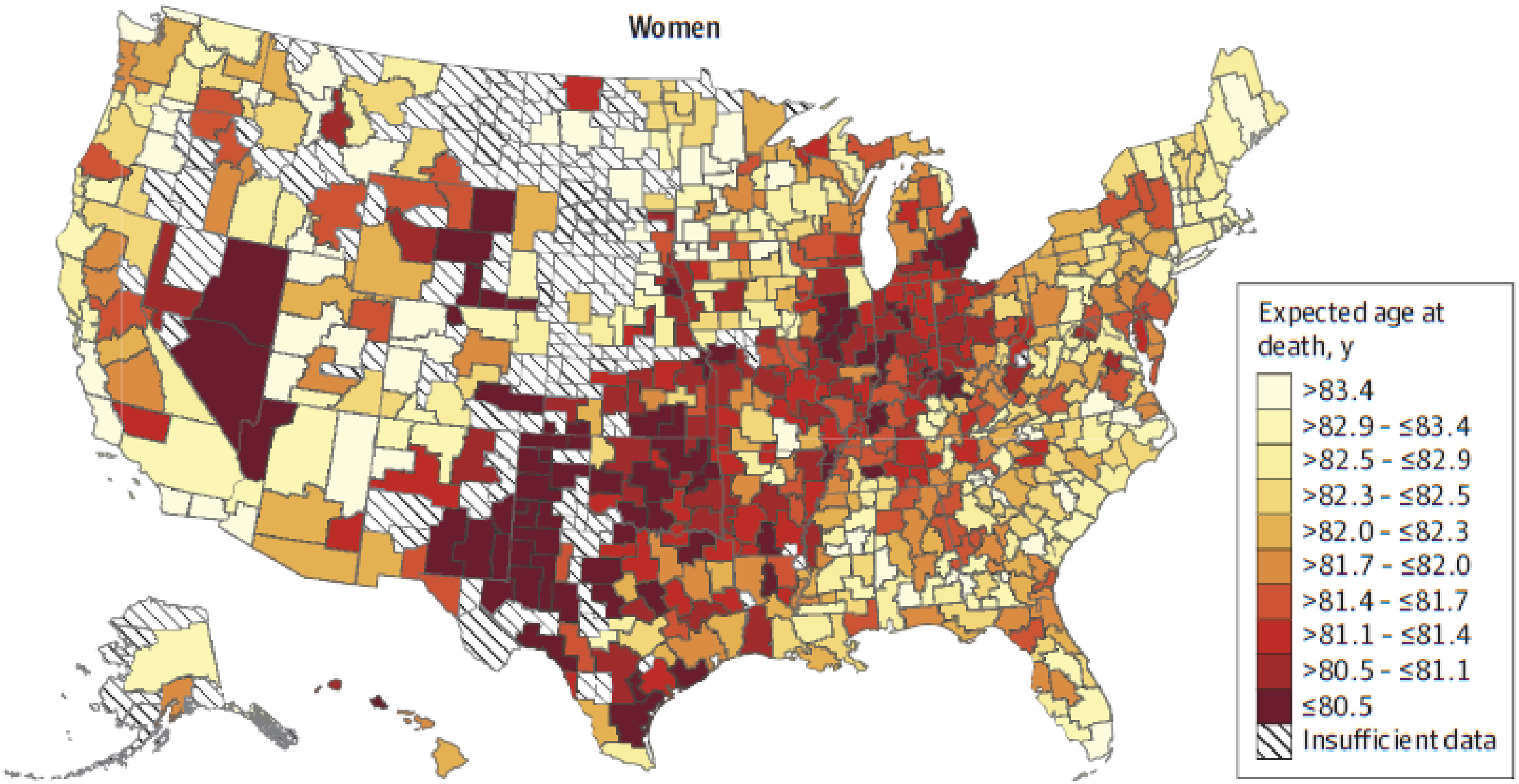
Federal Reserve of Boston Conference

A House Divided: Geographic Disparities in 21st-Century America

4 October 2019

Motivation

- Increasing interest in geographic disparities in health outcomes (e.g., Chetty et al., 2016; Case & Deaton, 2017)



Source: Chetty et al., 2016

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- Debate about the cause of these variations: Health behaviors, health care quality, or environment/social/trade?

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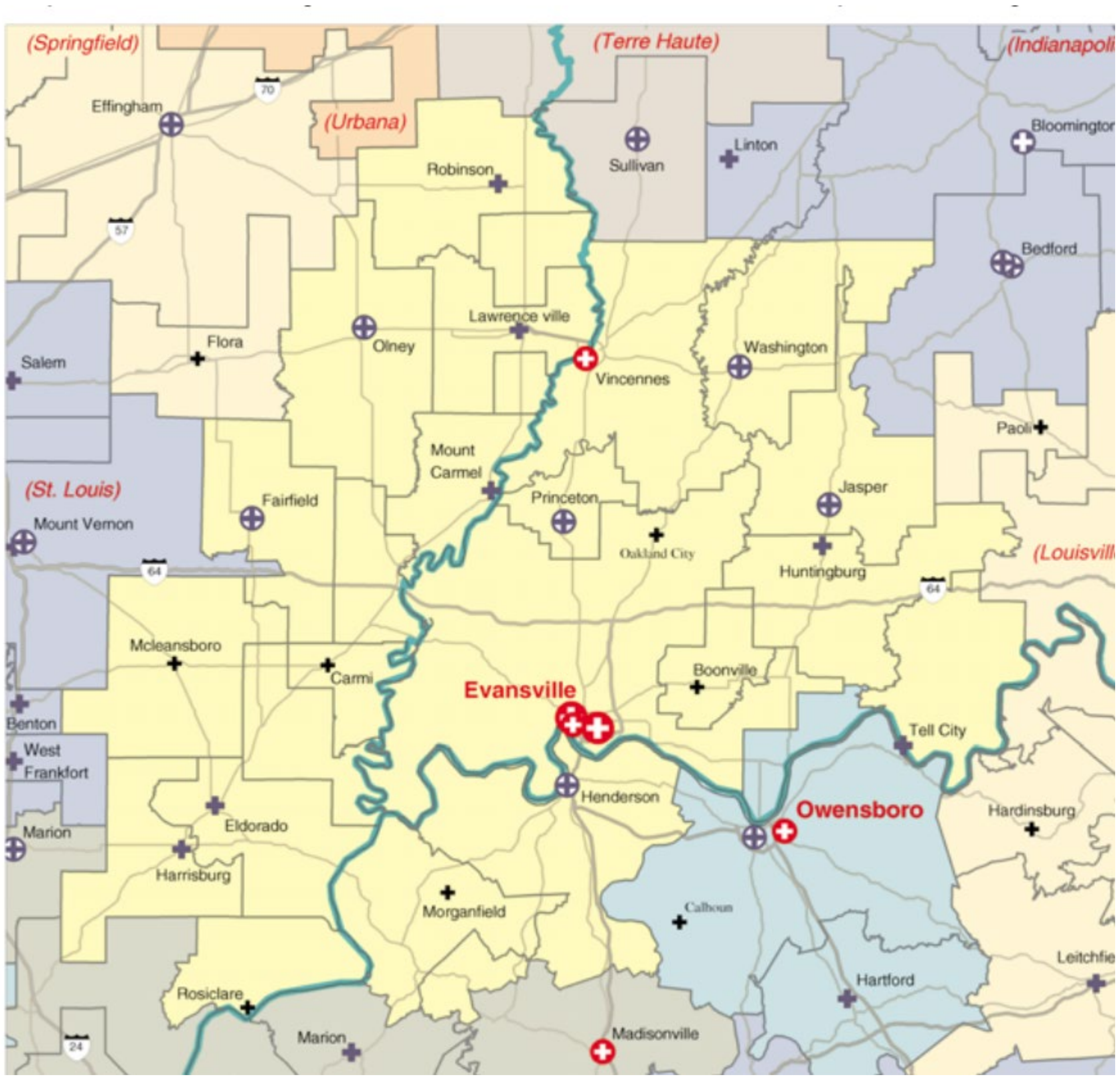
- Dramatic shifts in mortality by cause (Case and Deaton, 2015, 2017): Where have those changes occurred across the U.S. since 2000?
- Macro question: Since 2000 has there been convergence (or *divergence*) in the geographic distribution of health?

Methods

- Choice of region: Hospital Referral Regions, or HRRs (N = 306)
  - *State* sample size too small: N = 51
  - *Coumas* combine counties, (N ~1000) or *commuting zones* (N ~ 740); larger samples, but precision of measures more challenging
  - *HRRs* cut through counties, reflect travel patterns to hospitals

Example: Evansville Indiana Hospital Referral Region



Source: Dartmouth Atlas Project

Methods

Institute for Health Metrics and Evaluation

- Choice of region: Hospital Referral Regions (N = 306)
- Institute for Health Metrics and Evaluation (U. Washington) provide county data on mortality and health behaviors
  - For smaller counties: Random effects estimator “shrinks” county-level data towards county-specific predicted means by income, education, rurality
  - Concern: Smaller counties almost entirely based on prediction
  - Aggregated up to HRR using MABLE

MABLE

MCDC Data Applications

Missouri Census Data Center

Geocorr 2014: Geographic Correspondence Engine

Rev. 9/10/2016 with Census 2010 (and later) geography

This application accesses the MABLE geographic database to generate custom correlation lists as reports and/or files. Click on the help icons ( ) for detailed info on any section of this form. *Please note that processing time may be several minutes for large areas or multiple states.*

Help | Examples | What's new | Other Geocorr versions

INPUT OPTIONS

Select the state(s) to process:

Methods

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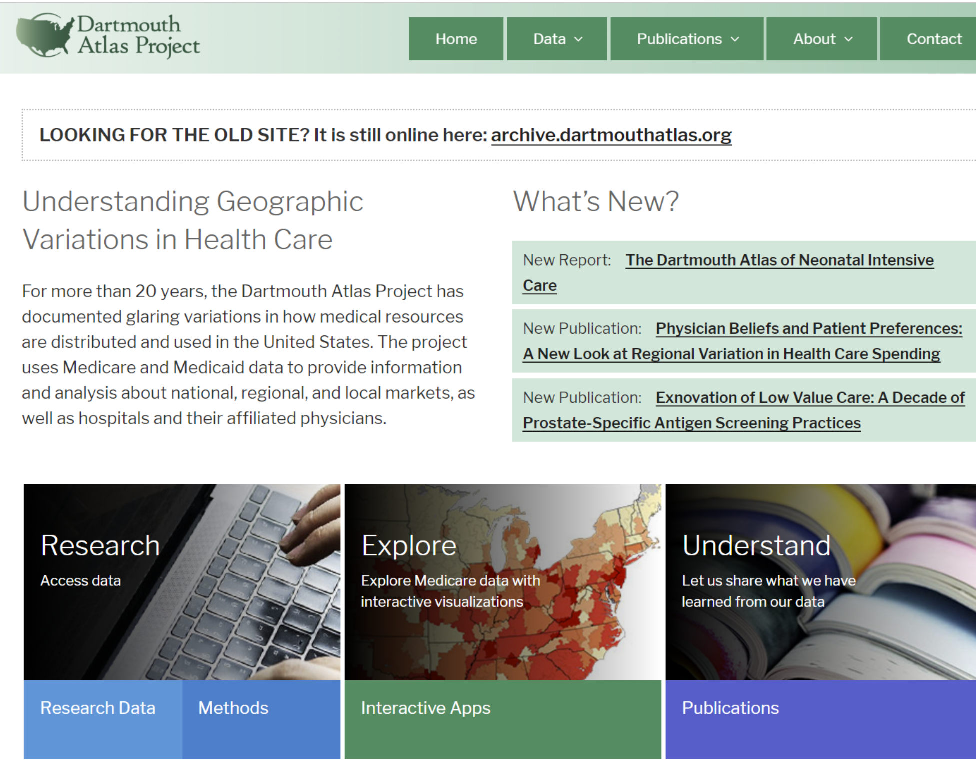
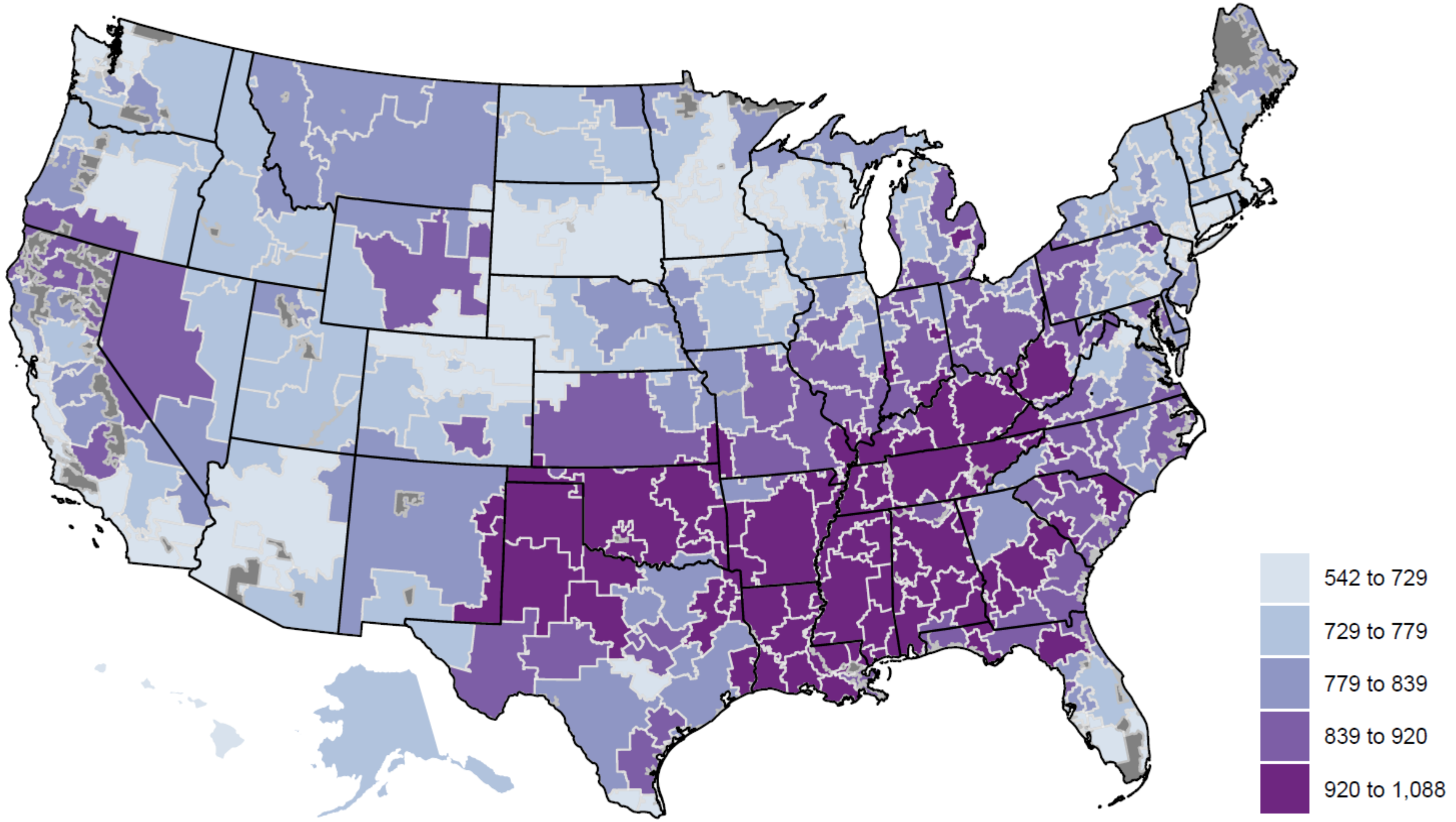
- Dartmouth Atlas data (various years)
- Census data (income)



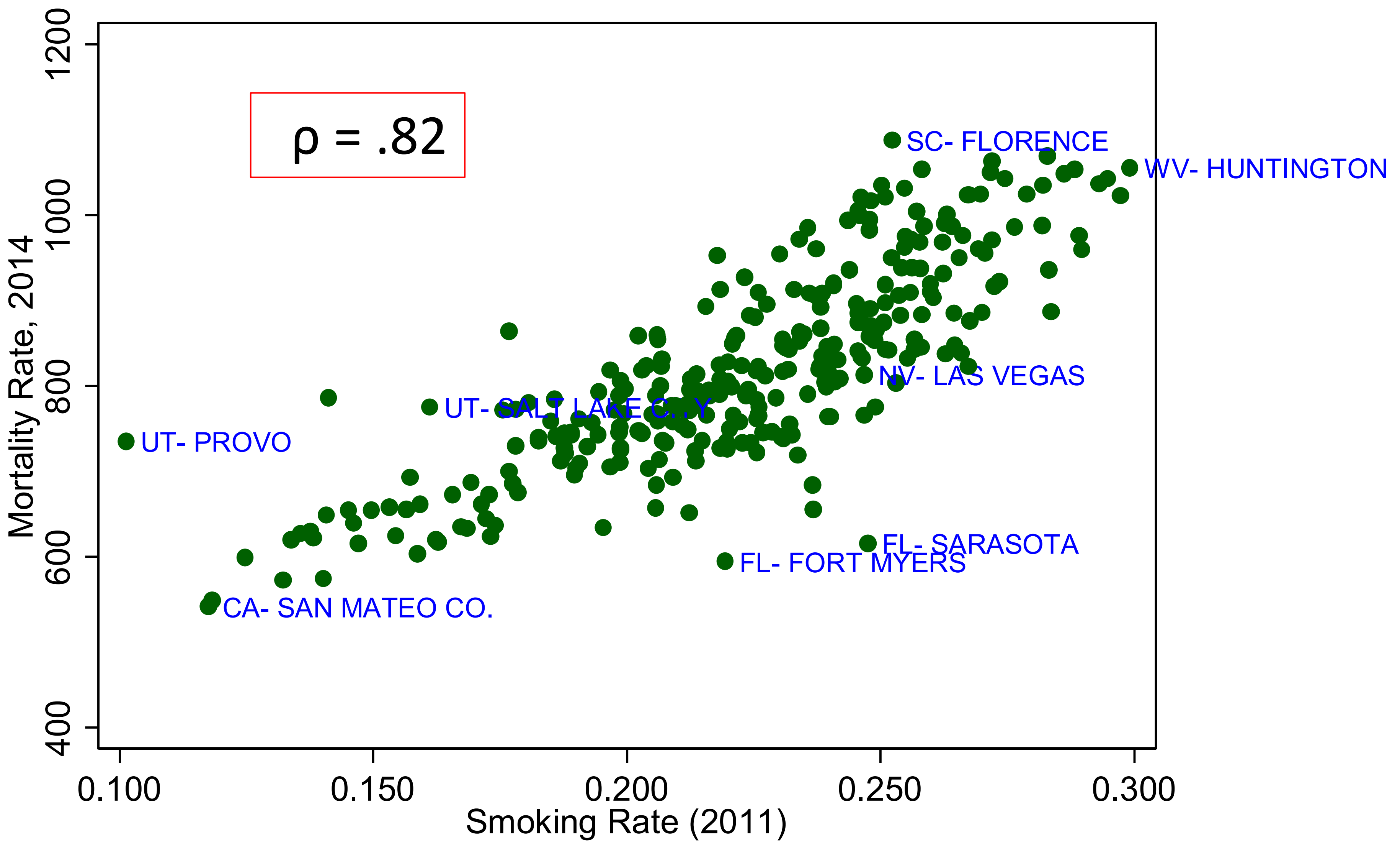
https://www.dartmouthatlas.org/

Age-Standardized Mortality per 100,000 by HRR, 2014



Source: Vital Statistics, IHME

Correlation between Smoking and Mortality, by HRR



Smoking is More a Sentinel Marker than a Causal One

- Causal estimates << HRR-level coefficient
- Changes in smoking don't seem to predict changes in mortality (Cutler et al., 2011)
- Smoking associated with other poor health behaviors

Contents lists available at SciVerse ScienceDirect

Journal of Health Economics

journal homepage: www.elsevier.com/locate/econbase

ELSEVIER

Rising educational gradients in mortality: The role of behavioral risk factors

David M. Cutler[a,1], Fabian Lange[b,*], Ellen Meara[c,2], Seth Richards-Shubik[d,3], Christopher J. Ruhm[e,4]

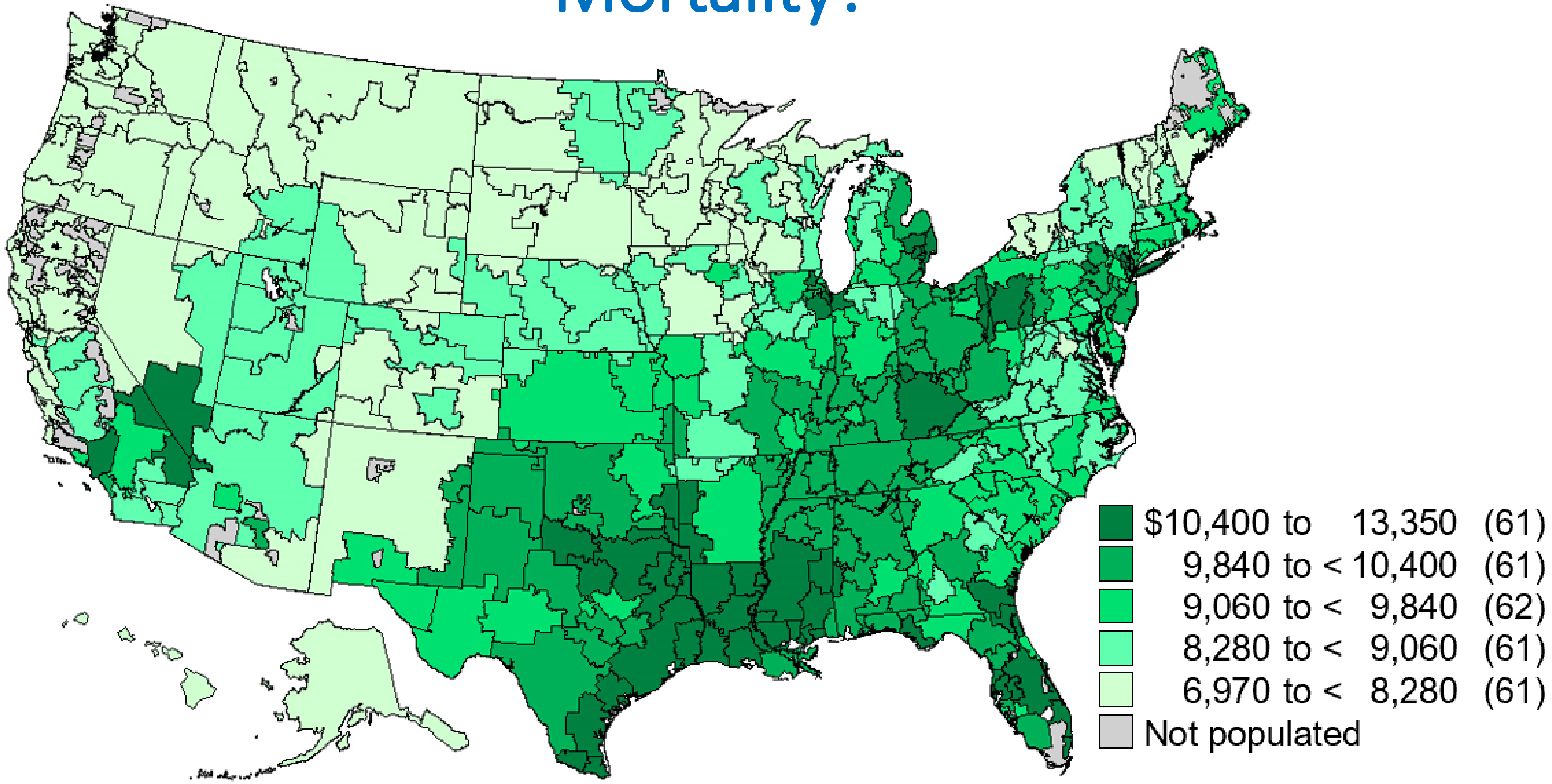
CA: A Cancer Journal for Clinicians

Review Article | Free Access

Who's still smoking? Disparities in adult cigarette smoking prevalence in the United States

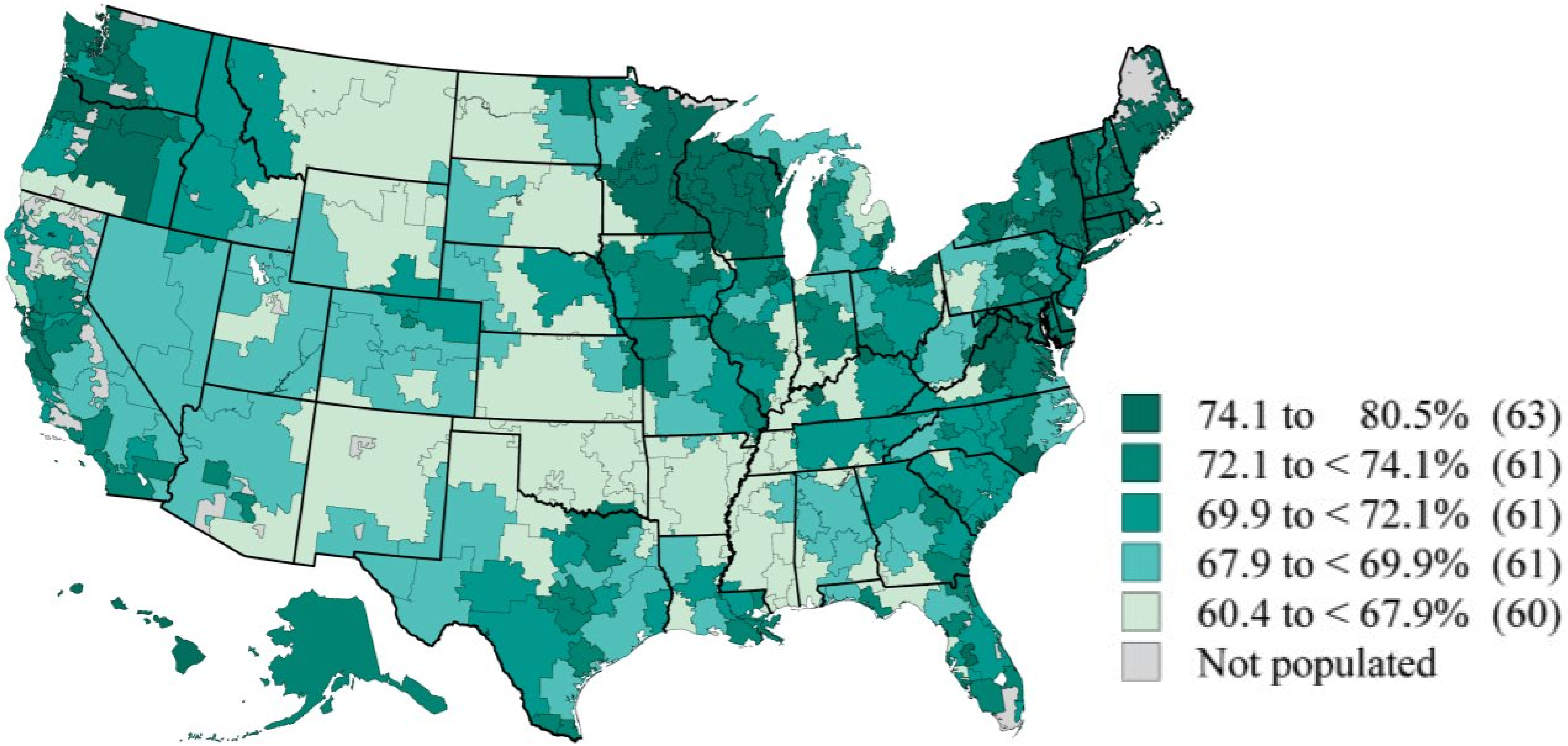
Jeffrey Drope PhD, Alex C. Liber MSPH, Zachary Cahn PhD, Michal Stoklosa MA, Rosemary Kennedy BSc, Clifford E. Douglas JD, Rosemarie Henson MSSW, MPH, Jacqui Drope MPH

Does Health Care Quality Predict Regional Variation in Mortality?



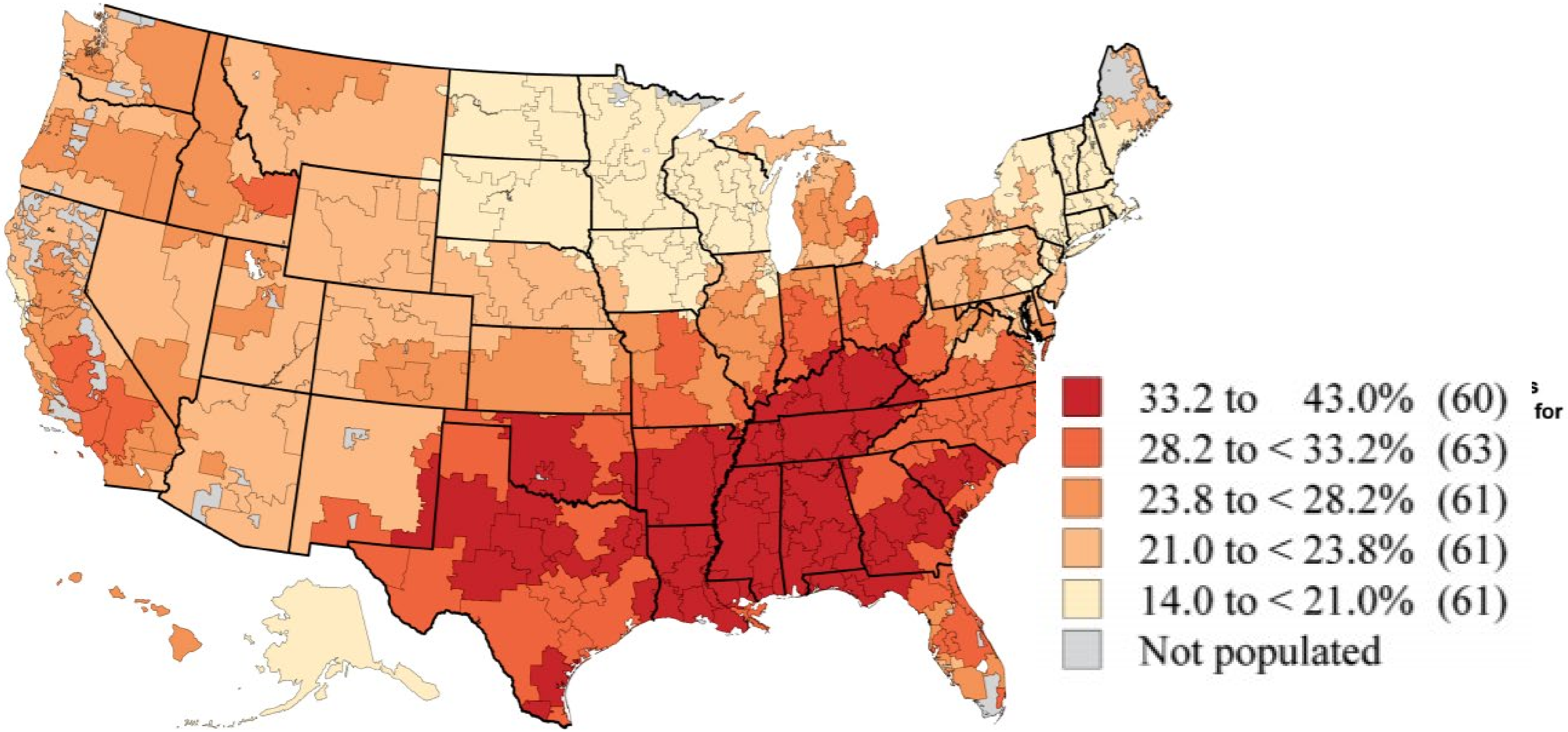
2014 Price-Adjusted Spending by Hospital Referral Region (HRR)

High-Quality Care: Percent of Diabetics Age 65-74 Filling at least 1 Statin Prescription, 2010



Source: N. Morden and J. Munson, The Dartmouth Atlas of Prescription Medicare Drug Use, 2013.

Low-Quality Care: Percent Filling at Least One High-Risk Medication Prescription, 2010



Examples include skeletal muscle relaxants, long-acting benzodiazepines and highly sedating antihistamines

Source: N. Morden and J. Munson, The Dartmouth Atlas of Prescription Medicare Drug Use, 2013.

Regression Analysis Explaining Mortality per 100,000 (N = 306 HRRs)

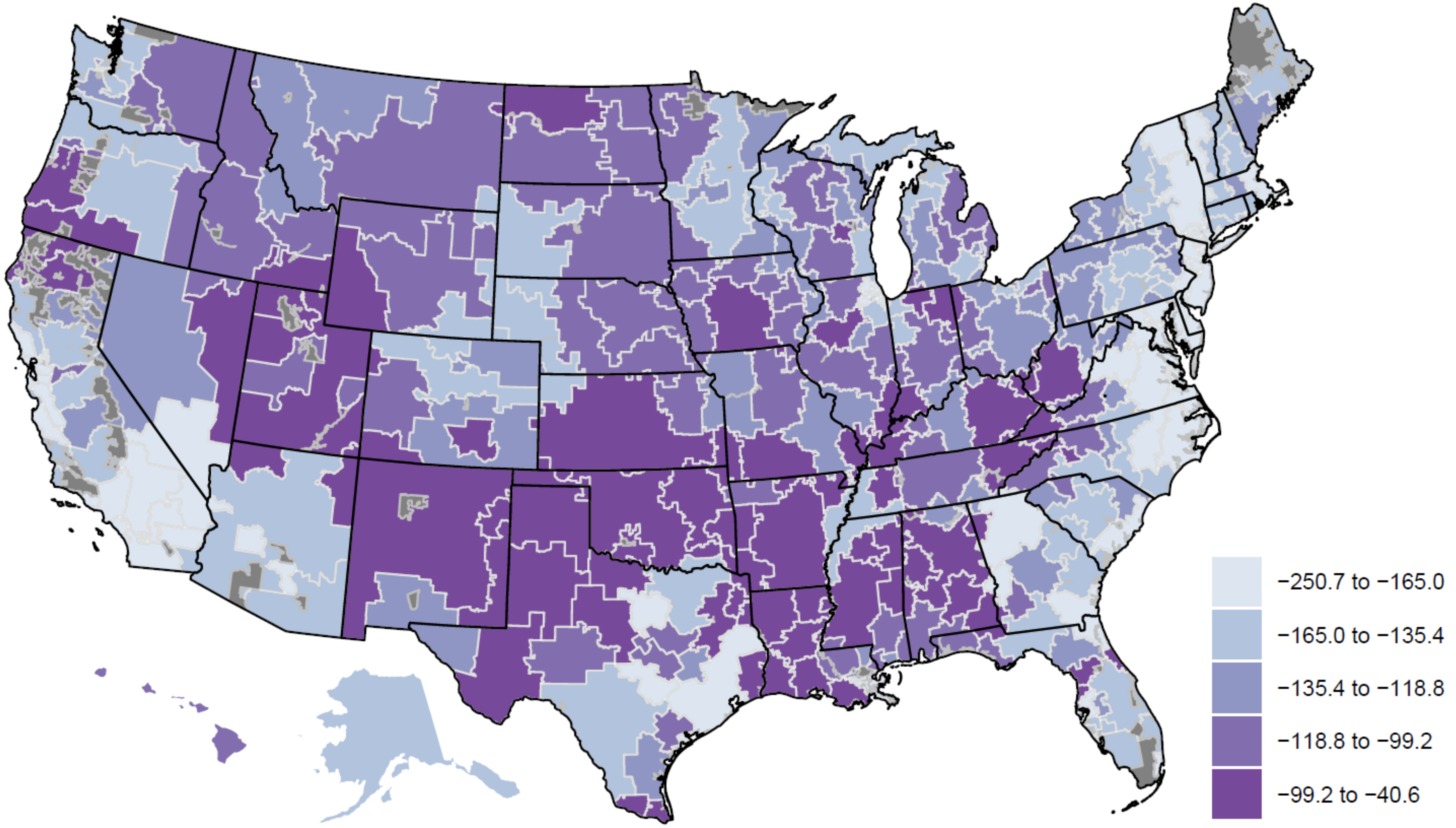
	(1)	(2)	(3)
Smoking Rate (2011)	1838.4	1787.2	1629.3
	(21.80)	(16.41)	(14.99)
Risky Prescribing (2010)	839.9	743.0	644.4
	(17.56)	(13.34)	(11.36)
Log Income		-20.7	22.6
		(-1.08)	(1.13)
Fraction Black		144.0	111.3
		(3.63)	(2.83)
Statin Prescribing (2010)			-266.2
			(-3.18)
Obesity Rate (2011)			502.2
			(4.59)
R-squared	**0.8351**	**0.8421**	**0.8561**

What About Changes Over Time in Mortality?
(Source: C. Coile & M. Duggan, JEP 2019)

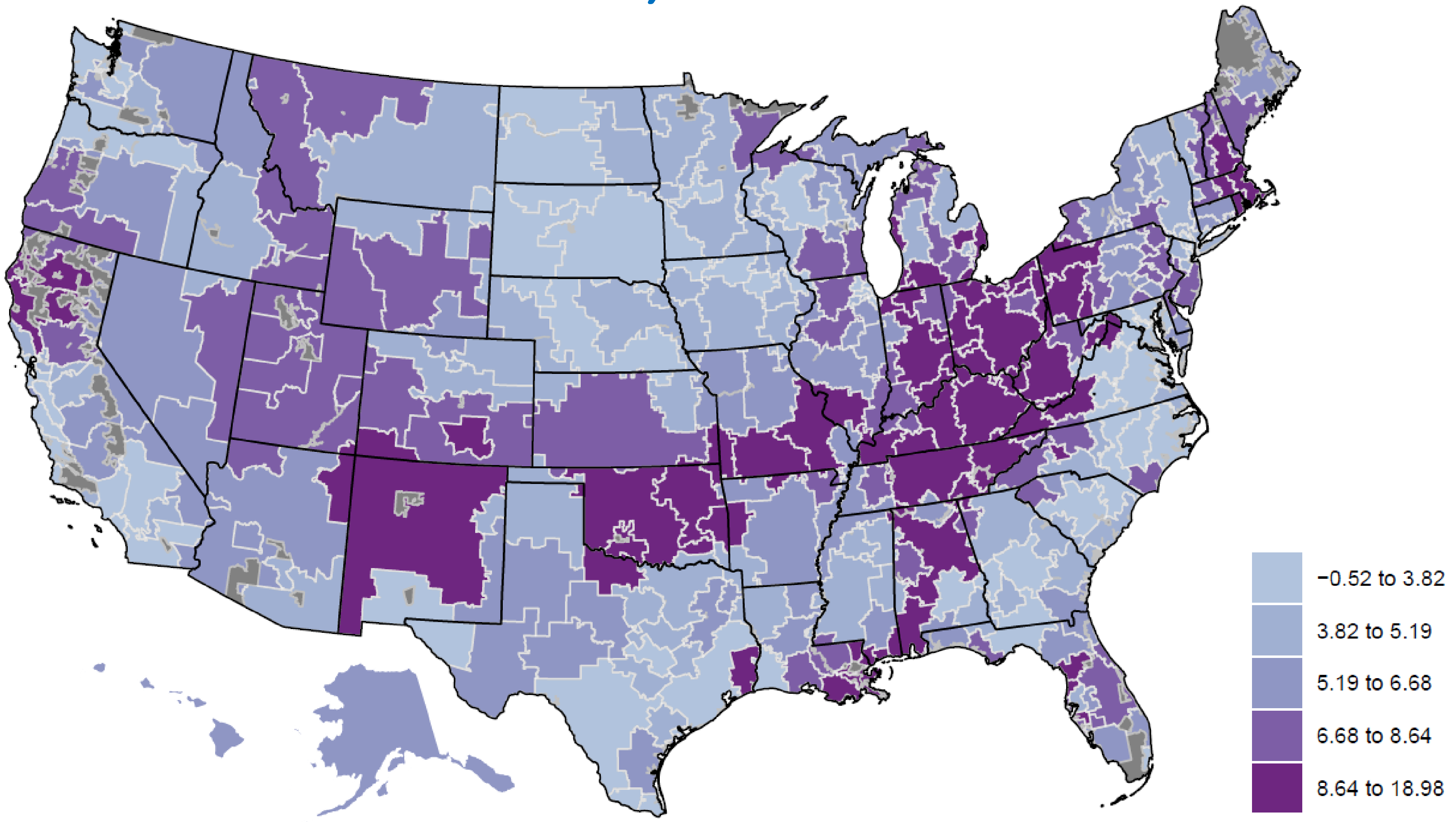
Male Mortality Rates by Age and Cause, Ages 25 to 54, 1980 to 2016

	Annual Mortality Rates per 100,000			*Annual % change*	
	1980	*2000*	*2016*	*1980–2000*	*2000–2016*
By Cause[a]					
Heart disease	121	64	53	–3.2%	–1.2%
Cancer	82	58	42	–1.8%	–2.0%
Accidents	65	48	76	–1.4%	+2.9%
Suicides	24	22	27	–0.4%	+1.5%
Homicides	25	11	14	–3.9%	+1.2%
HIV/AIDS	0	15	4	–	–8.3%
All other	105	94	91	–0.5%	–0.2%
Total	421	312	307	–1.5%	–0.1%

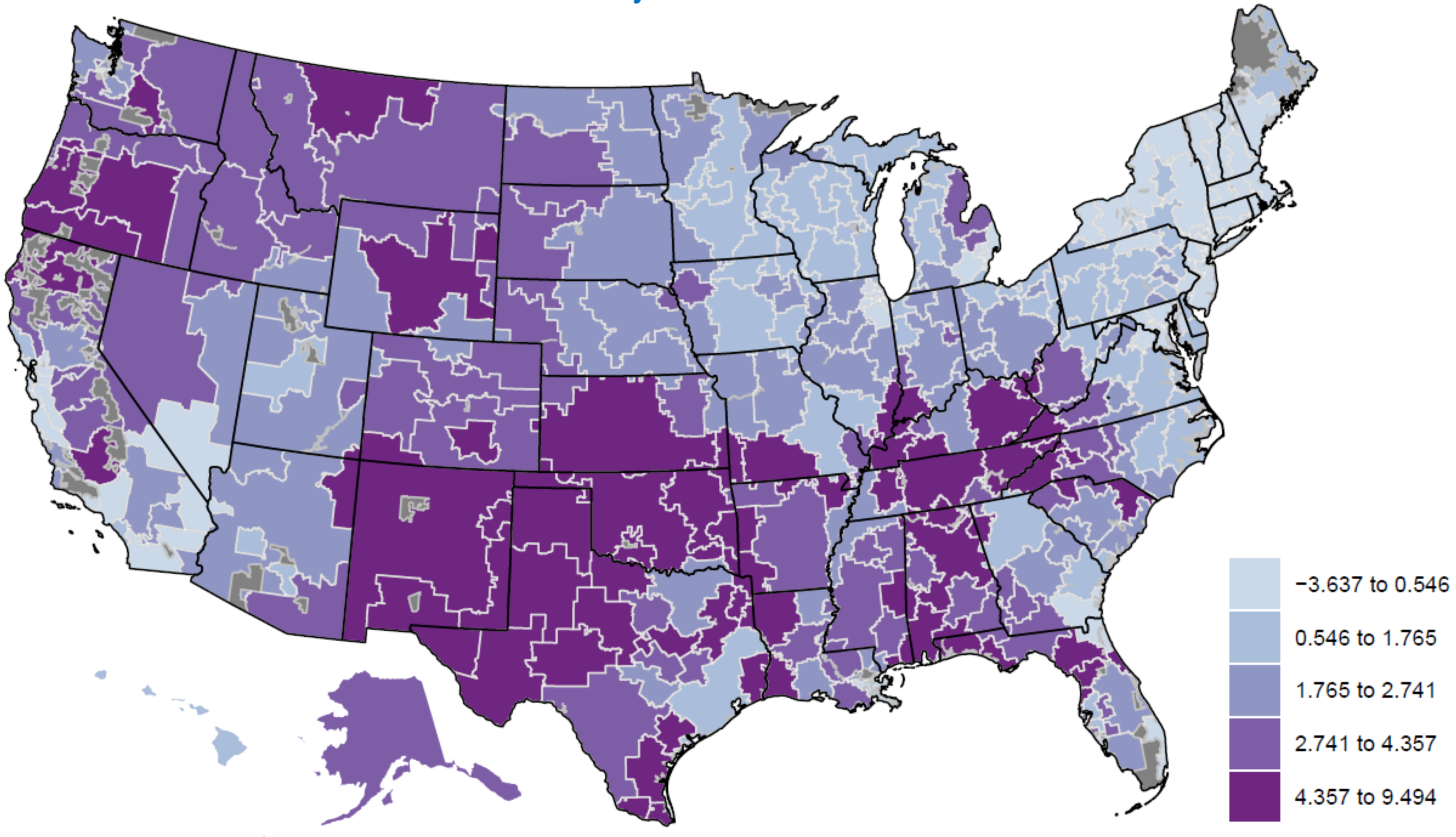
Change Between 2000 and 2014 in Age-Standardized Mortality



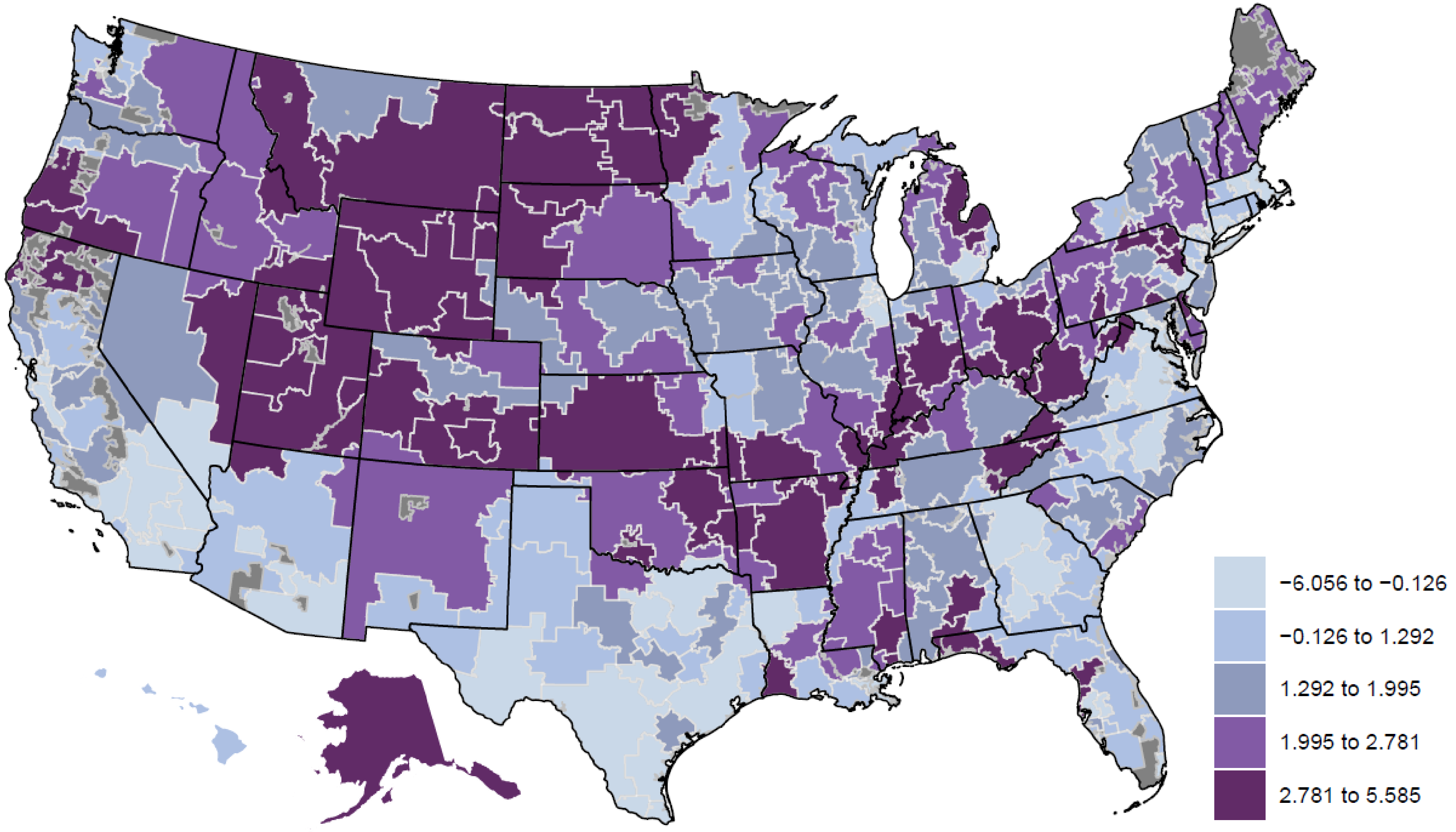
Change in Mortality from Mental and Substance Abuse Disorders, 2000-2014



Change in Mortality from Cirrhosis and other Liver Disorders, 2000-2014



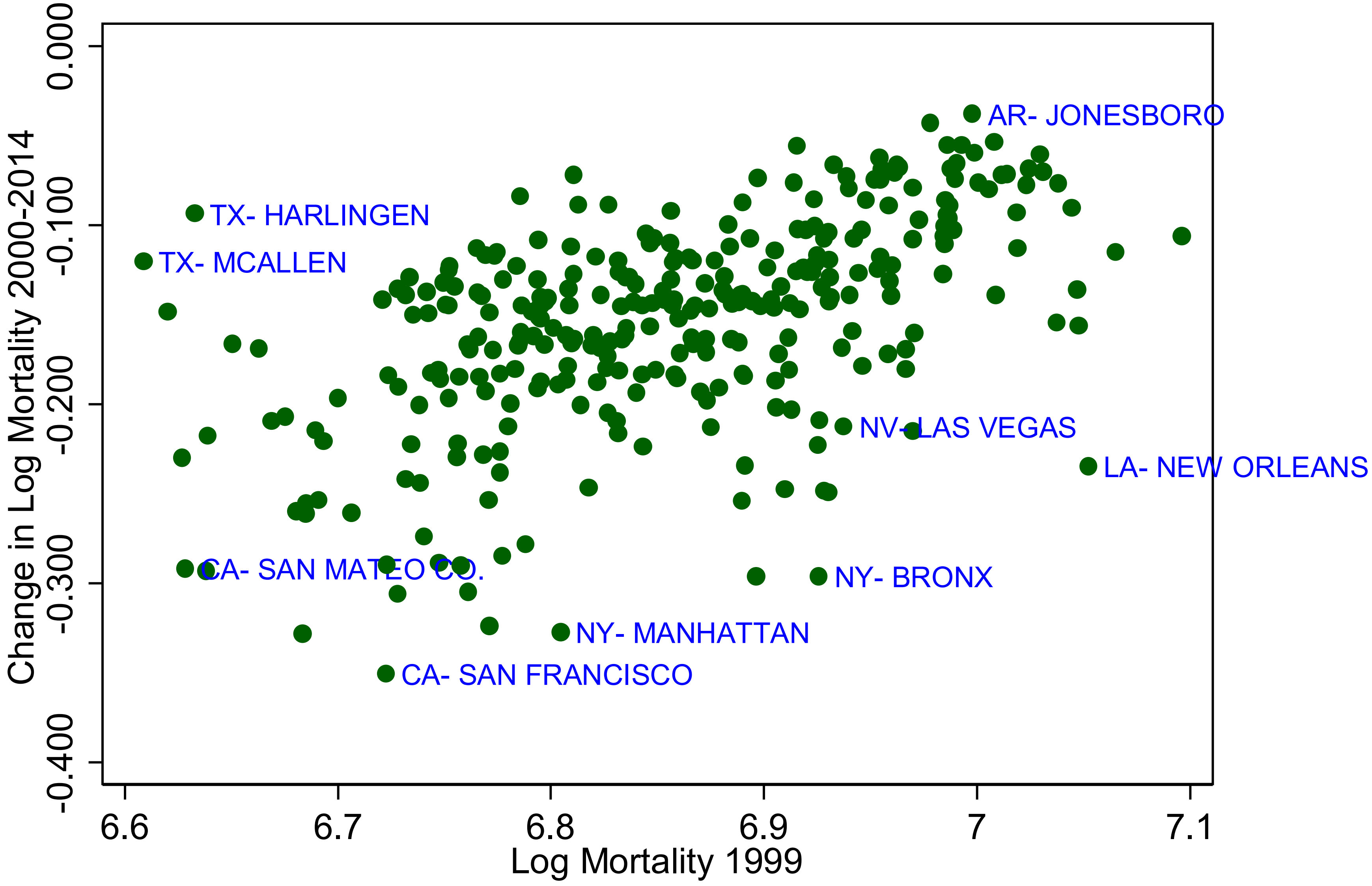
Change in Mortality from Self-Harm, 2000-2014



Sigma Convergence?

	Standard Deviation of Log Mortality (N = 306)
2000	.101
2014	.143

Association Between Log Mortality (1999) and Change in Log Mortality (2000-14) by HRR



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- Different regions address "despair" in different ways
- Speed of mortality divergence is remarkable and concerning – and not associated with income trends (see Case & Deaton, Ruhm)
- *More research is required…*