

Cancer Disparities in Appalachia: causes, consequences, and possible solutions



Aaron Yao
University of Virginia
@NAaronYao

ORIGINAL ARTICLE

Cancer Disparities in Rural Appalachia: Incidence, Early Detection, and Survivorship

Nengliang Yao, PhD; Héctor E. Alcalá, PhD; Roger Anderson, PhD; & Rajesh Balkrishnan, PhD

Department of Public Health Sciences, University of Virginia School of Medicine, Charlottesville, Virginia

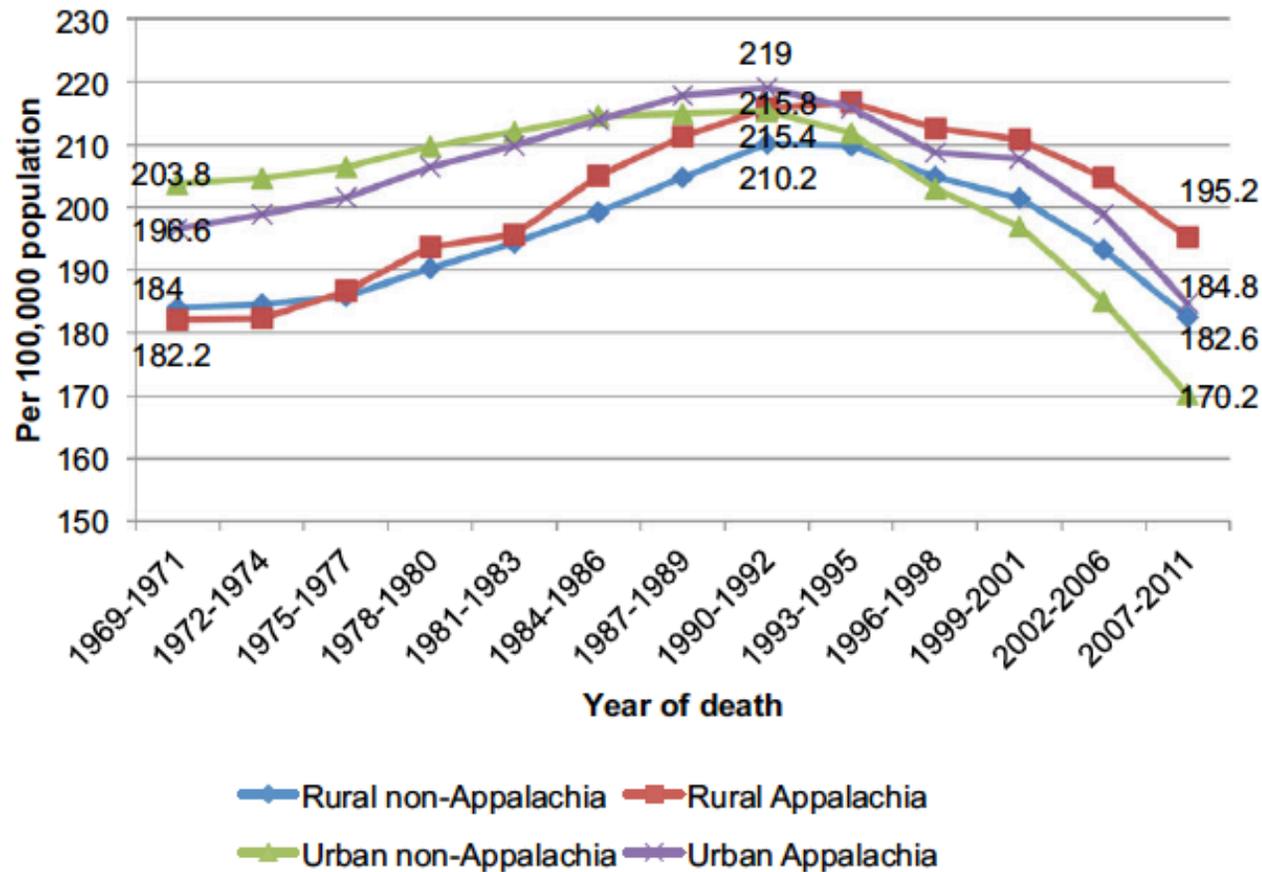
Abstract

Purpose: To document cancer-related health disparities in Appalachia.

Methods: The current study investigated disparities in cancer incidence, mortality, and staging between rural Appalachians and those living outside of rural

Disclosures: The authors report no conflicts of interest.

Figure 1 Cancer Mortality Rates by Appalachian Designation and Urbanization Level.



Source: Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov). SEER*Stat Database: Mortality – All COD, Aggregated with County, Total US (1969-2011) <Katrina/Rita Population Adjustment> – Linked to County Attributes – Total US, 1969-2012 Counties, National Cancer Institute, DCCPS, Surveillance Research Program, Surveillance Systems Branch, released July 2014. Underlying mortality data provided by NCHS (www.cdc.gov/nchs).

Age-adjusted Cancer death rates

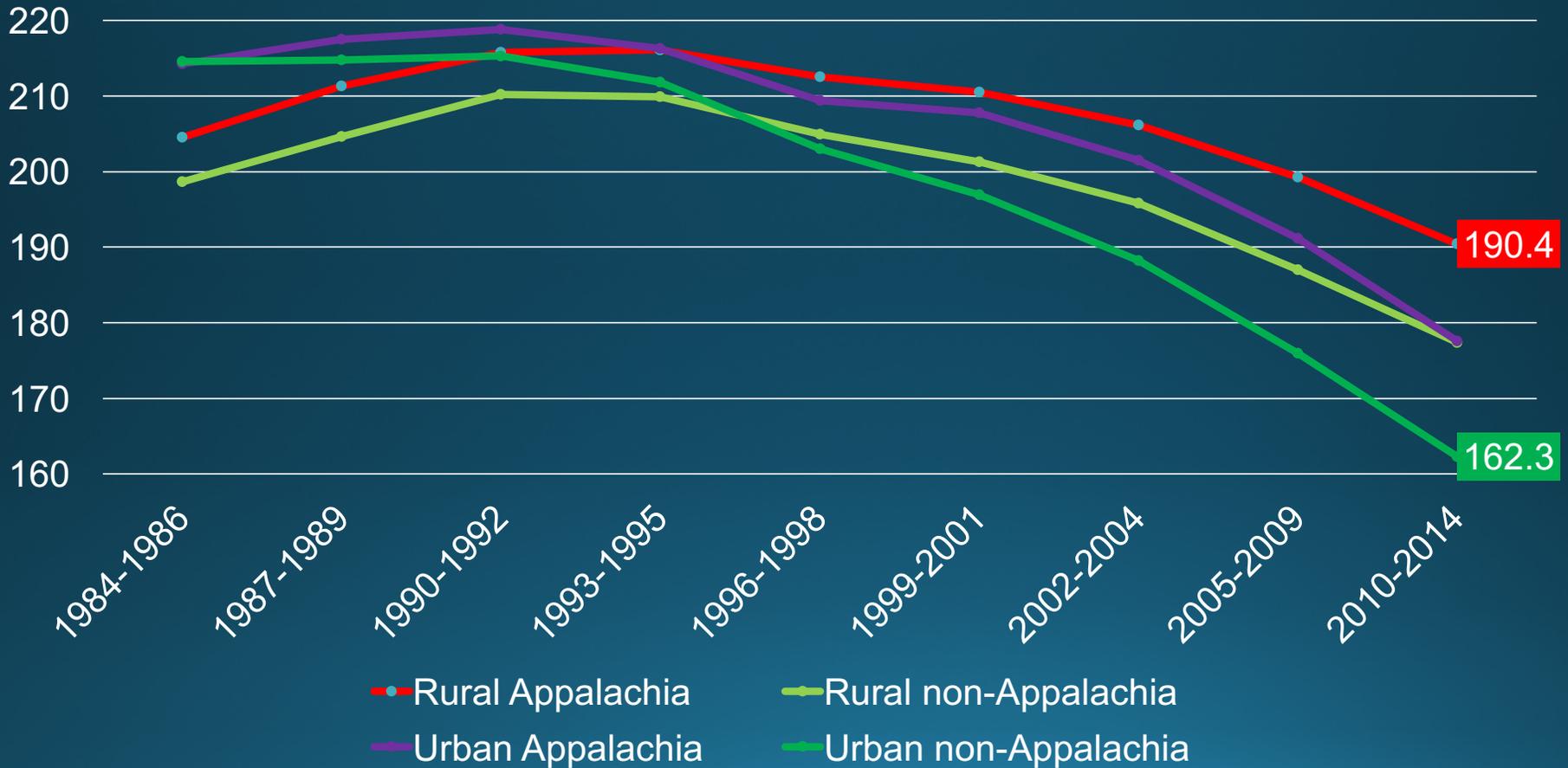
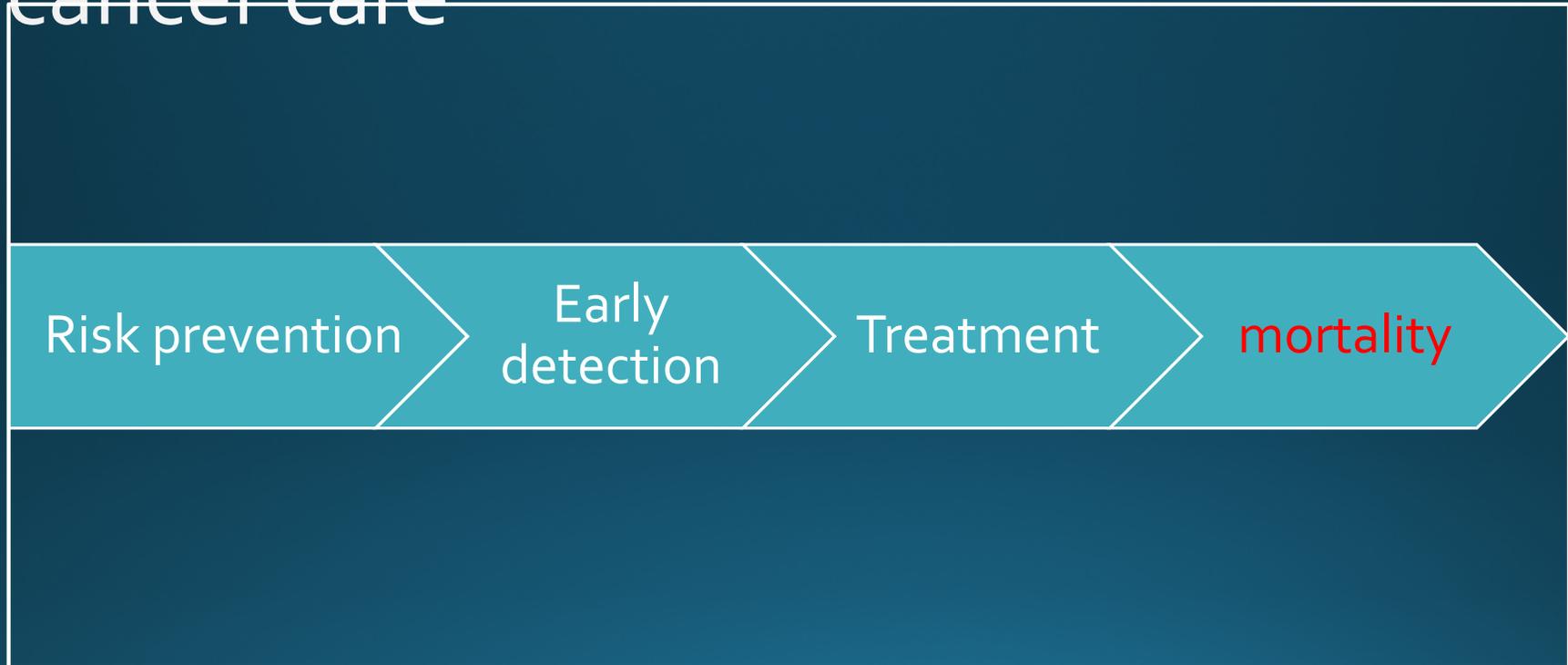


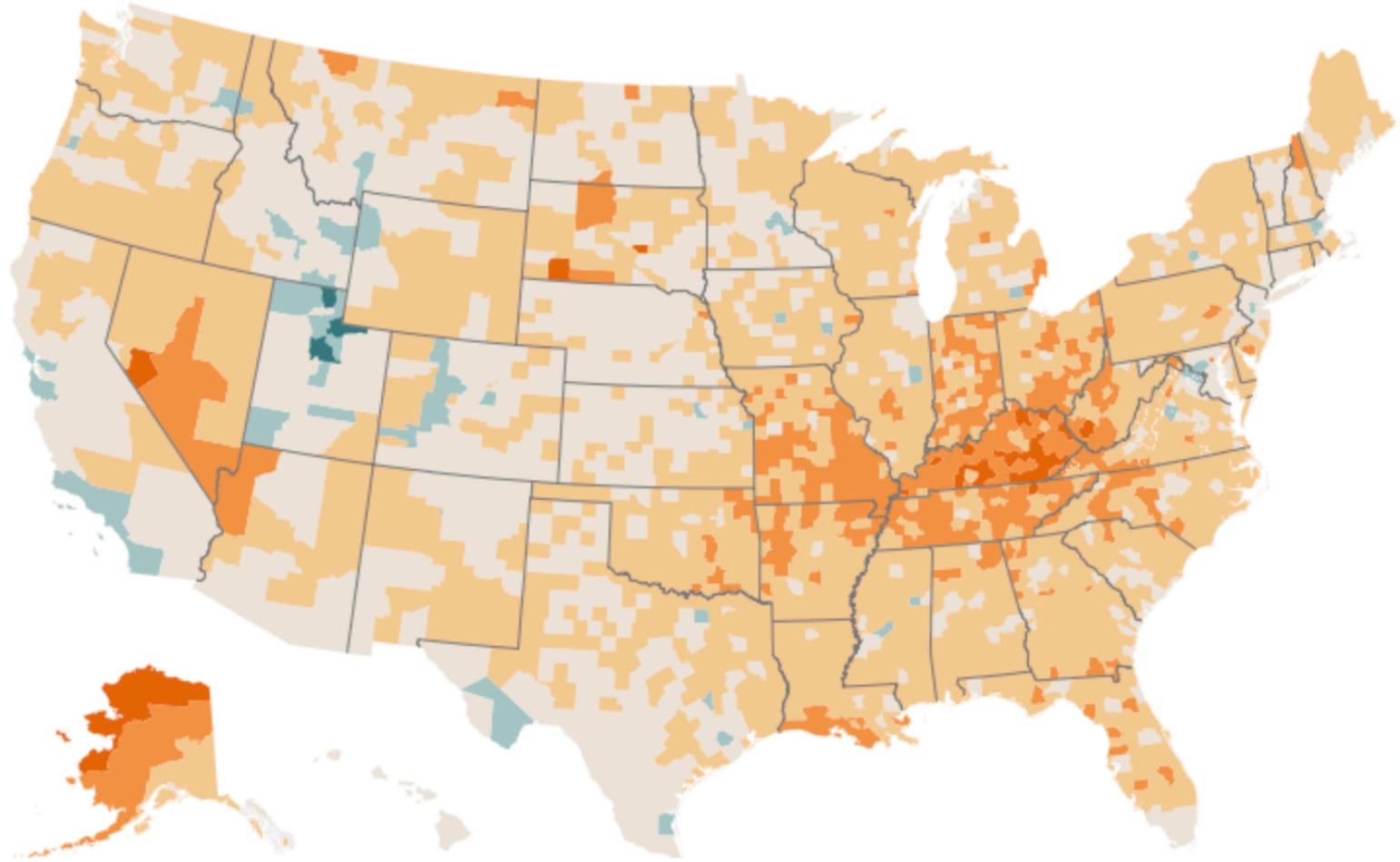
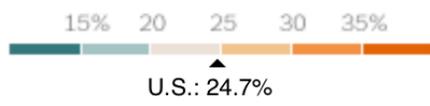
Table 1 Adjusted Cancer Mortality Rates in Rural Appalachian Counties in 13 States During 2007-2011

	Mortality Rates per 100,000 People	Percentage Difference Relative to Urban Non-Appalachians	Lives That Could Be Saved If Death Rates Were Equal to Urban Non-Appalachians
Kentucky	231.5	+36.0%	4,876
West Virginia	202.9	+19.2%	1,878
Alabama	201.8	+18.6%	1,570
Tennessee	201.3	+18.3%	1,907
Mississippi	198.7	+16.7%	1,085
Ohio	196.6	+15.5%	1,743
Virginia	195.2	+14.7%	716
South Carolina	183.6	+7.9%	117
Georgia	181.8	+6.8%	366
Pennsylvania	180.9	+6.3%	1,188
New York	178.5	+4.9%	331
North Carolina	177.6	+4.3%	310
Maryland	166.3	-2.3%	-8

Disparities across the continuum of cancer care



Smoking rate in **2012** **1996** among **All adults** **Women** **Men**



Note: County figures are estimated, based on modeled federal survey data.
Sources: Institute for Health Metrics and Evaluation

Smoking rate in

2012

1996

among

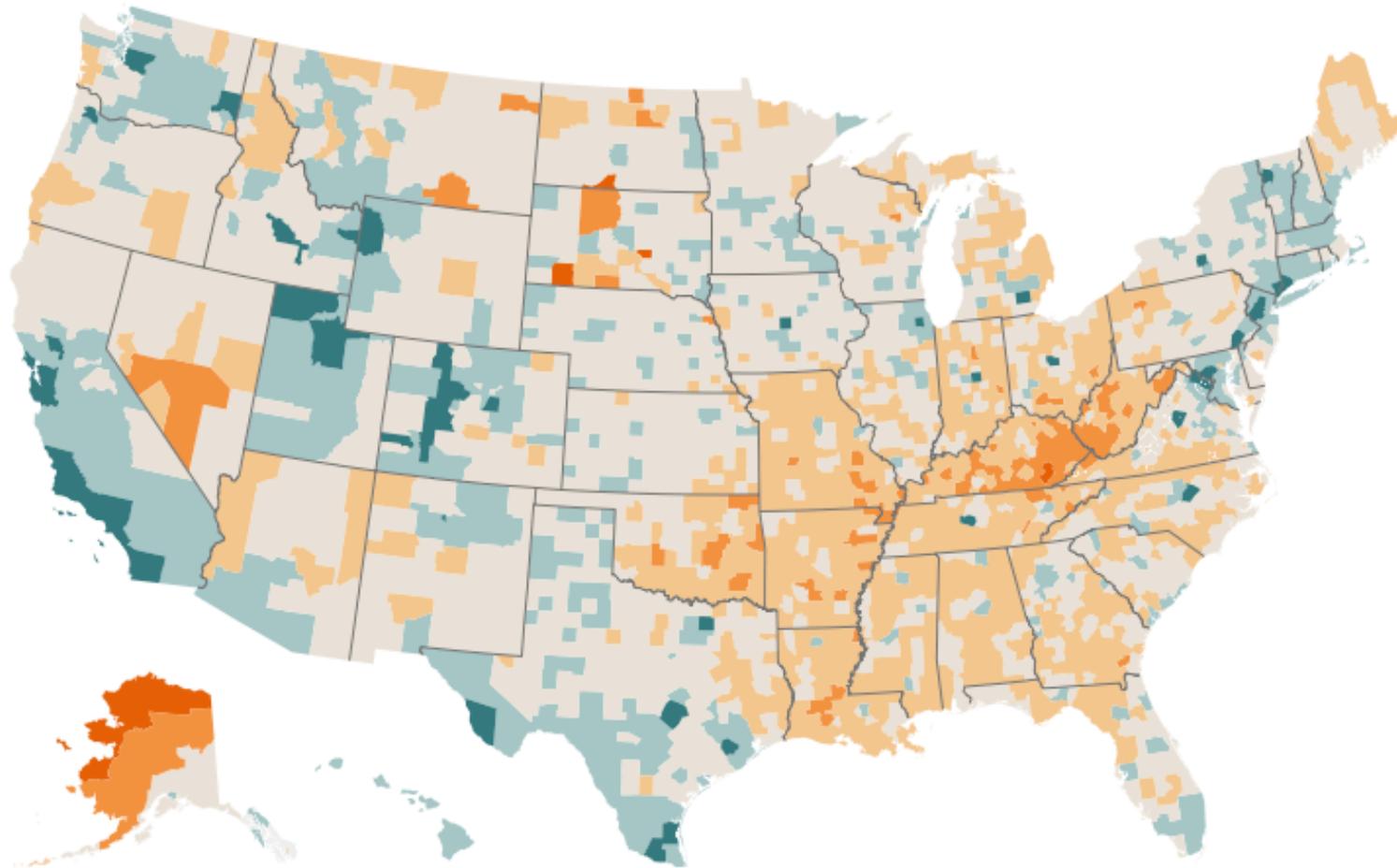
All adults

Women

Men

15% 20 25 30 35%

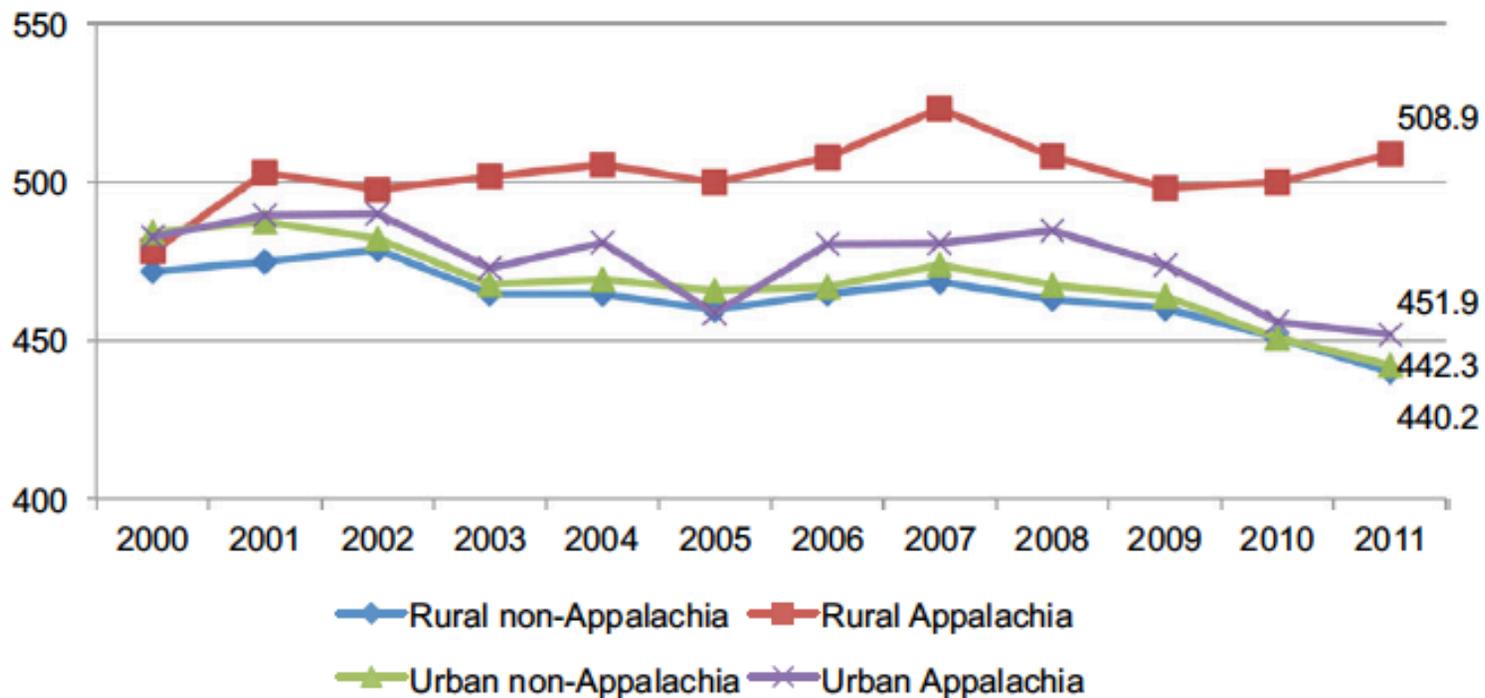
U.S.: 20.0%



Note: County figures are estimated, based on modeled federal survey data.

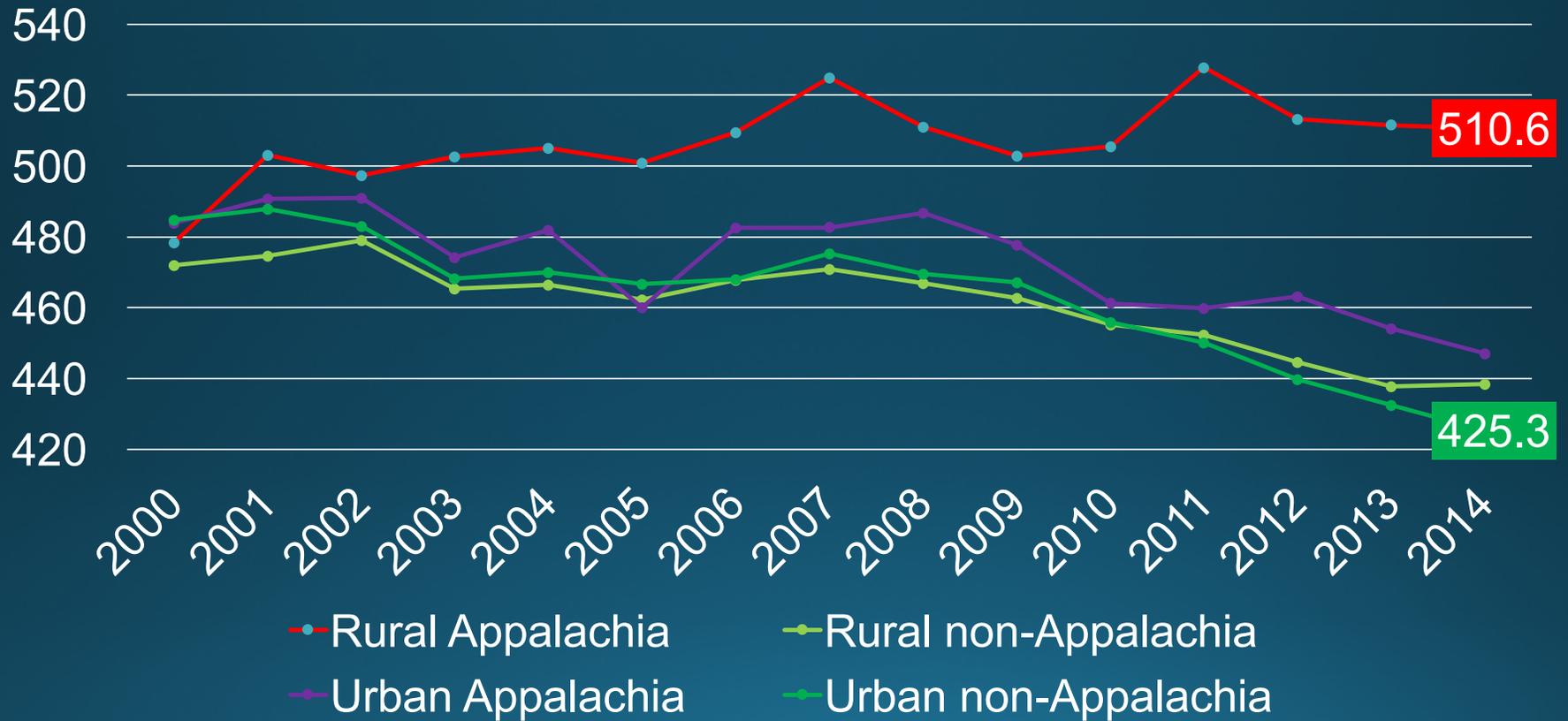
Sources: Institute for Health Metrics and Evaluation

Figure 2 Cancer Incidence Rates by Appalachian Designation and Urbanization Level.



Source: Surveillance, Epidemiology, and End Results (SEER) Program (www.seer.cancer.gov). SEER*Stat Database: Incidence – SEER 18 Regs Research Data + Hurricane Katrina Impacted Louisiana Cases, Nov 2013 Sub (2000-2011) < Katrina/Rita Population Adjustment > – Linked to County Attributes - Total US, 1969-2012 Counties, National Cancer Institute, DCCPS, Surveillance Research Program, Surveillance Systems Branch, released April 2014 (updated 5/7/2014), based on the November 2013 submission.

Age adjusted cancer incidence rates



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RESEARCH ARTICLE

Breast Cancer Screening, Area Deprivation, and Later-Stage Breast Cancer in Appalachia: Does Geography Matter?

Roger T. Anderson, Tse-Chang Yang, Stephen A. Matthews, Fabian Camacho, Teresa Kern, Heath B. Mackley, Gretchen Kimmick, Christopher Louis, Eugene Lengerich, and Nengliang Yao

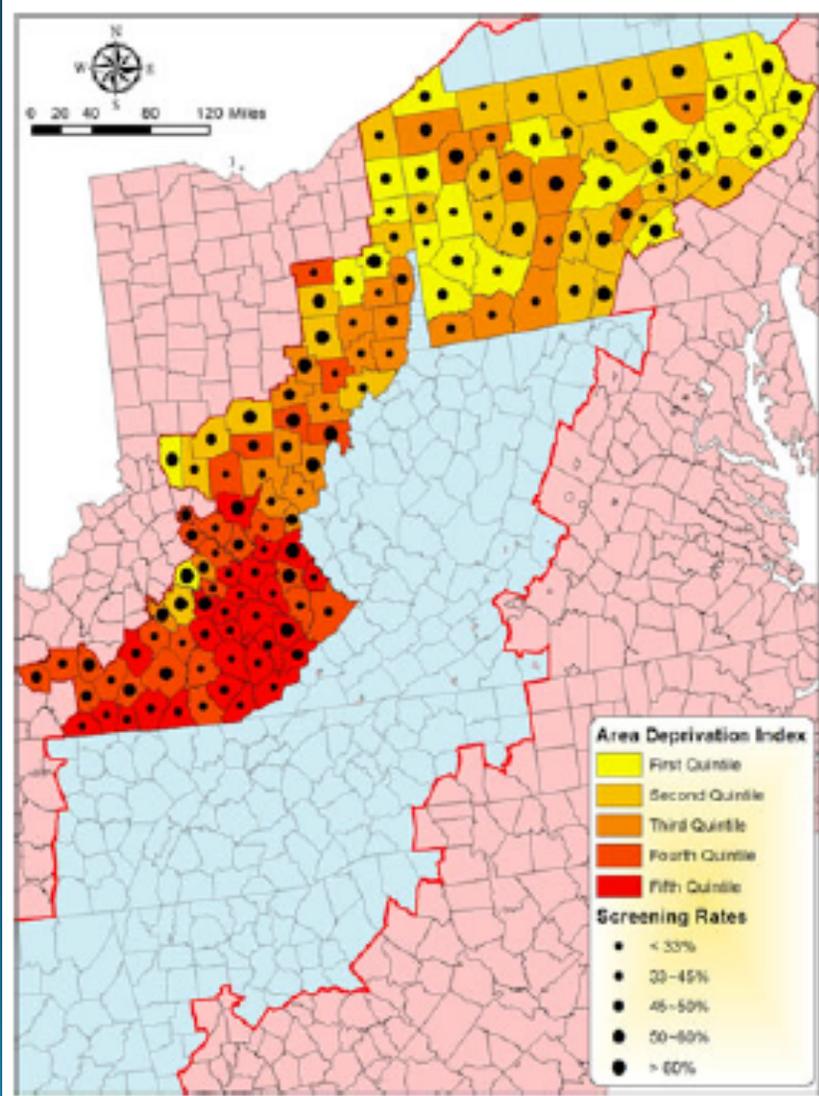
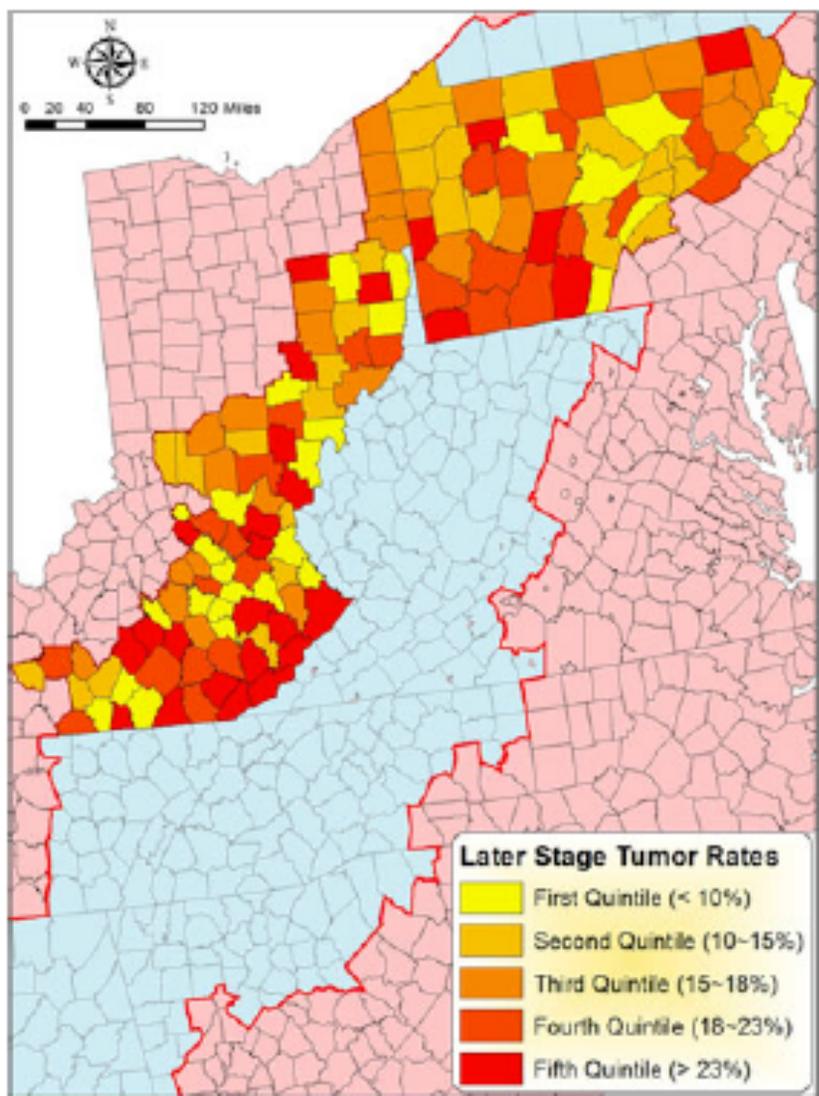


Table 2 Percentage of Patients Diagnosed with Early Stage Colorectal and Female Breast Cancers During 2007-2011, Excluding Stage 0 Cancers

	Rural Appalachia	Urban Non- Appalachia	Rural Non- Appalachia	Urban Appalachia
Female breast	80.6	82.7	82.3	82.7
Colorectal	53.8	53.5	54.4	52.4

Table 3 Percentage of Patients Diagnosed with Early Stage Colorectal and Female Breast Cancers during 2007-2011, Including Stage 0 Cancers

	Rural Appalachia	Urban Non- Appalachia	Rural Non- Appalachia	Urban Appalachia
Female breast	79.3	82.6	81.9	82.0
Colorectal	53.8	53.5	54.4	52.4

Table 4 Overall Survival Rates in Cancer Patients, % (SD)

	3-Year Survival Rates		5-Year Survival Rates	
	Rural Appalachia	Urban Non- Appalachia	Rural Appalachia	Urban Non- Appalachia
Patients diagnosed after 2000				
All Sites	57.1 (0.2)	65.1 (0.0)	49.9 (0.2)	58.3 (0.0)
Lung	17.0 (0.3)	20.1 (0.1)	11.8 (0.3)	14.4 (0.1)
Colorectal	60.7 (0.6)	64.1 (0.1)	51.3 (0.6)	54.4 (0.1)
Prostate	86.3 (0.3)	90.2 (0.0)	78.2 (0.4)	83.8 (0.1)
Breast	84.4 (0.4)	87.9 (0.1)	76.2 (0.5)	81.2 (0.1)
Early Stage patients diagnosed after 2004				
Colorectal	77.5 (0.9)	81.7 (0.1)	68.3 (1.1)	72.6 (0.2)
Prostate	91.2 (0.4)	94.4 (0.0)	84.4 (0.6)	88.9 (0.1)
Breast	92.0 (0.4)	94.2 (0.1)	85.9 (0.6)	89.3 (0.1)

HSR

Health Services Research

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DOI: 10.1111/1475-6773.12047

RESEARCH ARTICLE

Radiation Therapy Resources and Guideline-Concordant Radiotherapy for Early-Stage Breast Cancer Patients in an Underserved Region

Nengliang Yao, Stephen A. Matthews, Marianne M. Hillemeier, and Roger T. Anderson

Table 2: Predictors of Rates of Breast-Conserving Surgery without Radiation Therapy ($N = 120$)

<i>Variables</i>	<i>OLS Model</i>	<i>Spatial Lag Model</i>
Spatially lagged rate of BCS without radiation		0.71*** (0.07)
Constant	36.94*** (10.54)	12.51 (7.81)
Appalachian status	7.40** (2.35)	2.26 (1.92)
Radiation oncologists per 100,000 residents	2.74 (2.35)	2.59 (1.66)
Hospitals with radiation therapy facilities per 100,000 residents	-16.06*** (3.87)	-8.70** (2.76)
Surgeons per 100,000 residents	0.19 (0.10)	0.03 (0.07)
Hospitals with oncology services per 100,000 residents	0.17 (1.29)	0.03 (0.92)
% of cases diagnosed at stage II among early stage breast cancer patients	0.16 (0.18)	-0.05 (0.13)
% in poverty	-0.27 (0.73)	0.03 (0.30)
Medicare HMO penetration rate	-0.72 (0.40)	-0.16 (0.28)
% counties not containing an interstate highway	-5.82 (3.88)	-1.48 (2.75)
R-squared (adjusted R-squared)	0.29 (0.23)	
Multicollinearity condition number	17.90	
AIC	1039.90	985.59
Log likelihood	-509.95	-481.79
Schwarz criterion	1067.77	1016.25
Diagnostics for spatial dependence		
Lagrange multiplier (lag)	63.75***	
Robust LM (lag)	21.63***	
Lagrange multiplier (error)	46.04***	
Robust LM (error)	3.91*	
Likelihood ratio test for spatial dependence		56.31***

Note: Values are coefficients (Std. error).

* $p < .05$; ** $p < .01$; *** $p < .001$.

Diabetes management before and after cancer diagnosis: missed opportunity

Nengliang Yao¹, Fabian T. Camacho², Askar S. Chukmaitov¹, Steven T. Fleming³, Roger T. Anderson²

¹Department of Healthcare Policy and Research, Virginia Commonwealth University, College of Medicine, Richmond, VA 23298, USA; ²College of Medicine, University of Virginia, Charlottesville, VA, USA; ³College of Public Health, University of Kentucky, Lexington, KY 40506, USA

Correspondence to: Nengliang Yao, PhD. Department of Healthcare Policy and Research, College of Medicine, Virginia Commonwealth University, PO Box 980430, Richmond, VA 23298, USA. Email: nyao@vcu.edu.

Causes

Lifestyle
Public Health
Environment



Healthcare



Risk prevention

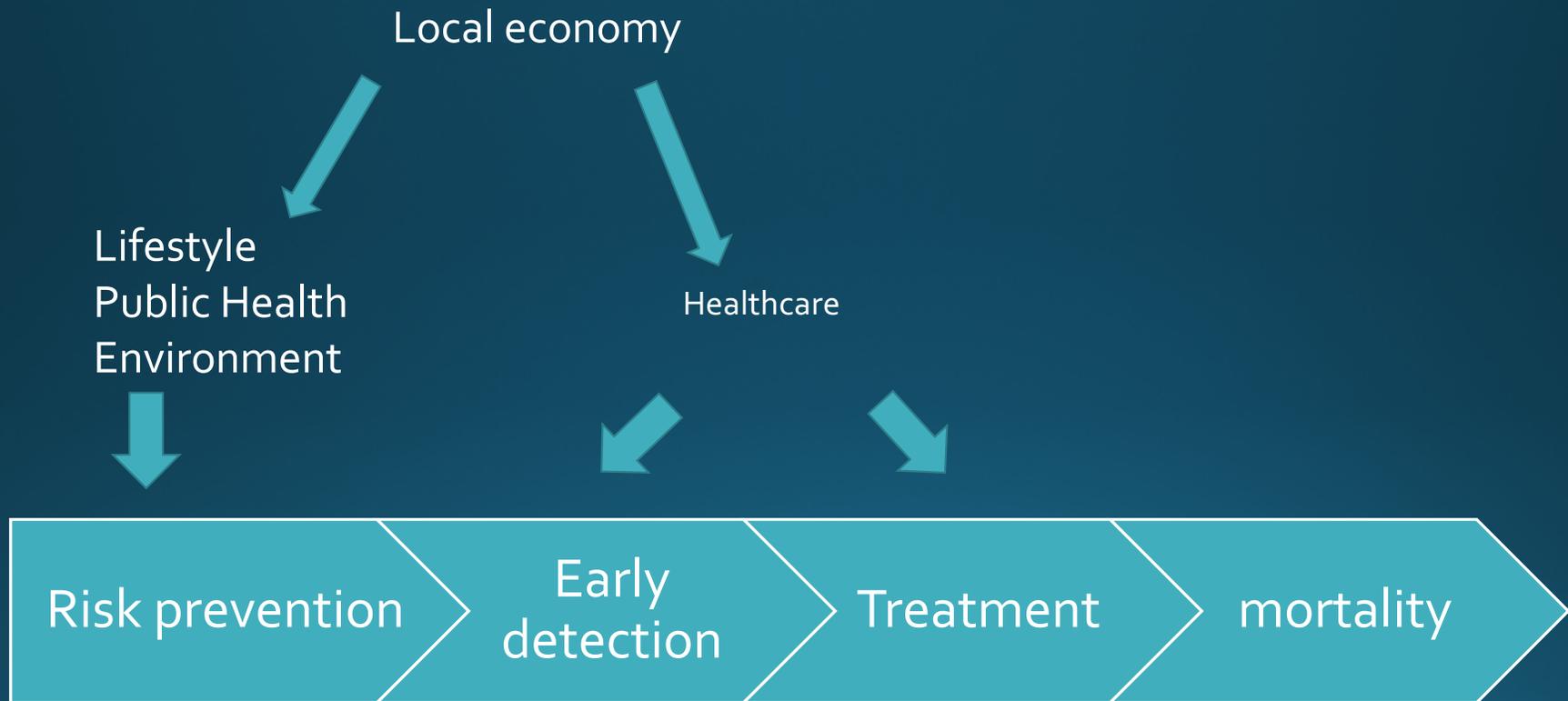
Early
detection

Treatment

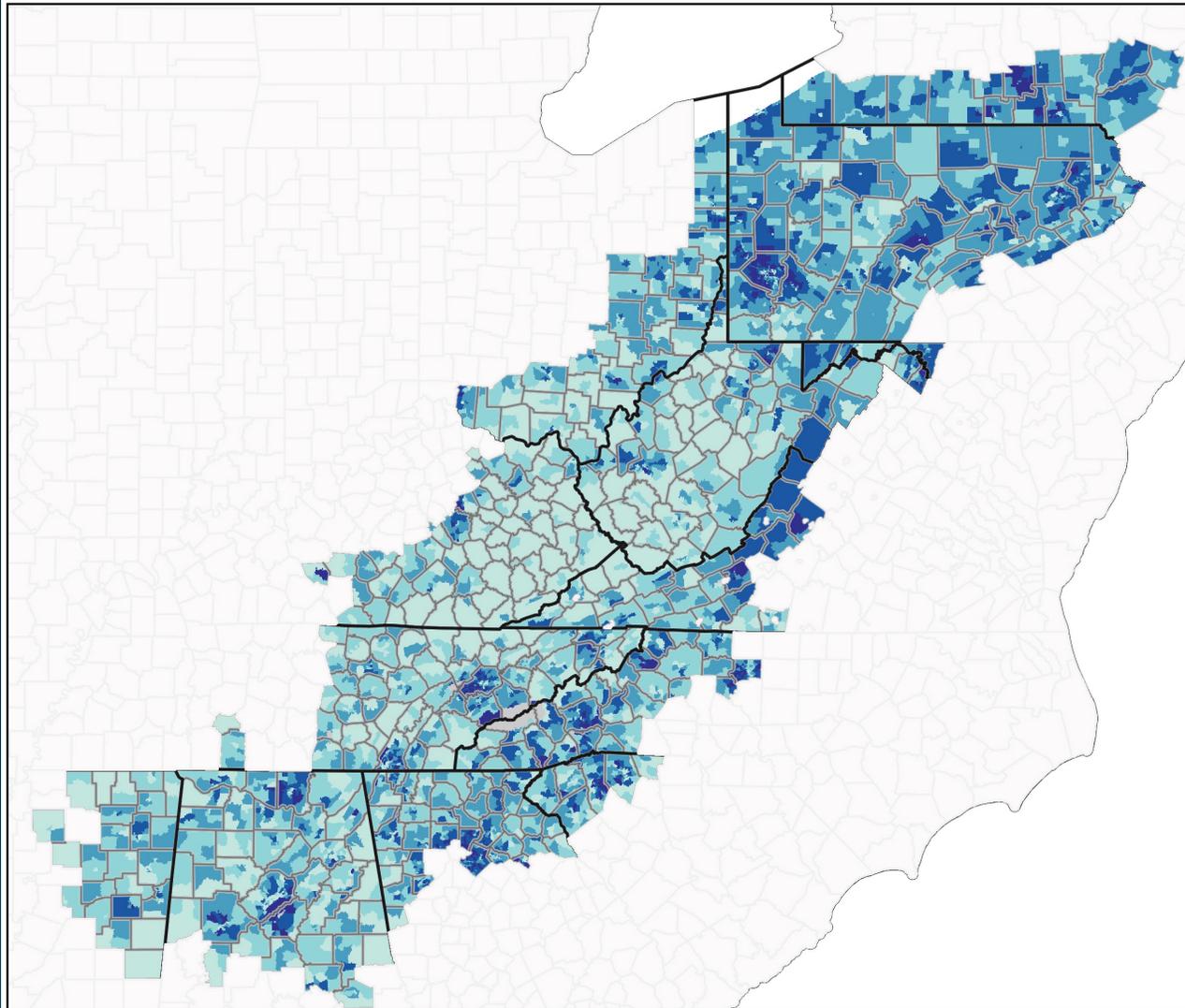
mortality



Causes



Labor Market Engagement in Appalachian Counties



Map Legend

Labor Market Engagement
Index by Block Group, HUD
eGIS 2015

- 76 - 99 (Better Market)
- 51 - 75
- 31 - 50
- 16 - 30
- 0 - 15 (Worse Market)
- No Data

Community Commons, 8/2/2016

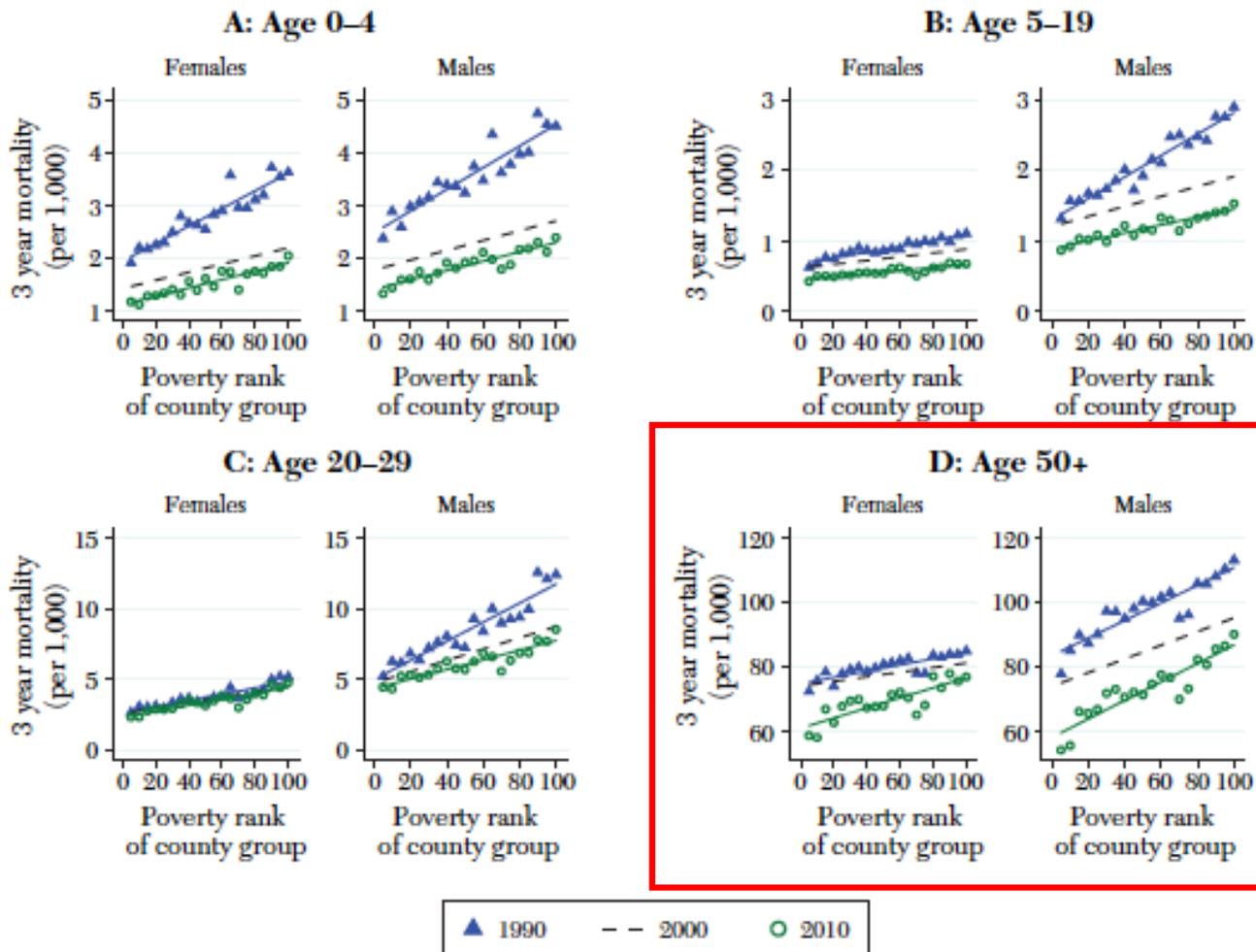
Mortality Inequality: The Good News from a County-Level Approach

Janet Currie and Hannes Schwandt

Life expectancy for the US population has shown a strong increase since 1990. The rise in life expectancy at birth holds for both men and women, as shown in [Figure 1](#). This development has not been driven solely by improvements in life expectancy at older ages. Mortality rates for those under one year of age, for the age group 1–4, and for every five-year age group above that level, declined for both males and females between 1990 and 2010.¶ Particularly pronounced improvements in mortality occurred at younger ages, which tend to be age groups in which deaths occur predominantly among the poor.

Figure 3

Three-Year Mortality Rates across Groups of Counties Ranked by their Poverty Rate



Consequences

- Significant impact on employment and personal income
- Little impact on local economy (is it true in rural Appalachia?)

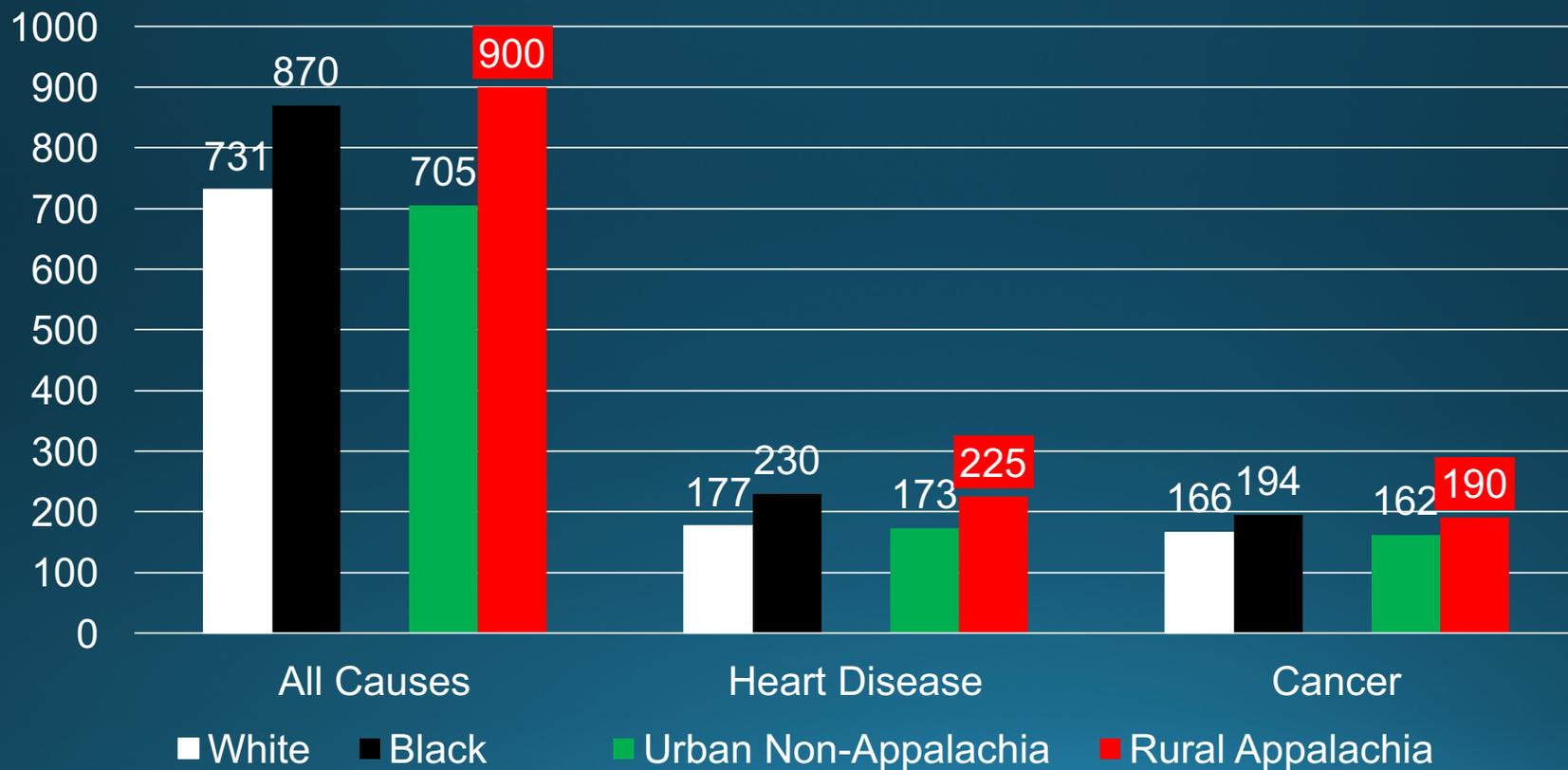
Bowser, Diana, and David Canning. "The effect of health improvements due to tobacco control on earnings in the United States." *Applied Economics* 45.36 (2013): 5021-5030.

Possible solutions

in a world of limited resources

- Local economy
 - Small businesses and globalization
- Public health
 - Smoking cessation

Age Adjusted Death Rates: 2010-2014



Questions & comments