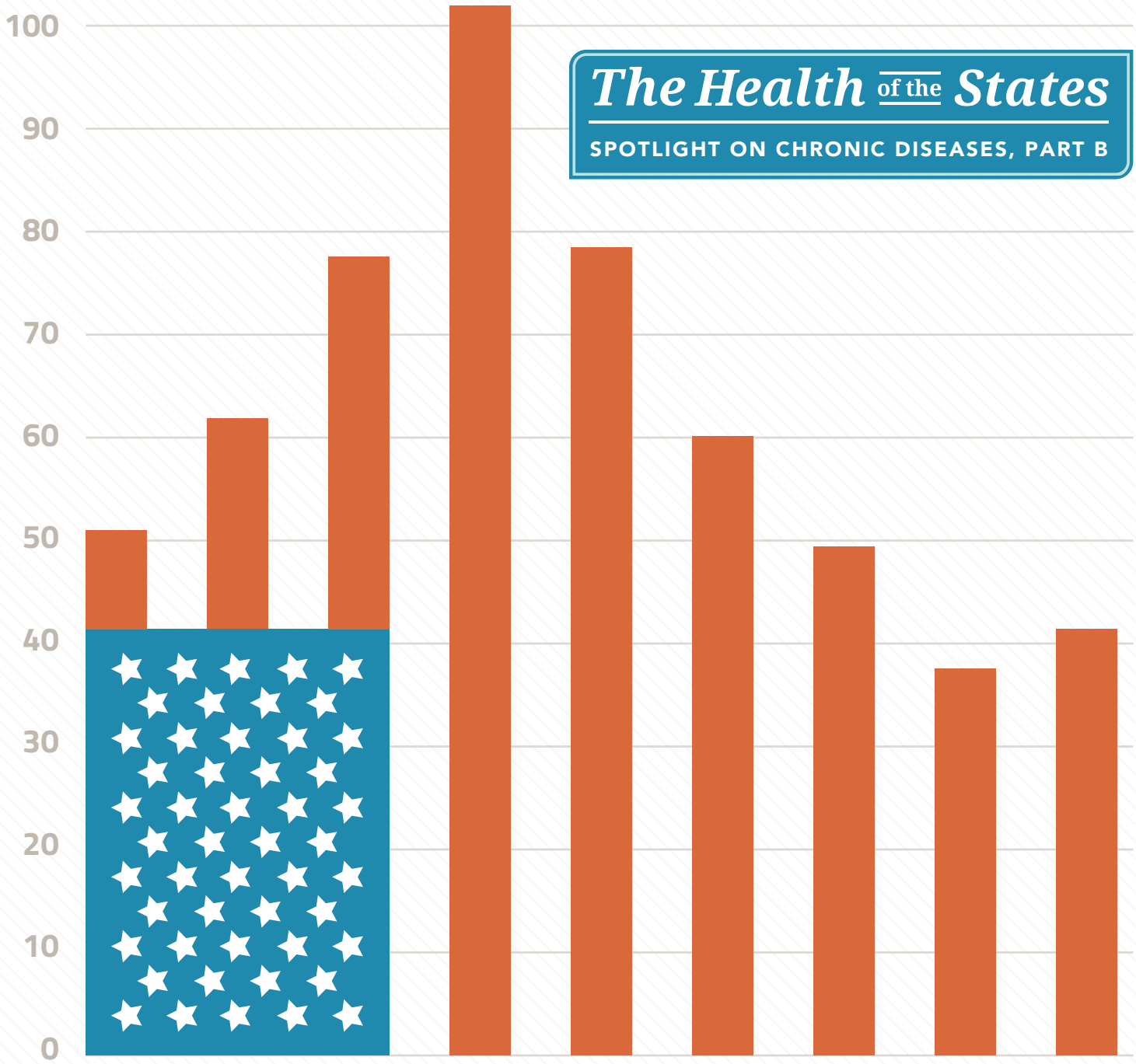

The Health of the States

SPOTLIGHT ON CHRONIC DISEASES, PART B

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Supplement 9, December 2017

Center on Society and Health

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The Health of the States study, funded by the Robert Wood Johnson Foundation, was a systematic examination of health disparities in the U.S. across the 50 states and the District of Columbia. The study was conducted in 2014–2016 by the Virginia Commonwealth University Center on Society and Health and the Urban Institute. The goal was to take a "deep dive" into the available data on the health of the states and the factors that shape health. The project examined how 123 potential determinants of health, drawn from five broad domains, correlated with 39 different health outcomes that span mortality and illness/injury across the life course.

The results were issued in a series of reports: a summary report[1] released in October 2016, which was followed by a series of supplements. This report, the last of nine supplements, focuses on how rates of chronic disease vary across the states. Please refer to the first supplement—*The Health of the States: Spotlight on Methods*[2]—for details on the data sources and analytic methods used to produce these results..

THE HEALTH OF THE STATES
Supplement 9:

Spotlight on Chronic Diseases, Part B

Cancer, Lower Respiratory Disease, Influenza and Pneumonia, and Alzheimer's Disease

Virginia Commonwealth University
Center on Society and Health
and the Urban Institute

December 2017

A WORD ABOUT METHODS

We examined how strongly health outcomes correlated with state statistics in five domains that shape health: health behaviors, the physical and social environment, social and economic factors, health care, and public policies and spending. The results, presented in Figures 3, 5, 7, and 9, are based on Spearman rank-order correlation coefficients (r_s), which measure the degree to which the state ranking for the indicator (e.g., poverty) matches the state ranking for the health outcome (e.g., infant mortality). Zero represents no association between the two rankings, and 1.0 represents an exact match. A positive correlation means that a high rank on the indicator is linked to a high rank on the health outcome, or vice versa; a negative correlation means that a high rank on the indicator is linked to a low rank on the health outcome, or vice versa. See *Supplement 1: The Health of the States: Spotlight on Methods*[2] for more details on data sources and methods and the rationale for omitting certain results from this report.

Spotlight on Chronic Diseases, Part B

CANCER MORTALITY

In 2013 data from the Centers for Disease Control and Prevention, death rates from cancer[a] varied across the states, from 132.5 deaths per 100,000 in Utah to 203.8 deaths per 100,000 in Kentucky (Figure 1). States with the lowest rates were primarily in the Pacific and Mountain regions of the country (Figure 2). Along with the nation's lowest cancer mortality rate, Utah had the lowest prevalence rates for lung, colorectal, and breast cancer. Although New England generally enjoyed favorable health outcomes, Connecticut was the only New England state in the Top 10 for cancer mortality.

States with the highest cancer mortality rates were primarily in the South and West South Central regions. Kentucky, Mississippi, and West Virginia had the nation's highest cancer mortality rates. Alabama and Tennessee also ranked in the Bottom 10 for cancer mortality. In addition, this region ranked in the Bottom 10 for high prevalence rates for lung cancer (Alabama, Tennessee, Kentucky, West Virginia, Florida, and Delaware). Kentucky's lung cancer prevalence was the nation's highest, and along with West Virginia, had rates that sharply exceeded those of the other Bottom 10 states.

What correlates the most with cancer mortality?

Although socioeconomic and environmental conditions are known to correlate with cancer mortality[3], Figure 3 reveals that state cancer mortality rates correlated most closely with rates of cigarette smoking, as well as with other health behaviors. In the Bottom 10 states (high cancer mortality), current smoking rates were 22.7 percent, compared with 15.4 percent in the Top 10 states (lowest cancer mortality). Top 10 states tended to be states with higher rates of other healthy behaviors, with more mothers breastfeeding their newborns and fewer children with unhealthy dietary habits (e.g., soda intake). These associations do not necessarily reflect causal relationships but rather a pattern of *co-occurrence*, where conditions "go together" at the state level. States where conditions are unhealthy for adults may also be unhealthy for children.

Cancer death rates also correlated

a. Space limitations compelled us to examine mortality rates for all cancers as a whole, but the social patterning of death rates often differs for specific cancers.

FIGURE 1

CANCER, LOWER RESPIRATORY, INFLUENZA, PNEUMONIA, AND ALZHEIMER'S MORTALITY (PER 100,000), BY STATE

	Cancer mortality		Lower respiratory mortality		Renal mortality		Influenza and pneumonia mortality		Alzheimer's mortality
UT	132.5	HI	15.6	VT	3.8	VT	9.3	NY	10.4
HI	138.3	DC	25.0	AZ	4.9	FL	9.5	HI	12.6
CO	143.0	CT	29.7	SD	5.9	WA	10.1	MD	14.3
NM	148.6	NY	30.7	WA	6.1	AZ	10.4	NM	14.9
CA	150.0	NJ	31.1	OR	6.8	OR	10.4	CT	16.2
AZ	151.0	MA	31.7	CA	7.2	MN	11.6	NJ	16.2
CT	152.9	UT	32.0	DC	8.8	CO	12.0	FL	16.9
WY	154.0	MD	32.5	IA	8.8	CT	12.2	PA	17.4
ND	157.4	RI	34.7	ID	8.8	NJ	12.6	DE	17.6
MT	158.0	CA	35.3	CO	9.0	RI	12.9	NV	18.4
NY	158.9	MN	37.1	WY	9.4	DC	13.2	AK	18.9
SD	158.9	VA	37.3	NY	9.7	DE	13.6	MA	19.4
ID	159.3	AK	37.9	NE	10.0	NH	13.9	UT	19.4
FL	159.6	ND	38.2	AK	10.1	ME	14.0	VA	19.7
WA	159.6	IL	39.3	MN	10.2	AK	14.1	DC	19.8
MN	159.7	PA	39.3	MT	10.3	SC	14.2	IL	19.8
NJ	160.8	SD	39.3	RI	10.4	TX	14.4	MT	20.7
TX	160.8	WA	39.4	NH	10.9	NE	14.5	KS	20.8
NH	162.4	FL	39.9	FL	11.1	ND	14.6	ID	21.0
MA	163.2	WI	40.3	HI	11.3	NM	14.8	WY	21.0
NE	165.3	NH	42.0	MD	11.4	ID	15.1	MN	21.5
VA	166.6	TX	42.4	CT	11.9	IN	15.3	NH	21.5
MD	166.7	OR	43.0	ND	12.9	WI	15.5	ME	21.6
KS	166.9	AZ	43.5	NJ	13.1	MI	15.8	RI	22.3
VT	167.7	DE	43.5	NM	13.2	MT	16.0	WI	22.7
NV	168.2	VT	44.1	NV	13.3	PA	16.2	NE	23.6
OR	168.4	NM	44.7	ME	13.6	SD	16.2	TX	24.3
WI	170.3	GA	45.4	MI	13.9	CA	16.6	WV	24.6
NC	171.0	CO	45.9	OH	14.0	OH	16.6	GA	25.0
GA	171.2	NC	46.3	WI	14.0	GA	16.8	OH	26.0
DE	172.1	ID	46.7	UT	14.1	IL	16.8	MI	26.4
IA	172.2	MI	46.7	OK	14.4	VA	17.0	AL	26.7
MI	175.1	LA	47.3	TN	14.8	MD	17.2	AR	27.2
PA	175.1	NE	47.7	MA	15.1	IA	17.8	CO	27.2
IL	175.9	IA	47.8	PA	15.7	MA	18.0	OR	27.2
AK	176.0	ME	49.1	TX	15.9	OK	18.0	MO	27.5
SC	177.7	OH	49.7	DE	16.0	NC	18.3	OK	27.6
RI	178.9	KS	50.3	SC	16.0	WY	18.4	NC	27.7
ME	180.5	MT	50.7	NC	16.6	LA	18.6	IA	28.2
OH	182.2	SC	50.8	IL	17.1	NV	18.6	IN	28.5
DC	182.5	MO	52.9	KS	17.3	UT	18.6	CA	30.0
MO	183.5	TN	53.2	MO	18.0	MO	18.7	MS	30.0
IN	184.7	NV	54.1	VA	18.0	KY	19.1	KY	31.4
AL	186.1	MS	54.3	GA	18.1	AL	19.2	AZ	31.7
TN	189.1	AL	54.8	IN	18.4	KS	20.1	SC	32.4
OK	190.6	IN	58.4	WV	18.6	WV	20.2	LA	32.9
LA	192.2	AR	60.1	AL	19.3	NY	20.5	VT	32.9
AR	193.4	OK	62.4	KY	20.5	TN	22.1	SD	34.9
WV	194.5	WY	63.1	AR	22.0	AR	23.2	ND	36.6
MS	200.0	WV	64.5	MS	22.8	HI	24.1	TN	36.9
KY	203.8	KY	64.6	LA	23.1	MS	24.3	WA	43.6

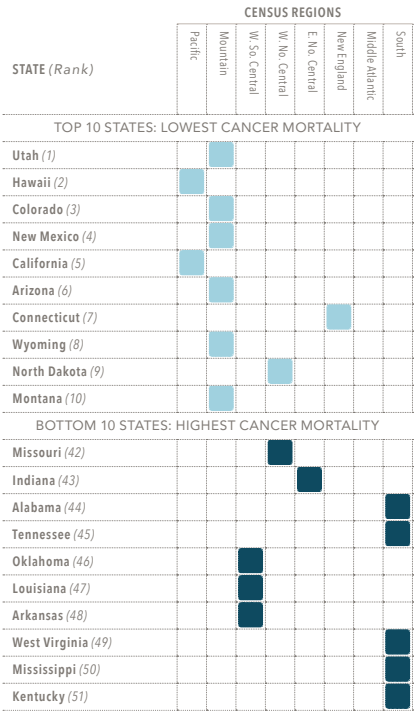
WHAT ABOUT.....

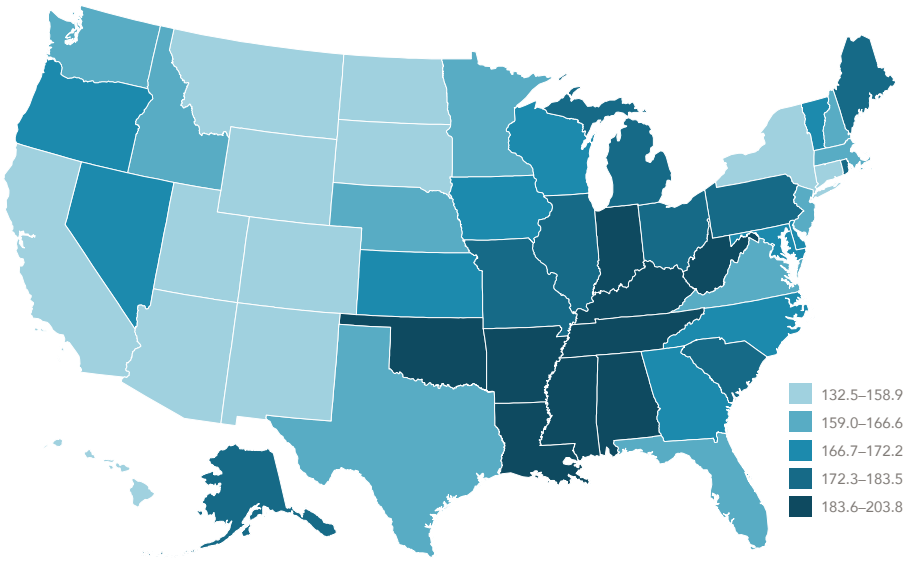
The Prevalence of Breast, Colon, and Prostate Cancers?

The prevalence of cancer can be influenced by differences across states in cancer screening. States where there is less cancer screening may appear to have lower cancer rates because these cases go undetected. For example, New England states reported especially high rates of breast cancer, which could either reflect greater exposure to risk factors or greater uptake of mammography screening. We found a wide variation across states in the reported prevalence of cancer: 4.6-fold for lung cancer, 2.3-fold for colorectal cancer, 1.8-fold for breast cancer, and 2.2-fold for prostate cancer. However, our correlational analysis of associated indicators revealed a paradoxical pattern in which healthful factors (e.g., high income, nonsmokers) were associated with *higher* rates of cancer. Populations with higher socioeconomic status may have greater access to cancer screening services, which may ultimately reduce mortality but increase prevalence rates. Delayed childbearing is a risk factor for breast cancer and is more common among more educated, affluent women. Melanoma rates may reflect recreational exposure where sunburn is more likely.

FIGURE 2

CANCER MORTALITY (PER 100,000), BY STATE (2013)





with avoidable hospitalizations, an indicator of inadequate care, in primary and/or secondary forms (e.g., screening services), or chronic disease treatment management services for patients with cancer. In Top 10 states (with low cancer mortality), 50.2 percent of hospitalizations were avoidable, compared with 85.8 percent in Bottom 10 states.

The leading cause of cancer deaths in the United States is lung cancer, a condition caused largely by smoking and that in sheer numbers drives much of the patterns for cancer mortality shown in Figure 2. The smoking rate in the Bottom 10 states (with highest prevalence of lung cancer) averaged 20.9 percent, compared with 16.4 percent in the Top 10 states where lung cancer was least prevalent.

Other data in our analysis—not shown in Figure 3—revealed that the prevalence of lung cancer also correlated highly with the proportion of current/former (ever) smokers (r_s= 0.74). The data also show an inverse correlation between breastfeeding and both cancer mortality (r_s= -0.74) and the prevalence of lung cancer (r_s= -0.63), which could represent the protective benefits of breastfeeding or a marker of other health behaviors that reduce cancer risks. For example, the correlation between state smoking rates and the percentage of women who ever breastfed their children was -0.55. And

the data show that lung cancer prevalence was lower in states with a healthier built environment (r_s= -0.56), perhaps a marker for communities with stronger prohibitions against smoking in public places (e.g., restaurants). For example, access to parks in Top 10 states (with lowest lung cancer prevalence) was 47.0 percent, compared with 23.3 percent in Bottom 10 states (highest lung cancer prevalence), and lung cancer prevalence was inversely correlated with per capita spending on parks and recreation services (r_s= -0.56).

LOWER RESPIRATORY MORTALITY

The lower respiratory tract includes the bronchi and lungs, where the damaging effects of smoking often lead to emphysema and other forms of chronic obstructive pulmonary disease (COPD). Lower respiratory mortality includes deaths from COPD and asthma, among other causes. Deaths from lower respiratory conditions varied more than four-fold in 2013, from 15.6 deaths per 100,000 in Hawaii to 64.6 deaths per 100,000 persons in Kentucky (Figure 1). The mortality rates in Hawaii and the District of Columbia were distinctly lower than those of other Top 10 states. The Bottom 10 states were primarily in the South and West South Central regions. Kentucky and West Virginia had the nation's highest lower respiratory mortality rates (Figure 4).

FIGURE 3

WHAT CORRELATES WITH CANCER MORTALITY?

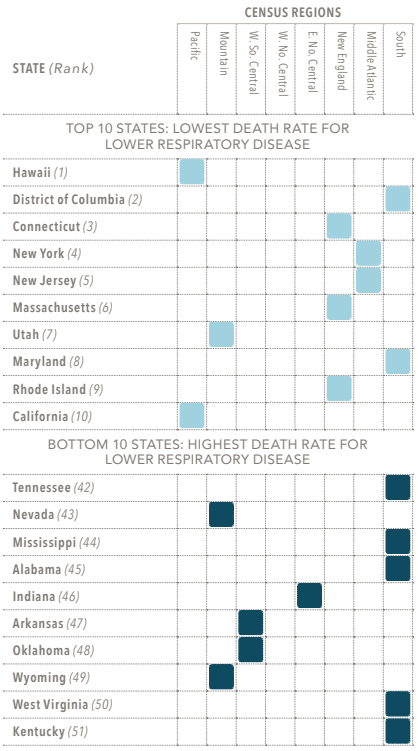
THE CORRELATION COEFFICIENTS (r_s)*

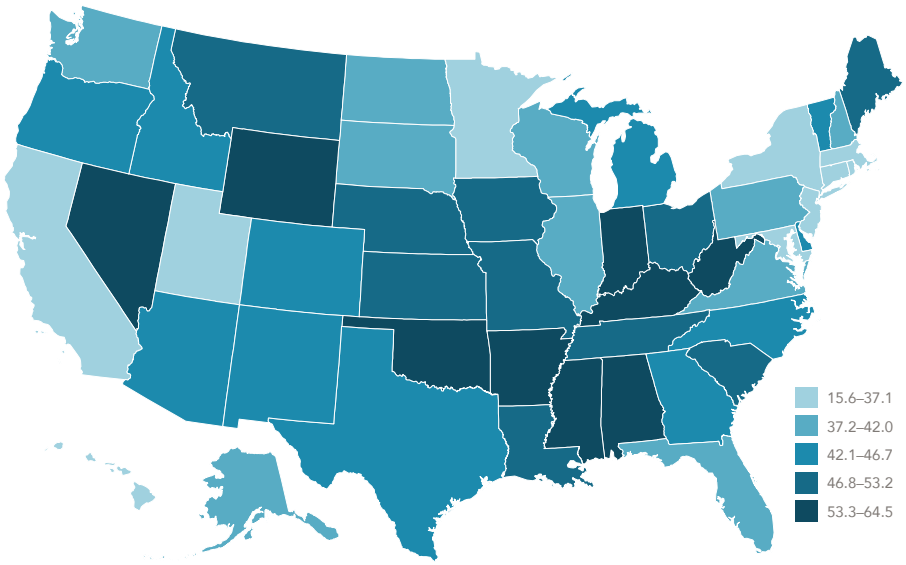
HEALTH BEHAVIORS			
Current smokers	0.72	Any breastfeeding	-0.74
Soda intake *(youth)*	0.51	Physical activity *(adult)*	-0.70
PHYSICAL AND SOCIAL ENVIRONMENT			
Commuting by motor vehicle	0.76	Neighborhood resources for children	-0.55
Childhood trauma	0.74		
Smokers in household *(child present)*	0.70		
SOCIAL AND ECONOMIC FACTORS			
Severe housing disrepair	0.57	Median household income	0.52
Poverty *(adults)*	0.54		
Single-parent households	0.50		
HEALTH SYSTEM			
Avoidable hospitalization	0.71		

*Correlation coefficients range from zero to 1.0 and measure how strongly one variable correlates with another. Factors on the left (negative coefficients) are inversely related (e.g., one goes up when the other goes down).

High correlations were also noted for other measures of **Health Behaviors**: Ever smokers (r_s= 0.56), Exclusive breastfeeding (-0.55), Alcohol/drugs before sex (youth); and **Physical and Social Environment**: Smokers in household (child present) (0.72), Indoor smoking (nonsmokers present) (0.62), Smoke-free homes (-0.71).

FIGURE 4
LOWER RESPIRATORY MORTALITY (PER 100,000), BY STATE (2013)





What correlates the most with lower respiratory mortality?

Not surprisingly, Figure 5 reveals that lower respiratory deaths correlated very highly with smoking rates, and they correlated inversely with tobacco tax rates (r_s= -0.64). The smoking rate in Bottom 10 states (highest respiratory death rates) was 22.5 percent, compared with 14.0 percent in Top 10 states (lowest respiratory death rates).

Lower respiratory mortality also correlated with the conditions that co-occur among people who smoke, such as low socioeconomic status (e.g., household income, education) and unhealthy neighborhood environments. For example, in Top 10 states (lowest lower respiratory death rates), the proportion of adults with a Bachelor's degree or higher education was 26.4 percent, compared with 15.9 percent in Bottom 10 states with the highest respiratory death rates.

Deaths from lower respiratory disease were more common in states with a less healthy built environment, perhaps a marker for states with laxer restrictions on smoking in public places (for which we lack data). States with higher respiratory mortality rates were those where more people commuted to work by automobile (r_s= 0.76) and had less

walkable neighborhoods (r_s= -0.71), parks (r_s= -0.64), and neighborhood resources for children (r_s= -0.63). The average values for Top 10 and Bottom 10 states are shown in Figure 6. Figure 7 shows that Bottom 10 states invested less in infrastructure. For example, we found an inverse correlation between state death rates from pulmonary disease and per capita spending on mass transit. States with lower death rates also set higher tobacco taxes to discourage smoking. The tobacco tax rate in Bottom 10 states was $0.75 per pack, compared with $2.77 per pack in Top 10 states (low respiratory death rates).

The Top 10 states also differed in their investment in income support for low-income individuals—averaging $2,564 in income support per capita of low-income individuals (incomes below 200 percent of the Federal Poverty Level), more than twice the per capita spending in Bottom 10 states ($1,220)—and they spent more on housing and redevelopment relative to the size of the low-income population (Figure 7).

Figure 5 also reveals that deaths from lower respiratory disease were inversely correlated with markers of access to health care, such as access to primary care physicians and to preventive services such as mammograms. In what may parallel shortages in other providers who offer services to prevent or treat pulmonary diseases, shortages in mental health professionals were experienced by 61.0 percent of the

FIGURE 5

WHAT CORRELATES WITH LOWER RESPIRATORY MORTALITY?

THE CORRELATION COEFFICIENTS (r_s)*

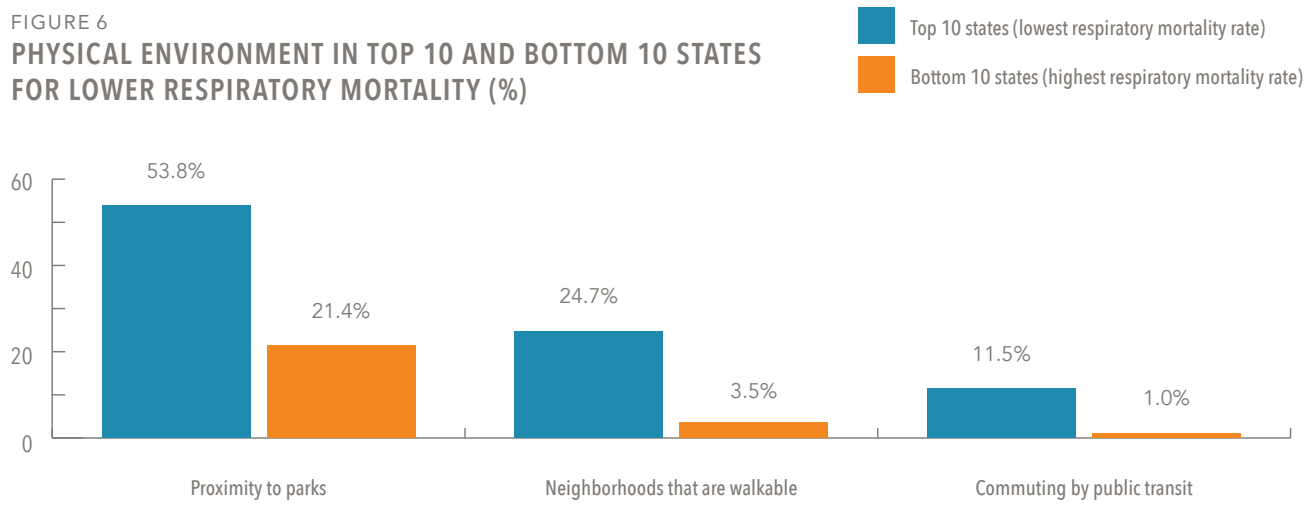
HEALTH BEHAVIORS			
Current smokers	0.80	Sexual abstinence before age 18	-0.58
Soda intake *(youth)*	0.63		
Carrying weapons *(youth)*	0.58		
Physical inactivity *(adult)*	0.54		
PHYSICAL AND SOCIAL ENVIRONMENT			
Commuting by motor vehicle	0.76	Neighborhoods that are walkable	-0.71
Childhood trauma	0.74	Proximity to parks	-0.64
Smokers in household *(child present)*	0.70	Neighborhood resources for children	-0.63
SOCIAL AND ECONOMIC FACTORS			
Severe housing disrepair	0.62	Median household income	-0.79
Poverty *(adults)*	0.56	Bachelor's degree/higher	-0.76
Food insecurity *(households)*	0.55	Higher educated household head	-0.64
HEALTH SYSTEM			
Primary care shortage	0.59	Annual dental visit (adult)	-0.73
Could not afford doctor	0.51	Mammography screening	-0.53

*Correlation coefficients range from zero to 1.0 and measure how strongly one variable correlates with another. Factors on the left (negative coefficients) are inversely related (e.g., one goes up when the other goes down).

High correlations were also noted for other measures of **Health Behaviors**: Ever smokers (r_s= 0.61), Teen smoking (0.55), Children living with user (0.53); **Physical and Social Environment**: Residents in walkable neighborhoods (-0.71), Commuting by public transit (-0.71), Smoke-free homes (-0.57), and Indoor smoking (child present) (0.56); and **Health Systems**: Mental health care shortage (0.63).

FIGURE 6

PHYSICAL ENVIRONMENT IN TOP 10 AND BOTTOM 10 STATES FOR LOWER RESPIRATORY MORTALITY (%)



population in Bottom 10 states (high respiratory death rates), more than four times that of Top 10 states (13.7 percent). Death rates were also higher in states where more residents were unable to afford their doctor: 11.4 percent could not afford their doctor in Top 10 states, compared with 16.8 percent in Bottom 10 states.

FIGURE 7

CORRELATIONS BETWEEN STATE SPENDING AND LOWER RESPIRATORY MORTALITY

Mass transit, per capita	-0.69
Tobacco taxes	-0.64
Housing & redevelopment ÷ pop. <100% FPL	-0.61
State income support ÷ pop. <100% FPL	-0.53

FPL = Federal poverty level. <100% FPL and <200% FPL refer to spending divided by the population living with incomes below 100 percent and 200 percent of the FPL, respectively.

Correlation coefficients range from zero to 1.0 and measure how strongly one variable correlates with another. Factors on the left (negative coefficients) are inversely related (e.g., one goes up when the other goes down).

High inverse correlations were also noted for spending on Housing & redevelopment per capita (r_s= -0.50) and ÷ pop. <200% FPL (-0.61), and State income support ÷ pop. <200% FPL (-0.53).

RENAL MORTALITY

Renal (kidney) disease is most often caused by diabetes, high blood pressure, or cardiovascular disease, and end-stage disease often requires dialysis. Complications can be prevented by better management of the underlying causes, such as controlling diabetes. In 2013, deaths from renal disease exhibited a sharp east-west divide (Figure 8) and varied more than 6-fold across the states, from 3.8 deaths per 100,000 in Vermont to 23.1 deaths per 100,000 in Louisiana (Figure 1). Although Vermont had the lowest rate, the Top 10 states (lowest renal mortality) were primarily in the Pacific and Mountain regions of the country. The Bottom 10 states were concentrated in the South and West South Central regions. Massachusetts, an otherwise healthy state that ranked in the Top 10 for 21 health outcomes, a total matched only by Utah, ranked in the fourth (second to lowest) quintile for renal mortality.

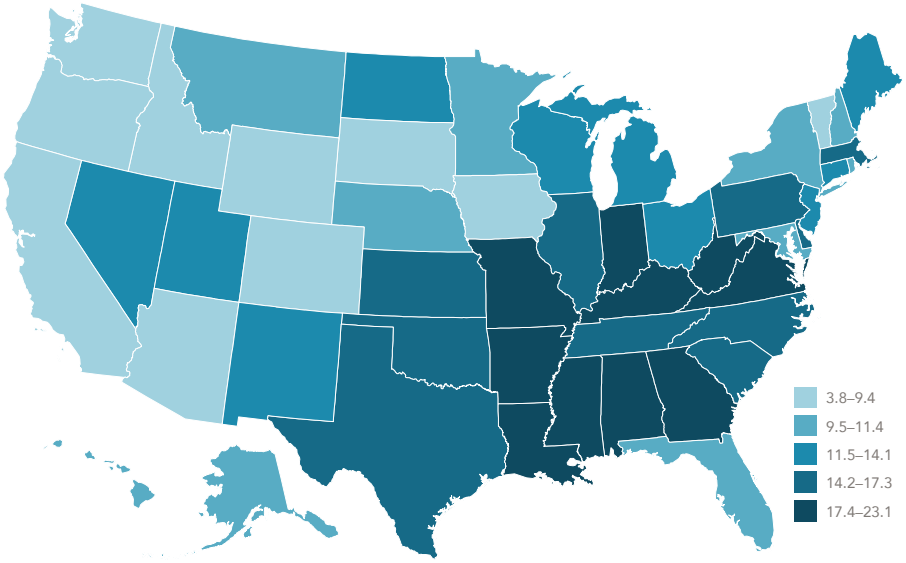
FIGURE 8

RENAL MORTALITY (PER 100,000), BY STATE (2013)

STATE *(Rank)*	Pacific	Mountain	W. So. Central	W. No. Central	E. No. Central	New England	Middle Atlantic	South
TOP 10 STATES: LOWEST RENAL MORTALITY								
Vermont *(1)*						■		
Arizona *(2)*		■						
South Dakota *(3)*				■				
Washington *(4)*	■							
Oregon *(5)*	■							
California *(6)*	■							
Iowa *(7)*				■				
Idaho *(7)*		■						
District of Columbia *(7)*								■
Colorado *(10)*		■						
BOTTOM 10 STATES: HIGHEST RENAL MORTALITY								
Virginia *(42)*								■
Missouri *(42)*				■				
Georgia *(44)*								■
Indiana *(45)*					■			
West Virginia *(46)*								■
Alabama *(47)*								■
Kentucky *(48)*								■
Arkansas *(49)*			■					
Mississippi *(50)*								■
Louisiana *(51)*			■					

CENSUS REGIONS

See Supplement 1: The Health of the States: Spotlight on Methods for our protocol for handling tied rankings.



What correlates the most with renal mortality?

Diabetes, high blood pressure, and other risk factors for renal mortality can be controlled through regular exercise, healthy diets, and weight management. Accordingly, renal mortality was lower in states where residents had healthier behaviors. It was also lower in states where neighborhoods had more resources that promote physical activity among children and discourage commuting by motor vehicle (Figure 9). Average values for Top 10 and Bottom 10 states are shown in Figure 10.

States with lower renal mortality had fewer primary care shortages. In what may reflect better access to outpatient (e.g., primary care) services to manage chronic diseases that affect the kidney, they also had lower rates of avoidable hospitalizations: they averaged 51.2 percent of hospitalizations in Top 10 states and 82.1 percent in Bottom 10 states. For reasons that require further study, states

FIGURE 9

WHAT CORRELATES WITH RENAL MORTALITY?

THE CORRELATION COEFFICIENTS (r_s)*

HEALTH BEHAVIORS			
Physical inactivity *(adult)*	0.72	Exclusive breastfeeding	-0.69
Current smokers	0.64	Fruit intake *(youth)*	-0.53
Fights with injury *(youth)*	0.56	Physical activity *(children)*	-0.52
Sexual activity before age 18	0.54		

PHYSICAL AND SOCIAL ENVIRONMENT			
Commuting by motor vehicle	0.64	Commuting by walking/cycling	-0.71
Indoor smoking *(child present)*	0.63	Neighborhood resources for children	-0.57
Dating violence *(youth)*	0.53	Neighborhoods that are walkable	-0.51
		Proximity to parks	-0.50

HEALTH SYSTEM			
Avoidable hospitalization	0.72		
Primary care shortage	0.59		

*Correlation coefficients range from zero to 1.0 and measure how strongly one variable correlates with another. Factors on the left (negative coefficients) are inversely related (e.g., one goes up when the other goes down).

High correlations were also noted for other measures of **Health Behaviors**: Any breastfeeding (r_s= -0.68). Bicycle helmet use (youth) (-0.57); and **Physical and Social Environment**: Smoke-free homes (-0.56), Smokers in household (child present) (0.55), Indoor smoking (nonsmokers present) (0.53), Residents in walkable neighborhoods (-0.51).

with higher renal mortality tended to have more violent characteristics. For example, in Bottom 10 states (high renal mortality), the proportion of teens reporting intimate partner violence was 12.6 percent, compared with 7.8 percent in Top 10 states; the proportion of teens injured in fights was twice as high in Bottom 10 states.

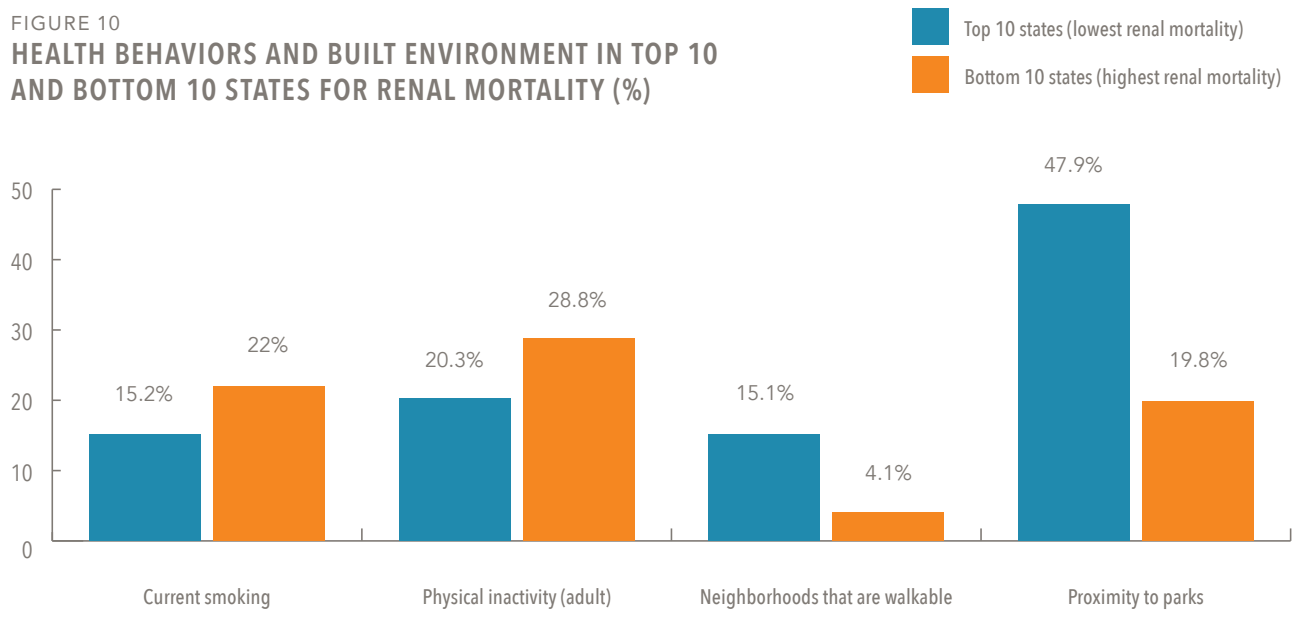
INFLUENZA AND PNEUMONIA MORTALITY

Influenza (flu) and pneumonia are more likely to claim lives among the very young and old, and people with compromised immune systems. Across all age groups, death rates in 2013 varied 2.6-fold across the states, from 9.3 per 100,000 in Vermont to 24.3 deaths per 100,000 in Mississippi (Figure 1). The Bottom 10 states (those with high death rates) were primarily in the South but included other regions, such as West North Central states (Kansas and Missouri) (Figure 11).

Hawaii, a state otherwise known for favorable health outcomes—ranking in the Top 10 for 20 health outcomes—ranked in the Bottom 10 and had the nation's highest mortality rate from influenza and pneumonia, after Mississippi. Similarly, Massachusetts, an otherwise healthy state that ranked in the Top 10 for 21 health outcomes, ranked in the fourth (second to lowest) quintile for influenza and pneumococcal mortality. New York also

FIGURE 10

HEALTH BEHAVIORS AND BUILT ENVIRONMENT IN TOP 10 AND BOTTOM 10 STATES FOR RENAL MORTALITY (%)



ranked in the Bottom 10, despite bordering New Jersey, which ranked in the Top 10.

What correlates the most with influenza and pneumonia mortality?

State death rates for influenza (flu) and pneumonia correlated with only a few factors in our analysis, such as primary care shortages (r_s= 0.56) and avoidable hospitalizations (r_s= 0.50). This probably reflects the higher rates of access to influenza vaccination and pneumococcal immunization. Death rates from the flu and pneumonia also correlated with measures of health behaviors, such as adult physical inactivity (r_s= 0.51) and living in smoke-free homes (r_s= -0.51). People with healthier behaviors are less likely to smoke—a risk factor for pneumonia—and to obtain immunizations.

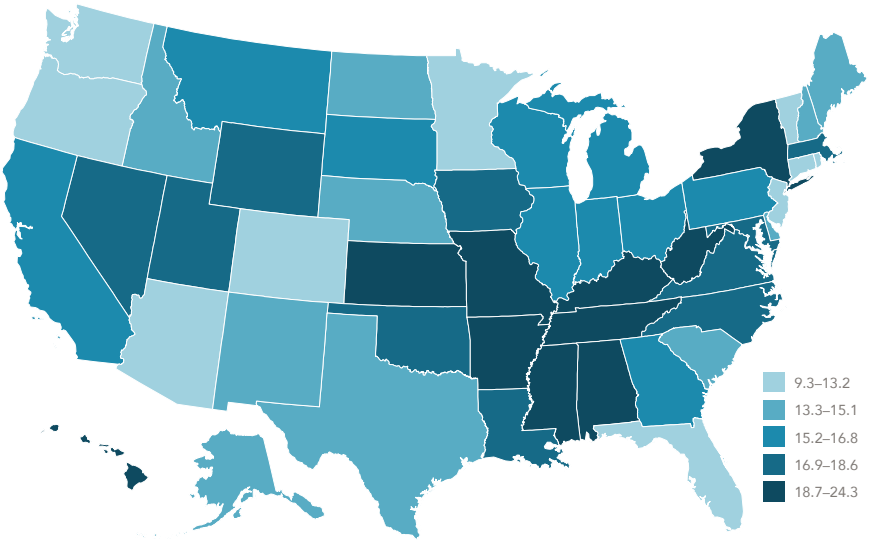
ALZHEIMER'S MORTALITY

Deaths from Alzheimer's disease are more likely in people with longer life spans and thus the death rate may be influenced by life expectancy. In 2013, death rates from Alzheimer's disease varied more than four-fold across the states, from 10.4 per 100,000 persons in New York to 43.6 deaths per 100,000 in Washington (Figure 1). The Top 10 states (low death rates from Alzheimer's disease) were primarily in the eastern United States but were otherwise geographically dispersed (Figure 12). The Bottom 10 states were also geographically dispersed and included states with favorable outcomes for other

FIGURE 11

INFLUENZA/PNEUMONIA MORTALITY (PER 100,000), BY STATE (2013)

STATE *(Rank)*	Pacific	Mountain	W. So. Central	W. No. Central	E. No. Central	New England	Middle Atlantic	South
TOP 10 STATES: LOWEST INFLUENZA/PNEUMONIA MORTALITY								
Vermont *(1)*							■	
Florida *(2)*								■
Washington *(3)*	■							
Oregon *(4)*	■							
Arizona *(4)*		■						
Minnesota *(6)*				■				
Colorado *(7)*			■					
Connecticut *(8)*						■		
New Jersey *(9)*							■	
Rhode Island *(10)*						■		
BOTTOM 10 STATES: HIGHEST INFLUENZA/PNEUMONIA MORTALITY								
Missouri *(42)*				■				
Kentucky *(43)*								■
Alabama *(44)*								■
Kansas *(45)*				■				
West Virginia *(46)*								■
New York *(47)*							■	
Tennessee *(48)*								■
Arkansas *(49)*			■					
Hawaii *(50)*	■							
Mississippi *(51)*								■

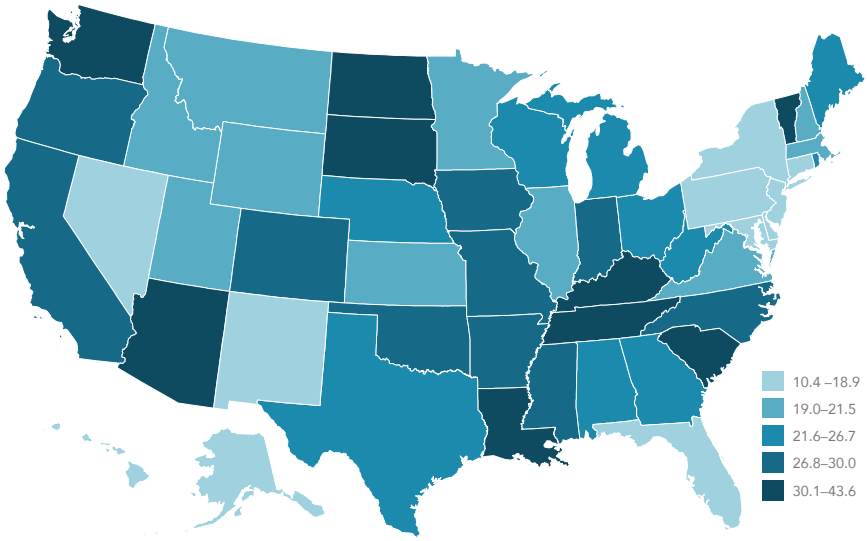


See Supplement 1: The Health of the States: Spotlight on Methods for our protocol for handling tied rankings.

FIGURE 12

ALZHEIMER'S MORTALITY (PER 100,000), BY STATE (2013)

STATE *(Rank)*	Pacific	Mountain	W. So. Central	W. No. Central	E. No. Central	New England	Middle Atlantic	South
TOP 10 STATES: LOWEST ALZHEIMER'S MORTALITY								
New York *(1)*							■	
Hawaii *(2)*	■							
Maryland *(3)*								■
New Mexico *(4)*		■						
New Jersey *(5)*							■	
Connecticut *(5)*						■		
Florida *(7)*								■
Pennsylvania *(8)*							■	
Delaware *(9)*								■
Nevada *(10)*		■						
BOTTOM 10 STATES: HIGHEST ALZHEIMER'S MORTALITY								
Mississippi *(41)*								■
Kentucky *(43)*								■
Arizona *(44)*		■						
South Carolina *(45)*								■
Vermont *(46)*						■		
Louisiana *(46)*			■					
South Dakota *(48)*				■				
North Dakota *(49)*				■				
Tennessee *(50)*								■
Washington *(51)*	■							



See Supplement 1: The Health of the States: Spotlight on Methods for our protocol for handling tied rankings.

health conditions. For example, Vermont ranked in the Top 10 for 20 health outcomes examined in this study but was in the Bottom 10 for Alzheimer's mortality; Washington ranked in the Top 10 for 11 conditions but had the nation's highest death rate from Alzheimer's disease.

What correlates the most with Alzheimer's mortality?

Our analysis provided little insight into the geographic variations in Alzheimer's mortality. Of the data we examined, death rates correlated highly with two health behaviors among youth (soda intake, $r_s = 0.56$; texting and driving, $r_s = 0.50$), median household income ($r_s = -0.52$), and commuting by public transit ($r_s = -0.52$).[b] Deaths from Alzheimer's disease, a disease of aging, may be more common in states where residents reach more advanced age by not succumbing earlier to heart disease, strokes, diabetes or cancer—and these conditions are susceptible to the above risk factors. More important risk factors for dementia (i.e., cognitive impairment) were not examined in this study and may correlate more strongly with state mortality rates from Alzheimer's disease.

What The Data Affirm: The Takeaway

Healthy behaviors—such as not smoking and getting regular exercise—and neighborhood features that promote physical activity—such as green space and walkability—correlate highly with lower risks of dying from cancer, lower respiratory disease, and kidney failure. Access to health care is also influential, particularly access to primary care, where patients can receive screening and get help in managing chronic diseases. Public policies also matter, such as tobacco taxes and income support for low-income families.

The bottom line? Healthy behaviors that determine our risk for multiple diseases reflect not only our personal choices but also the environmental conditions we create in our communities that promote (or discourage) a healthy lifestyle and access to health care.

b. Use of public transportation for commuting varied more than five-fold for Top 10 (low Alzheimer's mortality) and Bottom 10 states (high Alzheimer's mortality)—7.3% versus 1.4%—and the reasons can only be speculative. For example, driving impairment may require patients with Alzheimer's disease to rely more on public transit. However, further research is needed to rule out confounding variables.

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