

WHY ARE DEATH RATES RISING IN VIRGINIA'S WHITE POPULATION?

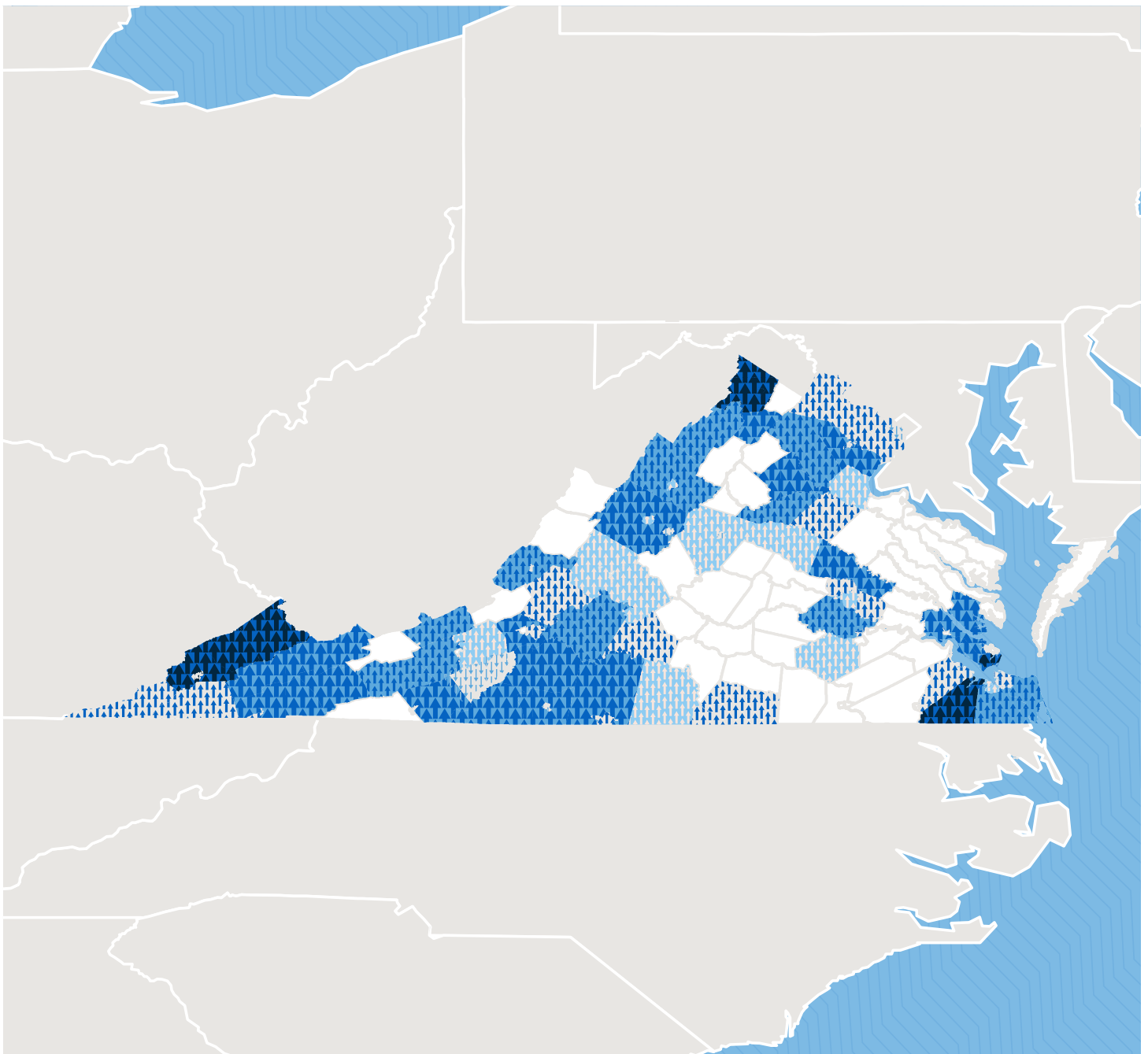


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Technical Supplement

INTRODUCTION

We undertook a detailed examination of state vital statistics from 1995 to 2014 and compared results across the state's 95 counties and 38 independent cities. The study was funded by the California Endowment and involved a partnership between the Center on Society and Health at Virginia Commonwealth University and the Graduate School of Public Health at the University of Pittsburgh. Our topline findings are presented in an accompanying issue brief.

This Technical Supplement provides documentation of the methods used in the study and greater detail about our results, along with data tables and figures, which could not be included in the issue brief.

METHODS

Deaths in Virginia were examined in aggregate (all-cause mortality) and for specific causes from 1995 to 2014. Death data for Virginia were obtained from the National Center for Health Statistics (NCHS) after approval by the National Association for Public Health Statistics and Information Systems. Individual-level death data, including county of residence, were abstracted from the Mortality Multiple Cause Micro-data Files.¹ Rates or counts with fewer than 10 deaths were suppressed per NCHS regulations. Population counts for calculating mortality rates were obtained from the National Cancer Institute's Surveillance, Epidemiology, and End Results Program.² The study was exempted by the institutional review board of Virginia Commonwealth University.

Death counts were aggregated into 5-year periods (1995-1999, 2000-2004, 2005-2009, and 2010-2014) to increase stability and reduce suppression. Mortality rates were stratified by age, sex, race, and ethnicity. Sample size considerations required the population to be classified into five, broad racial-ethnic groups: Hispanics/Latinos and non-Hispanic (NH) whites, NH blacks, NH Asians and Pacific Islanders, and NH American Indians and Alaskan Natives. For simplicity, this report uses "whites" as a shorthand for NH whites.

Causes of death were coded to the *International Classification of Diseases (ICD)* revision in effect at the time of death. Causes of death were grouped into 116 categories in 11 broad domains (Table 1).

Table 1.
HIERARCHICAL STRUCTURE FOR ANALYSIS OF CAUSES OF DEATH, BY DOMAIN AND PROJECT CODES

CAUSE OF DEATH	PROJECT CODES (N = 111)	ICD-10 CODES
ALL CAUSES	001	A00-Z99
Domain 1. Infectious and parasitic diseases	002	A00-B99
Tuberculosis	003	A16-A19
Septicemia	004	A40-A41
Viral disease	005	A80-B34
Viral hepatitis	006	B15-B19
HIV disease	007	B20-B24
Domain 2. Cancer	008	C00-C97, D00-D48
Cancer of oral cavity and pharynx	009	C00-C14.8
Cancer of digestive organs	010	C15-C26, C48
Cancer of esophagus	011	C15
Cancer of stomach	012	C16
Cancer of other and ill-defined digestive	013	C17, C21, C23, C24, C26
Cancer of colon and rectum	014	C18-C20, C26.0
Cancer of liver and intrahepatic bile ducts	015	C22
Cancer of pancreas	016	C25
Cancer of the respiratory system	017	C30-C39
Cancer of larynx	018	C32
Cancer of lung and bronchus	019	C34
Cancer, melanoma of skin	020	C43
Cancer of breast	021	C50
Cancer of cervix uteri	022	C53
Cancer of corpus/uterus, NOS	023	C54-C55
Cancer of ovary	024	C56
Cancer of prostate	025	C61
Cancer of the testis	026	C62
Cancer of kidney and renal pelvis	027	C64-C65
Cancer of urinary bladder	028	C67
Cancer of brain/other nervous system	029	C70-C72
Cancer of thyroid	030	C73
Cancer, Hodgkin lymphoma	031	C81
Cancer, non-Hodgkin lymphoma	032	C82-C85
Cancer, myeloma	033	C88.7-C88.9, C90.0, C90.2
Cancer, leukemia	034	C90.1, C91-C95
In situ, benign and uncertain neoplasms	035	D00-D48
Domain 3. Diseases of the endocrine system	038	E00-E88
Diabetes mellitus	039	E10-E14
Nutritional deficiencies	040	E40-E64
Malnutrition	041	E40-E46
Obesity	042	E65-E68
Metabolic disorders	043	E70-E88
Domain 4. Diseases of the nervous system	045	G00-G98
Meningitis	046	G00, G03
Parkinson's disease	047	G20-G21
Alzheimer's disease	048	G30
Multiple sclerosis	049	G35
Epilepsy	050	G40-G41

Table 1. (continued)
HIERARCHICAL STRUCTURE FOR ANALYSIS OF CAUSES OF DEATH, BY DOMAIN AND PROJECT CODES

CAUSE OF DEATH	PROJECT CODES (N = 111)	ICD-10 CODES
Domain 5. Diseases of the circulatory system	114	I00-I99
Heart disease	052	I00-I09, I11, I13, I20-I51
Rheumatic fever (acute) and chronic rheumatic heart diseases	053	I00-I09
Coronary heart disease	054	I11, I20-I25, I51.6
Hypertensive heart disease	055	I11
Ischemic heart diseases	056	I20-I25
Acute myocardial infarction	057	I21-I22
Atherosclerotic cardiovascular disease	058	I25.0
Hypertensive heart and renal disease	059	I13
Heart failure	060	I50
Hypertension (essential/primary) and hypertensive renal disease	061	I10, I12
Cerebrovascular diseases	062	I60-I69
Atherosclerosis	063	I70
Phlebitis, thrombophlebitis, venous embolism and thrombosis	064	I80-I82
Domain 6. Diseases of the respiratory system	065	J00-J98
Influenza and pneumonia	066	J10-J18
Influenza	067	J10-J11
Pneumonia	068	J12-J18
Chronic lower respiratory diseases	069	J40-J47
Bronchitis, chronic and unspecified	070	J40-J42
Emphysema	071	J43
Asthma	072	J45-J46
Pneumoconiosis	073	J60-J66
Pneumonitis due to solids and liquids	074	J69
Domain 7. Diseases of the digestive system	075	K00-K92
Peptic ulcer	076	K25-K28
Liver disease, chronic and cirrhosis	077	K70, K73-K74
Liver, alcoholic liver disease	078	K70
Cholelithiasis and other disorders of gallbladder	079	K80-K82
Pancreas and biliary tract disorders	080	K83-K86
Domain 8. Genitourinary system	084	N00-N98
Nephritis, nephrotic syndrome and nephrosis	085	N00-N07, N17-N19, N25-N27
Renal failure	086	N17-N19
Domain 9. Congenital malformations, deformations, chromosomal abnormalities	089	Q00-Q99
Domain 10. External cause of death, injury and accidents	091	U01-U03, V01-Y89
Homicide (assault)	095	U01-U02, X85-Y09, Y87.1
Homicide (assault), by discharge of firearm	096	U01.4, X93-X95
Suicide (intentional self-harm)	097	U03, X60-X84, Y87.0
Suicide (intentional self-harm), not firearm, other or unknown	098	U03, X60-X71, X75-X84, Y87.0
Suicide (intentional self-harm), by firearm	099	X72-X74
Accidents	100	V01-X59, Y85-Y86
Accidents, transport	101	V01-V99, Y85
Accidents, other transport, not motor vehicles	102	V01, V05-V06, V09.1, V09.3-V09.9, V10-V11, V15-V18, V19.3, V19.8-V19.9, V80.0-V80.2, V80.6-V80.9, V81.2-V81.9, V82.2-V82.9, V87.9, V88.9, V89.1, V89.3, V89.9, V90-V99, Y85

Table 1. (continued)
HIERARCHICAL STRUCTURE FOR ANALYSIS OF CAUSES OF DEATH, BY DOMAIN AND PROJECT CODES

CAUSE OF DEATH	PROJECT CODES (N = 111)	ICD-10 CODES
Accidents, motor vehicle	103	V02-V04, V09.0, V09.2, V12-V14, V19.0-V19.2, V19.4-V19.6, V20-V79, V80.3-V80.5, V81.0-V81.1, V82.0-V82.1, V83-V86, V87.0-V87.8, V88.0-V88.8, V89.0, V89.2
Accidents, nontransport	104	W00-X59, Y86
Accidents, nontransport excluding poisoning	105	W00-X39, X50-X59, Y86
Falls	106	W00-W19
Accidental discharge of firearms	107	W32-W34
Drowning and submersion (accidental)	108	V90, V92, W65-W74
Fire, smoke, and flames (accidental)	109	X00-X09
Accidental poisoning and exposure to noxious substances	110	X40-X49
Accidental drug poisoning	111	X40-X44
Accidental alcohol poisoning	112	X45
Complications of medical and surgical care	113	Y40-Y84, Y88
Domain 11. Other causes of death		
Diseases of the blood and blood forming organs	036	D50-D89
Mental and behavioral disorders	044	F01-F99
Skin and subcutaneous tissue	081	L00-L98
Diseases of the musculoskeletal system & connective tissue	082	M00-M99
Rheumatoid arthritis and related inflammatory polyarthropathies	083	M05-M08
Pregnancy, childbirth, and the puerperium	087	O00-O99
Perinatal conditions	088	P00-P96
Symptoms, signs not otherwise classified	090	R00-R99
Diseases of the eye, adnexa, ear and mastoid	115	H00-H57, H60-H93

Deaths from 1995-1998 and 1999-2014 were coded to ICD-9 and ICD-10, respectively (Table 2). Because the transition from ICD-9 to ICD-10 in 1999 could potentially introduce artifactual changes in cause-specific rates and because some mortality patterns changed distinctly after 2000-2004, the percentage increase in mortality rates was measured from two baseline time periods: 1995-1999 and 2000-2004. Mortality data are not shown for 1995-1999 if the specific cause of death did not have corresponding codes in the 9th and 10th revisions; mortality rates for these causes of death are shown only from 2000-2004 to 2010-2014.

Table 2.
TRANSLATION BETWEEN CORRESPONDING ICD-9 AND ICD-10 CODES

PROJECT CODE	CAUSE OF DEATH	ICD-10 CODE	ICD-9 CODE
1	All causes of death	A00-Z99	000-799, E800-E999
2	Infectious and parasitic diseases	A00-B99	000-139
3	Tuberculosis	A16-A19	010-018
4	Septicemia	A40-A41	038
5	Viral disease	A80-B34	042-079
6	Viral hepatitis	B15-B19	070
7	Human immunodeficiency virus (HIV) disease	B20-B24	042-044
8	Cancer	C00-C97	140-208
9	Cancer of oral cavity and pharynx	C00-C14.8	140-149
10	Cancer of digestive organs	C15-C26, C48	150-159
11	Cancer of esophagus	C15	150
12	Cancer of stomach	C16	151
13	Cancer of other and ill-defined digestive	C17, C21, C23, C24, C26	152, 154.2, 154.3, 154.8, 156, 159.1, 159.8, 159.9
14	Cancer of colon and rectum	C18-C20, C26.0	153.0-154.1, 159.0
15	Cancer of liver and intrahepatic bile ducts	C22	155
16	Cancer of pancreas	C25	157
17	Cancer of the respiratory system	C30-C39	160-165
18	Cancer of larynx	C32	161
19	Cancer of lung and bronchus	C34	162.2-162.9
20	Cancer, melanoma of skin	C43	172
21	Cancer of breast	C50	174-175
22	Cancer of cervix uteri	C53	180
23	Cancer of corpus/uterus, NOS	C54-C55	179, 182.0-182.8
24	Cancer of ovary	C56	183.0
25	Cancer of prostate	C61	185
26	Cancer of the testis	C62	186
27	Cancer of kidney and renal pelvis	C64-C65	189.0, 189.1
28	Cancer of urinary bladder	C67	188
29	Cancer of brain/other nervous system	C70-C72	191-192
30	Cancer of thyroid	C73	193
31	Cancer, Hodgkin lymphoma	C81	201
32	Cancer, non-Hodgkin lymphoma	C82-C85	200.0-200.8, 202.0-202.2, 202.8-202.9
33	Cancer, myeloma	C88.7-C88.9, C90.0, C90.2	203.0, 203.2-203.8
34	Cancer, leukemia	C90.1, C91-C95	202.4, 203.1, 204-208
35	In situ, benign and uncertain neoplasms	D00-D48	210-239
36	Diseases of the blood and blood forming organs	D50-D89	280-289
37	Drug-induced deaths	D52.1, D59.0, D59.2, D61.1, D64.2, E06.4, E16.0, E23.1, E24.2, E27.3, E66.1, F11.0-F11.5, F11.7-F12.5, F12.7-F13.5, F13.7-F14.5, F14.7-F15.5, F15.7-F16.5, F16.7-F17.0, F17.3-F17.5, F17.7-F18.5, F18.7-F19.5, F19.7-F19.9, G21.1, G24.0, G25.1, G25.4, G25.6, G44.4, G62.0, G72.0, I95.2, J70.2-J70.4, L10.5, L27.0-L27.1, M10.2, M32.0, M80.4, M81.4, M83.5, M87.1, R78.1-R78.5, U01.6, X40-X44, X60-X64, X85, Y10-Y14	292, 304, 305.2-305.9, E850-E858, E950.0-E950.5, E962.0, E980.0-E980.5
38	Diseases of the endocrine system	E00-E88	240-279
39	Diabetes mellitus	E10-E14	250

Table 2. (continued)
TRANSLATION BETWEEN CORRESPONDING ICD-9 AND ICD-10 CODES

PROJECT CODE	CAUSE OF DEATH	ICD-10 CODE	ICD-9 CODE
40	Nutritional deficiencies	E40-E64	260-269
41	Malnutrition	E40-E46	260-263
42	Obesity	E65-E68	278
43	Metabolic disorders	E70-E88	270-277
44	Mental and behavioral disorders	F01-F99	290-319
45	Diseases of the nervous system	G00-G98	320-359
46	Meningitis	G00, G03	320-322
47	Parkinson's disease	G20-G21	332
48	Alzheimer's disease	G30	331.0
49	Multiple sclerosis	G35	340
50	Epilepsy	G40-G41	345
51	Cardiovascular diseases (major)	I00-I78	390-448
52	Heart disease	I00-I09, I11, I13, I20-I51	390-398, 402, 404-429
53	Rheumatic fever (acute) and chronic rheumatic heart diseases	I00-I09	390-398
54	Coronary heart disease	I11, I20-I25, I51.6	402, 410-414, 429.2
55	Hypertensive heart disease	I11	402
56	Ischemic heart diseases	I20-I25	410-414
57	Acute myocardial infarction	I21-I22	410
58	Atherosclerotic cardiovascular disease	I25.0	429.2
59	Hypertensive heart and renal disease	I13	404
60	Heart failure	I50	428
61	Hypertension (essential/primary) and hypertensive renal disease	I10, I12	401, 403
62	Cerebrovascular diseases	I60-I69	430-438
63	Atherosclerosis	I70	440
64	Phlebitis, thrombophlebitis, venous embolism and thrombosis	I80-I82	451-453
65	Diseases of the respiratory system	J00-J98	460-519
66	Influenza and pneumonia	J10-J18	480-487
67	Influenza	J10-J11	487
68	Pneumonia	J12-J18	480-486
69	Chronic lower respiratory diseases	J40-J47	490-496
70	Bronchitis, chronic and unspecified	J40-J42	490-491
71	Emphysema	J43	492
72	Asthma	J45-J46	493
73	Pneumoconiosis	J60-J66	500-505
74	Pneumonitis due to solids and liquids	J69	507
75	Diseases of the digestive system	K00-K92	520-579
76	Peptic ulcer	K25-K28	531-534
77	Liver disease, chronic and cirrhosis	K70, K73-K74	571
78	Liver, alcoholic liver disease	K70	571.0-571.3
79	Cholelithiasis and other disorders of gallbladder	K80-K82	574-575
80	Pancreas and biliary tract disorders	K83-K86	576-577
81	Skin and subcutaneous tissue	L00-L98	680-709
82	Diseases of the musculoskeletal system & connective tissue	M00-M99	710-739
83	Rheumatoid arthritis and related inflammatory polyarthropathies	M05-M08	714
84	Genitourinary system	N00-N98	580-629
85	Nephritis, nephrotic syndrome and nephrosis	N00-N07, N17-N19, N25-N27	580-589
86	Renal failure	N17-N19	584-586
87	Pregnancy, childbirth, and the puerperium	O00-O99	630-676

Table 2. (continued)
TRANSLATION BETWEEN CORRESPONDING ICD-9 AND ICD-10 CODES

PROJECT CODE	CAUSE OF DEATH	ICD-10 CODE	ICD-9 CODE
88	Perinatal conditions	P00-P96	760-779
89	Congenital malformations, deformations, chromosomal abnormalities	Q00-Q99	740-759
90	Symptoms, signs not otherwise classified	R00-R99	780-799
91	External cause of death, injury and accidents	U01-U03, V01-Y89	E800-E999
92	Firearm related injuries (accidental, suicide, homicide, undetermined, legal interv.)	U01.4, W32-W34, X72-X74, X93-X95, Y22-Y24, Y35.0	E922, E955.0-E955.4, E965.0-E965.4, E970, E985.0-E985.4
93	Poisoning (accidental, suicide, homicide, undetermined, legal interv.)	U01.6, U01.7, X40-X49, X60-X69, X85-X90, Y10-Y19, Y35.2	E850-E869, E950-E952, E962, E972, E980-E982
94	Suffocation and strangulation (accidental, suicide, homicide, undetermined)	W75-W84, X70, X91, Y20	E911-E913, E953, E963, E983
95	Homicide (assault)	U01-U02, X85-Y09, Y87.1	E960-E969
96	Homicide (assault), by discharge of firearm	U01.4, X93-X95	E965.0-E965.4
97	Suicide (intentional self-harm)	U03, X60-X84, Y87.0	E950-E959
98	Suicide (intentional self-harm), not firearm, other or unknown	U03, X60-X71, X75-X84, Y87.0	E950-E954, E955.5-E959.9
99	Suicide (intentional self-harm), by firearm	X72-X74	E955.0-E955.4
100	Accidents	V01-X59, Y85-Y86	E800-E869, E880-E929
101	Accidents, transport	V01-V99, Y85	E800-E848, E929.0, E929.1
102	Accidents, other transport, not motor vehicles	V01, V05-V06, V09.1, V09.3-V09.9, V10-V11, V15-V18, V19.3, V19.8-V19.9, V80.0-V80.2, V80.6-V80.9, V81.2-V81.9, V82.2-V82.9, V87.9, V88.9, V89.1, V89.3, V89.9, V90-V99, Y85	E800-E807, E820-E848, E929.0, E929.1
103	Accidents, motor vehicle	V02-V04, V09.0, V09.2, V12-V14, V19.0-V19.2, V19.4-V19.6, V20-V79, V80.3-V80.5, V81.0-V81.1, V82.0-V82.1, V83-V86, V87.0-V87.8, V88.0-V88.8, V89.0, V89.2	E810-E819
104	Accidents, nontransport	W00-X59, Y86	E850-E869, E880-E928, E929.2-E929.9
105	Accidents, nontransport excluding poisoning	W00-X39, X50-X59, Y86	E880-E924.0, E924.8-E928, E929.2-E929.9
106	Falls	W00-W19	E880-E886, E888
107	Accidental discharge of firearms	W32-W34	E922
108	Drowning and submersion (accidental)	V90, V92, W65-W74	E830, E832, E910
109	Fire, smoke, and flames (accidental)	X00-X09	E890-E899
110	Accidental poisoning and exposure to noxious substances	X40-X49	E850-E869, E924.1
111	Accidental drug poisoning	X40-X44	E850-E858
112	Accidental alcohol poisoning	X45	E860
113	Complications of medical and surgical care	Y40-Y84, Y88	E870-E879, E930-E949
114	Diseases of the circulatory system	I00-I99	390-459
115	H codes	H00-H57, H60-H93	360-389
116	R and Y codes	R00-R99, Y10-Y39, Y89	780-799, E970-E999

We also created a composite measure for “stress-related conditions (SRC).” SRC mortality rates combined deaths from four causes: (1) accidental drug overdoses, (2) alcohol poisoning, (3) alcoholic liver disease, and (4) suicides (project codes 111, 112, 078, and 097, respectively, in Table 1).

Age adjustment was performed to account for shifts in age distributions within the age groups. Weights calculated from the 2000 US standard million population were applied to age-specific rates and summed across age-groups to produce the final age-adjusted rates. Trends in death rates reported in the issue brief generally refer to age-adjusted rates; crude rates are reported in selected tables to provide the reader with complete information on actual death rates. The statistical significance of differences in mortality rates was determined using the standard error of the difference³ (for crude rates) and by checking for overlap between 95% confidence intervals, which were computed using Fay and Feuer's method using the gamma distribution⁴ (for age-adjusted rates). Calculations were performed in SAS (version 9.4, Cary, NC).

The study focused on identifying causes of death responsible for shifting death rates in the population. This was accomplished by first examining and reporting all-cause mortality trends by race and ethnicity and then conducting a more detailed analysis of age-specific mortality trends (across 5-year age bands) among NH whites. As reported below, we identified NH whites ages 25-54 years as the age group that experienced the largest relative increase in mortality rates.^a

The study then focused on identifying the specific causes of death responsible for these trends. This involved a systematic examination of cause-specific mortality trends at each level of the hierarchical classification of deaths (Table 1), from mortality trends in the 10 broadest categories of causes of death, to those in the 116 causes of death, and those at specific 3-digit and 4-digit ICD code levels. We also calculated SRC mortality rates. We focused on causes of death that produced a statistically significant increase in age-adjusted mortality rates.

Excess and averted deaths were calculated using the following procedure: The expected number of deaths for each time period (assuming no mortality increase) was computed by applying the prior time period's crude mortality rate to the subsequent time period's population. Specifically, crude mortality rates for 1995-1999 were applied to the population of 2000-2004, 2000-2004 mortality rates to the 2005-2009 population, and 2005-2009 rates to the 2010-2014 population. Actual deaths were subtracted from the expected deaths to determine the number of averted deaths (decrease in cause-specific mortality) or excess (increase in cause-specific mortality) for each time period. The number of averted/excess deaths was summed over the three time periods to arrive at a total number of averted/excess deaths by cause.

^a This age group was identified in both an initial examination of crude all-cause mortality rates and a subsequent analysis of age-adjusted SRC mortality rates. Statistically significant increases in SRC mortality also occurred among NH whites age 55 and older.

We encountered challenges in examining cause-specific mortality trends at the sub-state level due to the small number of deaths in many Virginia localities. The Commonwealth of Virginia is divided into 95 counties and 38 independent cities that are considered county-equivalents for census purposes. This report collectively refers to Virginia counties and cities as localities. SRC data were suppressed for many of these localities because fewer than ten SRC deaths were reported per time period (see above). In 58 localities^b—usually those with small numbers of deaths and wide confidence intervals—we could not calculate the relative increase in SRC death rates between time periods because data were lacking for one or more time periods. Moreover, many of the 75 localities with adequate data to calculate changes in mortality rates did not have changes that achieved statistical significance.

We therefore aggregated deaths across localities by examining mortality trends for eight regions established by the Virginia Department of Planning and Budget (Table 3).⁵ We mapped mortality trends by region and by localities (for those localities that had mortality data available).

Table 3.		
VIRGINIA COUNTIES AND CITIES, BY REGION		
1. CENTRAL VIRGINIA		
Albemarle County	Dinwiddie County	Madison County
Amelia County	Fluvanna County	Nelson County
Buckingham County	Goochland County	New Kent County
Caroline County	Greene County	Orange County
Charles City County	Hanover County	Petersburg City
Charlottesville City	Henrico County	Powhatan County
Chesterfield County	Hopewell City	Prince George County
Colonial Heights City	King and Queen County	Rappahannock County
Culpeper County	King William County	Richmond City
Cumberland County	Louisa County	Sussex County
2. EASTERN VIRGINIA		
Accomack County	Lancaster County	Northumberland County
Essex County	Middlesex County	Richmond County
King George County	Northampton County	Westmoreland County

^a Data were unavailable to calculate changes in SRC mortality rates (statistically significant or otherwise) in the following 58 localities: Accomack County, Amelia County, Appomattox County, Bath County, Bland County, Brunswick County, Buckingham County, Buena Vista city, Caroline County, Charles City County, Charlotte County, Clarke County, Covington city, Craig County, Cumberland County, Emporia city, Essex County, Falls Church city, Fluvanna County, Franklin city, Galax city, Goochland County, Grayson County, Greene County, Greensville County, Highland County, Hopewell city, King and Queen County, King George County, King William County, Lancaster County, Lexington city, Lunenburg County, Madison County, Manassas Park city, Mathews County, Middlesex County, Nelson County, New Kent County, Northampton County, Northumberland County, Norton city, Nottoway County, Page County, Petersburg city, Poquoson city, Powhatan County, Prince Edward County, Prince George County, Radford city, Rappahannock County, Richmond County, Salem city, Southampton County, Surry County, Sussex County, Westmoreland County, and Williamsburg city.

Table 3. (continued)
VIRGINIA COUNTIES AND CITIES, BY REGION

3. HAMPTON ROADS		
Chesapeake City	Mathews County	Surry County
Franklin City	Newport News City	Virginia Beach City
Gloucester County	Norfolk City	Williamsburg City
Hampton City	Poquoson City	York County
Isle of Wight County	Portsmouth City	
James City County	Suffolk City	
4. NORTHERN VIRGINIA		
Alexandria City	Falls Church City	Manassas Park City
Arlington County	Fauquier County	Prince William County
Clarke County	Fredericksburg City	Spotsylvania County
Fairfax City	Loudoun County	Stafford County
Fairfax County	Manassas City	Warren County
5. SOUTHSIDE		
Brunswick County	Halifax County	Nottoway County
Charlotte County	Henry County	Patrick County
Danville City	Lunenburg County	Pittsylvania County
Emporia City	Martinsville City	Prince Edward County
Greensville County	Mecklenburg County	Southampton County
6. SOUTHWEST VIRGINIA		
Bland County	Galax City	Smyth County
Bristol City	Grayson County	Tazewell County
Buchanan County	Lee County	Washington County
Carroll County	Norton City	Wise County
Dickenson County	Russell County	Wythe County
Floyd County	Scott County	
7. SHENANDOAH VALLEY		
Alleghany County	Harrisonburg City	Shenandoah County
Augusta County	Highland County	Staunton City
Bath County	Lexington City	Waynesboro City
Buena Vista City	Page County	Winchester City
Covington City	Rockbridge County	
Frederick County	Rockingham County	
8. WEST CENTRAL VIRGINIA		
Amherst County	Craig County	Pulaski County
Appomattox County	Franklin County	Radford City
Bedford County	Giles County	Roanoke City
Botetourt County	Lynchburg City	Roanoke County
Campbell County	Montgomery County	Salem City

Source: Adapted from Virginia Department of Planning and Budget, <http://vaperforms.virginia.gov/Regions/regionsMap.php>

We used data from the U.S. Census Bureau and other sources to compare localities and regions of Virginia in terms of population size, Rural-Urban Continuum Codes, and 31 place-based characteristics covering seven domains: demographic characteristics, educational attainment, income and employment, housing, transportation, environment, and access to health care (Table 4). We calculated Pearson correlation coefficients to determine how closely each of these place-based values correlated with the relative (%) increase in SRC mortality, (a) from 1995-1999 to 2010-2014 and (b) from 2000-2004 to 2010-2014. Specifically, the place-based values used for these calculations were aggregate values (e.g., proportions, rates, ratios) for (a) the population of each of the eight regions and (b) the aggregated population of those localities in each region *that experienced a statistically significant increase in SRC mortality*.

Table 4.
PLACE-BASED INDICATORS EXAMINED IN VIRGINIA REGIONS AND LOCALITIES

PLACE-BASED INDICATOR	DEFINITION	DATA SOURCE
Geographic Characteristics		
Rurality (%)	Percentage of the locality population living in rural areas	U.S. Census, 2010 Census Urban and Rural Classification
Urbanicity (%)	Percentage of the locality population living in urban areas	U.S. Census, 2010 Census Urban and Rural Classification
Rural-Urban Continuum Codes	Counties in metro areas of 1 million population or more (RUCC 1), 250,000 to 1 million population (RUCC 2), or fewer than 250,000 population (RUCC 3); non-metropolitan counties with urban population of 20,000 or more—adjacent (RUCC 4) or not adjacent (RUCC 5) to a metro area—or an urban population of 2,500-19,999, adjacent (RUCC 6) or not adjacent (RUCC 7) to a metro area; and completely rural or less than 2,500 urban population, adjacent (RUCC 8) or not adjacent (RUCC 9) to a metro area.	2013 Rural-Urban Continuum Codes
Demographic Characteristics		
Diversity Index	Probability that two individuals chosen at random would be of different races or ethnicities	PolicyMap, 2010-2014
Foreign born population (%)	Percentage of the population who is foreign-born	U.S. Census, ACS 2014 5-year estimates, Table B05012
Single parent households (%)	Percentage of children who live in single-parent households	2016 County Health Rankings
Educational Attainment		
High school degree or more education (%)	Percentage of persons 25 years of older with a high school degree or higher	2016 County Health Rankings
Some college or more education (%)	Percentage of persons 25 years or older with some post-secondary education	U.S. Census, ACS 2014 5-year estimates, Table S1505
Bachelor's degree or more education (%)	Percentage of persons 25 years or older with a Bachelor's degree or higher	U.S. Census, ACS 2014 5-year estimates, Table S1505
Household Economic Conditions		
Median household income (\$)	Median annual household income	2016 County Health Rankings
Poverty (%)	Percentage of population living below poverty level	U.S. Census, ACS 2015 5-year estimates, Table S1701
Child poverty (%)	Percentage of children (under age 18 years) living in poverty	2016 County Health Rankings
Poverty (adult only, %)	Percentage of population ages 18-64 years living below poverty level	U.S. Census, ACS 2015 5-year estimates, Table S1701
Gini Index	Statistical dispersion measure (zero to 1.0) representing the distribution of income	U.S. Census, ACS 2014 5-year estimates, Table B19083
Unemployment (%)	Percentage of civilian labor force (ages 16 and older) that is unemployed but seeking work	2016 County Health Rankings
Physical Environment		
Ozone days (per year)	Number of ozone days per year above regulatory standard	CDC Environmental Public Health Tracking Network, 2012
Violent crime rate (per 100,000)	Number of reported violent crime offenses per 100,000 population	2016 County Health Rankings

Table 4. (continued)
PLACE-BASED INDICATORS EXAMINED IN VIRGINIA REGIONS AND LOCALITIES

PLACE-BASED INDICATOR	DEFINITION	DATA SOURCE
Housing		
Severe housing disrepair (%)	Percentage of households with at least 1 of 4 housing problems: overcrowding, high housing costs, or lack of kitchen or plumbing facilities	2016 County Health Rankings
Overcrowding (%)	Percentage of households with more than one occupant per room	U.S. Census, ACS 2014 5-year estimates, Table DP04
Housing built before 1950 (%)	Proportion of housing units built 1950 or earlier	U.S. Census, ACS 2014 5-year estimates, Table B25034
Cost burden (renters, %)	Percentage of renter-occupied households paying more than 30% of income on housing	U.S. Census, ACS 2014 5-year estimates, Table B25070
Cost burden (homeowners, %)	Percentage of owner-occupied households paying more than 30% of income on housing	U.S. Census, ACS 2014 5-year estimates, Table B25093
Transportation		
No vehicle access (%)	Percentage of workers age 16 years and over in households without a vehicle available	U.S. Census, ACS 2014 5-year estimates, Table B08141
Commuting to work by motor vehicle (%)	Percentage who commute by car, truck, van, taxi, motorcycle, or other means	U.S. Census, ACS 2014 5-year estimates, Table S0801
Commuting to work by public transit (%)	Percentage of workers age 16 years and over who commute to work by bus, train, or subway	U.S. Census, ACS 2014 5-year estimates, Table S0801
Commuting to work by walking/cycling (%)	Percentage of workers age 16 years and over who commute to work by walking or cycling	U.S. Census, ACS 2014 5-year estimates, Table S0801
Access to Health Care		
Uninsured (%)	Percentage of population without any health insurance	U.S. Census, ACS 2014 5-year estimates, Table S2701
Public insurance (%)	Percentage with public health insurance (e.g., Medicare, Medicaid)	U.S. Census, ACS 2014 5-year estimates, Table S2701
Private insurance (%)	Percent with private insurance	U.S. Census, ACS 2014 5-year estimates, Table S2701
Primary care physician ratio	Ratio of population to primary care physicians	2016 County Health Rankings
Dentist ratio	Ratio of population to dentists	2016 County Health Rankings
Mental health provider ratio	Ratio of population to mental health providers	2016 County Health Rankings
ACS= American Community Survey, CDC= Centers for Disease Control and Prevention		

Finally, we examined temporal socioeconomic data to see how regions and localities fared over time in terms of median household income, poverty, and unemployment. We examined every region and selected localities within each region that experienced the largest relative increases in SRC mortality after 1995-1999.^c We obtained poverty data from the U.S. Census Bureau, using its Small Area Income and Poverty Estimates (SAIPE) Program for recent decades (1999 forward)⁶ and its Historical Income Tables⁷ to examine whether the patterns observed predate the observation period of this study. We obtained employment data from the U.S. Bureau of Labor Statistics Local Area Unemployment Statistics (LAUS) program.⁸

^c These included Chesterfield County and Hanover County in Central Virginia; Hampton city, Suffolk city, and York County in Hampton Roads; Prince William County and Warren County in Northern Virginia; Frederick County and Winchester city in Shenandoah Valley; Patrick County and Pittsylvania County in Southside Virginia; Buchanan County, Dickenson County, and Wise County in Southwest Virginia; and Franklin County and Roanoke County in West Central Virginia.

RESULTS

We found that age-adjusted all-cause mortality decreased in Virginia between 1995-1999 and 2010-2014, but the decrease was more pronounced among people of color (Table 5). The mortality rate among non-Hispanic whites decreased by 16.4%, compared to decreases of 25.3%, 22.7%, and 49.2%, respectively, among non-Hispanic blacks, Asians and Pacific Islanders, and American Indian and Alaskan Natives. Mortality rates among Hispanics in Virginia decreased by 25.5%.

Table 5.
ALL-CAUSE MORTALITY RATES (ALL AGES), BY RACE-ETHNICITY, VIRGINIA, 1995–2014

RACE-ETHNICITY	1995–1999		2000–2004		2005–2009		2010–2014		RELATIVE INCREASE IN AGE-ADJUSTED MORTALITY RATE (%)	
	DEATHS (NO.)	AGE-ADJUSTED MORTALITY RATE	DEATHS (NO.)	AGE-ADJUSTED MORTALITY RATE	DEATHS (NO.)	AGE-ADJUSTED MORTALITY RATE	DEATHS (NO.)	AGE-ADJUSTED MORTALITY RATE	FROM 1995–99 TO 2010–2014	FROM 2000–04 TO 2010–2014
Non-Hispanic whites	207,121	868.7	21,7881	828.5	222,803	764.1	235,273	726.5	-16.4*	-12.3*
Non-Hispanic blacks	57,057	1,161.2	58,381	1,083.6	58,602	971.4	59,604	868	-25.3*	-19.9*
Non-Hispanic American Indians and Alaskan Natives	242	792.8	244	370.6	297	381.1	399	402.5	-49.2*	8.6
Non-Hispanic Asians and Pacific Islanders	2,297	489	3,386	460.9	4,523	424.9	5,830	378.1	-22.7*	-18.0*
Hispanics	1,926	496.4	3,165	490.5	4,074	410.2	4,834	370	-25.5*	-24.6*

* p < 0.05

All-cause mortality rates did not decrease among young and middle-aged NH whites in Virginia (ages 25-54 years), and they *increased* significantly in Southside, Southwest, and West Central Virginia (Table 6). In Southwest Virginia, all-cause mortality among NH whites ages 25-54 years increased by 34.5% between 1995-1999 and 2010-2014.

Table 6.
ALL-CAUSE MORTALITY RATES, NON-HISPANIC WHITES AGES 25-54 YEARS, BY REGION, VIRGINIA, 1995–2014

REGION	1995–1999		2000–2004		2005–2009		2010–2014		RELATIVE INCREASE IN AGE-ADJUSTED MORTALITY RATE (%)	
	DEATHS (NO.)	AGE-ADJUSTED MORTALITY RATE	DEATHS (NO.)	AGE-ADJUSTED MORTALITY RATE	DEATHS (NO.)	AGE-ADJUSTED MORTALITY RATE	DEATHS (NO.)	AGE-ADJUSTED MORTALITY RATE	FROM 1995–99 TO 2010–2014	FROM 2000–04 TO 2010–2014
Northern Virginia	5,299	147.8	5,206	136.3	4,998	132.2	4,663	121.9	-17.6%	-10.6%
Central Virginia	4,115	197.7	4,278	192.4	4,405	191.2	4,348	191.3	-3.3%	-0.6%
Hampton Roads	4,311	203.4	4,262	193.7	4,418	200.1	4,266	203.1	-0.1%	4.9%
Eastern Virginia	441	237.4	469	242.6	509	255.5	470	252.2	6.2%	3.9%
Shenandoah Valley	1,714	211.2	1,793	212.2	1,881	214.0	1,959	227.6	7.7%	7.2%
West Central Virginia	2,780	231	2,960	241.2	3,043	248.1	3,096	256.7	11.1%*	6.4%
Southside Virginia	1,345	253.5	1,474	282.1	1,484	294.1	1,555	326.3	28.7%*	15.7%*
Southwest Virginia	2,542	284.1	2,956	332.2	3,126	357.7	3,150	382.1	34.5%*	15.0%*

* p < 0.05. See Table 3 for a list of localities within each region.

In addition, we found a statewide increase in SRC mortality—our composite measure of deaths from drug overdoses, alcohol poisoning, alcoholic liver disease, and suicides—among NH whites ages 25–54 years. SRC mortality increased statewide in this age group by 82.6% between 1995–1999 and 2010–2014 and by 44.5% between 2000–2004 and 2010–2014. The increase was even greater among young NH whites (ages 25–34 years): SRC mortality in this age group increased by 101.7% between 1995–1999 and 2010–2014.

Tables 7–8 list the specific causes of death responsible for increasing mortality rates among NH whites ages 25–54 years in Virginia. The increase claimed an estimate 4,069 lives between 1995–1999 and 2010–2014, 56.3% (2,291 deaths) due to drug overdoses, alcohol poisoning, alcoholic liver disease, and suicides. The SRC death rate among NH whites ages 25–54 years increased dramatically (Table 7). Notably, the mortality rate from accidental drug and alcohol overdoses increased by 330.5% between 1995–1999 and 2010–2014. Medical complications of substance abuse also increased—e.g., deaths from cirrhosis of the liver increased by 53.2% after 1995–1999—and the suicide rate increased by 28.5%.

Table 7.
MORTALITY FROM STRESS-RELATED CONDITIONS AMONG NON-HISPANIC WHITES AGES 25–54 YEARS,
VIRGINIA, 1995–2014

CAUSE OF DEATH (ICD-10 CODE*)	1995–1999		2000–2004		2005–2009		2010–2014		RELATIVE INCREASE IN AGE-ADJUSTED MORTALITY RATE (%) ‡		EXCESS DEATHS FROM 1995–1999 TO 2010–2014
	DEATHS (NO.)	AGE- ADJUSTED MORTALITY RATE (CRUDE)	DEATHS (NO.)	AGE- ADJUSTED MORTALITY RATE (CRUDE)	DEATHS (NO.)	AGE- ADJUSTED MORTALITY RATE (CRUDE)	DEATHS (NO.)	AGE- ADJUSTED MORTALITY RATE (CRUDE)	FROM 1995–1999 TO 2010–2014	FROM 2000–2004 TO 2010–2014	
STRESS-RELATED CONDITIONS †	2,807	24.4 (24.3)	3,535	30.8 (31.0)	4,269	38.0 (38.4)	4,882	44.5 (44.8)	82.6 (84.7)	44.4 (44.7)	2,291
Conditions related to drug use											
Accidental drug poisoning (X40-X44)	488	4.2 (4.2)	1,200	10.6 (10.5)	1,657	15.1 (14.9)	1,954	18.3 (17.9)	330.5 (325.3)	71.5 (70.6)	1,537
Sedative-hypnotic, psychotropic, anti-epileptic, and antiparkinsonian drugs (X41)	NC	NC	48	0.4 (0.4)	61	0.6 (0.5)	99	0.9 (0.9)	NC	121.2 (116.1)	NC
Narcotics and hallucinogens (X42)	NC	NC	730	6.5 (6.4)	813	7.4 (7.3)	991	9.2 (9.1)	NC	41.9 (42.3)	NC
Other drugs, medicaments and biological substances (X44) ¶	NC	NC	408	3.6 (3.6)	769	7.0 (6.9)	858	8.0 (7.9)	NC	123.5 (120.4)	NC
Conditions related to alcohol use											
Alcoholic liver disease (K70)	328	2.9 (2.8)	380	3.1 (3.3)	421	3.4 (3.8)	474	4.0 (4.4)	36.8 (53.5)	26.1 (30.7)	169
Alcoholic cirrhosis of liver (K70.3)	205	1.8 (1.8)	234	1.9 (2.1)	264	2.1 (2.4)	334	2.8 (3.1)	53.2 (73.1)	44.0 (49.6)	143
Accidental alcohol poisoning (X45.0) †	53	0.5 (0.5)	55	0.5 (0.5)	60	0.5 (0.5)	86	0.7 (0.8)	59.4 (NS) (72.4)	55.6 (NS) (63.9)	36
Suicide (see notes)	1,938	16.8 (16.8)	1,900	16.6 (16.6)	2,131	18.9 (19.2)	2,368	21.6 (21.7)	28.5 (29.8)	30.1 (30.6)	549
Suicide not involving firearm (see notes)	800	6.9 (6.9)	853	7.5 (7.5)	1,049	9.4 (9.4)	1,115	10.3 (10.2)	47.9 (48.0)	37.2 (37.0)	369
Hanging, strangulation, or suffocation (X70)	282	2.4 (2.4)	301	2.7 (2.6)	415	3.8 (3.7)	501	4.7 (4.6)	92.4 (88.7)	74.8 (74.4)	239
Narcotics and hallucinogens (X62)	NC	NC	59	0.5 (0.5)	51	0.4 (0.5)	59	0.5 (0.5)	NC	2.3 (NS) (4.8) (NS)	NC
Other drugs, medicaments and biological substances (X64)	NC	NC	174	1.5 (1.5)	254	2.3 (2.3)	246	2.2 (2.3)	NC	45.8 (48.2)	NC

Table 7. (continued)

MORTALITY FROM STRESS-RELATED CONDITIONS AMONG NON-HISPANIC WHITES AGES 25–54 YEARS, VIRGINIA, 1995–2014

CAUSE OF DEATH (ICD-10 CODE*)	1995–1999		2000–2004		2005–2009		2010–2014		RELATIVE INCREASE IN AGE-ADJUSTED MORTALITY RATE (%) §		EXCESS DEATHS FROM 1995–1999 TO 2010–2014
	DEATHS (NO.)	AGE- ADJUSTED MORTALITY RATE (CRUDE)	DEATHS (NO.)	AGE- ADJUSTED MORTALITY RATE (CRUDE)	DEATHS (NO.)	AGE- ADJUSTED MORTALITY RATE (CRUDE)	DEATHS (NO.)	AGE- ADJUSTED MORTALITY RATE (CRUDE)	FROM 1995–1999 TO 2010–2014	FROM 2000–2004 TO 2010–2014	
STRESS-RELATED CONDITIONS †	2,807	24.4 (24.3)	3,535	30.8 (31.0)	4,269	38.0 (38.4)	4,882	44.5 (44.8)	82.6 (84.7)	44.4 (44.7)	2,291
Jumping from a high place (X80)	16	0.1 (0.1)	20	0.2 (0.2)	34	0.3 (0.3)	50	0.5 (0.5)	229.0 (232.1)	156.1 (162.0)	35
Suicide by firearm (X72-74)	1,138	9.8 (9.8)	1,047	9.1 (9.2)	1,082	9.6 (9.7)	1,253	11.3 (11.5)	14.9 (17.0)	24.3 (25.4)	179
Injuries											
Motorcycle rider injured in transport accident (V20-V29)	NC	NC	140	1.2 (1.2)	196	1.8 (1.8)	195	1.7 (1.8)	NC	40.2 (46.0)	NC
Falls (W00-W19)	130	1.1 (1.1)	168	1.4 (1.5)	170	1.4 (1.5)	180	1.5 (1.7)	34.0 (NS) (47.1)	7.7 (NS) (12.3) (NS)	60

* ICD-10 codes refer to deaths from 1999 forward. Deaths in 1995-1998 were classified under ICD-9 codes using the conversion dictionary provided in Table 2.

† Stress-related conditions include total deaths from accidental drug poisoning (X40-X44), alcoholic liver disease (K70), accidental alcohol poisoning (X45.0), and suicides (see Notes).

§ All mortality rate increases were statistically significant ($p < 0.05$) unless otherwise noted as non-significant (NS).

¶ Includes agents primarily acting on smooth and skeletal muscles and the respiratory system anesthetics (general)(local) drugs affecting the: cardiovascular system, gastrointestinal system, hormones and synthetic substitutes, systemic and hematological agents, systemic antibiotics and other anti-infectives therapeutic gases, topical preparations, vaccines, water-balance agents, and drugs affecting mineral and uric acid metabolism.

‡ Some of the increase in deaths from alcohol poisoning may reflect a change in ICD coding in 2007-2008.

‡ Data refer to pedestrian injuries in unspecified transport accidents, which account for one-third to one-half of pedestrian fatalities. The unadjusted mortality rate for all pedestrian injuries (ICD 10 codes V01-V09) increased from 2.2 to 2.6 deaths per 100,000 after 2000-2004 ($p < 0.05$).

NC=No conversion: deaths not reported because deaths during this period (1995-1999) were classified under ICD-9 codes that were not comparable to those in ICD-10. Increases in death rates from 1995-99 (and calculations of excess deaths since that time period) therefore cannot be calculated and also designated as "NC."

NS=Not statistically significant.

Notes: The table focuses on specific causes of death and not overarching categories; a statistically significant increase in age-adjusted mortality rates after 1995-1999 was observed for deaths from "external causes," which includes accidents and injuries. The table omits data on causes of death that did not produce a statistically significant increase in age-adjusted rates. An exception was made for suicides involving narcotics given the public health significance of the current opioid crisis. Population counts for calculating crude rates were 11,569,504 (1995-1999), 11,413,860 (2000-2004), 11,110,767 (2005-2009), and 10,891,574 (2010-2014). ICD-10 codes for suicide included U03, X60-84, and Y87.0; those for suicides not involving firearms included U03, X60-X71, X75-X84, and Y87.0.

Other organ diseases contributed significantly to increasing mortality rates in Virginia among non-Hispanic whites (Table 8). Behaviors that could be traced to stress may have contributed to these fatal organ diseases, including smoking (chronic lower respiratory disease), drug use (e.g., hepatitis C, liver cancer), and overeating (obesity and diabetes). Increasing death rates from essential hypertension and hypertensive heart disease could be linked to alcohol abuse, but other explanations are possible. Further research is needed to determine whether increasing death rates from these diseases are causally linked to accidents, trauma, or heavy sedation associated with overdoses or suicide attempts (e.g., renal failure, sepsis, pneumonitis from aspiration pneumonia, acute pancreatitis, anoxic brain injury) or have independent explanations.

Table 8.
INCREASED MORTALITY FROM ORGAN DISEASES AMONG NON-HISPANIC WHITES AGES 25-54 YEARS, VIRGINIA, 1995-2014

CAUSE OF DEATH (ICD-10 CODE*)	1995–1999		2000–2004		2005–2009		2010–2014		RELATIVE INCREASE IN AGE-ADJUSTED MORTALITY RATE (%) §		EXCESS DEATHS FROM 1995–1999 TO 2010–2014
	DEATHS (NO.)	AGE- ADJUSTED MORTALITY RATE (CRUDE)	DEATHS (NO.)	AGE- ADJUSTED MORTALITY RATE (CRUDE)	DEATHS (NO.)	AGE- ADJUSTED MORTALITY RATE (CRUDE)	DEATHS (NO.)	AGE- ADJUSTED MORTALITY RATE (CRUDE)	FROM 1995–1999 TO 2010–2014	FROM 2000–2004 TO 2010–2014	
CONDITIONS RELATED TO DRUG USE											
Chronic lower respiratory disease (J40-47)	322	2.8 (2.8)	366	3.0 (3.2)	376	2.9 (3.4)	457	3.6 (4.2)	25.9 (50.8)	20.4 (NS) (30.9)	157
Pneumonitis due to solids and liquids (J69)	30	0.3 (0.3)	57	0.5 (0.5)	82	0.7 (0.7)	89	0.7 (0.8)	175.8 (215.1)	49.9 (NS) (63.6)	63
GASTROINTESTINAL DISEASE											
Viral hepatitis (B15-19)	96	0.8 (0.8)	198	1.6 (1.7)	216	1.7 (1.9)	183	1.4 (1.7)	66.9 (102.5)	-12.9 (NS) (-3.1) (NS)	98
Malignant neoplasm of liver and intrahepatic bile ducts (C22)	110	1.0 (1.0)	162	1.3 (1.4)	195	1.5 (1.8)	220	1.7 (2.0)	76.9 (112.5)	31.5 (NS) (42.3)	120
Acute pancreatitis (K85)	34	0.3 (0.3)	37	0.3 (0.3)	57	0.5 (0.5)	63	0.5 (0.6)	83.2 (NS) (96.9)	71.9 (NS) (78.5)	32
ENDOCRINE DISEASES AND OBESITY											
Obesity (E66)	65	0.6 (0.6)	114	1.0 (1.0)	137	1.2 (1.2)	142	1.2 (1.3)	118.2 (132.1)	30.3 (NS) (30.5) (NS)	84
Diabetes (E10-E14)	449	3.9 (3.9)	583	4.8 (5.1)	618	5.1 (5.6)	630	5.2 (5.8)	32.7 (49.0)	8.9 (NS) (13.2) (NS)	215
Metabolic disorders (E10-E14)	100	0.9 (0.9)	159	1.4 (1.4)	150	1.2 (1.4)	173	1.5 (1.6)	66.5 (83.8)	7.0 (NS) (14.0) (NS)	82

Table 8. (continued)

INCREASED MORTALITY FROM ORGAN DISEASES AMONG NON-HISPANIC WHITES AGES 25-54 YEARS, VIRGINIA, 1995-2014

CAUSE OF DEATH (ICD-10 CODE*)	1995–1999		2000–2004		2005–2009		2010–2014		RELATIVE INCREASE IN AGE-ADJUSTED MORTALITY RATE (%) ‡		EXCESS DEATHS FROM 1995–1999 TO 2010–2014
	DEATHS (NO.)	AGE- ADJUSTED MORTALITY RATE (CRUDE)	DEATHS (NO.)	AGE- ADJUSTED MORTALITY RATE (CRUDE)	DEATHS (NO.)	AGE- ADJUSTED MORTALITY RATE (CRUDE)	DEATHS (NO.)	AGE- ADJUSTED MORTALITY RATE (CRUDE)	FROM 1995–1999 TO 2010–2014	FROM 2000–2004 TO 2010–2014	
CIRCULATORY DISEASES											
Essential hypertension (I10)	42	0.4 (0.4)	53	0.4 (0.5)	80	0.6 (0.7)	103	0.9 (0.9)	132.2 (160.5)	98.1 (103.7)	65
Hypertensive heart disease (I11)	77	0.7 (0.7)	154	1.3 (1.3)	249	2.1 (2.2)	310	2.7 (2.8)	292.6 (327.7)	107.1 (111.0)	243
RENAL CONDITIONS											
Renal failure (N17-19)	92	0.8 (0.8)	201	1.7 (1.8)	215	1.8 (1.9)	221	1.8 (2.0)	127.8 (155.2)	10.5 (NS) (15.2) (NS)	140
Chronic renal failure (N18)	31	0.3 (0.3)	78	0.6 (0.7)	95	0.8 (0.9)	119	1.0 (1.1)	264.6 (307.8)	52.6 (59.9)	92
Acute renal failure (N17)	13	0.1 (0.1)	28	0.2 (0.2)	30	0.2 (0.3)	52	0.4 (0.5)	274.1 (325.1)	85.8 (NS) (94.6)	41
INFECTIOUS DISEASES											
Septicemia (A40-41)	206	1.8 (1.8)	303	2.5 (2.7)	331	2.7 (3.0)	382	3.2 (3.5)	75.3 (97.0)	26.0 (32.1)	193
NEUROLOGIC DISEASES											
Anoxic brain damage, not elsewhere classified (G93.1)	50	0.4 (0.4)	76	0.6 (0.7)	110	0.9 (1.0)	131	1.1 (1.2)	149.7 (178.3)	71.8 (80.6)	86
Motor neuron disease (G12.2)	68	0.6 (0.6)	68	0.6 (0.6)	78	0.6 (0.7)	101	0.8 (0.9)	41.3 (NS) (57.8)	52.6 (NS) (55.7)	37
Infantile cerebral palsy (G80)	17	0.1 (0.1)	21	0.2 (0.2)	37	0.3 (0.3)	46	0.4 (0.4)	200.2 (187.5)	135.9 (129.6)	30
										TOTAL	1,778

* ICD-10 codes refer to deaths from 1999 forward. Deaths in 1995-1998 were classified under ICD-9 codes using the conversion dictionary provided in Table 2.

‡ All mortality rate increases were statistically significant ($p < 0.05$) unless otherwise noted as non-significant (NS).

NC=No conversion: deaths not reported because deaths during this period (1995-1999) were classified under ICD-9 codes that were not comparable to those in ICD-10. Increases in death rates from 1995-99 (and calculations of excess deaths since that time period) therefore cannot be calculated and also designated as "NC."

NS=Not statistically significant.

Notes: The table focuses on specific causes of death and not overarching categories; a statistically significant increase in age-adjusted mortality rates after 1995-1999 was observed for deaths from the following broad categories: diseases of the digestive system, cancer of the digestive organs, mental and behavioral disorders, pregnancy/childbirth and the puerperium, and diseases of the endocrine system, nervous system, respiratory system, and genitourinary systems. The table omits data on causes of death that did not produce a statistically significant decrease in age-adjusted rates. Population counts for calculating crude rates were 11,569,504 (1995-1999), 11,413,860 (2000-2004), 11,110,767 (2005-2009), and 10,891,574(2010-2014).

Table 9 provides the relative changes in mortality rates by region and, when available, by county and city. All reported results were statistically significant. The table emphasizes SRC data (including drug overdoses, alcoholic liver disease, and suicide) but also notes, by locality, where increases in mortality rates from organ diseases (e.g., hypertensive heart disease, renal failure) or motor vehicle crashes also achieved statistical significance.

Table 9.											
RELATIVE (%) INCREASES IN MORTALITY FROM STRESS-RELATED CONDITIONS AMONG WHITES											
AGES 25-54 YEARS, VIRGINIA, BY REGION AND LOCALITY											
	POPULATION (WHITES AGES 25-54 YRS, 2010-2014)	SRC		DRUG OVERDOSE		ALCOHOLIC LIVER DISEASE		SUICIDE		OTHER STATISTICALLY SIGNIFICANT INCREASES	
		FROM 1995-1999	FROM 2000-2004	FROM 1995-1999	FROM 2000-2004	FROM 1995-1999	FROM 2000-2004	FROM 1995-1999	FROM 2000-2004	FROM 1995-1999	FROM 2000-2004
CENTRAL VIRGINIA	2,090,831	64.9%*	44.1%*	213.6%*	81.6%*	61.3%	47.3%	23.5%*	26.5%*	Non-firearm suicide (55.2%*), including hanging† (160.3%*)	Hanging † (57.7%*)
Counties											
Albemarle County	150,347	8.0%	-10.9%	NA	NA	NA	NA	-17.5%	-24.1%		
Amelia County	18,834	NA	NA	NA	NA	NA	NA	NA	NA		
Buckingham County	21,847	NA	NA	NA	NA	NA	NA	NA	NA		
Caroline County	40,585	NA	NA	NA	NA	NA	NA	NA	NA		
Charles City County	6,314	NA	NA	NA	NA	NA	NA	NA	NA		
Chesterfield County	429,960	103.4%*	52.2%*	318.9%*	125.4%*	NA	17.7%	55.3%	25.2%		
Culpeper County	70,668	136.2%	64.9%	NA	NA	NA	NA	-3.8%	17.8%		
Cumberland County	12,265	NA	NA	NA	NA	NA	NA	NA	NA		
Dinwiddie County	37,145	4.0%	7.3%	NA	NA	NA	NA	NA	NA		
Fluvanna County	41,515	NA	NA	NA	NA	NA	NA	NA	NA		
Goochland County	32,520	NA	NA	NA	NA	NA	NA	NA	NA		
Greene County	32,993	NA	NA	NA	NA	NA	NA	NA	NA		
Hanover County	170,091	168.6%*	121.7%*	NA	128.0%	NA	NA	82.0%	125.3%*		
Henrico County	370,825	56.4%*	55.3%*	133.7%*	53.4%	NA	NA	14.4%	43.3%		
King & Queen County	8,905	NA	NA	NA	NA	NA	NA	NA	NA		
King William County	26,647	NA	NA	NA	NA	NA	NA	NA	NA		

Table 9. (continued)

RELATIVE (%) INCREASES IN SRC MORTALITY AMONG WHITES AGES 25-54 YEARS, VIRGINIA, BY REGION AND LOCALITY

	POPULATION (WHITES AGES 25-54 YRS, 2010-2014)	SRC		DRUG OVERDOSE		ALCOHOLIC LIVER DISEASE		SUICIDE		OTHER STATISTICALLY SIGNIFICANT INCREASES	
		FROM 1995-1999	FROM 2000-2004	FROM 1995-1999	FROM 2000-2004	FROM 1995-1999	FROM 2000-2004	FROM 1995-1999	FROM 2000-2004	FROM 1995-1999	FROM 2000-2004
CENTRAL VIRGINIA	2,090,831	64.9%*	44.1%*	213.6%*	81.6%*	61.3%	47.3%	23.5%*	26.5%*	Non-firearm suicide (55.2%*), including hanging† (160.3%*)	Hanging† (57.7%*)
Counties											
Louisa County	53,837	14.1%	47.7%	NA	NA	NA	NA	-14.2%	3.9%		
Madison County	20,956	NA	NA	NA	NA	NA	NA	NA	NA		
Nelson County	21,147	NA	NA	NA	NA	NA	NA	NA	NA		
New Kent County	32,515	NA	NA	NA	NA	NA	NA	NA	NA		
Orange County	52,247	106.0%	114.9%	NA	NA	NA	NA	25.4%	NA		
Powhatan County	49,459	NA	179.0%	NA	NA	NA	NA	NA	NA		
Prince George County	45,397	NA	NA	NA	NA	NA	NA	NA	NA		
Rappahannock County	11,877	NA	NA	NA	NA	NA	NA	NA	NA		
Sussex County	9,749	NA	NA	NA	NA	NA	NA	NA	NA		
Independent Cities											
Charlottesville	63,166	-27.1%	-21.2%	NA	NA	NA	NA	-43.9%	-38.1%		
Colonial Heights	24,730	123.5%	80.0%	NA	NA	NA	NA	NA	NA		
Hopewell	22,528	NA	54.2%	NA	NA	NA	NA	NA	NA		
Petersburg	9,681	NA	1.8%	NA	NA	NA	NA	NA	NA		
Richmond	202,081	13.6%	4.0%	48.9%	14.1%	NA	NA	-14.8%	-8.4%		
EASTERN VIRGINIA	161,462	154.1%*	43.7%	NA	52.8%	NA	NA	88.4%	55.1%		
Accomack County	34,951	NA	19.5%	NA	25.8%	NA	NA	NA	NA		
Essex County	11,260	NA	NA	NA	NA	NA	NA	NA	NA		
King George County	39,888	NA	NA	NA	NA	NA	NA	NA	NA		
Lancaster County	9,715	NA	NA	NA	NA	NA	NA	NA	NA		
Middlesex County	13,507	NA	NA	NA	NA	NA	NA	NA	NA		
Northampton County	10,702	NA	NA	NA	NA	NA	NA	NA	NA		

Table 9. (continued)

RELATIVE (%) INCREASES IN SRC MORTALITY AMONG WHITES AGES 25-54 YEARS, VIRGINIA, BY REGION AND LOCALITY

	POPULATION (WHITES AGES 25-54 YRS, 2010-2014)	SRC		DRUG OVERDOSE		ALCOHOLIC LIVER DISEASE		SUICIDE		OTHER STATISTICALLY SIGNIFICANT INCREASES	
		FROM 1995-1999	FROM 2000-2004	FROM 1995-1999	FROM 2000-2004	FROM 1995-1999	FROM 2000-2004	FROM 1995-1999	FROM 2000-2004	FROM 1995-1999	FROM 2000-2004
EASTERN VIRGINIA	161,462	154.1%*	43.7%	NA	52.8%	NA	NA	88.4%	55.1%		
Northumberland County	11,034	NA	NA	NA	NA	NA	NA	NA	NA		
Richmond County	11,047	NA	NA	NA	NA	NA	NA	NA	NA		
Westmoreland County	19,358	NA	NA	NA	NA	NA	NA	NA	NA		
HAMPTON ROADS	1,990,838	91.5%*	65.1%*	219.1%*	77.5%*	66.2%*	52.5%	48.0%*	53.6%*	Non-firearm suicide (63.1%*), including hanging† (122.0%*); suicide by firearm (34.5%*); mental and behavioral disorders (111.3%*); hypertensive heart disease (204.7%*); renal failure (119.4%*)	Non-firearm suicide (68.8%*), including hanging† (119.8%*); suicide by firearm (40.0%*)
Counties											
Gloucester County	64,894	123.7%	87.4%	NA	NA	NA	NA	119.2%	60.5%		
Isle of Wight County	50,838	47.6%	35.4%	NA	NA	NA	NA	NA	NA		
James City County	93,500	124.1%	53.3%	NA	NA	NA	NA	NA	NA		
Mathews County	12,665	NA	NA	NA	NA	NA	NA	NA	NA		
Surry County	7,102	NA	NA	NA	NA	NA	NA	NA	NA		
York County	97,351	151.3%*	146.1%*	NA	NA	NA	NA	124.2%	109.1%		
Independent Cities											
Chesapeake	297,211	96.1%*	67.5%*	215.5%*	41.2%	NA	6.0%	41.7%	92.3%*		
Franklin	5,429	NA	NA	NA	NA	NA	NA	NA	NA		
Hampton	118,765	222.8%*	88.2%*	NA	74.0%	NA	NA	89.4%	57.4%		
Newport News	171,413	142.6%*	81.7%*	509.2%*	98.8%	29.9%	NA	64.4%	68.5%	Non-firearm suicide (209.2%*)	Non-firearm suicide (195.9%*)
Norfolk	235,393	55.8%*	56.3%*	128.3%*	139.0%*	47.1%	21.5%	16.2%	18.2%		

Table 9. (continued)

RELATIVE (%) INCREASES IN SRC MORTALITY AMONG WHITES AGES 25-54 YEARS, VIRGINIA, BY REGION AND LOCALITY

	POPULATION (WHITES AGES 25-54 YRS, 2010-2014)	SRC		DRUG OVERDOSE		ALCOHOLIC LIVER DISEASE		SUICIDE		OTHER STATISTICALLY SIGNIFICANT INCREASES	
		FROM 1995-1999	FROM 2000-2004	FROM 1995-1999	FROM 2000-2004	FROM 1995-1999	FROM 2000-2004	FROM 1995-1999	FROM 2000-2004	FROM 1995-1999	FROM 2000-2004
HAMPTON ROADS	1,990,838	91.5%*	65.1%*	219.1%*	77.5%*	66.2%*	52.5%	48.0%*	53.6%*	Non-firearm suicide (63.1%*), including hanging† (122.0%*); suicide by firearm (34.5%*); mental and behavioral disorders (111.3%*); hypertensive heart disease (204.7%*); renal failure (119.4%*)	Non-firearm suicide (68.8%*), including hanging† (119.8%*); suicide by firearm (40.0%*)
Independent Cities											
Poquoson	21,565	NA	NA	NA	NA	NA	NA	NA	NA		
Portsmouth	80,991	37.8%	28.6%	46.8%	16.6%	NA	NA	37.4%	34.6%		
Suffolk	92,257	210.2%*	74.8%	NA	NA	NA	NA	NA	84.6%		
Virginia Beach	629,439	83.5%*	66.2%*	201.4%*	74.5%*	97.3%	74.7%	39.3%	49.0%*		Hanging † (126.7%*)
Williamsburg	12,025	NA	NA	NA	NA	NA	NA	NA	NA		
NORTHERN VIRGINIA	3,596,992	57.1%*	41.2%	212.7%*	58.6%*	11.7%	1.3%	24.4%*	39.7%*	Mental and behavioral disorders (93.3%*); hypertensive heart disease (247.2%*)	Non-firearm suicide (37.8%*); suicide by firearm (41.9%*)
Counties											
Arlington County	406,542	-20.8%	-21.6%	24.8%	-52.9%	NA	NA	-23.7%	11.4%		
Clarke County	24,447	NA	NA	NA	NA	NA	NA	NA	NA		
Fairfax County	1,294,175	76.3%*	60.3%*	168.1%*	56.3%*	50.8%	131.5%	54.1%*	55.7%*	Non-firearm suicide (63.8%*), including hang- ing† (131.7%*); mental and behavioral disorders (164.5%*)	
Fauquier County	111,269	96.1%	71.0%	NA	169.1%	NA	NA	24.5%	56.2%		
Loudoun County	484,013	50.8%	90.8%*	NA	132.1%	NA	NA	26.2%	103.8%*		

Table 9. (continued)

RELATIVE (%) INCREASES IN SRC MORTALITY AMONG WHITES AGES 25-54 YEARS, VIRGINIA, BY REGION AND LOCALITY

	POPULATION (WHITES AGES 25-54 YRS, 2010-2014)	SRC		DRUG OVERDOSE		ALCOHOLIC LIVER DISEASE		SUICIDE		OTHER STATISTICALLY SIGNIFICANT INCREASES	
		FROM 1995-1999	FROM 2000-2004	FROM 1995-1999	FROM 2000-2004	FROM 1995-1999	FROM 2000-2004	FROM 1995-1999	FROM 2000-2004	FROM 1995-1999	FROM 2000-2004
NORTHERN VIRGINIA	3,596,992	57.1%*	41.2%	212.7%*	58.6%*	11.7%	1.3%	24.4%*	39.7%*	Mental and behavioral disorders (93.3%*); hypertensive heart disease (247.2%*)	Non-firearm suicide (37.8%*); suicide by firearm (41.9%*)
Counties											
Arlington County	406,542	-20.8%	-21.6%	24.8%	-52.9%	NA	NA	-23.7%	11.4%		
Clarke County	24,447	NA	NA	NA	NA	NA	NA	NA	NA		
Fairfax County	1,294,175	76.3%*	60.3%*	168.1%*	56.3%*	50.8%	131.5%	54.1%*	55.7%*	Non-firearm suicide (63.8%*), including hanging† (131.7%*); mental and behavioral disorders (164.5%*)	
Fauquier County	111,269	96.1%	71.0%	NA	169.1%	NA	NA	24.5%	56.2%		
Loudoun County	484,013	50.8%	90.8%*	NA	132.1%	NA	NA	26.2%	103.8%*		
Prince William County	461,064	129.2%*	28.2%	483.4%*	87.6%*	NA	NA	49.9%	9.6%		
Spotsylvania County	191,342	74.1%	67.9%	NA	273.3%*	NA	NA	-0.9%	7.9%		
Stafford County	198,158	38.7%	30.6%	NA	45.8%	NA	NA	-4.9%	62.5%		
Warren County	70,175	173.8%*	53.8%	NA	76.1%	NA	NA	66.1%	41.9%		
Independent Cities											
Alexandria	219,000	-13.0%	-24.2%	NA	-37.2%	NA	NA	-23.2%	-18.0%		
Fairfax	28,155	-11.5%	-35.6%	NA	NA	NA	NA	NA	NA		
Falls Church	20,798	NA	NA	NA	NA	NA	NA	NA	NA		
Fredericksburg	30,895	38.5%	52.3%	NA	NA	NA	NA	NA	NA		
Manassas	41,432	96.4%	202.2%*	NA	NA	NA	NA	26.8%	NA		
Manassas Park	15,527	NA	NA	NA	NA	NA	NA	NA	NA		

Table 9. (continued)

RELATIVE (%) INCREASES IN SRC MORTALITY AMONG WHITES AGES 25-54 YEARS, VIRGINIA, BY REGION AND LOCALITY

	POPULATION (WHITES AGES 25-54 YRS, 2010-2014)	SRC		DRUG OVERDOSE		ALCOHOLIC LIVER DISEASE		SUICIDE		OTHER STATISTICALLY SIGNIFICANT INCREASES	
		FROM 1995-1999	FROM 2000-2004	FROM 1995-1999	FROM 2000-2004	FROM 1995-1999	FROM 2000-2004	FROM 1995-1999	FROM 2000-2004	FROM 1995-1999	FROM 2000-2004
SHENANDOAH VALLEY	782,168	116.2%*	75.4%*	954.9%*	135.4%*	64.9%	103.9%	41.0%*	41.8%	Alcoholic cirrhosis (187.5%*); mental and behavioral disorders (142.0%*)	
Counties											
Alleghany County	26,624	113.1%	NA	NA	NA	NA	NA	NA	NA		
Augusta County	132,326	142.3%*	122.9%*	NA	NA	NA	NA	45.7%	40.0%		
Bath County	7,793	NA	NA	NA	NA	NA	NA	NA	NA	Non-firearm suicide (63.8%*), including hang- ing† (131.7%*); mental and behavioral disorders (164.5%*)	
Frederick County	142,571	188.4%*	110.9%*	NA	184.4%*	NA	NA	78.8%	48.3%		
Highland County	3,524	NA	NA	NA	NA	NA	NA	NA	NA		
Page County	44,162	NA	96.7%	NA	NA	NA	NA	NA	NA		
Rockbridge County	37,680	28.2%	-15.5%	NA	NA	NA	NA	NA	NA		
Rockingham County	132,649	98.5%	38.2%	NA	NA	NA	NA	47.7%	4.4%		
Shenandoah County	71,310	88.5%	24.1%	NA	NA	NA	NA	NA	NA		
Independent Cities											
Buena Vista	10,470	NA	NA	NA	NA	NA	NA	NA	NA		
Covington	9,366	NA	NA	NA	NA	NA	NA	NA	NA		
Harrisonburg	51,035	22.0%	NA	NA	NA	NA	NA	NA	NA		
Lexington	5,861	NA	NA	NA	NA	NA	NA	NA	NA		
Staunton	37,629	27.5%	1.4%	NA	NA	NA	NA	10.9%	NA		
Waynesboro	32,866	-32.4%	11.1%	NA	NA	NA	NA	NA	NA		
Winchester	36,302	182.8%*	67.9%	NA	NA	NA	NA	NA	58.3%		

Table 9. (continued)

RELATIVE (%) INCREASES IN SRC MORTALITY AMONG WHITES AGES 25-54 YEARS, VIRGINIA, BY REGION AND LOCALITY

	POPULATION (WHITES AGES 25-54 YRS, 2010-2014)	SRC		DRUG OVERDOSE		ALCOHOLIC LIVER DISEASE		SUICIDE		OTHER STATISTICALLY SIGNIFICANT INCREASES	
		FROM 1995-1999	FROM 2000-2004	FROM 1995-1999	FROM 2000-2004	FROM 1995-1999	FROM 2000-2004	FROM 1995-1999	FROM 2000-2004	FROM 1995-1999	FROM 2000-2004
SOUTHSIDE VIRGINIA	420,204	88.9%*	38.2%*	680.8%*	100.3%*	0.8%	-27.4%	23.5%	26.2%		Hanging† (201.3%*)
Counties											
Brunswick County	13,089	NA	NA	NA	NA	NA	NA	NA	NA		
Charlotte County	15,115	NA	NA	NA	NA	NA	NA	NA	NA		
Greensville County	10,065	NA	NA	NA	NA	NA	NA	NA	NA		
Halifax County	37,964	11.1%	138.7%	NA	NA	NA	NA	NA	NA		
Henry County	70,144	128.9%*	29.6%	NA	55.3%	NA	NA	34.4%	42.0%		
Lunenburg County	14,426	NA	NA	NA	NA	NA	NA	NA	NA		
Mecklenburg County	33,026	76.8%	56.6%	NA	NA	NA	NA	39.7%	NA		
Nottoway County	17,044	NA	NA	NA	NA	NA	NA	NA	NA		
Patrick County	30,241	173.3%*	98.2%	NA	NA	NA	NA	46.3%	27.4%		
Pittsylvania County	90,002	141.6%*	61.4%	NA	NA	NA	NA	18.2%	13.0%	Motor vehicle accidents (177.2%*)	
Prince Edward County	20,043	NA	NA	NA	NA	NA	NA	NA	NA		
Southampton County	22,822	NA	NA	NA	NA	NA	NA	NA	NA		
Independent Cities											
Danville	31,740	93.4%	24.4%	NA	NA	NA	NA	31.4%	48.0%		
Emporia	2,891	NA	NA	NA	NA	NA	NA	NA	NA		
Martinsville	11,592	130.2%	36.2%	NA	NA	NA	NA	NA	NA		
SOUTHWEST VIRGINIA	753,829	142.0%*	30.1%*	696.7%*	67.4%*	27.0%	0.9%	19.2%	-0.5%	Hanging† (214.0%*); chronic lower respiratory diseases (60.9%*); diabetes (88.4%*); renal failure (226.7%*); sepsis (278.6%*)	Hanging† (131.7%*); chronic lower respiratory diseases (63.1%*)
Counties											
Bland County	13,094	NA	2.1	NA	NA	NA	NA	NA	NA		

Table 9. (continued)

RELATIVE (%) INCREASES IN SRC MORTALITY AMONG WHITES AGES 25-54 YEARS, VIRGINIA, BY REGION AND LOCALITY

	POPULATION (WHITES AGES 25-54 YRS, 2010-2014)	SRC		DRUG OVERDOSE		ALCOHOLIC LIVER DISEASE		SUICIDE		OTHER STATISTICALLY SIGNIFICANT INCREASES	
		FROM 1995-1999	FROM 2000-2004	FROM 1995-1999	FROM 2000-2004	FROM 1995-1999	FROM 2000-2004	FROM 1995-1999	FROM 2000-2004	FROM 1995-1999	FROM 2000-2004
SOUTHWEST VIRGINIA	753,829	142.0%*	30.1%*	696.7%*	67.4%*	27.0%	0.9%	19.2%	-0.5%	Hangint† (214.0%*); chronic lower respiratory diseases (60.9%*); diabetes (88.4%*); renal failure (226.7%*); sepsis (278.6%*)	Hangint† (131.7%*); chronic lower respiratory diseases (63.1%*)
Counties											
Buchanan County	45,869	245.3%*	41.0%	NA	138.4%*	NA	NA	45.6%	-11.5%		
Carroll County	53,246	137.2%*	164.5%*	NA	NA	NA	NA	112.6%	143.1%		
Dickenson County	30,109	215.2%*	93.5%	NA	170.2%*	NA	NA	58.3%	NA		
Floyd County	27,445	-27.7%	NA	NA	NA	NA	NA	NA	NA		
Grayson County	25,904	NA	62.7%	NA	NA	NA	NA	NA	NA		
Lee County	45,862	92.0%	-2.7%	NA	-7.1%	NA	NA	44.4%	-2.3%		
Russell County	54,683	146.4%*	1.1%	NA	7.8%	NA	NA	10.8%	-10.2%		
Scott County	42,637	77.2%	33.6%	NA	NA	NA	NA	-27.6%	-19.5%		
Smyth County	57,666	168.7%*	29.8%	NA	NA	NA	NA	19.6%	-9.0%		
Tazewell County	80,123	147.7%*	76.1%*	NA	97.9%*	NA	NA	-27.6%	5.4%	Motor vehicle accidents (177.2%*)	
Washington County	101,696	136.4%*	-1.7%	NA	52.4%	NA	NA	20.3%	-41.9%		
Wise County	74,105	261.8%*	27.8%	NA	85.9%	NA	NA	84.7%	-16.2%		
Wythe County	54,222	89.9%	-2.2%	NA	21.0%	NA	NA	NA	NA		
Independent Cities											
Bristol	30,623	113.2%	78.7%	NA	NA	NA	NA	NA	NA		
Galax	9,624	NA	NA	NA	NA	NA	NA	NA	NA		
Norton	6,921	NA	NA	NA	NA	NA	NA	NA	NA		

Table 9. (continued)

RELATIVE (%) INCREASES IN SRC MORTALITY AMONG WHITES AGES 25-54 YEARS, VIRGINIA, BY REGION AND LOCALITY

	POPULATION (WHITES AGES 25-54 YRS, 2010-2014)	SRC		DRUG OVERDOSE		ALCOHOLIC LIVER DISEASE		SUICIDE		OTHER STATISTICALLY SIGNIFICANT INCREASES	
		FROM 1995-1999	FROM 2000-2004	FROM 1995-1999	FROM 2000-2004	FROM 1995-1999	FROM 2000-2004	FROM 1995-1999	FROM 2000-2004	FROM 1995-1999	FROM 2000-2004
WEST-CENTRAL VIRGINIA	1,095,250	84.2%*	36.7%*	490.5%*	56.2%*	41.0%	58.6%	19.4%	15.5%	Diabetes (103.2%*); renal failure (22.4%*)	Alcoholic cirrhosis (113.3%*)
Counties											
Amherst County	46,167	26.1%	-2.7%	NA	NA	NA	NA	NA	NA		
Appomattox County	22,747	NA	NA	NA	NA	NA	NA	NA	NA		
Bedford County	126,788	99.4%*	37.0%	NA	88.3%	NA	NA	15.1%	1.2%		
Botetourt County	58,557	81.1%	24.6%	NA	NA	NA	NA	24.4%	29.1%		
Campbell County	87,187	72.3%	126.8%*	NA	NA	NA	NA	16.1%	70.5%		
Craig County	9,623	NA	NA	NA	NA	NA	NA	NA	NA		
Franklin County	90,039	142.5%*	105.8%*	NA	NA	NA	NA	43.1%	8.2%		
Giles County	31,121	99.1%	-1.5%	NA	21.0%	NA	NA	NA	NA		
Montgomery County	140,283	34.8%	40.5%	NA	63.2%	NA	NA	-1.4%	21.5%		
Pulaski County	61,876	97.3%*	3.9%	NA	-5.1%	NA	NA	0.9%	-2.0%		
Roanoke County	154,927	130.2%*	70.9%*	NA	83.3%	NA	NA	74.9%	67.1%		
Cities											
Lynchburg	76,496	42.3%	17.2%	NA	23.3%	NA	NA	-36.2%	-21.4%		
Radford	19,389	NA	NA	NA	NA	NA	NA	NA	NA		
Roanoke	130,826	67.4%*	21.2%	259.0%*	10.2%	12.1%	45.9%	25.0%	21.4%		
Salem	39,224	NA	104.6%	NA	NA	NA	NA	NA	NA		
*Statistically significant (p<0.05). NA= <i>Inadequate data for calculations</i> SRC= <i>Stress-related conditions</i>											

We examined place-based data for each region, county, and city. Table 10 arrays the data by region, separating the results for (a) localities that experienced a statistically significant change in SRC mortality between 1995-1999 and 2010-2014, (b) localities that experienced a change that did not achieve statistical significance and (c) localities for which data were unavailable to calculate a change in mortality rates. For each location we examined population size, Rural-Urban Continuum Codes (RUCC), and 31 place-based characteristics covering seven domains: demographic characteristics, educational attainment, income and employment, housing, transportation, environment, and access to health care.

Table 10.

PLACE-BASED CHARACTERISTICS OF REGIONS, COUNTIES, AND CITIES IN VIRGINIA

LOCATIONS	SRC MORTALITY			GEOGRAPHY			DEMOGRAPHICS			EDUCATIONAL ATTAINMENT		
	CHANGE (%) IN SRC MORTALITY			SIZE OF POP.	RUCC	RURALITY	DIVERSITY INDEX	FOREIGN BORN	SINGLE PARENTS	HIGH SCHOOL OR MORE	SOME COLLEGE+	BACH+
	SRC MORTALITY (2010-2014)	FROM 1995-99 TO 2010-14	FROM 2000-04 TO 2010-14									
SOUTHWEST												
Places with statistically significant changes in SRC mortality after 1995-1999												
Buchanan County	125.2	245.3%	41.0%	45,869	9	100.0	8.2	1.5	40.3	44.9	34.5	8.6
Carroll County	75.8	137.2%	164.5%*	53,246	7	97.1	8.8	1.9	32.0	49.9	43.1	13.0
Dickenson County	161.1	215.2%	93.5%	30,109	9	100.0	3.7	0.8	29.7	49.0	37.6	10.2
Russell County	108.8	146.4%	1.1%	54,683	7	88.2	5.9	1.0	27.0	48.6	38.4	11.9
Smyth County	67.4	168.7%	29.8%	57,666	7	75.3	10.2	1.2	36.1	50.6	40.8	14.9
Tazewell County	108.2	147.7%	76.1%*	80,123	5	51.9	11.1	0.7	29.4	52.0	42.9	12.8
Washington County	48.6	136.4%	-1.7%	101,696	2	71.7	8.2	1.4	28.2	59.9	50.8	23.5
Wise County	105.8	261.8%	27.8%	74,105	7	56.7	14.9	1.6	29.5	49.3	40.1	12.8
Places with changes in SRC mortality after 1995-1999 that were not statistically significant												
Bristol city	85.5	113.2%	78.7%	30,623	2	0.0	20.1	1.6	53.5	52.8	46.9	20.4
Floyd County	31.6	-27.7%	NC	27,445	3	100.0	11.6	2.3	9.5	52.3	47.3	16.7
Lee County	91.1	92.0%	-2.7%	45,862	8	99.6	13.1	1.2	28.3	50.0	40.6	11.1
Scott County	77.7	77.2%	33.6%	42,637	2	82.1	5.7	0.9	25.8	55.4	38.6	11.6
Wythe County	57.4	89.9%	-2.2%	54,222	6	75.3	11.0	1.0	32.2	48.8	45.2	15.2
Places with inadequate data to measure changes in SRC mortality after 1995-1999												
Bland County	77.9	NC	2.1%	13,094	8	100.0	9.8	1.2	19.1	53.1	44.9	14.2
Galax city	NC	NC	NC	9,624	7	13.7	39.3	9.5	52.8	42.1	41.8	12.4
Norton city	NC	NC	NC	6,921	7	2.6	18.0	2.3	49.3	66.9	57.4	20.5
Grayson County	64.2	NC	62.7%	25,904	9	99.9	11.8	0.9	35.0	51.6	38.6	10.8
WEST CENTRAL												
Places with statistically significant changes in SRC mortality after 1995-1999												
Bedford County	47.3	99.4%	37.0%	126,788	2	78.4	20.9	2.0	25.1	65.2	55.6	26.3
Franklin County	70.7	142.5%	105.8%*	90,039	2	89.2	23.4	2.4	25.8	57.2	50.3	19.8
Pulaski County	84.2	97.3%	3.9%	61,876	3	46.9	16.3	1.0	37.3	54.1	50.1	16.4
Roanoke city	86.0	67.4%	21.2%	130,826	2	0.0	54.3	7.3	50.0	57.6	53.0	24.1
Roanoke County	54.5	130.2%	70.9%*	154,927	2	18.5	22.9	4.8	25.5	71.8	64.8	34.0
Places with changes in SRC mortality after 1995-1999 that were not statistically significant												
Amherst County	31.2	26.1%	-2.7%	46,167	2	63.7	39.1	1.6	34.8	53.2	46.0	18.3
Botetourt County	42.1	81.1%	24.6%	58,557	2	64.1	12.4	2.3	17.3	64.0	56.2	25.4
Campbell County	44.9	72.3%	126.8%*	87,187	2	61.1	32.7	2.3	33.7	57.7	47.9	18.9
Giles County	66.9	99.1%	-1.5%	31,121	3	66.3	8.7	1.8	30.5	53.0	44.7	17.0
Lynchburg city	47.0	42.3%	17.2%	76,496	2	2.7	52.4	5.1	41.1	67.2	61.7	32.3
Montgomery County	45.3	34.8%	40.5%	140,283	3	24.9	27.1	9.3	25.6	78.7	68.5	44.3
Places with inadequate data to measure changes in SRC mortality after 1995-1999												
Appomattox County	NC	NC	NC	22,747	2	100.0	37.2	0.9	36.8	56.4	43.7	15.3
Craig County	NC	NC	NC	9,623	2	100.0	6.3	0.4	19.2	57.3	41.9	13.1
Radford city	NC	NC	NC	19,389	3	2.9	28.5	4.0	41.5	77.0	66.6	34.9
Salem city	82.7	NC	104.6%	39,224	2	0.0	24.8	4.9	36.9	68.3	61.5	30.7

Table 10. (continued)

PLACE-BASED CHARACTERISTICS OF REGIONS, COUNTIES, AND CITIES IN VIRGINIA

LOCATIONS	HOUSEHOLD ECONOMIC CONDITIONS						HOUSING					
	MEDIAN HOUSEHOLD INCOME (\$)	POVERTY RATES			INEQUALITY		UN-EMPLOYMENT	HOUSING DISREPAIR	OVER-CROWDING	PRE-1950 HOUSING	HOUSING COST BURDEN	
		ALL AGES	CHILDREN	AGES 18-64	GINI INDEX	RENTING					OWNER-SHIP	
SOUTHWEST												
Places with statistically significant changes in SRC mortality after 1995-1999												
Buchanan County	\$32,083	24.0	31.3	22.2	0.46	10.4	12.0	0.7	14.2	78.6	18.5	
Carroll County	\$38,474	18.5	25.0	18.2	0.42	6.8	10.5	0.9	15.5	65.1	24.9	
Dickenson County	\$32,103	20.2	27.1	20.5	0.43	9.9	11.4	1.4	17.1	77.1	17.3	
Russell County	\$37,378	18.7	24.6	18.4	0.46	8.0	12.5	0.2	13.7	66.7	15.3	
Smyth County	\$37,831	19.3	26.9	17.3	0.47	7.8	12.0	0.9	17.0	53.8	18.3	
Tazewell County	\$38,292	19.5	24.7	19.0	0.48	8.0	11.2	0.5	21.7	58.0	19.8	
Washington County	\$43,353	12.3	20.7	12.3	0.47	5.7	10.2	0.6	14.5	51.2	21.5	
Wise County	\$38,528	22.7	28.9	22.6	0.47	9.4	13.3	0.6	18.4	65.6	15.9	
Places with changes in SRC mortality after 1995-1999 that were not statistically significant												
Bristol city	\$34,099	19.6	34.9	17.9	0.46	6.4	18.7	0.9	23.9	51.7	17.4	
Floyd County	\$43,355	10.6	20.0	10.2	0.4	4.6	10.6	1.0	18.8	51.4	19.1	
Lee County	\$31,429	26.0	31.9	25.0	0.43	8.2	15.8	1.7	22.5	66.7	19.0	
Scott County	\$36,290	19.1	26.1	18.3	0.47	5.9	11.3	0.6	19.7	63.3	15.9	
Wythe County	\$41,132	15.1	21.6	14.5	0.45	6.4	9.7	0.6	21.7	55.1	19.5	
Places with inadequate data to measure changes in SRC mortality after 1995-1999												
Bland County	\$42,624	13.5	17.4	12.1	0.4	6.0	8.7	0.9	17.9	64.5	15.9	
Galax city	\$33,182	25.8	34.8	22.3	0.5	7.2	16.4	2.6	18.9	50.0	18.7	
Norton city	\$31,620	14.8	32.9	16.6	0.5	7.8	12.4	0.0	23.0	47.6	22.4	
Grayson County	\$31,893	20.2	29.0	18.6	0.4	7.7	11.4	0.2	20.2	57.6	20.0	
WEST CENTRAL												
Places with statistically significant changes in SRC mortality after 1995-1999												
Bedford County	\$55,507	10.2	13.6	9.9	0.42	5.1	11.0	0.8	9.7	60.2	21.1	
Franklin County	\$47,419	14.5	23.9	12.9	0.44	5.3	12.6	1.6	9.8	59.6	24.8	
Pulaski County	\$46,186	13.6	22.1	14.8	0.42	6.0	11.1	0.9	19.9	56.2	20.1	
Roanoke city	\$40,735	21.9	33.0	20.5	0.46	5.9	19.5	2.0	35.1	51.7	29.6	
Roanoke County	\$61,935	7.9	10.5	7.8	0.42	4.5	10.3	1.0	7.0	44.6	22.1	
Places with changes in SRC mortality after 1995-1999 that were not statistically significant												
Amherst County	\$43,998	11.2	20.5	11.2	0.41	5.4	9.4	1.1	14.6	51.5	22.2	
Botetourt County	\$63,646	7.2	10.6	6.3	0.43	4.8	8.3	1.1	15.6	46.0	20.1	
Campbell County	\$46,663	14.8	19.4	14.9	0.42	5.3	11.9	0.8	11.4	56.9	21.4	
Giles County	\$45,979	13.3	18.2	14.9	0.43	6.0	9.0	1.4	24.6	54.1	15.8	
Lynchburg city	\$40,065	24.6	31.7	25.5	0.49	6.3	19.2	1.4	26.7	61.5	26.0	
Montgomery County	\$43,484	25.6	16.0	30.5	0.49	5.0	20.4	1.1	10.3	65.6	18.3	
Places with inadequate data to measure changes in SRC mortality after 1995-1999												
Appomattox County	\$44,397	18.2	21.9	16.6	0.4	5.7	9.9	1.0	10.8	65.6	22.4	
Craig County	\$46,551	10.4	21.0	9.6	0.4	6.3	6.0	0.0	22.2	29.9	18.1	
Radford city	\$34,267	39.6	20.6	47.6	0.5	6.6	26.7	0.0	24.7	71.5	22.7	
Salem city	\$54,195	11.6	13.9	12.4	0.4	5.1	17.0	1.6	14.2	51.3	23.7	

Table 10. (continued)

PLACE-BASED CHARACTERISTICS OF REGIONS, COUNTIES, AND CITIES IN VIRGINIA

LOCATIONS	TRANSPORTATION				ENVIRONMENT		HEALTH CARE					
	NO VEHICLE	COMMUTING			OZONE DAYS	VIOLENT CRIME	HEALTH INSURANCE COVERAGE			POPULATION TO PROVIDE RATIO		
		MOTOR VEHICLE	WALK/BIKE	PUBLIC TRANSIT			UN-INSURED	PRIVATE (ONLY)	PUBLIC (ONLY)	PRIMARY CARE SHORTAGE	DENTIST SHORTAGE	MENTAL HEALTH SHORTAGE
SOUTHWEST												
Places with statistically significant changes in SRC mortality after 1995-1999												
Buchanan County	1.3	97.3	1.5	0.3	1	0.1	11.9	37.3	32.4	3371.0	5777.0	4621.0
Carroll County	2.2	95.9	0.8	0.4	2	0.1	16.3	42.1	21.2	996.0	3291.0	3703.0
Dickenson County	0.5	95.5	2.7	0.0	1	0.1	11.6	40.7	28.7	3097.0	15308.0	5103.0
Russell County	0.5	95.8	1.4	0.0	3	0.1	14.7	42.3	22.0	2355.0	9341.0	1751.0
Smyth County	2.8	96.2	1.1	0.6	3	0.2	13.1	43.4	23.6	1862.0	1856.0	928.0
Tazewell County	2.4	95.2	1.5	0.1	1	0.1	15.0	43.0	22.4	1297.0	2556.0	805.0
Washington County	1.9	93.9	2.1	0.3	3	0.1	11.8	50.9	16.8	1569.0	1955.0	1033.0
Wise County	2.0	96.1	1.8	0.4	2	0.2	14.8	43.5	21.8	2388.0	4437.0	1248.0
Places with changes in SRC mortality after 1995-1999 that were not statistically significant												
Bristol city	2.0	93.0	3.4	1.2	3	0.3	15.8	42.9	22.7	2477.0	2864.0	1432.0
Floyd County	1.0	89.7	1.7	0.0	1	0.1	12.6	53.6	16.0	3106.0	7789.0	2225.0
Lee County	1.3	95.9	1.2	0.7	3	0.1	16.0	35.4	26.0	3148.0	4990.0	1313.0
Scott County	1.1	96.7	1.0	0.1	3	0.1	11.8	45.5	19.7	2516.0	4477.0	1017.0
Wythe County	1.8	95.0	1.2	1.2	1	0.1	14.3	49.4	18.7	1834.0	2912.0	594.0
Places with inadequate data to measure changes in SRC mortality after 1995-1999												
Bland County	1.0	95.3	1.8	0.0	1	0.1	11.0	52.3	16.7		1656.0	6625.0
Galax city	6.3	95.1	1.3	1.1	2	0.4	13.9	37.0	26.8		877.0	292.0
Norton city	1.4	94.6	3.7	0.0	2	0.1	12.0	45.0	26.0	309.0	806.0	366.0
Grayson County	2.3	95.4	1.8	0.9	3	0.1	14.1	38.7	25.4	3032.0	5031.0	15093.0
WEST CENTRAL												
Places with statistically significant changes in SRC mortality after 1995-1999												
Bedford County	1.7	95.0	0.6	0.5	1	0.2	9.7	58.5	13.2	1425.0	6348.0	3191.0
Franklin County	1.9	91.6	3.0	0.2	1	0.1	13.6	49.2	17.0	2167.0	5636.0	5636.0
Pulaski County	1.0	95.5	1.3	0.5	1	0.2	11.9	51.6	17.4	1725.0	3814.0	3432.0
Roanoke city	5.3	91.6	3.1	2.8	1	0.6	16.8	46.5	21.4	1186.0	1530.0	495.0
Roanoke County	1.7	94.9	0.9	0.4	1	0.1	7.0	62.9	12.1	806.0	1187.0	488.0
Places with changes in SRC mortality after 1995-1999 that were not statistically significant												
Amherst County	1.9	93.3	2.9	1.0	0	0.1	12.2	51.7	17.2	6436.0	5340.0	6408.0
Botetourt County	0.6	96.7	0.5	0.2	0	0.1	5.6	65.2	10.1	1941.0	4138.0	3310.0
Campbell County	1.4	96.2	0.7	0.1	1	0.1	13.1	52.0	15.2	3945.0	6098.0	54885.0
Giles County	3.4	94.3	1.9	0.1	1	0.1	16.8	47.5	14.0	1693.0	2803.0	16815.0
Lynchburg city	6.3	87.2	5.4	4.2	0	0.4	12.7	53.5	16.5	780.0	952.0	302.0
Montgomery County	2.5	85.1	5.8	4.3	1	0.1	8.9	69.6	8.5	1436.0	2559.0	612.0
Places with inadequate data to measure changes in SRC mortality after 1995-1999												
Appomattox County	2.4	96.3	0.2	0.0	1	0.1	10.9	52.0	18.1	7628.0	7640.0	7640.0
Craig County	0.0	97.9	0.9	0.1	1	0.1	12.6	48.9	17.3	5210.0	1745.0	
Radford city	2.0	86.8	11.7	0.5	1	0.4	9.6	67.0	11.6	1562.0	1961.0	882.0
Salem city	3.1	91.3	4.1	1.6	1	0.1	11.2	60.5	11.0	723.0	822.0	148.0

Table 10. (continued)

PLACE-BASED CHARACTERISTICS OF REGIONS, COUNTIES, AND CITIES IN VIRGINIA

LOCATIONS	SRC MORTALITY			GEOGRAPHY			DEMOGRAPHICS			EDUCATIONAL ATTAINMENT		
	CHANGE (%) IN SRC MORTALITY			SIZE OF POP.	RUCC	RURALITY	DIVERSITY INDEX	FOREIGN BORN	SINGLE PARENTS	HIGH SCHOOL OR MORE	SOME COLLEGE+	BACH+
	SRC MORTALITY (2010-2014)	FROM 1995-99 TO 2010-14	FROM 2000-04 TO 2010-14									
SOUTHSIDE												
Places with statistically significant changes in SRC mortality after 1995-1999												
Henry County	105.2	128.9%	29.6%	70,144	4	60.7	44.6	3.1	34.8	53.3	43.9	11.5
Patrick County	93.5	173.3%	98.2%	30,241	8	100.0	18.4	1.7	32.5	50.7	42.1	11.2
Pittsylvania County	58.9	141.6%	61.4%	90,002	4	85.6	40.2	2.2	32.2	55.6	44.8	14.0
Places with changes in SRC mortality after 1995-1999 that were not statistically significant												
Danville city	87.7	93.4%	24.4%	31,740	4	4.5	55.9	3.4	60.2	62.9	50.1	17.2
Halifax County	57.1	11.1%	138.7%	37,964	6	77.1	50.3	1.1	39.7	54.4	42.5	14.6
Martinsville city	132.1	130.2%	36.2%	11,592	4	0.0	56.5	3.5	58.8	57.7	47.9	16.6
Mecklenburg County	54.7	76.8%	56.6%	33,026	7	77.8	52.0	2.8	44.1	52.4	44.5	15.2
Places with inadequate data to measure changes in SRC mortality after 1995-1999												
Brunswick County	NC	NC	NC	13,089	6	75.5	51.8	1.3	50.0	40.8	39.1	13.3
Charlotte County	57.0	NC	NC	15,115	8	100.0	46.6	1.5	40.1	47.4	41.2	15.4
Emporia city	NC	NC	NC	2,891	6	6.3	47.6	2.3	61.9	51.8	39.2	15.0
Greensville County	NC	NC	NC	10,065	6	87.0	50.9	1.4	48.5	31.2	31.5	8.5
Lunenburg County	NC	NC	NC	14,426	9	100.0	52.2	3.3	42.5	42.9	37.9	12.5
Nottoway County	NC	NC	NC	17,044	6	52.3	54.3	2.5	48.1	40.5	37.1	12.2
Prince Edward County	NC	NC	NC	20,043	6	63.2	50.1	2.3	37.5	54.9	44.5	22.4
Southampton County	NC	NC	NC	22,822	6	98.0	50.8	0.9	36.8	57.3	44.5	14.8
SHENANDOAH VALLEY												
Places with statistically significant changes in SRC mortality after 1995-1999												
Augusta County	63.3	142.3%	122.9%*	132,326	3	66.4	15.2	1.7	24.4	49.3	44.8	21.2
Frederick County	56.8	188.4%	110.9%*	142,571	3	44.8	26.1	5.8	21.4	63.7	56.2	28.2
Winchester city	92.5	182.8%	67.9%	36,302	3	0.0	49.6	11.2	39.2	56.1	52.8	28.1
Places with changes in SRC mortality after 1995-1999 that were not statistically significant												
Alleghany County	73.8	113.1%	NC	26,624	6	47.6	14.9	1.6	28.7	53.3	47.4	16.9
Harrisonburg city	43.2	22.0%	NC	51,035	3	100.0	47.7	15.5	28.1	58.1	56.7	35.6
Rockbridge County	29.3	28.2%	-15.5%	37,680	6	91.6	12.7	2.1	22.4	56.0	47.4	23.5
Rockingham County	30.1	98.5%	38.2%	132,649	3	40.7	17.5	4.8	22.0	51.4	44.9	23.7
Shenandoah County	40.8	88.5%	24.1%	71,310	6	33.4	19.4	4.7	32.3	46.8	44.0	19.8
Staunton city	37.8	27.5%	1.4%	37,629	3	96.3	31.2	3.6	39.1	61.0	55.8	31.5
Waynesboro city	43.2	-32.4%	11.1%	32,866	3	97.5	36.5	4.1	42.8	48.6	46.3	19.0
Places with inadequate data to measure changes in SRC mortality after 1995-1999												
Bath County	NC	NC	NC	7,793	8	100.0	18.6	4.8	35.2	40.7	45.7	19.8
Buena Vista city	NC	NC	NC	10,470	6	3.9	20.2	0.8	30.7	37.6	39.0	14.0
Covington city	NC	NC	NC	9,366	6	0.0	30.7	1.3	34.5	39.3	41.2	9.0
Highland County	NC	NC	NC	3,524	8	100.0	0.4	0.6	21.1	31.5	38.8	19.4
Lexington city	NC	NC	NC	5,861	6	0.0	31.6	3.1	26.9	76.7	60.9	44.8
Page County	82.4	NC	96.7%	44,162	6	80.2	10.1	1.6	36.1	42.3	34.3	12.4

Table 10. (continued)

PLACE-BASED CHARACTERISTICS OF REGIONS, COUNTIES, AND CITIES IN VIRGINIA

LOCATIONS	HOUSEHOLD ECONOMIC CONDITIONS						HOUSING				
	MEDIAN HOUSEHOLD INCOME (\$)	POVERTY RATES			INEQUALITY	UN-EMPLOYMENT	HOUSING DISREPAIR	OVER-CROWDING	PRE-1950 HOUSING	HOUSING COST BURDEN	
		ALL AGES	CHILDREN	AGES 18-64	GINI INDEX					RENTING	OWNER-SHIP
SOUTHSIDE											
Places with statistically significant changes in SRC mortality after 1995-1999											
Henry County	\$34,842	17.8	31.3	17.6	0.43	7.7	12.8	2.1	11.8	54.5	20.5
Patrick County	\$34,885	20.2	31.8	19.6	0.41	6.5	8.6	1.1	13.2	63.7	19.2
Pittsylvania County	\$44,207	14.5	20.1	14.1	0.41	6.3	12.7	1.5	13.4	55.8	22.1
Places with changes in SRC mortality after 1995-1999 that were not statistically significant											
Danville city	\$33,646	26.1	36.6	24.3	0.5	8.7	19.3	1.6	30.2	53.3	22.0
Halifax County	\$39,079	20.2	25.3	19.1	0.45	7.8	12.9	1.0	20.3	66.3	22.1
Martinsville city	\$29,971	25.9	35.4	25.7	0.5	9.9	21.0	1.2	24.9	59.5	30.2
Mecklenburg County	\$38,500	19.9	30.6	18.7	0.44	7.7	14.7	1.2	15.8	61.5	24.5
Places with inadequate data to measure changes in SRC mortality after 1995-1999											
Brunswick County	\$37,344	23.5	31.5	20.5	0.5	8.2	15.8	1.3	14.5	72.5	27.9
Charlotte County	\$36,339	19.3	30.4	17.2	0.4	6.7	13.5	1.3	23.3	60.0	23.5
Emporia city	\$33,160	34.6	41.8	30.0	0.5	8.2	25.8	2.0	22.4	55.9	32.4
Greensville County	\$36,459	20.0	27.2	18.1	0.5	6.7	11.8	1.0	9.9	61.2	26.5
Lunenburg County	\$37,548	19.9	28.7	19.6	0.4	6.0	18.4	1.4	24.3	62.5	23.8
Nottoway County	\$37,996	20.9	30.9	22.3	0.4	5.4	18.0	2.4	25.7	71.4	29.5
Prince Edward County	\$37,543	22.3	30.1	24.2	0.5	7.8	18.5	2.1	13.9	60.5	21.4
Southampton County	\$46,521	14.5	22.4	13.4	0.4	5.0	14.9	0.6	17.1	57.5	26.6
SHENANDOAH VALLEY											
Places with statistically significant changes in SRC mortality after 1995-1999											
Augusta County	\$57,808	9.3	13.8	9.0	0.42	4.7	11.4	0.7	17.8	51.0	21.2
Frederick County	\$65,485	5.9	11.5	5.9	0.40	4.7	13.8	1.7	9.1	49.6	25.0
Winchester city	\$44,537	15.6	21.7	16.7	0.48	5.0	20.2	3.1	28.5	59.4	23.3
Places with changes in SRC mortality after 1995-1999 that were not statistically significant											
Alleghany County	\$45,454	14.2	21.9	13.1	0.42	6.0	12.5	1.3	29.8	52.8	20.8
Harrisonburg city	\$38,541	32.5	23.6	38.2	0.48	6.1	30.6	4.5	11.7	57.0	23.0
Rockbridge County	\$48,497	13.2	18.5	13.2	0.4	5.4	11.4	0.5	20.7	58.1	27.5
Rockingham County	\$55,798	10.9	16.3	9.2	0.45	4.6	15.0	1.9	18.1	51.0	22.9
Shenandoah County	\$45,430	12.8	17.6	11.7	0.41	5.0	14.2	1.3	21.6	54.0	25.9
Staunton city	\$42,552	18.2	25.6	17.3	0.47	5.2	19.6	1.6	31.7	59.0	24.4
Waynesboro city	\$44,843	20.7	24.9	19.4	0.40	5.3	17.7	1.7	26.6	57.3	28.8
Places with inadequate data to measure changes in SRC mortality after 1995-1999											
Bath County	\$43,852	9.3	15.6	6.2	0.5	4.4	7.0	0.5	27.5	33.2	21.7
Buena Vista city	\$38,331	22.9	25.2	22.4	0.4	5.8	18.3	0.6	34.4	68.0	29.5
Covington city	\$36,503	21.9	26.5	23.1	0.4	8.0	14.3	0.0	52.9	55.4	24.1
Highland County	\$38,636	12.5	21.8	13.5	0.4	3.8	9.0	0.9	46.0	67.3	20.0
Lexington city	\$40,829	19.3	16.5	26.8	0.5	7.9	24.2	0.0	38.4	51.2	26.4
Page County	\$44,851	17.2	23.8	18.2	0.4	8.1	14.1	1.3	22.7	56.5	23.4

Table 10. (continued)

PLACE-BASED CHARACTERISTICS OF REGIONS, COUNTIES, AND CITIES IN VIRGINIA

LOCATIONS	TRANSPORTATION				ENVIRONMENT		HEALTH CARE					
	NO VEHICLE	COMMUTING			OZONE DAYS	VIOLENT CRIME	HEALTH INSURANCE COVERAGE			POPULATION TO PROVIDE RATIO		
		MOTOR VEHICLE	WALK/BIKE	PUBLIC TRANSIT			UN-INSURED	PRIVATE (ONLY)	PUBLIC (ONLY)	PRIMARY CARE SHORTAGE	DENTIST SHORTAGE	MENTAL HEALTH SHORTAGE
SOUTHSIDE												
Places with statistically significant changes in SRC mortality after 1995-1999												
Henry County	2.4	97.2	0.2	0.4	1	0.3	15.3	41.5	20.5	1594.0	1680.0	52081.0
Patrick County	1.8	95.9	1.4	0.5	1	0.1	15.6	40.0	22.3	6123.0	6088.0	6088.0
Pittsylvania County	2.7	95.9	0.8	0.4	1	0.1	12.9	49.5	17.2	20809.0	8912.0	15596.0
Places with changes in SRC mortality after 1995-1999 that were not statistically significant												
Danville city	6.2	92.9	2.1	2.5	1	0.4	14.1	37.3	26.5	1047.0	1011.0	574.0
Halifax County	2.7	94.6	1.2	0.4	2	0.1	15.0	41.1	22.0	2213.0	2514.0	1467.0
Martinsville city	4.1	96.2	2.2	0.2	1	0.3	17.0	34.6	27.1	13755.0		381.0
Mecklenburg County	2.1	93.2	1.7	0.4	2	0.2	14.6	41.8	20.2	1496.0	3899.0	1950.0
Places with inadequate data to measure changes in SRC mortality after 1995-1999												
Brunswick County	3.6	93.8	1.5	1.3	1	0.1	13.8	42.3	22.6	3395.0	4125.0	4125.0
Charlotte County	2.4	92.4	2.5	1.0	1	0.1	20.4	39.9	20.9	3076.0	3056.0	12225.0
Emporia city	7.8	90.1	7.4	0.0	1	0.6	21.2	32.4	23.6		1092.0	
Greensville County	4.6	96.6	0.7	0.7	1	0.1	10.9	48.4	19.0	2377.0	11681.0	899.0
Lunenburg County	2.5	94.1	1.4	0.4	1	0.2	14.7	40.3	23.8	4176.0	4155.0	2493.0
Nottoway County	1.7	94.4	1.8	0.5	1	0.2	15.7	38.8	21.9	1434.0	2226.0	3116.0
Prince Edward County	4.5	85.5	8.1	0.1	1	0.1	14.6	51.9	16.7	1900.0	2884.0	524.0
Southampton County	2.5	94.2	1.6	0.2	2	0.1	14.0	49.7	17.0	4532.0	18059.0	
SHENANDOAH VALLEY												
Places with statistically significant changes in SRC mortality after 1995-1999												
Augusta County	1.5	93.9	1.4	0.3	1	0.1	10.8	56.9	12.0	2112.0	3517.0	1718.0
Frederick County	1.5	94.8	1.0	0.3	1	0.1	11.8	61.9	10.0	2259.0	8238.0	2841.0
Winchester city	6.5	88.3	7.7	0.7	1	0.2	16.8	52.8	14.7	358.0	586.0	237.0
Places with changes in SRC mortality after 1995-1999 that were not statistically significant												
Alleghany County	1.6	96.2	1.3	0.7	0	0.1	10.0	48.9	17.9	1469.0	3955.0	5273.0
Harrisonburg city	3.7	84.2	10.1	2.9	1	0.2	15.6	63.7	10.3	779.0	990.0	332.0
Rockbridge County	1.0	94.4	0.6	0.2	0	0.1	13.3	52.0	13.3	929.0	22327.0	22327.0
Rockingham County	2.2	90.9	3.1	0.4	1	0.1	13.9	57.9	12.9	3887.0	5211.0	8686.0
Shenandoah County	1.5	94.1	2.1	0.2	1	0.1	13.3	52.6	14.8	2134.0	3309.0	2531.0
Staunton city	2.5	90.3	6.8	0.2	0	0.2	14.3	49.7	14.5	1873.0	1168.0	208.0
Waynesboro city	2.7	95.6	2.2	0.3	0	0.3	14.0	45.8	20.5	1063.0	822.0	822.0
Places with inadequate data to measure changes in SRC mortality after 1995-1999												
Bath County	2.8	91.0	6.5	0.0	0	0.0	14.2	46.6	6.2	2308.0	4563.0	
Buena Vista city	6.4	91.9	5.0	0.0	0	0.1	16.2	46.3	20.9	6680.0	1321.0	2201.0
Covington city	1.4	94.0	3.3	0.3	0	0.3	14.0	38.6	19.0	1455.0	1451.0	484.0
Highland County	2.6	79.4	14.5	0.0	1	0.1	19.8	33.9	10.6		2248.0	450.0
Lexington city	1.1	58.8	32.0	0.0	0	0.0	6.8	65.5	8.7		812.0	222.0
Page County	1.3	94.9	1.4	0.6	1	0.1	15.3	46.6	19.9	2166.0	5962.0	3975.0

Table 10. (continued)

PLACE-BASED CHARACTERISTICS OF REGIONS, COUNTIES, AND CITIES IN VIRGINIA

LOCATIONS	SRC MORTALITY			GEOGRAPHY			DEMOGRAPHICS			EDUCATIONAL ATTAINMENT		
	CHANGE (%) IN SRC MORTALITY			SIZE OF POP.	RUCC	RURALITY	DIVERSITY INDEX	FOREIGN BORN	SINGLE PARENTS	HIGH SCHOOL OR MORE	SOME COLLEGE+	BACH+
	SRC MORTALITY (2010-2014)	FROM 1995-99 TO 2010-14	FROM 2000-04 TO 2010-14									
NORTHERN VIRGINIA												
Places with statistically significant changes in SRC mortality after 1995-1999												
Fairfax County	25.3	76.3%	60.3%*	1,294,175	1	1.4	65.0	29.8	19.2	79.9	78.7	59.2
Prince William County	33.1	129.2%	28.2%	461,064	1	4.2	68.9	21.8	23.1	69.4	67.8	38.1
Warren County	67.1	173.8%	53.8%	70,175	1	50.4	21.6	3.6	29.3	50.2	46.9	19.7
Places with changes in SRC mortality after 1995-1999 that were not statistically significant												
Alexandria city	17.7	-13.0%	-24.2%	219,000	1	0.0	64.5	26.6	32.8	81.8	79.4	61.5
Arlington County	16.6	-20.8%	-21.6%	406,542	1	0.0	55.9	22.9	22.2	88.3	84.7	72.0
Fairfax city	38.7	-11.5%	-35.6%	28,155	1	0.0	58.7	25.0	21.5	81.5	76.3	53.5
Fauquier County	48.7	96.1%	71.0%	111,269	1	57.5	32.6	5.9	20.3	66.7	63.5	34.3
Fredericksburg city	61.4	38.5%	52.3%	30,895	1	1.2	57.5	8.3	44.7	65.6	64.0	37.7
Loudoun County	24.5	50.8%	90.8%*	484,013	1	12.6	58.9	23.1	15.3	82.9	79.7	58.0
Manassas city	60.5	96.4%	202.2%*	41,432	1	0.0	66.5	26.9	27.9	50.8	55.7	29.1
Spotsylvania County	40.5	74.1%	67.9%	191,342	1	32.3	46.2	7.3	25.9	58.7	57.5	28.3
Stafford County	26.9	38.7%	30.6%	198,158	1	19.8	51.9	8.8	21.3	69.8	68.9	37.1
Places with inadequate data to measure changes in SRC mortality after 1995-1999												
Clarke County	NC	NC	NC	24,447	1	69.5	22.6	4.5	29.0	71.7	62.6	32.2
Falls Church city	NC	NC	NC	20,798	1	0.0	45.0	17.9	22.4	87.9	87.9	75.1
Manassas Park city	NC	NC	NC	15,527	1	0.0	70.0	32.4	25.8	57.6	55.7	26.3
CENTRAL												
Places with statistically significant changes in SRC mortality after 1995-1999												
Chesterfield County	41.1	103.4%	52.2%*	429,960	1	5.9	53.1	8.0	27.7	69.2	66.5	36.6
Hanover County	43.0	168.6%	121.7%*	170,091	1	39.1	27.2	3.6	20.2	73.9	64.6	36.3
Henrico County	46.2	56.4%	55.3%*	370,825	1	4.3	59.4	11.9	35.0	72.7	66.9	39.7
Places with changes in SRC mortality after 1995-1999 that were not statistically significant												
Albemarle County	17.9	8.0%	-10.9%	150,347	3	45.0	38.5	10.0	20.8	76.3	72.9	52.1
Charlottesville city	34.3	-27.1%	-21.2%	63,166	3	0.0	51.4	11.8	41.3	75.9	66.5	49.3
Colonial Heights city	68.6	123.5%	80.0%	24,730	1	0.0	37.0	5.6	37.6	55.3	50.5	19.6
Culpeper County	56.8	136.2%	64.9%	70,668	1	61.9	45.8	6.5	31.9	51.3	50.1	21.4
Dinwiddie County	39.4	4.0%	7.3%	37,145	1	71.2	49.8	2.2	37.2	46.9	40.6	13.7
Louisa County	40.9	14.1%	47.7%	53,837	8	100.0	37.9	3.2	28.4	50.0	43.8	19.2
Orange County	59.3	106.0%	114.9%	52,247	6	57.8	34.5	5.2	28.8	55.9	52.2	24.0
Richmond city	50.0	13.6%	4.0%	202,081	1	0.0	60.1	7.0	63.1	66.0	59.3	35.4
Places with inadequate data to measure changes in SRC mortality after 1995-1999												
Amelia County	NC	NC	NC	18,834	1	100.0	41.8	0.9	20.8	58.6	45.5	15.6
Buckingham County	NC	NC	NC	21,847	3	100.0	50.6	1.8	40.9	33.8	32.5	11.2
Caroline County	37.2	NC	NC	40,585	1	78.4	50.8	2.8	37.0	52.5	45.1	19.3
Charles City County	NC	NC	NC	6,314	1	100.0	59.4	1.1	43.6	42.3	34.0	11.8
Cumberland County	NC	NC	NC	12,265	8	96.0	48.3	0.3	49.7	47.0	42.8	16.4
Fluvanna County	34.0	NC	NC	41,515	3	62.9	35.7	2.6	21.1	59.1	57.9	29.6

Table 10. (continued)

PLACE-BASED CHARACTERISTICS OF REGIONS, COUNTIES, AND CITIES IN VIRGINIA

LOCATIONS	HOUSEHOLD ECONOMIC CONDITIONS						HOUSING					
	MEDIAN HOUSEHOLD INCOME (\$)	POVERTY RATES			INEQUALITY	UN-EMPLOYMENT	HOUSING DISREPAIR	OVER-CROWDING	PRE-1950 HOUSING	HOUSING COST BURDEN		
		ALL AGES	CHILDREN	AGES 18-64	GINI INDEX					RENTING	OWNER-SHIP	
NORTHERN VIRGINIA												
Places with statistically significant changes in SRC mortality after 1995-1999												
Fairfax County	\$110,507	6.0	8.7	5.5	0.42	4.1	14.7	2.8	3.6	47.2	24.5	
Prince William County	\$91,886	6.5	10.4	5.5	0.37	4.8	15.9	2.8	2.3	52.8	26.7	
Warren County	\$60,714	9.9	15.8	9.9	0.42	5.5	15.5	1.4	16.2	55.3	26.5	
Places with changes in SRC mortality after 1995-1999 that were not statistically significant												
Alexandria city	\$86,419	8.7	15.8	7.7	0.44	3.7	14.5	3.1	19.5	46.6	23.0	
Arlington County	\$107,143	8.8	11.0	8.3	0.44	3.2	14.0	2.0	24.2	41.8	21.9	
Fairfax city	\$94,067	8.8	7.9	9.4	0.4	4.1	15.8	2.3	6.9	56.8	23.3	
Fauquier County	\$89,106	5.8	9.4	5.4	0.43	4.5	13.5	0.8	13.3	50.5	25.6	
Fredericksburg city	\$51,195	19.2	23.4	19.9	0.48	6.0	21.0	0.8	20.0	57.2	22.6	
Loudoun County	\$122,641	3.8	4.4	3.7	0.36	4.2	13.1	1.7	4.4	47.4	27.3	
Manassas city	\$72,510	12.3	16.4	10.1	0.40	4.9	21.8	6.3	4.3	61.2	26.2	
Spotsylvania County	\$75,714	8.1	12.8	7.6	0.39	5.3	13.8	1.0	3.1	54.2	26.5	
Stafford County	\$92,647	5.4	7.6	4.5	0.37	5.2	12.2	1.2	2.9	55.0	24.8	
Places with inadequate data to measure changes in SRC mortality after 1995-1999												
Clarke County	\$70,281	9.5	10.6	8.9	0.4	4.3	12.5	0.3	22.1	55.4	28.5	
Falls Church city	\$125,635	4.6	3.3	4.1	0.4	3.6	11.9	2.2	20.8	46.3	23.0	
Manassas Park city	\$73,065	9.3	14.7	8.2	0.4	4.5	17.8	1.7	0.5	46.5	37.2	
CENTRAL												
Places with statistically significant changes in SRC mortality after 1995-1999												
Chesterfield County	\$72,972	7.2	11.2	7.0	0.41	5.1	12.1	1.1	3.1	51.9	24.7	
Hanover County	\$81,940	5.5	7.9	5.4	0.39	4.5	10.1	0.8	6.3	53.2	23.4	
Henrico County	\$62,446	10.7	17.2	9.7	0.45	5.1	14.9	1.5	7.7	50.3	26.2	
Places with changes in SRC mortality after 1995-1999 that were not statistically significant												
Albemarle County	\$67,083	9.7	10.3	11.2	0.49	4.4	14.8	1.0	7.6	55.5	23.2	
Charlottesville city	\$45,890	27.5	24.4	31.4	0.51	4.3	21.4	0.9	25.6	56.9	23.6	
Colonial Heights city	\$52,355	10.6	18.7	9.5	0.4	5.7	11.7	1.7	13.5	52.8	19.8	
Culpeper County	\$62,394	9.7	15.3	9.8	0.40	5.0	17.2	2.1	11.2	56.7	32.6	
Dinwiddie County	\$52,288	13.7	17.7	13.4	0.40	6.4	11.5	1.2	8.7	49.1	23.6	
Louisa County	\$60,121	9.6	17.3	9.1	0.40	5.1	12.4	0.9	9.0	57.8	25.8	
Orange County	\$59,282	12.6	15.7	11.8	0.41	5.2	13.7	2.2	11.6	54.3	26.5	
Richmond city	\$42,074	25.5	38.9	23.5	0.54	6.1	25.7	2.1	42.1	58.3	33.7	
Places with inadequate data to measure changes in SRC mortality after 1995-1999												
Amelia County	\$51,738	9.6	18.9	10.4	0.4	5.3	18.3	1.9	12.4	69.0	23.3	
Buckingham County	\$38,731	22.2	27.1	19.4	0.4	6.6	15.4	0.5	15.2	64.0	22.3	
Caroline County	\$56,099	12.5	17.3	10.7	0.4	6.1	15.3	1.2	10.1	50.2	27.0	
Charles City County	\$49,768	13.6	19.1	12.6	0.4	5.8	13.5	0.9	8.6	65.8	27.7	
Cumberland County	\$41,409	18.5	29.3	15.9	0.4	6.1	19.3	2.1	13.9	63.5	26.7	
Fluvanna County	\$64,258	6.5	10.7	7.6	0.4	4.3	10.8	1.4	7.7	51.4	25.1	

Table 10. (continued)

PLACE-BASED CHARACTERISTICS OF REGIONS, COUNTIES, AND CITIES IN VIRGINIA

LOCATIONS	TRANSPORTATION				ENVIRONMENT		HEALTH CARE					
	NO VEHICLE	COMMUTING			OZONE DAYS	VIOLENT CRIME	HEALTH INSURANCE COVERAGE			POPULATION TO PROVIDE RATIO		
		MOTOR VEHICLE	WALK/BIKE	PUBLIC TRANSIT			UN-INSURED	PRIVATE (ONLY)	PUBLIC (ONLY)	PRIMARY CARE SHORTAGE	DENTIST SHORTAGE	MENTAL HEALTH SHORTAGE
NORTHERN VIRGINIA												
Places with statistically significant changes in SRC mortality after 1995-1999												
Fairfax County	2.7	82.8	2.1	9.5	13	0.1	11.8	66.0	6.3	973.0	1033.0	709.0
Prince William County	1.5	88.6	1.9	5.6	2	0.1	13.5	65.7	8.6	2345.0	2075.0	1147.0
Warren County	2.0	93.3	1.9	0.3	1	0.1	12.6	60.3	11.6	1759.0	4873.0	1218.0
Places with changes in SRC mortality after 1995-1999 that were not statistically significant												
Alexandria city	6.0	68.3	4.8	21.5	8	0.2	14.9	64.7	8.2	1504.0	1333.0	399.0
Arlington County	7.6	60.8	6.5	27.0	12	0.2	10.9	65.4	3.9	1363.0	1745.0	813.0
Fairfax city	4.8	79.7	4.7	10.7	4	0.1	12.8	64.4	6.5	11987.0		94.0
Fauquier County	1.4	90.1	1.7	1.3	1	0.1	10.2	66.9	8.7	1977.0	1896.0	1517.0
Fredericksburg city	3.1	85.2	6.6	3.9	3	0.4	14.3	59.9	10.9	686.0	545.0	201.0
Loudoun County	1.6	87.8	1.9	3.2	2	0.1	8.7	76.9	4.0	1350.0	1650.0	856.0
Manassas city	2.6	91.2	1.1	4.0	2	0.4	21.8	57.1	11.9	887.0	859.0	434.0
Spotsylvania County	1.2	92.5	0.6	2.6	3	0.2	11.9	62.4	8.9	1612.0	2533.0	2051.0
Stafford County	1.2	89.4	2.1	3.9	4	0.1	8.7	66.8	6.6	3336.0	2800.0	1728.0
Places with inadequate data to measure changes in SRC mortality after 1995-1999												
Clarke County	1.0	90.3	3.7	0.4	1	0.1	9.9	63.1	7.8	2050.0	2885.0	1803.0
Falls Church city	3.6	68.5	4.1	20.7	7	0.1	4.2	78.6	2.8	307.0	368.0	111.0
Manassas Park city	4.3	89.2	2.3	5.6	2	0.1	24.2	56.4	10.9			
CENTRAL												
Places with statistically significant changes in SRC mortality after 1995-1999												
Chesterfield County	1.1	94.1	0.6	0.7	3	0.1	10.2	65.4	9.4	1122.0	1403.0	866.0
Hanover County	1.1	92.1	1.6	0.4	5	0.1	5.8	69.9	7.6	1388.0	1788.0	879.0
Henrico County	1.9	93.7	1.0	1.0	6	0.2	11.8	62.4	11.5	1018.0	1450.0	477.0
Places with changes in SRC mortality after 1995-1999 that were not statistically significant												
Albemarle County	2.0	87.3	3.6	1.8	1	0.1	8.2	68.1	8.1	691.0	1066.0	1112.0
Charlottesville city	6.7	70.8	14.5	8.5	1	0.4	11.3	67.0	11.4	346.0	1232.0	124.0
Colonial Heights city	1.6	95.5	1.0	0.1	3	0.2	12.1	54.6	11.9	653.0	443.0	554.0
Culpeper County	3.2	92.1	1.5	0.8	1	0.2	12.1	60.6	13.2	2205.0	2588.0	910.0
Dinwiddie County	0.9	94.5	1.0	0.2	1	0.2	14.3	55.1	13.2	6976.0	13930.0	9286.0
Louisa County	1.6	93.0	1.0	0.6	0	0.1	16.2	52.7	13.4	6789.0	4907.0	6870.0
Orange County	2.2	93.1	1.7	1.3	1	0.1	13.2	50.3	15.7	1652.0	4378.0	2335.0
Richmond city	7.7	83.4	6.9	5.6	4	0.7	17.5	47.0	20.6	991.0	792.0	405.0
Places with inadequate data to measure changes in SRC mortality after 1995-1999												
Amelia County	0.0	94.9	0.9	0.7	1	0.2	12.5	54.4	14.8	12745.0	4285.0	3214.0
Buckingham County	3.8	95.8	0.9	0.8	1	0.2	16.0	46.1	20.2	2856.0	1691.0	4228.0
Caroline County	3.3	92.6	2.1	0.8	4	0.1	13.7	54.5	16.0	7325.0	4963.0	4963.0
Charles City County	3.1	92.0	1.1	1.9	5	0.1	13.2	48.8	17.9	3565.0	2341.0	3512.0
Cumberland County	1.1	94.8	0.6	0.1	1	0.1	18.8	43.0	19.3	4921.0	9827.0	
Fluvanna County	0.8	93.6	0.2	0.1	1	0.1	10.6	61.9	11.0	3247.0	6523.0	2609.0

Table 10. (continued)

PLACE-BASED CHARACTERISTICS OF REGIONS, COUNTIES, AND CITIES IN VIRGINIA

LOCATIONS	SRC MORTALITY			GEOGRAPHY			DEMOGRAPHICS			EDUCATIONAL ATTAINMENT		
	CHANGE (%) IN SRC MORTALITY			SIZE OF POP.	RUCC	RURILITY	DIVERSITY INDEX	FOREIGN BORN	SINGLE PARENTS	HIGH SCHOOL OR MORE	SOME COLLEGE+	BACH+
	SRC MORTALITY (2010-2014)	FROM 1995-99 TO 2010-14	FROM 2000-04 TO 2010-14									
CENTRAL												
Places with inadequate data to measure changes in SRC mortality after 1995-1999												
Goochland County	43.6	NC	NC	32,520	1	97.0	36.6	3.0	22.1	59.9	62.5	38.3
Greene County	33.3	NC	NC	32,993	3	51.2	26.6	4.4	22.5	50.7	50.6	24.5
Hopewell city	81.0	NC	54.2%	22,528	1	0.0	58.5	4.9	58.7	40.5	40.4	10.9
King and Queen	NC	NC	NC	8,905	8	100.0	48.7	2.7	43.3	43.9	42.5	16.8
King William County	58.7	NC	NC	26,647	1	83.2	38.4	1.9	28.4	57.5	48.1	19.1
Madison County	NC	NC	NC	20,956	8	100.0	26.0	1.9	36.1	51.2	46.3	23.1
Nelson County	NC	NC	NC	21,147	3	100.0	31.1	3.9	40.0	49.0	49.7	29.0
New Kent County	37.4	NC	NC	32,515	1	100.0	34.4	2.9	23.1	63.7	57.6	24.6
Petersburg city	134.2	NC	1.8%	9,681	1	2.1	38.0	3.6	68.3	43.0	42.6	14.9
Powhatan County	58.3	NC	179.0%	49,459	1	99.7	29.5	3.1	18.6	60.4	59.2	28.0
Prince George County	32.3	NC	NC	45,397	1	53.4	57.3	3.9	27.3	52.5	52.1	18.5
Rappahannock	NC	NC	NC	11,877	1	100.0	20.1	5.4	10.3	67.8	60.0	32.0
Sussex County	NC	NC	NC	9,749	1	100.0	53.8	2.4	52.3	22.6	28.3	9.0
HAMPTON ROADS												
Places with statistically significant changes in SRC mortality after 1995-1999												
Chesapeake city	44.7	96.1%	67.5%*	297,211	1	7.6	55.6	4.7	31.2	69.6	63.9	29.4
Hampton city	58.7	222.8%	88.2%*	118,765	1	0.2	59.0	4.9	48.3	68.5	62.5	23.3
Newport News city	56.5	142.6%	81.7%*	171,413	1	0.0	63.0	7.7	45.8	65.4	60.7	24.1
Norfolk city	63.8	55.8%	56.3%*	235,393	1	0.0	62.6	6.8	51.3	66.9	59.7	25.6
Suffolk city	54.1	210.2%	74.8%	92,257	1	21.6	57.2	3.3	37.6	67.0	59.1	26.1
Virginia Beach city	44.3	83.5%	66.2%*	629,439	1	1.5	55.0	8.9	31.8	76.1	70.7	33.5
York County	37.3	151.3%	146.1%*	97,351	1	6.1	43.9	7.6	21.7	78.5	74.6	42.0
Places with changes in SRC mortality after 1995-1999 that were not statistically significant												
Gloucester County	56.5	123.7%	87.4%	64,894	1	64.6	26.2	2.0	25.1	61.7	57.6	22.9
Isle of Wight County	37.6	47.6%	35.4%	50,838	1	57.4	44.5	2.4	27.0	65.9	58.0	26.1
James City County	30.6	124.1%	53.3%	93,500	1	15.9	38.8	6.9	29.5	70.0	71.3	46.1
Portsmouth city	65.7	37.8%	28.6%	80,991	1	0.0	56.6	2.6	56.0	62.4	53.5	19.5
Places with inadequate data to measure changes in SRC mortality after 1995-1999												
Franklin city	NC	NC	NC	5,429	6	3.3	51.7	3.6	54.5	59.8	52.0	19.8
Mathews County	NC	NC	NC	12,665	1	100.0	24.0	2.2	38.4	57.7	56.4	29.0
Poquoson city	NC	NC	NC	21,565	1	6.5	13.4	4.3	20.5	72.2	67.7	35.8
Surry County	NC	NC	NC	7,102	8	100.0	52.1	1.2	43.2	51.6	48.1	18.8
Williamsburg city	NC	NC	NC	12,025	1	0.0	48.5	10.1	45.0	73.9	72.9	48.6
EASTERN												
Places with inadequate data to measure changes in SRC mortality after 1995-1999												
Accomack County	51.3	NC	19.5%	34,951	8	100.0	53.8	6.6	40.1	43.5	40.5	18.3
Essex County	NC	NC	NC	11,260	6	77.3	55.1	2.3	35.2	45.9	41.5	13.7
King George County	53.2	NC	NC	39,888	6	73.2	41.4	2.1	21.5	67.5	63.0	31.8

Table 10. (continued)

PLACE-BASED CHARACTERISTICS OF REGIONS, COUNTIES, AND CITIES IN VIRGINIA

LOCATIONS	HOUSEHOLD ECONOMIC CONDITIONS						HOUSING					
	MEDIAN HOUSEHOLD INCOME (\$)	POVERTY RATES			INEQUALITY		UN-EMPLOYMENT	HOUSING DISREPAIR	OVER-CROWDING	PRE-1950 HOUSING	HOUSING COST BURDEN	
		ALL AGES	CHILDREN	AGES 18-64	GINI INDEX	RENTING					OWNER-SHIP	
CENTRAL												
Places with inadequate data to measure changes in SRC mortality after 1995-1999												
Goochland County	\$86,610	6.2	10.4	5.5	0.5	4.7	11.9	0.8	7.5	59.6	23.1	
Greene County	\$61,762	11.3	13.8	11.4	0.4	4.4	11.0	1.2	7.0	52.2	27.6	
Hopewell city	\$40,122	17.7	31.3	16.4	0.4	8.7	19.6	2.1	15.4	55.6	26.5	
King and Queen County	\$46,331	11.3	22.9	8.1	0.4	5.8	13.0	2.2	18.1	45.9	20.0	
King William County	\$64,305	11.7	13.4	9.4	0.4	5.2	13.7	1.4	13.2	62.8	27.6	
Madison County	\$52,513	13.8	18.3	13.2	0.4	4.0	13.7	1.3	22.5	69.4	26.1	
Nelson County	\$48,076	14.1	21.5	15.7	0.5	4.8	12.6	1.5	13.4	55.6	25.5	
New Kent County	\$72,406	5.4	9.7	4.8	0.4	4.5	11.7	1.4	6.3	46.7	24.9	
Petersburg city	\$32,749	27.5	37.5	24.3	0.4	10.6	17.7	1.6	24.0	64.9	28.2	
Powhatan County	\$75,539	5.4	9.1	6.0	0.4	4.5	10.7	0.3	5.9	49.7	26.3	
Prince George County	\$61,792	10.1	13.0	10.3	0.4	6.2	9.1	1.0	4.1	56.6	20.4	
Rappahannock County	\$62,800	10.7	16.6	11.1	0.5	4.7	14.2	1.1	32.2	51.8	25.4	
Sussex County	\$37,748	22.5	30.5	25.4	0.4	7.4	9.8	2.6	19.9	64.5	21.0	
HAMPTON ROADS												
Places with statistically significant changes in SRC mortality after 1995-1999												
Chesapeake city	\$66,625	9.1	14.0	8.0	0.40	5.3	17.1	1.7	4.9	54.7	33.1	
Hampton city	\$47,615	15.5	21.6	13.6	0.42	6.7	23.2	5.9	13.5	62.2	30.7	
Newport News city	\$48,440	15.2	25.8	13.4	0.43	6.2	17.4	2.3	10.7	52.6	29.3	
Norfolk city	\$42,567	20.5	31.7	18.6	0.47	6.4	23.9	2.5	27.5	60.0	36.4	
Suffolk city	\$60,735	11.1	20.2	8.9	0.42	5.8	16.7	1.7	13.2	57.8	32.6	
Virginia Beach city	\$67,676	8.3	12.4	7.2	0.41	4.9	16.5	1.2	2.8	55.5	33.4	
York County	\$81,169	6.2	7.0	6.1	0.39	5.0	12.0	0.8	2.8	51.5	24.9	
Places with changes in SRC mortality after 1995-1999 that were not statistically significant												
Gloucester County	\$58,900	8.6	15.2	8.2	0.39	4.8	12.8	0.4	11.8	48.6	30.9	
Isle of Wight County	\$64,350	11.3	13.7	10.2	0.42	5.3	13.2	0.8	10.1	56.7	27.4	
James City County	\$75,926	8.5	11.5	9.6	0.43	5.0	13.5	0.9	2.5	60.7	24.2	
Portsmouth city	\$43,045	18.2	28.3	15.4	0.42	7.1	21.3	2.2	25.1	59.4	36.8	
Places with inadequate data to measure changes in SRC mortality after 1995-1999												
Franklin city	\$38,583	25.8	34.7	24.4	0.5	7.9	27.1	0.5	18.6	70.5	35.8	
Mathews County	\$58,268	9.1	18.0	5.7	0.4	4.6	10.1	0.7	30.2	63.4	18.7	
Poquoson city	\$84,213	6.2	6.9	6.0	0.4	4.5	10.2	0.3	13.6	47.5	23.6	
Surry County	\$48,707	11.4	20.1	11.1	0.4	6.1	10.3	1.7	21.0	62.4	19.8	
Williamsburg city	\$46,954	20.5	24.4	24.9	0.5	7.1	15.9	1.1	15.0	61.5	29.9	
EASTERN												
Places with inadequate data to measure changes in SRC mortality after 1995-1999												
Accomack County	\$38,390	20.5	30.9	19.0	0.5	6.5	18.4	1.7	20.0	53.6	23.3	
Essex County	\$48,277	12.4	24.6	13.1	0.4	6.4	14.3	0.8	13.1	58.8	26.0	
King George County	\$76,206	5.8	10.5	4.9	0.4	5.3	10.3	1.5	9.7	40.9	23.5	

Table 10. (continued)

PLACE-BASED CHARACTERISTICS OF REGIONS, COUNTIES, AND CITIES IN VIRGINIA

LOCATIONS	TRANSPORTATION				ENVIRONMENT		HEALTH CARE					
	NO VEHICLE	COMMUTING			OZONE DAYS	VIOLENT CRIME	HEALTH INSURANCE COVERAGE			POPULATION TO PROVIDE RATIO		
		MOTOR VEHICLE	WALK/BIKE	PUBLIC TRANSIT			UN-INSURED	PRIVATE (ONLY)	PUBLIC (ONLY)	PRIMARY CARE SHORTAGE	DENTIST SHORTAGE	MENTAL HEALTH SHORTAGE
CENTRAL												
Places with inadequate data to measure changes in SRC mortality after 1995-1999												
Goochland County	0.4	92.8	0.4	0.4	3	0.1	6.6	65.5	10.0	1201.0	3134.0	1371.0
Greene County	2.6	95.1	0.7	0.4	1	0.2	12.8	57.1	13.9	6268.0	6344.0	3172.0
Hopewell city	3.8	96.5	1.3	0.9	3	0.6	16.1	44.5	23.1	2216.0	2220.0	965.0
King and Queen County	1.4	92.1	0.0	0.1	4	0.1	18.2	49.7	15.2	2377.0		
King William County	0.2	91.5	0.9	0.2	4	0.1	9.9	64.5	11.7	1789.0	2312.0	4047.0
Madison County	1.9	91.7	1.0	0.5	2	0.1	14.3	52.6	14.3	1886.0	3289.0	4386.0
Nelson County	1.0	90.6	1.4	0.7	0	0.1	12.6	50.9	13.2	1643.0	1856.0	1350.0
New Kent County	0.4	93.2	0.3	0.4	4	0.1	7.0	71.3	6.8	3251.0	6674.0	1054.0
Petersburg city	5.0	93.4	2.5	2.1	3	0.6	19.5	36.2	26.0	1205.0	1308.0	409.0
Powhatan County	0.7	93.2	0.4	0.5	1	0.1	8.0	66.4	7.8	1662.0	2188.0	2845.0
Prince George County	0.8	90.9	1.3	3.4	4	0.1	9.4	62.9	9.2	6209.0	4667.0	889.0
Rappahannock County	3.4	81.4	3.4	2.2	1	0.1	14.2	52.8	12.0	2493.0	3681.0	1472.0
Sussex County	1.2	93.7	0.7	0.5	2	0.2	9.3	42.6	27.3	3937.0	5884.0	5884.0
HAMPTON ROADS												
Places with statistically significant changes in SRC mortality after 1995-1999												
Chesapeake city	2.0	94.6	1.8	0.7	3	0.4	9.4	61.5	11.2	1220.0	2288.0	1357.0
Hampton city	3.9	91.7	2.5	3.2	2	0.3	13.1	52.0	15.5	2531.0	1045.0	503.0
Newport News city	3.5	89.4	4.4	3.8	3	0.5	14.2	54.3	15.3	1597.0	1271.0	1011.0
Norfolk city	5.4	82.0	7.1	3.9	3	0.6	16.8	49.4	17.8	1052.0	1320.0	669.0
Suffolk city	2.0	95.4	1.5	0.5	2	0.3	10.2	56.8	14.6	1072.0	2553.0	2067.0
Virginia Beach city	1.6	91.4	3.1	0.9	7	0.2	10.5	63.3	8.5	1315.0	1401.0	776.0
York County	1.5	92.7	2.9	0.3	3	0.1	7.0	66.7	5.7	960.0	2073.0	1843.0
Places with statistically significant changes in SRC mortality after 1995-1999												
Gloucester County	1.3	96.0	1.0	0.3	3	0.1	12.4	58.0	9.1	1674.0	3095.0	844.0
Isle of Wight County	0.7	96.6	0.8	0.0	1	0.1	10.0	57.1	11.7	1877.0	5144.0	6001.0
James City County	1.8	92.4	1.5	0.7	3	0.1	7.9	58.8	10.1	705.0	955.0	454.0
Portsmouth city	4.9	91.2	3.7	2.1	3	0.6	13.4	47.8	21.6	2138.0	990.0	545.0
Places with inadequate data to measure changes in SRC mortality after 1995-1999												
Franklin city	6.8	92.8	4.5	0.0	1	0.4	16.3	36.3	27.8	785.0	1705.0	1066.0
Mathews County	2.1	90.9	2.1	0.2	7	0.1	8.1	53.3	14.1	2966.0	4418.0	4418.0
Poquoson city	1.0	94.5	0.5	0.0	3	0.1	6.9	63.9	8.2	1729.0	1721.0	2410.0
Surry County	2.3	96.0	1.1	0.3	1	0.3	15.7	49.7	16.1	6765.0		1698.0
Williamsburg city	4.3	72.1	17.5	4.5	2	0.2	7.8	66.9	9.0	15206.0		2099.0
EASTERN												
Places with inadequate data to measure changes in SRC mortality after 1995-1999												
Accomack County	3.4	91.9	4.5	0.6	15	0.2	17.7	43.9	18.5	2550.0	2540.0	1572.0
Essex County	1.2	90.0	4.6	0.2	4	0.2	14.7	51.0	16.9	3743.0	1388.0	5552.0
King George County	1.8	95.3	1.1	1.1	8	0.1	8.0	68.1	7.9	4985.0	2114.0	2819.0

Table 10. (continued)

PLACE-BASED CHARACTERISTICS OF REGIONS, COUNTIES, AND CITIES IN VIRGINIA

LOCATIONS	SRC MORTALITY			GEOGRAPHY			DEMOGRAPHICS			EDUCATIONAL ATTAINMENT		
	CHANGE (%) IN SRC MORTALITY			SIZE OF POP.	RUCC	RURALITY	DIVERSITY INDEX	FOREIGN BORN	SINGLE PARENTS	HIGH SCHOOL OR MORE	SOME COLLEGE+	BACH+
	SRC MORTALITY (2010-2014)	FROM 1995-99 TO 2010-14	FROM 2000-04 TO 2010-14									

EASTERN

Places with inadequate data to measure changes in SRC mortality after 1995-1999

Lancaster County	NC	NC	NC	9,715	9	100.0	44.2	2.0	53.5	53.7	56.8	28.7
Middlesex County	NC	NC	NC	13,507	8	100.0	35.0	2.6	28.7	59.5	59.8	28.3
Northampton County	NC	NC	NC	10,702	8	100.0	56.5	6.8	46.2	40.6	44.3	20.4
Northumberland County	NC	NC	NC	11,034	9	100.0	42.2	2.9	38.8	52.1	54.1	23.6
Richmond County	NC	NC	NC	11,047	9	100.0	54.0	6.6	45.8	34.4	35.0	12.9
Westmoreland County	NC	NC	NC	19,358	6	78.8	50.7	3.6	32.8	44.4	41.1	16.5

LOCATIONS	HOUSEHOLD ECONOMIC CONDITIONS						HOUSING					
	MEDIAN HOUSEHOLD INCOME (\$)	POVERTY RATES			INEQUALITY		UN-EMPLOYMENT	HOUSING DISREPAIR	OVER-CROWDING	PRE-1950 HOUSING	HOUSING COST BURDEN	
		ALL AGES	CHILDREN	AGES 18-64	GINI INDEX	RENTING					OWNER-SHIP	

EASTERN

Places with inadequate data to measure changes in SRC mortality after 1995-1999

Lancaster County	\$45,827	10.9	26.4	10.2	0.4	7.6	13.9	0.7	20.5	61.4	26.7
Middlesex County	\$48,921	9.8	26.0	10.0	0.4	5.1	11.3	0.9	15.7	52.6	24.9
Northampton County	\$36,822	23.8	33.4	21.7	0.5	7.4	18.1	0.9	30.6	57.3	30.0
Northumberland County	\$51,422	12.2	30.4	14.0	0.4	7.1	14.4	1.6	15.1	73.4	29.0
Richmond County	\$42,204	12.9	23.9	10.1	0.5	5.5	10.7	0.4	21.4	55.6	22.8
Westmoreland County	\$48,232	12.7	27.5	13.4	0.4	6.3	14.9	1.0	15.0	56.8	27.3

	TRANSPORTATION				ENVIRONMENT		HEALTH CARE					
	NO VEHICLE	COMMUTING			OZONE DAYS	VIOLENT CRIME	HEALTH INSURANCE COVERAGE			POPULATION TO PROVIDE RATIO		
		MOTOR VEHICLE	WALK/BIKE	PUBLIC TRANSIT			UN-INSURED	PRIVATE (ONLY)	PUBLIC (ONLY)	PRIMARY CARE SHORTAGE	DENTIST SHORTAGE	MENTAL HEALTH SHORTAGE

EASTERN

Places with inadequate data to measure changes in SRC mortality after 1995-1999

Lancaster	2.1	91.1	1.2	0.9	7	0.1	11.0	45.4	14.2	1593.0	11044.0	1104.0
Mid-	4.0	88.0	2.7	0.9	7	0.1	8.6	50.9	11.2	2691.0	2139.0	2674.0
	4.3	87.3	4.6	1.0	15	0.1	23.3	35.5	19.2	808.0	932.0	1212.0
Northum-	1.6	87.2	1.8	1.4	13	0.1	14.2	44.7	12.9	718.0	942.0	12251.0
Rich-	1.5	89.7	1.7	1.8	5	0.1	9.9	49.0	19.1		1780.0	742.0
Westmo-	3.3	87.9	5.1	1.1	11	0.1	18.5	44.0	16.6	8806.0	8739.0	17477.0

* p < 0.05. All increases reported for the period between 1995-99 and 2010-2014 were also statistically significant (p < 0.05). See Table 4 for definitions of place-based indicators.
 NC= not calculable RUCC= Rural-Urban Continuum Codes SRC mortality= age-adjusted deaths per 100,000 from stress-related conditions (combined deaths from drug overdoses, alcohol poisoning, alcoholic liver disease, and suicides)

2013 Rural-Urban Continuum Codes

*Metropolitan Counties**

- 1 Counties in metro areas of 1 million population or more
- 2 Counties in metro areas of 250,000 to 1 million population
- 3 Counties in metro areas of fewer than 250,000 population

Nonmetropolitan Counties

- 4 Urban population of 20,000 or more, adjacent to a metro area
- 5 Urban population of 20,000 or more, not adjacent to a metro area
- 6 Urban population of 2,500 to 19,999, adjacent to a metro area
- 7 Urban population of 2,500 to 19,999, not adjacent to a metro area
- 8 Completely rural or less than 2,500 urban population, adjacent to a metro area
- 9 Completely rural or less than 2,500 urban population, not adjacent to a metro area

Characteristics of interest included not only the rurality of the localities and the demographic characteristics of their populations but also the socioeconomic status and physical and social environment. Of special interest was identifying the features that differentiated localities with the largest relative increases in SRC mortality from those with more modest increases. We then examined how strongly these factors correlated with the relative change in SRC mortality rates between 1995-1999 and 2010-2014.

As shown by the Pearson correlation coefficients in Table 11, the largest changes in SRC mortality among whites ages 25-54 years occurred in more rural and less populated areas; in places with less diversity and fewer foreign-born residents; and where populations had less educational attainment, lower household incomes, greater income inequality, more child poverty, older housing stock, more people without health insurance, and greater shortages of health care professionals. Three regional factors had the highest correlation coefficients (absolute values exceeding 0.70): rurality, the percentage of adults without a high school diploma or some college education, and shortages of mental health professionals. Among localities with significant increases in SRC mortality, the unemployment rate had the highest correlation with the degree of increase.

**Table 11 .
CORRELATIONS BETWEEN PLACE-BASED CHARACTERISTICS AND RELATIVE (%) INCREASE IN MORTALITY FROM STRESS-RELATED CONDITIONS (SRC) BETWEEN 1995-1999 AND 2010-2014**

	CORRELATION COEFFICIENTS		
	BY REGION	BY LOCALITY	
		Localities with statistically significant changes (only) in SRC mortality between 1995-99 and 2010-14	Localities with any changes (significant or otherwise) in SRC mortality between 1995-99 and 2010-14
MORTALITY			
Relative increase in SRC mortality between 1995-99 and 2010-14	1.00	1.00	1.00
Relative increase in SRC mortality between 2000-04 and 2010-14	0.01	0.18	0.44
SRC mortality (deaths per 100,000), 2010-2014	0.63	0.48	0.61
DEMOGRAPHIC CHARACTERISTICS			
Size of population	-0.77	-0.49	-0.09
Rurality	0.81	0.39	0.16
Diversity index	-0.44	-0.43	-0.34
Foreign-born population	-0.61	-0.39	-0.33
Single-parent households	0.19	-0.04	0.01

Table 11 . (continued)

CORRELATIONS BETWEEN PLACE-BASED CHARACTERISTICS AND RELATIVE (%) INCREASE IN MORTALITY FROM STRESS-RELATED CONDITIONS (SRC) BETWEEN 1995-1999 AND 2010-2014

	CORRELATION COEFFICIENTS		
	BY REGION	BY LOCALITY	
		Localities with statistically significant changes (only) in SRC mortality between 1995-99 and 2010-14	Localities with any changes (significant or otherwise) in SRC mortality between 1995-99 and 2010-14
EDUCATIONAL ATTAINMENT			
High school education or more	0.81	0.46	0.31
Some college or more	0.73	0.49	0.34
Bachelor's degree or more	0.69	0.47	0.43
INCOME, INEQUALITY, AND EMPLOYMENT			
Median household income	-0.62	-0.33	-0.20
Poverty			
<i>All ages</i>	0.46	0.31	-0.03
<i>Children</i>	0.60	0.22	0.11
<i>Ages 18-64</i>	0.43	0.32	-0.07
Income inequality (Gini index)	0.68	0.09	-0.09
Unemployment	0.60	0.55	0.44
HOUSING			
Housing disrepair	-0.35	-0.15	-0.21
Overcrowding	-0.63	0.02	-0.01
Pre-1950 housing	0.68	0.09	-0.17
Housing cost burden			
<i>Renting</i>	0.44	0.55	0.31
<i>Ownership</i>	-0.31	-0.41	-0.15
TRANSPORTATION			
No vehicle	-0.56	-0.17	-0.30
Commuting			
<i>By motor vehicle</i>	0.52	0.42	0.52
<i>By walking/cycling</i>	0.07	-0.08	-0.37
<i>By public transit</i>	-0.60	-0.34	-0.41

Table 11 . (continued)

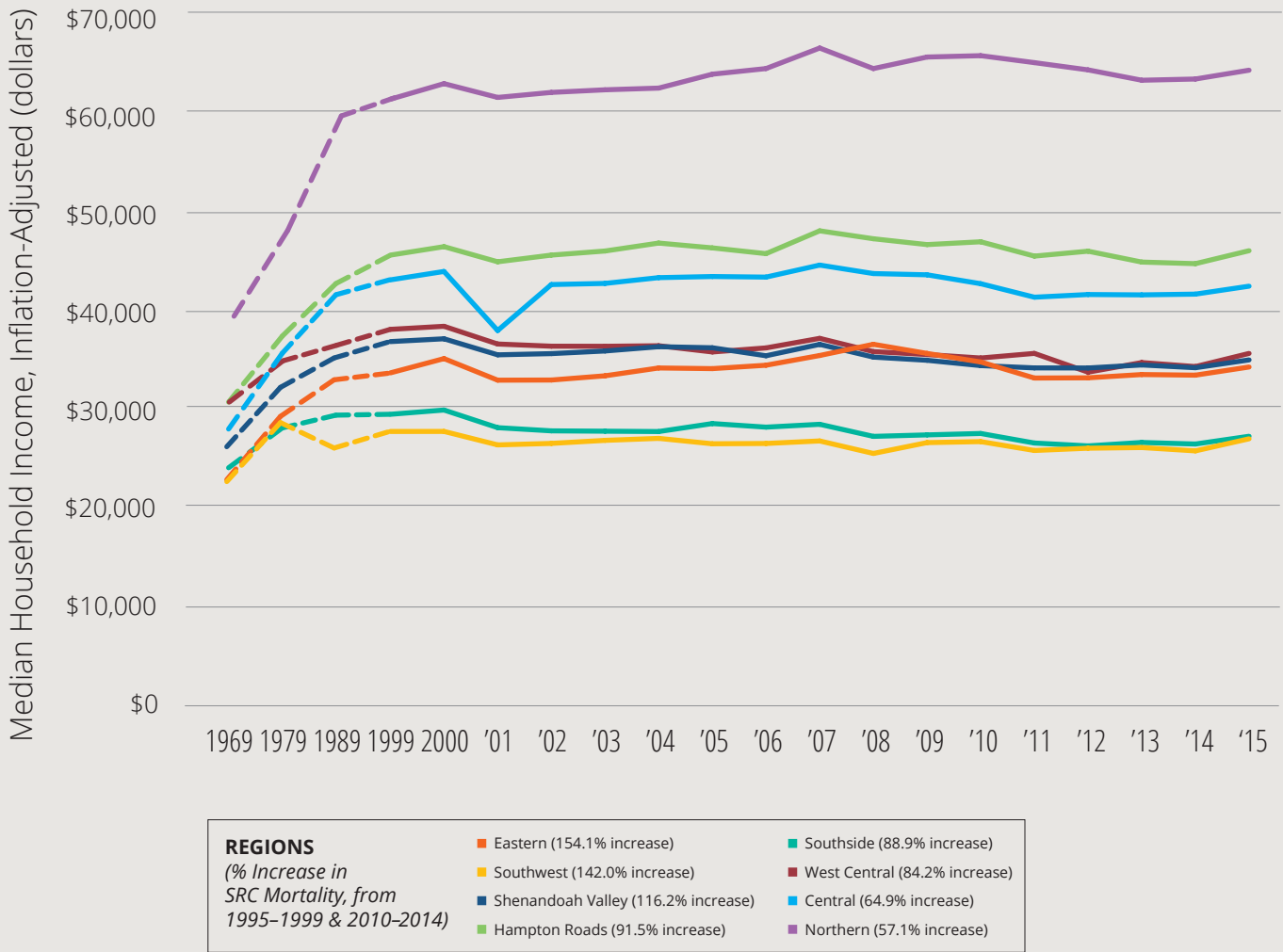
CORRELATIONS BETWEEN PLACE-BASED CHARACTERISTICS AND RELATIVE (%) INCREASE IN MORTALITY FROM STRESS-RELATED CONDITIONS (SRC) BETWEEN 1995-1999 AND 2010-2014

	CORRELATION COEFFICIENTS		
	BY REGION	BY LOCALITY	
		Localities with statistically significant changes (only) in SRC mortality between 1995-99 and 2010-14	Localities with any changes (significant or otherwise) in SRC mortality between 1995-99 and 2010-14
ENVIRONMENT			
Ozone days	0.41	-0.40	-0.15
Violent crime	-0.39	-0.32	-0.17
ACCESS TO HEALTH CARE			
Health insurance			
<i>Uninsured</i>	0.68	0.00	-0.05
<i>Private (only)</i>	-0.69	-0.36	-0.28
<i>Public (only)</i>	0.56	0.41	0.33
Shortages (pop.-to-provider ratio)			
<i>Primary care</i>	0.58	0.12	0.01
<i>Dentist</i>	0.62	0.37	0.08
<i>Mental health</i>	0.71	0.00	0.02

Notes: Values in table represent Pearson correlation coefficients.

We examined how socioeconomic conditions in the impacted regions changed over recent decades. Regions of Virginia with the largest relative increases in SRC mortality among NH whites ages 25-54 years had low median household incomes spanning a period of decades (Figure 1) and, as shown in the issue brief, had consistently higher poverty rates.

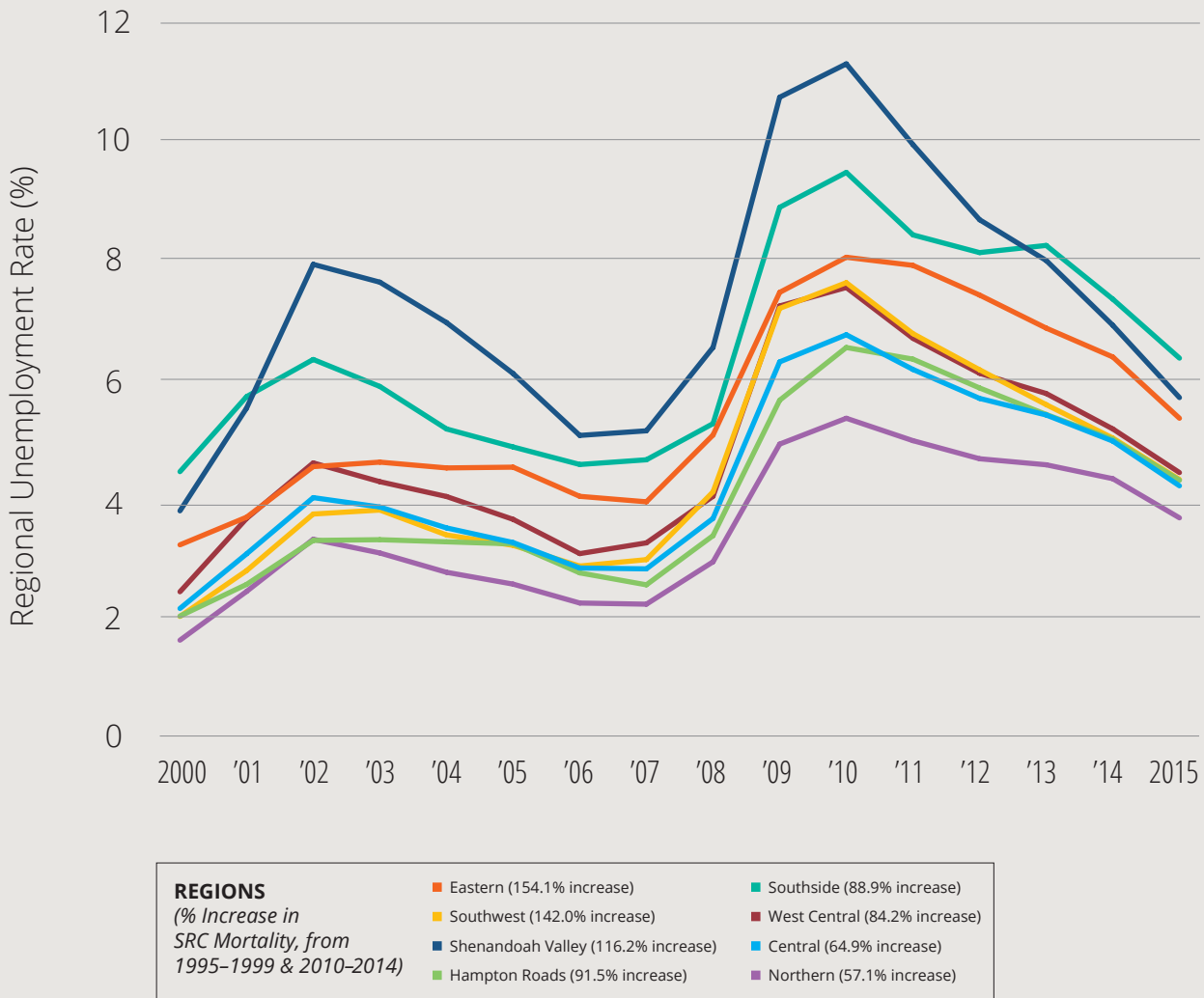
Figure 1. Regional Household Income in Virginia, 1969-2015



Source: U.S. Census Bureau, Small Area Income and Poverty Estimates (SAIPE) Program, 1999-2015 (<https://www.census.gov/did/www/saipe/data/statecounty/data/index.html>); U.S. Census Bureau, Historical Income Tables, Counties, Table C4 (<https://www.census.gov/data/tables/time-series/dec/historical-income-counties.html>)

Unemployment rates in Virginia increased sharply after the 2007 recession, but recovery was slower among many of the regions that experienced the largest relative increases in SRC mortality (Figure 2).

Figure 2. Regional Unemployment in Virginia, 2000-2015



Source: U.S. Bureau of Labor Statistics. Local Area Unemployment Statistics (LAUS), Labor force data by county, 2000-2015 annual averages.

ACKNOWLEDGMENTS

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REFERENCES

- ¹ Centers for Disease Control and Prevention, NCHS Data Release and Access Policy for Micro-data and Compressed Vital Statistics Files. https://www.cdc.gov/nchs/nvss/dvs_data_release.htm
- ² National Cancer Institute. Surveillance, Epidemiology, and End Results Program. US Population Data. <https://seer.cancer.gov/popdata/popdic.html>
- ³ Rothman KJ. *Modern Epidemiology*. Boston, MA: Little, Brown and Company; 1986.
- ⁴ Fay MP, Feuer EJ. Confidence intervals for directly standardized rates: A method based on the gamma distribution. *Statistics in Medicine*. 1997;16:791-801.
- ⁵ Virginia Department of Planning and Budget. Virginia's Eight Regions. Virginia Performs. Accessed 2-13-18 at <http://vaperforms.virginia.gov/Regions/regionsMap.php>
- ⁶ U.S. Census Bureau, Small Area Income and Poverty Estimates (SAIPE) Program, 1999-2015 (<https://www.census.gov/did/www/saipe/data/statecounty/data/index.html>)
- ⁷ U.S. Census Bureau, Historical Income Tables, Counties, Table C4 (<https://www.census.gov/data/tables/time-series/dec/historical-income-counties.html>)
- ⁸ U.S. Bureau of Labor Statistics. Local Area Unemployment Statistics (LAUS), Labor force data by county, 2000-2015 annual averages.