SUPPLEMENTAL MATERIAL

Health and Voting in Rural America

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Table A1: County-Level Variable Definitions and Data Sources

Level	Variable	Measurement	Source	Year
County	% of Voter Turnout in 2016 of Citizen Voting Age Population	Total number votes cast in a county in 2016 divided by the estimated citizen voting age population, multiplied by 100.	Calculated from MIT's 2016 Votes Cast in 2016 General Election and US Census CVAP 2012-2016 estimates from the American Community Survey Data	2016, 2012-2016 estimates
County	Average Physically Unhealthy Days/Month Per Person	Poor Physical Health Days measures the average number of physically unhealthy days reported in past 30 days. This measure is based on responses to the Behavioral Risk Factor Surveillance System (BRFSS) question: "Thinking about your physical health, which includes physical illness and injury, for how many days during the past 30 days was your physical health not good?" See the County Health Rankings for more information.	Appalachian Regional Commission's 2017 "Health Disparities" Dataset using Robert Wood Johnson Foundation and the University of Wisconsin Population Health Institute's County Health Rankings, 2016 edition; Behavioral Risk Factor Surveillance System	2014
County	Median Age	Median Age of the County (all), see US Census for additional information	US Census Median Age 2012-2016 estimates from the American Community Survey Data	2012-216 estimates
County	% of High School Graduates or Less	Percent of adults with less than a high school diploma added to the percent of adults with a high school diploma only.	USDA ERS Educational Attainment 2014-2018 County Data	2014-2018 estimates

County	% of White Citizen Voting Age Population	Total number of white voting age citizens in a county divided by the population, multiplied by 100.	US Census Race CVAP 2012-2016 estimates from the American Community Survey Data	2012-216 estimates
County	Percent Households with Income Below Poverty	Percent Households with Income Below Poverty, See US Census for additional detail.	Appalachian Regional Commission's 2017 "Health Disparities" Dataset using RUS Census Bureau's Small Area Income and Poverty Estimates based on 2014 Poverty and Median Household Income Estimates - Counties, States, and National; Source: U.S. Census Bureau, Small Area Income and Poverty Estimates (SAIPE) Program, Release date: December 2015	2014
County	Religious Adherents per 1,000	For all denominations/groups the rates of reported adherence per 1,000 population.	Association of Religious Data Archives, 2010 Census County Data	2010
County	Social Associations per 10,000 Population (rate)	Social Associations measures the number of membership associations per 10,000 population. Rates measure the number of events in a given time period (generally one or more years) divided by the average number of people at risk during that period. See the County Health Rankings for more information.	Appalachian Regional Commission's 2017 "Health Disparities" Dataset using Robert Wood Johnson Foundation and the University of Wisconsin Population Health Institute's County Health Rankings, 2016 edition; County Business Patterns	2013
County	% Difference in 2012 Election	Total number votes cast in a county in 2016 divided by the estimated citizen voting age population, multiplied by 100. Then the difference in % taken for Obama and Romney and included as an absolute value.	MIT's 2012 Votes Cast in 2012 General Election and US Census CVAP 2012-2016 estimates from the American Community Survey Data	2012, 2012-2016 estimates
County	Rurality	See explanation in paper.	Center for Disease Control's National Center for Health Services 2013 Rural Codes.	

State	Cost of Voting Index for 2016	See explanation in paper.	Li et al. 2018	
County	Years Potential Life Lost per 100,000	Rates measure the number of events (i.e., deaths, births, etc.) in a given time period (generally one or more years) divided by the average number of people at risk during that period. All the years of potential life lost in a county during a three-year period are summed and divided by the total population of the county during that same time period. This value is then multiplied by 100,000 to calculate the years of potential life lost under age 75 per 100,000 people. See the County Health Rankings for more information.	Appalachian Regional Commission's 2017 "Health Disparities" Dataset using Robert Wood Johnson Foundation and the University of Wisconsin Population Health Institute's County Health Rankings, 2016 edition; National Center for Health Statistics – Mortality Files	2011-2013
County	Median Household Income	Median Household Income is the income where half of households in a county earn more and half of households earn less, income is defined as "total income." See US Census for more information.	Appalachian Regional Commission's 2017 "Health Disparities" Dataset using US Census Bureau's American Community Survey; United States Census Bureau." Summary File."2010 – 2014 American Community Survey. U.S. Census Bureau's American Community Survey Office, 2015. Web. 13 January 2016.	2010-2014
County	Percent Adults With At Least Some College	Some College is the percentage of the population ages 25-44 with some post-secondary education. It includes individuals who pursued education following high school but did not receive a degree as well as those who attained degrees. See the County Health Rankings for more information.	Appalachian Regional Commission's 2017 "Health Disparities" Dataset using Robert Wood Johnson Foundation and the University of Wisconsin Population Health Institute's County Health Rankings, 2016 edition; American Community Survey	2010-2014

Table A.2: Individual-Level Survey Questions and Response Options

Healthy Appalachia Study Survey Questions			
Question	**Responses**	**Values**	**Existing Source**
In your community, how often do you vote in elections:	Hardly Ever	=1	
	Sometimes	=2	
	Often	=3	
	Always	=4	
How would you rate your overall physical health?	Excellent	=5	RWJF "American Health Values Survey"
	Very Good	=4	
	Good	=3	
	Fair	=2	
	Poor	=1	
Your age (in years):	18 to 24	=1	RWJF "American Health Values Survey"
	25 to 34	=2	
	35 to 44	=3	
	45 to 54	=4	
	55 to 64	=5	
	65+	=6	
Your gender:	Woman	=1	
	Man	=0	
	I prefer not to answer.	=.	
What is the highest level of schooling you have completed?	No schooling, less than grade school	=1	RWJF "American Health Values Survey"
	Grade/Elementary School (grades 1-8)	=1	
	High School or GED Graduate	=1	
	2-year College or Technical School Graduate	=0	
	4-year College Graduate	=0	
	Post-Graduate Degree	=0	
What would you say is your yearly household income?	Less than $15,000	=1	RWJF "American Health Values Survey"
	$15,000 to $30,000	=2	
	$30,00 to $50,000	=3	
	$50,000 to $100,000	=4	
	$100,000 to $125,000	=5	
	$125,000 to $150,000	=not in data*	
	More than $150,000	=6	
In your community, how often do you attend church or other religious ceremonies:	Hardly Ever	=1	
	Sometimes	=2	
	Often	=3	
	Always	=4	
In your community, how often do you volunteer:	Hardly Ever	=1	
	Sometimes	=2	
	Often	=3	
	Always	=4	
In your community, how often do you attend activities:	Hardly Ever	=1	
	Sometimes	=2	
	Often	=3	
	Always	=4	
In your community, how often do you go to sporting events:	Hardly Ever	=1	
	Sometimes	=2	
	Often	=3	
	Always	=4	
In your community, how often do you play sports:	Hardly Ever	=1	
	Sometimes	=2	
	Often	=3	
	Always	=4	

*Note: None of the respondents selected this income category, so it was not included as part of the coding scale.

Table A3: County-Level Analyses Robustness with Social Associations
OLS Regression Models

% Voter Participation of Citizen Voting Age Population (CVAP) in 2016 Presidential Election						
County-Level Measures	**Rural Only N=1,301 Model 1**	**Non-Rural N=1,778 Model 2**	**All Counties N=3,078 Model 3**	**Rural Only N=1,301 Model 4**	**Non-Rural N=1,778 Model 5**	**All Counties N=3,078 Model 6**
Average Phys. Unhealthy Days	-0.710	-1.631***	-4.926***	-1.027*	-1.809***	-5.229***
	(0.49)	(0.44)	(0.74)	(0.48)	(0.44)	(0.73)
Median Age (in county)	0.556***	0.695***	0.654***	0.569***	0.697***	0.648***
	(0.05)	(0.04)	(0.03)	(0.05)	(0.04)	(0.03)
% of HS Graduate or Less	-0.310***	-0.327***	-0.332***	-0.318***	-0.328***	-0.290***
	(0.03)	(0.02)	(0.02)	(0.03)	(0.02)	(0.02)
% of White CVAP	-0.050**	-0.023	-0.020*	-0.052***	-0.024	-0.027**
	(0.02)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)
% of Households in Poverty	-0.252***	-0.323***	-0.252***	-0.276***	-0.331***	-0.253***
	(0.07)	(0.05)	(0.04)	(0.06)	(0.05)	(0.04)
Social Associations	0.017	-0.001	0.023	0.003	-0.008	0.042
	(0.03)	(0.04)	(0.02)	(0.03)	(0.04)	(0.02)
% Difference in 2012 Election	0.015	-0.008	-0.005	0.019	-0.008	0.006
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Rurality Scale			-2.687***			-3.257***
			(0.52)			(0.52)
State-Level						
Cost of Voting Index for 2016	-1.977***	-1.540***		-8.467***	-5.435***	-1.806***
	(0.30)	(0.20)		(1.60)	(1.21)	(0.17)
Interaction						
Cost of Voting (X) Physical Unhealthy Days				1.905***	1.141***	
				(0.43)	(0.32)	
Interaction						
Rurality (X) Physical Unhealthy Days			0.686***			0.790***
			(0.14)			(0.14)
Constant	62.309***	60.349***	73.081***	63.580***	61.130***	73.616***
	(2.82)	(2.09)	(2.73)	(2.77)	(2.07)	(2.70)
R Squared	0.513	0.560	0.522	0.524	0.564	0.539
Degrees of Freedom	1291	1769	3069	1290	1768	3067
BIC	8603.9	11518.7	20203.4	8582.1	11512.9	20094.3

* $p<0.05$, ** $p<0.01$, *** $p<0.001$

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Table A4: Ordinal Logistic Regression Post-Estimation of Survey Results from Model 12

Variables and Set-Values		
Variable	**Value**	**Description**
Self-Rated Health	3.298	Mean
Age (Grouped)	2.113	Mean
Female	1	Binary
High School or Less Education	1	Binary
Household Income	2.077	Mean
Religious Participation/Attendance	2.961	Mean

For Females with a High School Education or Less				
Quantity of Interest	Mean	Std. Err.	[95% Conf.	Interval]
Pr(Vote in Election, Hardly Ever=1)	0.551	0.042	0.465	0.631
Pr(Vote in Election, Sometimes=1)	0.222	0.028	0.168	0.277
Pr(Vote in Election, Often=1)	0.087	0.018	0.053	0.125
Pr(Vote in Election, Always=1)	0.140	0.025	0.096	0.194
Quantity of Interest	Mean	Std. Err.	[95% Conf.	Interval]
dPr(Hardly Ever=1 | Poor Health)	0.118	0.055	0.003	0.220
dPr(Hardly Ever=1 | Fair Health)	0.060	0.029	0.001	0.118
dPr(Hardly Ever=1 | Good Health)	-0.002	0.001	-0.005	0.000
dPr(Hardly Ever=1 | Very Good Health)	-0.067	0.033	-0.134	-0.002
dPr(Hardly Ever=1 | Excellent Health)	-0.130	0.063	-0.252	-0.003
dPr(Sometimes=1 | Poor Health)	-0.044	0.025	-0.096	-0.001
dPr(Sometimes=1 | Fair Health)	-0.020	0.012	-0.046	0.000
dPr(Sometimes=1 | Good Health)	0.001	0.000	0.000	0.002
dPr(Sometimes=1 | Very Good Health)	0.016	0.009	0.000	0.035
dPr(Sometimes=1 | Excellent Health)	0.023	0.013	-0.002	0.050
dPr(Often=1 | Poor Health)	-0.025	0.013	-0.050	-0.001
dPr(Often=1 | Fair Health)	-0.013	0.007	-0.027	0.000
dPr(Often=1 | Good Health)	0.001	0.000	0.000	0.001
dPr(Often=1 | Very Good Health)	0.015	0.008	0.000	0.032
dPr(Often=1 | Excellent Health)	0.015	0.008	0.000	0.032
dPr(Always=1 | Poor Health)	-0.048	0.022	-0.089	-0.002
dPr(Always=1 | Fair Health)	-0.027	0.013	-0.052	-0.001
dPr(Always=1 | Good Health)	0.001	0.001	0.000	0.002
dPr(Always=1 | Very Good Health)	0.036	0.019	0.001	0.078
dPr(Always=1 | Excellent Health)	0.079	0.045	0.002	0.177

For Males with a High School Education or Less				
Quantity of Interest	Mean	Std. Err.	[95% Conf.	Interval]
Pr(Vote in Election, Hardly Ever=1)	0.563	0.053	0.459	0.661
Pr(Vote in Election, Sometimes=1)	0.218	0.028	0.165	0.276
Pr(Vote in Election, Often=1)	0.084	0.019	0.050	0.127

	Mean	Std. Err.	[95% Conf.	Interval]
Pr(Vote in Election, Always=1)	0.135	0.029	0.085	0.197

Quantity of Interest	Mean	Std. Err.	[95% Conf.	Interval]
dPr(Hardly Ever=1 | Poor Health)	0.119	0.052	0.014	0.219
dPr(Hardly Ever=1 | Fair Health)	0.061	0.028	0.007	0.118
dPr(Hardly Ever=1 | Good Health)	-0.003	0.001	-0.005	0.000
dPr(Hardly Ever=1 | Very Good Health)	-0.069	0.032	-0.135	-0.008
dPr(Hardly Ever=1 | Excellent Health)	-0.133	0.062	-0.258	-0.015
dPr(Sometimes=1 | Poor Health)	-0.046	0.025	-0.098	-0.005
dPr(Sometimes=1 | Fair Health)	-0.021	0.012	-0.047	-0.002
dPr(Sometimes=1 | Good Health)	0.001	0.000	0.000	0.002
dPr(Sometimes=1 | Very Good Health)	0.017	0.010	0.002	0.039
dPr(Sometimes=1 | Excellent Health)	0.026	0.015	-0.002	0.058
dPr(Often=1 | Poor Health)	-0.025	0.012	-0.049	-0.003
dPr(Often=1 | Fair Health)	-0.013	0.007	-0.027	-0.001
dPr(Often=1 | Good Health)	0.001	0.000	0.000	0.001
dPr(Often=1 | Very Good Health)	0.015	0.008	0.001	0.033
dPr(Often=1 | Excellent Health)	0.029	0.015	0.003	0.062
dPr(Always=1 | Poor Health)	-0.048	0.020	-0.086	-0.007
dPr(Always=1 | Fair Health)	-0.026	0.012	-0.050	-0.003
dPr(Always=1 | Good Health)	0.001	0.001	0.000	0.002
dPr(Always=1 | Very Good Health)	0.036	0.019	0.004	0.076
dPr(Always=1 | Excellent Health)	0.079	0.043	0.007	0.176

For Females with More than a High School Education				
Quantity of Interest	Mean	Std. Err.	[95% Conf.	Interval]
Pr(Vote in Election, Hardly Ever=1)	0.412	0.054	0.309	0.520
Pr(Vote in Election, Sometimes=1)	0.246	0.030	0.183	0.303
Pr(Vote in Election, Often=1)	0.117	0.024	0.070	0.162
Pr(Vote in Election, Always=1)	0.225	0.043	0.147	0.318

Quantity of Interest	Mean	Std. Err.	[95% Conf.	Interval]
dPr(Hardly Ever=1 | Poor Health)	0.125	0.062	0.003	0.242
dPr(Hardly Ever=1 | Fair Health)	0.061	0.031	0.002	0.121
dPr(Hardly Ever=1 | Good Health)	-0.002	0.001	-0.005	0.000
dPr(Hardly Ever=1 | Very Good Health)	-0.063	0.030	-0.120	-0.002
dPr(Hardly Ever=1 | Excellent Health)	-0.116	0.054	-0.216	-0.003
dPr(Sometimes=1 | Poor Health)	-0.025	0.020	-0.071	0.003
dPr(Sometimes=1 | Fair Health)	-0.008	0.008	-0.029	0.004
dPr(Sometimes=1 | Good Health)	0.000	0.000	0.000	0.001
dPr(Sometimes=1 | Very Good Health)	-0.001	0.008	-0.018	0.013
dPr(Sometimes=1 | Excellent Health)	-0.010	0.018	-0.052	0.015
dPr(Often=1 | Poor Health)	-0.027	0.015	-0.057	-0.001

	Mean	Std. Err.	[95% Conf.	Interval]
dPr(Often=1 | Fair Health)	-0.013	0.008	-0.029	0.000
dPr(Often=1 | Good Health)	0.001	0.000	0.000	0.001
dPr(Often=1 | Very Good Health)	0.012	0.007	0.000	0.027
dPr(Often=1 | Excellent Health)	0.020	0.011	0.000	0.043
dPr(Always=1 | Poor Health)	-0.073	0.034	-0.136	-0.003
dPr(Always=1 | Fair Health)	-0.040	0.019	-0.077	-0.001
dPr(Always=1 | Good Health)	0.002	0.001	0.000	0.004
dPr(Always=1 | Very Good Health)	0.051	0.027	0.001	0.106
dPr(Always=1 | Excellent Health)	0.107	0.058	0.003	0.226

For Males with More than a High School Education				
Quantity of Interest	Mean	Std. Err.	[95% Conf.	Interval]
Pr(Vote in Election, Hardly Ever=1)	0.422	0.065	0.298	0.553
Pr(Vote in Election, Sometimes=1)	0.245	0.030	0.184	0.305
Pr(Vote in Election, Often=1)	0.116	0.026	0.067	0.169
Pr(Vote in Election, Always=1)	0.217	0.048	0.135	0.322
Quantity of Interest	Mean	Std. Err.	[95% Conf.	Interval]
dPr(Hardly Ever=1 | Poor Health)	0.124	0.060	0.000	0.236
dPr(Hardly Ever=1 | Fair Health)	0.061	0.030	0.000	0.118
dPr(Hardly Ever=1 | Good Health)	-0.002	0.001	-0.005	0.000
dPr(Hardly Ever=1 | Very Good Health)	-0.063	0.030	-0.122	0.000
dPr(Hardly Ever=1 | Excellent Health)	-0.118	0.055	-0.223	0.000
dPr(Sometimes=1 | Poor Health)	-0.026	0.022	-0.080	0.003
dPr(Sometimes=1 | Fair Health)	-0.010	0.010	-0.036	0.005
dPr(Sometimes=1 | Good Health)	0.000	0.000	0.000	0.001
dPr(Sometimes=1 | Very Good Health)	0.001	0.009	-0.019	0.020
dPr(Sometimes=1 | Excellent Health)	-0.007	0.019	-0.050	0.026
dPr(Often=1 | Poor Health)	-0.027	0.014	-0.057	0.000
dPr(Often=1 | Fair Health)	-0.013	0.007	-0.029	0.000
dPr(Often=1 | Good Health)	0.001	0.000	0.000	0.001
dPr(Often=1 | Very Good Health)	0.012	0.007	0.000	0.029
dPr(Often=1 | Excellent Health)	0.021	0.012	0.000	0.048
dPr(Always=1 | Poor Health)	-0.071	0.033	-0.134	0.000
dPr(Always=1 | Fair Health)	-0.038	0.019	-0.075	0.000
dPr(Always=1 | Good Health)	0.002	0.001	0.000	0.003
dPr(Always=1 | Very Good Health)	0.049	0.026	0.000	0.101
dPr(Always=1 | Excellent Health)	0.104	0.055	0.000	0.215

Table A5: Logistic Regression Post-Estimation of Survey Results from Model 13

Variables and Set-Values		
Variable	**Value**	**Description**
Self-Rated Health	3.298	Mean
Age (Grouped)	2.113	Mean
Female	1	Binary
High School or Less Education	1	Binary
Household Income	2.077	Mean
Religious Participation/Attendance	2.961	Mean

For Females with a High School Education or Less				
Quantity of Interest	Mean	Std. Err.	[95% Conf.	Interval]
Pr(Vote in Election=0)	0.543	0.044	0.459	0.631
Pr(Vote in Election=1)	0.457	0.044	0.369	0.541
Quantity of Interest	Mean	Std. Err.	[95% Conf.	Interval]
dPr(Vote in Election=1 | Poor Health)	-0.165	0.057	-0.268	-0.046
dPr(Vote in Election=1 | Fair Health)	-0.086	0.031	-0.144	-0.023
dPr(Vote in Election=1 | Good Health)	0.004	0.001	0.001	0.006
dPr(Vote in Election=1 | Very Good Health)	0.095	0.035	0.025	0.161
dPr(Vote in Election=1 | Excellent Health)	0.182	0.064	0.050	0.297

For Males with a High School Education or Less				
Quantity of Interest	Mean	Std. Err.	[95% Conf.	Interval]
Pr(Vote in Election=0)	0.601	0.056	0.487	0.710
Pr(Vote in Election=1)	0.399	0.056	0.290	0.513
Quantity of Interest	Mean	Std. Err.	[95% Conf.	Interval]
dPr(Vote in Election=1 | Poor Health)	-0.150	0.051	-0.239	-0.038
dPr(Vote in Election=1 | Fair Health)	-0.079	0.029	-0.132	-0.019
dPr(Vote in Election=1 | Good Health)	0.003	0.001	0.001	0.006
dPr(Vote in Election=1 | Very Good Health)	0.093	0.035	0.020	0.158
dPr(Vote in Election=1 | Excellent Health)	0.182	0.067	0.040	0.302

For Females with More than a High School Education				
Quantity of Interest	Mean	Std. Err.	[95% Conf.	Interval]
Pr(Vote in Election=0)	0.336	0.063	0.217	0.472
Pr(Vote in Election=1)	0.664	0.063	0.528	0.783
Quantity of Interest	Mean	Std. Err.	[95% Conf.	Interval]
dPr(Vote in Election=1 | Poor Health)	-0.172	0.067	-0.295	-0.038
dPr(Vote in Election=1 | Fair Health)	-0.082	0.032	-0.141	-0.018
dPr(Vote in Election=1 | Good Health)	0.003	0.001	0.001	0.005

dPr(Vote in Election=1 | Very Good Health)	0.077	0.028	0.019	0.128
dPr(Vote in Election=1 | Excellent Health)	0.137	0.046	0.037	0.222

For Males with More than a High School Education				
Quantity of Interest	Mean	Std. Err.	[95% Conf.	Interval]
Pr(Vote in Election=0)	0.392	0.076	0.254	0.546
Pr(Vote in Election=1)	0.608	0.076	0.454	0.746
Quantity of Interest	Mean	Std. Err.	[95% Conf.	Interval]
dPr(Vote in Election=1 | Poor Health)	-0.172	0.063	-0.287	-0.048
dPr(Vote in Election=1 | Fair Health)	-0.084	0.032	-0.142	-0.023
dPr(Vote in Election=1 | Good Health)	0.003	0.001	0.001	0.006
dPr(Vote in Election=1 | Very Good Health)	0.083	0.030	0.025	0.142
dPr(Vote in Election=1 | Excellent Health)	0.151	0.052	0.048	0.248