



Adult Literacy Proficiency and Public Health in Appalachia

**The Correlations Between
Low Literacy Proficiency
and Health Outcomes
in Appalachian Counties**

Appendices

October 6th, 2023

Appendix A

Respective Incidence, Prevalence, and Mortality Rates for the Appalachian Region and the 431 Appalachian Jurisdictions Contained within the Thirteen Appalachian States

Public Health Measure	National	Appalachia	AL	GA	KY	MD	MS	NY	NC	OH	PA	SC	TN	VA	WV
Adult Asthma Prevalence (2020)	9.2%	10.6%	10.1%	9.7%	12.0%	10.4%	10.1%	10.6%	9.4%	10.9%	10.3%	10.3%	10.8%	10.1%	11.7%
Adult Depression Prevalence (2020)	19.5%	25.2%	26.4%	21.5%	27.6%	21.7%	21.9%	21.8%	24.0%	26.0%	22.8%	23.2%	27.8%	22.8%	28.3%
Adult Diabetes Prevalence (2020)	9.7%	11.1%	11.8%	10.7%	12.3%	9.7%	12.7%	8.6%	9.6%	11.1%	9.5%	10.9%	11.6%	10.9%	12.1%
Adult Obesity Prevalence (2020)	32.0%	37.5%	39.3%	34.8%	40.6%	35.4%	41.0%	31.6%	33.2%	39.3%	34.8%	36.3%	37.2%	37.0%	39.9%
All Cancer Mortality (2021)	209.0	263.5	237.1	223.7	293.0	242.4	234.5	239.4	259.7	252.8	257.9	221.1	273.2	292.0	292.7
Breast Cancer Mortality (2021)	16.8	15.7	14.1	15.3	14.9*	14.1*	17.3*	14.4	16.8	16.9	19.5	15.8	17.3	14.7*	13.7
Cervical Cancer Mortality (2021)	1.5	◆	2.3*	1.4*	2.1*	1.2*	2.4*	1.2*	1.4*	1.4*	1.3*	2.1*	1.6*	1.2*	1.7
Chlamydia Incidence (2021)	495.5	304.8	474.5	300.1	240.4	*	664.1	254.3	286.2	242.5	220.9	588.7	308.9	251.3	231.3

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Public Health Measure	National	Appalachia	AL	GA	KY	MD	MS	NY	NC	OH	PA	SC	TN	VA	WV
Cocaine Overdose Deaths (2021)	7.7	2.6	4.9*	5.0*	5.7*	15.0*	3.4*	11.7*	13.6*	13.8*	12.2*	8.9*	9.2*	8.9*	9.1
Colorectal Cancer Mortality (2021)	21.8	26.3	18.5	22.1	29.8	27.6	34.0	22.3	26.7	33.7	27.1	27.4	25.4	24.9	31.0
COPD Prevalence (2020)	6.0%	8.9%	8.6%	7.3%	12.0%	7.0%	7.7%	6.9%	7.1%	9.8%	7.3%	7.3%	9.4%	8.1%	10.4%
Coronary Heart Disease Prevalence (2020)	4.0%	7.0%	6.9%	6.6%	8.0%	6.2%	7.1%	5.9%	6.4%	7.2%	6.3%	6.4%	7.1%	6.5%	7.6%
Current Adult Smokers (2020)	16.0%	23.2%	21.2%	19.8%	28.1%	19.0%	21.4%	18.6%	20.4%	26.8%	20.8%	19.9%	25.3%	21.9%	25.0%
Drug Overdose Deaths (2021)	32.4	44.5	26.2	34.1	64.5	47.0	18.6	24.0	43.8	47.3	39.1	40.0	51.1	40.1	90.9
Gonorrhea Incidence (2021)	214.0	120.0	233.8	125.6	79.2	*	394.6	84.0	111.3	76.3	50.2	283.0	125.5	78.1	64.1
HIV Incidence (2021)	12.7	4.2	11.5	8.1	10.3*	14.4*	13.8	2.8	4.1	2.3	2.4	10.0	3.8	0.7	3.5
HIV Prevalence (2021)	392.2	141.4	210.1	190.1	82.8	237.9	230.2	149.7	147.6	110.3	114.2	241.9	126.9	115.8	143.3

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Public Health Measure	National	Appalachia	AL	GA	KY	MD	MS	NY	NC	OH	PA	SC	TN	VA	WV
Lung Cancer Mortality (2021)	41.1	73.3	66.6	61.6	91.7	53.8	69.9	57.2	68.7	70.4	60.9	57.1	84.6	76.3	86.1
Meth Overdose Deaths (2021)	10.8	28.4	9.1	13.8	39.4	2.3*	11.6*	17.6	22.8	28.9	12.6	20.1	35.1	18.3	63.4
Opioid Overdose Deaths (2021)	21.4	44.0	18.8	22.1	64.5	54.6	14.6*	28.2	37.5	48.1	34.9	36.2	48.4	29.5	82.3
Ovarian Cancer Mortality (2021)	4.2	✦	4.5*	4.0*	3.6*	4.1*	4.7*	4.3*	4.1*	4.5*	4.5*	3.4*	4.5*	4.5*	4.8*
Pancreatic Cancer Mortality (2021)	15.3	18.5	18.0	14.9	15.8*	14.8*	16.1*	22.2	20.5	18.3	23.8	16.6	18.7	15.3*	19.8
Prostate Cancer Mortality (2021)	10.9	10.3	9.9	7.8	15.8*	14.8*	16.1*	15.6	11.9	9.2	14.5	12.8	11.0	15.3*	9.1
Stimulant Overdose Deaths (2021)	17.4	31.5	11.7	15.5	42.7	23.8	14.1*	19.9	25.9	33.6	18.6	24.6	37.2	20.3	69.4
Syphilis Incidence (2021)	16.2	8.2	11.1	5.2	10.2	★	28.8	3.2	9.6	3.9	2.9	21.0	7.8	2.6	11.9

* – Statewide measurement used due to insufficient available data to accurately measure Appalachian county-specific data

✦ – Insufficient available data to accurately measure for Appalachian Region

★ – Data suppressed

Appendix B

List of International Classification of Diseases, Tenth Revision (ICD-10) Codes Used in Mortality Searches on Centers for Disease Control WONDER Online Database

Disease State	ICD-10 Code(s) Selected	Definition
All Cancer Mortality (2021)	C00 – C97	Malignant Neoplasms
Breast Cancer Mortality (2021)	C50.0	Nipple and areola
	C50.1	Central portion of breast
	C50.2	Upper-inner quadrant of breast
	C50.3	Lower-inner quadrant of breast
	C50.4	Upper-outer quadrant of breast
	C50.5	Lower-outer quadrant of breast
	C50.6	Axillary tail of breast
	C50.8	Overlapping lesion of breast
Cocaine Overdose Deaths (2021)	C50.9	Breast, unspecified
	X40 - X44	Accidental poisoning by drugs, medicaments and biological substances
	X60 - X64	Intentional self-poisoning by drugs, medicaments and biological substances
	X85	Assault by drugs, medicaments and biological substances
	Y10 - Y14	Poisoning by drugs, medicaments and biological substances, undetermined intent
	T40.5	Cocaine

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Disease State	ICD-10 Code(s) Selected	Definition
Colorectal Cancer Mortality (2021)	C18.0	Caecum
	C18.1	Appendix
	C18.2	Ascending colon
	C18.3	Hepatic flexure
	C18.4	Transverse colon
	C18.5	Splenic flexure
	C18.6	Descending colon
	C18.7	Sigmoid colon
	C18.8	Overlapping lesion of colon
	C18.9	Colon, unspecified
	C19	Malignant neoplasm of rectosigmoid colon
	C20	Malignant neoplasm of rectum
	C21.8	Overlapping lesion of rectum, anus, and anal canal
	C78.5	Secondary malignant neoplasm of large intestine and rectum
	C78.6	Secondary malignant neoplasm of retroperitoneum and peritoneum
	D37.4	Colon - uncertain neoplasms
D37.5	Rectum - uncertain neoplasms	

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Disease State	ICD-10 Code(s) Selected	Definition
Drug Overdose Deaths (2021)	X40 - X44	Accidental poisoning by drugs, medicaments and biological substances
	X60 - X64	Intentional self-poisoning by drugs, medicaments and biological substances
	X85	Assault by drugs, medicaments and biological substances
	Y10 - Y14	Poisoning by drugs, medicaments and biological substances, undetermined intent
	T36 - T50	Poisoning by drugs, medicaments, and biological substances
Lung Cancer Mortality (2021)	C34.0	Main bronchus
	C34.1	Upper lobe, bronchus or lung
	C34.2	Middle lobe, bronchus or lung
	C34.3	Lower lobe, bronchus or lung
	C34.8	Overlapping lesion of bronchus and lung
	C34.9	Bronchus or lung, unspecified
Methamphetamine Overdose Deaths (2021)	X40 - X44	Accidental poisoning by drugs, medicaments and biological substances
	X60 - X64	Intentional self-poisoning by drugs, medicaments and biological substances
	X85	Assault by drugs, medicaments and biological substances
	Y10 - Y14	Poisoning by drugs, medicaments and biological substances, undetermined intent
	T43.6	Psychostimulants with Abuse Potential

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Disease State	ICD-10 Code(s) Selected	Definition
Opioid Overdose Deaths (2021)	X40 - X44	Accidental poisoning by drugs, medicaments and biological substances
	X60 - X64	Intentional self-poisoning by drugs, medicaments and biological substances
	X85	Assault by drugs, medicaments and biological substances
	Y10 - Y14	Poisoning by drugs, medicaments and biological substances, undetermined intent
	T40.0	Opium
	T40.1	Heroin
	T40.2	Other Opioids
	T40.3	Methadone
	T40.4	Other Synthetic Opioids
	T40.6	Other and Unspecified Narcotics
Ovarian Cancer Mortality (2021)	C56	Malignant neoplasm of ovary
Pancreatic Cancer Mortality (2021)	C25.0	Head of pancreas
	C25.1	Body of pancreas
	C25.2	Tail of pancreas
	C25.3	Pancreatic duct
	C25.4	Endocrine pancreas
	C25.7	Other parts of pancreas
	C25.8	Overlapping lesion of pancreas
	C25.9	Pancreas, unspecified

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Disease State	ICD-10 Code(s) Selected	Definition
Prostate Cancer Mortality (2021)	C61	Malignant neoplasm of prostate
Stimulant Overdose Deaths (2021)	X40 - X44	Accidental poisoning by drugs, medicaments and biological substances
	X60 - X64	Intentional self-poisoning by drugs, medicaments and biological substances
	X85	Assault by drugs, medicaments and biological substances
	Y10 - Y14	Poisoning by drugs, medicaments and biological substances, undetermined intent
	T40.5	Cocaine
	T43.6	Psychostimulants with Abuse Potential

Appendix C

Correlation Findings Between Adult Literacy Proficiency and Public Health Measures, Appalachia

Public Health Measure	Appalachia	AL	GA	KY	MD	MS	NY	NC	OH	PA	SC	TN	VA	WV
Adult Asthma Prevalence (2020)	0.8	0.9	0.7	0.2	0.8	0.6	0.7	0.3	0.3	0.9	0.6	0.6	0.6	11.7%
Adult Depression Prevalence (2020)	0.1	0.6	0.6	1.0	-0.2	0.6	0.4	0.2	0.3	0.5	0.6	0.6	0.5	28.3%
Adult Diabetes Prevalence (2020)	0.7	0.8	0.8	0.2	0.7	0.6	0.7	0.3	0.6	0.9	0.8	0.5	0.7	12.1%
Adult Obesity Prevalence (2020)	0.7	0.8	0.6	-0.3	0.8	0.4	0.5	0.1	0.5	0.7	0.5	0.5	0.6	39.9%
All Cancer Mortality (2021)	0.6	0.3	0.6	-0.1	0.3	0.7	0.2	-0.1	0.3	0.9	0.4	0.5	0.4	292.7
Breast Cancer Mortality (2021)	0.0	0.2	*	*	*	-0.1	-0.2	-0.4	0.0	0.7	0.0	0.0	-0.5	13.7
Cervical Cancer Mortality (2021)	*	*	*	*	*	*	*	*	*	*	*	*	*	1.7
Chlamydia Incidence (2021)	0.3	0.3	-0.3	*	0.4	-0.4	-0.1	-0.6	-0.4	0.5	-0.3	-0.2	-0.4	231.3

Appendix C

Public Health Measure	Appalachia	AL	GA	KY	MD	MS	NY	NC	OH	PA	SC	TN	VA	WV
Cocaine Overdose Deaths (2021)	*	-0.5	*	*	*	*	*	-0.4	-0.5	-0.4	*	-0.7	*	-0.7
Colorectal Cancer Mortality (2021)	0.3	-0.1	0.3	0.1	*	*	0.5	0.1	0.6	0.5	0.8	0.3	0.5	0.4
COPD Prevalence (2020)	0.7	0.8	0.9	0.8	1.0	0.5	0.9	0.8	0.7	0.8	0.9	0.9	0.6	0.8
Coronary Heart Disease Prevalence (2020)	0.8	0.8	0.9	0.8	1.0	0.6	0.8	0.8	0.5	0.8	1.0	0.9	0.6	0.8
Current Adult Smokers (2020)	0.8	0.9	0.9	0.9	0.2	0.8	0.9	0.9	0.7	0.9	1.0	0.9	0.8	0.8
Drug Overdose Deaths (2021)	0.2	-0.2	0.3	0.1	0.0	-0.2	-0.1	0.4	-0.2	-0.3	-0.8	0.1	0.4	0.2
Gonorrhea Incidence (2021)	0.1	0.3	0.4	0.0	*	0.3	-0.4	0.1	-0.4	-0.4	0.7	-0.5	0.1	-0.3
HIV Incidence (2021)	-0.3	0.1	-0.2	*	*	*	-0.2	-0.3	-0.5	-0.6	-0.4	-0.8	*	-0.6
HIV Prevalence (2021)	0.0	0.1	0.2	0.0	-0.2	0.4	-0.2	-0.2	-0.2	-0.2	0.0	-0.4	0.3	-0.2

Appendix C

Public Health Measure	Appalachia	AL	GA	KY	MD	MS	NY	NC	OH	PA	SC	TN	VA	WV
Lung Cancer Mortality (2021)	0.5	0.5	0.4	0.7	-0.3	0.7	0.7	0.3	-0.1	0.2	0.8	0.5	0.5	0.4
Meth Overdose Deaths (2021)	0.2	-0.5	0.2	-0.2	*	*	0.6	0.2	0.0	-0.1	-0.9	0.2	0.5	0.6
Opioid Overdose Deaths (2021)	0.2	-0.5	0.5	-0.3	*	*	0.2	0.0	0.2	0.0	0.5	-0.1	0.5	0.5
Ovarian Cancer Mortality (2021)	*	-0.9	*	*	*	*	*	-0.6	-0.9	-0.6	*	-0.9	*	*
Pancreatic Cancer Mortality (2021)	-0.1	0.6	0.0	*	*	*	0.2	-0.5	-0.2	0.5	0.7	-0.2	*	-0.1
Prostate Cancer Mortality (2021)	-0.4	0.8	-0.5	*	*	*	0.6	0.3	-0.4	-0.2	0.8	-0.6	*	-0.8
Stimulant Overdose Deaths (2021)	0.2	-0.5	0.2	-0.2	*	*	0.3	0.1	-0.1	-0.2	-0.9	0.1	0.5	0.6
Syphilis Incidence (2021)	0.1	-0.1	0.1	0.2	*	0.0	-0.3	0.0	-0.2	-0.2	-0.1	0.0	0.1	-0.3

* – Insufficient Data available to generate a Pearson Correlation Coefficient



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