APPENDICES

APPENDIX A: CMS WAGE INDEX

TABLE 27- CMS WAGE INDEX APPROVED FOR USE IN 2010 MEDICARE PAYMENTS (EXCERPTS FROM RECLASSIFIED INDEX)

CBSAGEO	cbsa unadjusted ahw	unadjusted wage index	cbsa occmix adjusted wages	cbsa occmix adjusted ahw	occ mix adjusted wage index
a	b	c	d	e	f
01	24.5828	0.7327	537,171,016.88	24.81461	0.7401
02	39.1490	1.1669	55,870,291.81	39.07405	1.1655
03	29.4898	0.879	115,413,433.82	29.55665	0.8816
04	24.5993	0.7332	405,796,338.06	25.27959	0.754
05	40.2613	1.2001	282,058,410.30	39.60987	1.1814
06	33.3101	0.9929	266,785,865.61	32.51602	0.9699
07	37.2154	1.1093	199,174,413.45	37.74876	1.1259
08	33.2470	0.991	181,828,359.29	33.57681	1.0015
10	28.7395	0.8566	414,629,181.48	28.88329	0.8615
11	25.5738	0.7623	796,499,027.93	26.25911	0.7832
12	37.2838	1.1113	229,761,783.16	37.88722	1.1301
13	25.9421	0.7733	86,108,799.32	25.66652	0.7656
14	27.8874	0.8312	767,721,224.45	27.94876	0.8336
15	28.6157	0.8529	475,590,501.29	28.5959	0.8529
16	28.9343	0.8624	413,214,145.70	28.77978	0.8584
17	27.3979	0.8167	382,851,414.05	27.34289	0.8156
18	26.2109	0.7813	998,040,430.76	26.54652	0.7918
19	25.5337	0.7611	524,643,658.07	26.27411	0.7837
20	28.7816	0.8579	348,349,981.79	28.72936	0.8569
21	30.6333	0.9131	202,587,754.07	30.99966	0.9246
23	29.4509	0.8778	1,008,509,665.22	29.54314	0.8812
24	30.7321	0.916	434,719,304.17	30.74302	0.917
25	25.6260	0.7638	936,884,454.57	25.91737	0.773
26	25.7365	0.7671	581,873,857.91	26.25918	0.7832
27	28.1781	0.8399	177,787,208.61	27.85996	0.831
28	29.2055	0.8705	318,361,097.12	29.08873	0.8676
29	32.4571	0.9674	43,705,967.27	32.49179	0.9691
30	33.4037	0.9957	453,167,298.66	33.53765	1.0003
32	29.9848	0.8938	316,882,007.34	30.18106	0.9002
33	27.7410	0.8269	993,168,365.41	28.15631	0.8398
34	28.6542	0.8541	1,430,081,871.85	28.85795	0.8607
35	26.2109	0.7813	72,696,021.57	26.80444	0.7995
36	28.5362	0.8506	1,095,384,224.15	28.61054	0.8534
37	25.6773	0.7654	570,564,918.08	26.21748	0.782
38	34.3414	1.0236	312,301,998.80	34.22945	1.021
39	27.8664	0.8306	1,348,642,320.53	28.04196	0.8364

CBSAGEO	cbsa unadjusted ahw	unadjusted wage index	cbsa occmix adjusted wages	cbsa occmix adjusted ahw	occ mix adjusted wage index
42	28.1621	0.8394	586,312,111.57	28.18972	0.8408
43	28.5519	0.851	144,197,091.29	28.07504	0.8374
44	26.1942	0.7808	679,934,388.12	26.53199	0.7914
45	26.0298	0.7759	1,073,441,785.43	26.67742	0.7957
46	28.0567	0.8363	82,653,766.16	28.34997	0.8456
47	32.7529	0.9763	150,892,853.86	32.20597	0.9606
49	26.4005	0.7869	475,395,964.87	27.08658	0.8079
50	34.2998	1.0224	198,657,517.99	33.99501	1.014
51	24.8124	0.7396	456,190,357.94	25.11384	0.7491
52	30.8842	0.9206	602,552,912.35	30.98923	0.9243
53	31.9893	0.9535	153,392,368.63	31.53379	0.9406
10180	26.6569	0.7946	134,608,459.40	27.99435	0.835
10380	11.6131	0.3462	22,914,237.30	11.29923	0.337
10420	29.6921	0.885	549,839,345.38	29.69807	0.8858
10500	29.8542	0.8899	177,531,492.74	29.99301	0.8946
10580	29.4455	0.8777	765,992,510.29	29.56859	0.8819
10740	31.5326	0.9399	657,191,563.81	32.16856	0.9595
10780	26.8807	0.8012	192,221,458.48	27.37408	0.8165
10900	32.2446	0.9611	820,887,225.88	32.95485	0.9829
11020	29.7350	0.8863	145,459,054.64	29.6321	0.8838
11100	29.1493	0.8689	210,048,961.59	28.86153	0.8608
11180	31.8496	0.9493	55,052,646.44	32.03333	0.9555
11260	40.3019	1.2013	287,947,371.32	39.78169	1.1866
11300	30.3672	0.9052	108,338,849.87	30.61859	0.9133
11340	30.2705	0.9023	139,776,634.52	30.67785	0.915
11460	34.5306	1.0293	1,078,630,885.62	34.39726	1.026
11500	25.6425	0.7643	90,615,578.11	25.53313	0.7616
11540	31.1643	0.9289	131,100,162.27	31.05119	0.9262
11700	30.3850	0.9057	396,215,526.24	30.49976	0.9097
12020	31.8446	0.9492	196,954,955.58	30.91235	0.922
12060	32.1786	0.9591	3,077,772,100.35	32.17651	0.9597
12100	38.7640	1.1554	335,910,444.36	38.32462	1.1431
12220	27.3031	0.8138	79,374,938.97	28.3184	0.8446
12260	31.5672	0.9409	527,200,313.81	31.71917	0.9461
12420	31.9321	0.9518	798,759,163.07	31.95571	0.9531
12540	37.6822	1.1232	477,861,580.53	38.11265	1.1368
12580	34.2662	1.0214	3,209,722,482.84	34.0219	1.0148
12620	34.0646	1.0154	227,651,974.54	33.66637	1.0042
12700	42.3315	1.2618	217,831,436.91	42.24554	1.2601
12940	27.4430	0.818	516,025,094.36	27.67032	0.8253
12980	33.5494	1	120,775,692.16	33.83193	1.0091
13020	31.0916	0.9267	91,647,418.75	31.72294	0.9462
13140	28.1248	0.8383	319,036,661.78	27.95648	0.8339
13380	38.2307	1.1395	124,352,444.75	37.89383	1.1303
13460	38.4005	1.1446	144,606,968.98	37.88804	1.1301
13644	34.5474	1.0298	599,447,050.91	34.10797	1.0173
13740	29.4611	0.8781	210,552,772.31	30.29329	0.9036
13780	29.4553	0.878	244,828,103.59	30.10871	0.898

CBSAGEO	cbsa unadjusted ahw	unadjusted wage index	cbsa occmix adjusted wages	cbsa occmix adjusted ahw	occ mix adjusted wage index
13820	28.6977	0.8554	980,843,975.64	28.5866	0.8526
13900	25.6205	0.7637	131,947,842.97	26.57642	0.7927
13980	28.1620	0.8394	86,482,280.18	28.0388	0.8363
14020	30.3396	0.9043	110,045,795.57	31.27462	0.9328
14060	31.4638	0.9378	113,212,495.16	31.81891	0.9491
14260	31.2610	0.9318	429,030,222.18	31.31018	0.9339
14484	40.8844	1.2186	3,316,113,219.64	41.28132	1.2313
14500	34.4432	1.0266	279,016,172.14	34.54688	1.0304

Key by column:

a. Geographic Code for CBSA from Bureau of Labor Statistics

b. Unadjusted average hourly wage (AHW) by CBSA from cost reports of providers in or assigned to this CBSA

c. Unadjusted wage mix index by CBSA, with 1.0 as national average

d. Total occupational mix adjusted wages by CBSA

e. Occupational mix adjusted AHW by CBSA

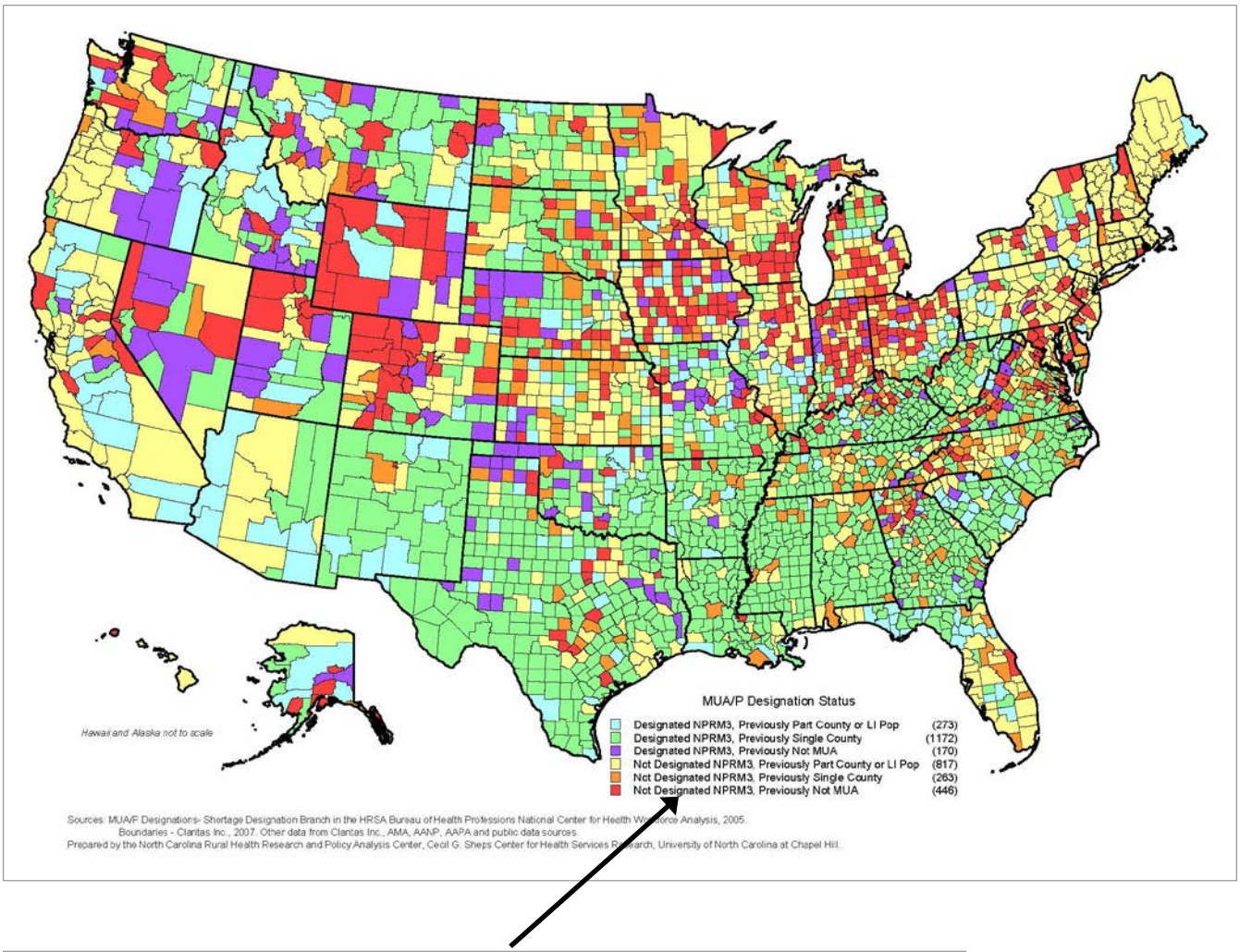
f. Occupational mix adjusted wage index before reclassification, with 1.0 as national average of all CBSA's

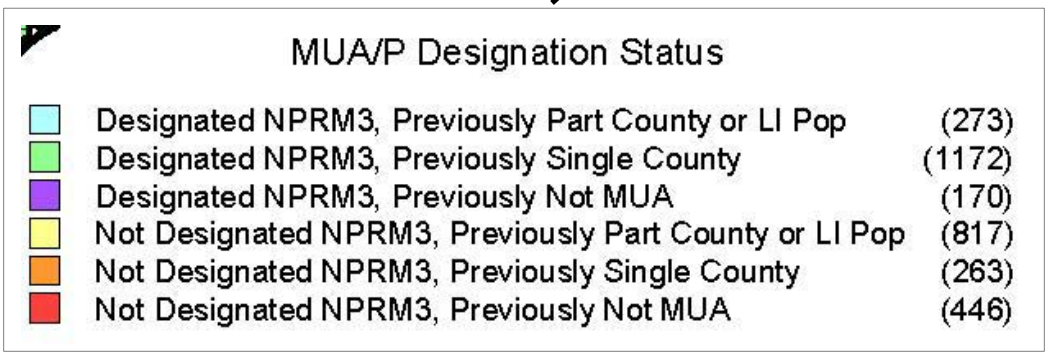
These data are before reclassification for any special adjustment for providers or areas.

Source: CMS FY 2010 Final Rule Home Page, Details for Final Occupational Mix Adjusted & Unadjusted AHWs & Pre-Reclass Wage Indexes by CBSA.
https://www.cms.gov/AcuteInpatientPPS/10FR/itemdetail.asp?filterType=none&filterByDID=-99&sortByDID=1&sortOrder=ascending&itemID=CMS1227467&intNumPerPage=10

APPENDIX B: SHEPS CENTER MEDICALLY UNDERSERVED MAP

FIGURE 46 - MEDICALLY UNDERSERVED AREAS & POPULATIONS IN THE UNITED STATES
NPRM3 DESIGNATION CHANGE CATEGORIES: MUA/PS





APPENDIX C: FEDERAL MEDICAL ASSISTANCE PERCENTAGE RATES BY STATE 2011

TABLE 28 - FEDERAL ASSISTANCE PERCENTAGES AND ENHANCED FEDERAL MEDICAL ASSISTANCE PERCENTAGES EFFECTIVE OCTOBER 1, 2010- SEPTEMBER 30, 2011 (FISCAL YEAR 2011)

State	Federal Medical assistance percentages	Enhanced Federal medical assistance percentages
Alabama.	**68.54**	**77.98**
Alaska.	50.00	65.00
American Samoa *	50.00	65.00
Arizona	65.85	76.10
Arkansas	71.37	79.96
California	50.00	65.00
Colorado	50.00	65.00
Connecticut	50.00	65.00
Delaware	53.15	67.21
District of Columbia **	70.00	79.00
Florida	55.45	68.82
Georgia	**65.33**	**75.73**
Guam *	50.00	65.00
Hawaii	51.79	66.25
Idaho	68.85	78.20
Illinois	50.20	65.14
Indiana	66.52	76.56
Iowa	62.63	73.84
Kansas	59.05	71.34
Kentucky	**71.49**	**80.04**
Louisiana	63.61	74.53
Maine	63.80	74.66
Maryland	**50.00**	**65.00**
Massachusetts	50.00	65.00
Michigan	65.79	76.05
Minnesota	50.00	65.00
Mississippi	**74.73**	**82.31**
Missouri	63.29	74.30
Montana	66.81	76.77
Nebraska	58.44	70.91
Nevada	51.61	66.13
New Hampshire	50.00	65.00
New Jersey	50.00	65.00
New Mexico	69.78	78.85
New York	**50.00**	**65.00**
North Carolina	**64.71**	**75.30**
North Dakota	60.35	72.25

State	Federal Medical assistance percentages	Enhanced Federal medical assistance percentages
Northern Mariana Islands *	50.00	65.00
Ohio	**63.69**	**74.58**
Oklahoma	64.94	75.46
Oregon	62.85	74.00
Pennsylvania	**55.64**	**68.95**
Puerto Rico *	50.00	65.00
Rhode Island	52.97	67.08
South Carolina	**70.04**	**79.03**
South Dakota	61.25	72.88
Tennessee	**65.85**	**76.10**
Texas	60.56	72.39
Utah	71.13	79.79
Vermont	58.71	71.10
Virgin Islands *	50.00	65.00
Virginia	**50.00**	**65.00**
Washington	50.00	65.00
West Virginia	**73.24**	**81.27**
Wisconsin	60.16	72.11
Wyoming	50.00	65.00

Source: "Federal Financial Participation in State Assistance Expenditures; Federal Matching Shares for Medicaid, the Children's Health Insurance Program, and Aid to Needy Aged, Blind, or Disabled Persons for October 1, 2010 through September 30, 2011," Office of the Secretary, DHHS. ACTION: Notice, Federal Register: November 27, 2009 (Volume 74, Number 227) [Page 62315-62317], http://aspe.hhs.gov/health/fmap11.htm

Appendix D: National Health Spending Projections Through 2020

Table 29- Projected National Health Expenditures: The Estimated Impact of Reform - Aggregate Amounts

Item	2005	2006	2007	2008	2009	Projected 2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
National Health Expenditures (billions)	$2,021.0	$2,152.1	$2,283.5	$2,391.4	$2,486.3	$2,584.2	$2,708.4	$2,823.9	$2,980.4	$3,227.4	$3,417.9	$3,632.0	$3,849.5	$4,080.0	$4,346.5	$4,638.4
National Health Expenditures as a Percent of Gross Domestic Product	16.0%	16.1%	16.2%	16.6%	17.6%	17.6%	17.7%	17.6%	17.6%	18.1%	18.3%	18.6%	18.8%	19.1%	19.4%	19.8%
National Health Expenditures Per Capita	$6,826.7	$7,197.6	$7,560.7	$7,845.0	$8,086.5	$8,327.3	$8,648.5	$8,936.8	$9,348.8	$10,035.2	$10,535.3	$11,099.3	$11,664.3	$12,259.1	$12,951.7	$13,708.8
Gross Domestic Product (billions)	$12,638.4	$13,398.9	$14,061.8	$14,369.1	$14,119.0	$14,659.6	$15,334.4	$16,071.0	$16,891.1	$17,803.8	$18,712.3	$19,573.5	$20,454.8	$21,396.1	$22,380.8	$23,388.4
Gross Domestic Product (billions of 2005 $)	$12,638.4	$12,976.2	$13,228.9	$13,228.8	$12,880.6	$13,254.1	$13,678.3	$14,129.7	$14,638.3	$15,194.6	$15,726.4	$16,198.2	$16,635.5	$17,034.8	$17,409.5	$17,775.1
Gross Domestic Product Implicit Price Deflator (chain weighted 2005 base year)	1.000	1.033	1.063	1.086	1.096	1.107	1.123	1.139	1.157	1.175	1.194	1.213	1.235	1.262	1.292	1.323
Consumer Price Index (CPI-W) - 1982-1984 base	1.953	2.016	2.073	2.153	2.145	2.182	2.232	2.292	2.363	2.437	2.505	2.575	2.647	2.721	2.797	2.876
U.S. Population[2]	296.1	299.0	302.0	304.8	307.5	310.3	313.2	316.0	318.8	321.6	324.4	327.2	330.0	332.8	335.6	338.4
Population age less than 65 years	259.7	262.1	264.4	266.2	268.0	270.2	272.1	273.6	275.0	276.5	277.9	279.3	280.7	281.9	283.0	284.1
Population age 65 years and older	36.3	36.9	37.7	38.6	39.4	40.2	41.1	42.4	43.8	45.1	46.5	47.9	49.4	50.9	52.6	54.2
Private Health Insurance - NHE (billions)	$697.2	$733.6	$763.8	$790.6	$801.2	$822.3	$850.3	$884.4	$926.9	$1,013.7	$1,076.7	$1,141.0	$1,200.3	$1,251.0	$1,324.7	$1,402.0
Private Health Insurance - PHC (billions)	603.8	636.4	663.8	692.7	712.2	725.5	748.7	775.4	810.5	879.9	932.2	989.7	1,041.4	1,089.1	1,153.4	1,219.2
National Health Expenditures (billions)	—	6.5%	6.1%	4.7%	4.0%	3.9%	4.8%	4.3%	5.5%	8.3%	5.9%	6.3%	6.0%	6.0%	6.5%	6.7%
National Health Expenditures as a Percent of Gross Domestic Product (Change)	—	0.4	1.1	2.5	5.8	0.1	0.2	-0.5	0.4	2.7	0.8	1.6	1.4	1.3	1.8	2.1
National Health Expenditures Per Capita	—	5.4	5.0	3.8	3.1	3.0	3.9	3.3	4.6	7.3	5.0	5.4	5.1	5.1	5.6	5.8
Gross Domestic Product (billlions)	—	6.0	4.9	2.2	-1.7	3.8	4.6	4.8	5.1	5.4	5.1	4.6	4.5	4.6	4.6	4.5
Gross Domestic Product (billions of 2005 $)	—	2.7	1.9	0.0	-2.6	2.9	3.2	3.3	3.6	3.8	3.5	3.0	2.7	2.4	2.2	2.1
Gross Domestic Product Implicit Price Deflator (chain weighted 2005 base year)	—	3.3	2.9	2.2	0.9	1.0	1.4	1.5	1.5	1.6	1.6	1.6	1.8	2.2	2.4	2.4
Consumer Price Index (CPI-W) - 1982-1984 base	—	3.2	2.8	3.8	-0.4	1.7	2.3	2.7	3.1	3.1	2.8	2.8	2.8	2.8	2.8	2.8
U.S. Population[3]	—	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.8	0.8
Population age less than 65 years	—	0.9	0.9	0.7	0.7	0.8	0.7	0.6	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4
Population age 65 years and older	—	1.7	2.0	2.6	2.0	1.9	2.3	3.2	3.3	3.1	3.0	3.0	3.1	3.2	3.2	3.2
Private Health Insurance - NHE	—	5.2	4.1	3.5	1.3	2.6	3.4	4.0	4.8	9.4	6.2	6.0	5.2	4.2	5.9	5.8
Private Health Insurance - PHC	—	5.4	4.3	4.4	2.8	1.9	3.2	3.6	4.5	8.6	5.9	6.2	5.2	4.6	5.9	5.7

[1]The health spending projections were based on the National Health Expenditures released in January 2011. The projections include impacts of the Affordable Care Act.
[2]July 1 Census resident based population estimates.

NOTE: Numbers and percent's may not add to totals because of rounding.
Source: Centers for Medicare & Medicaid Services, Office of the Actuary.

APPENDIX E: OVERVIEW OF MEDICAID ECONOMIC IMPACT

TABLE 30 – MEDICAID ECONOMIC IMPACT FOR ARC STATES

State	State Study	Findings
Georgia	A. Essig, Governor's FY 2004 and FY 2005 Medicaid Budget Proposals (Georgia Budget Notes, no. 16), February 2004 ,Fiscal Research Center, Andrew Young School of Policy Studies, Georgia State University	The state funded portion of the Medicaid budget in FY 2001 was $2.15 billion. Spending for FY 2001 resulted in : • $3.225 billion federal match. • Employment impact: 75,000 jobs. • Business activity impact: $7.2 billion. Medicaid cuts proposed in the FY2004 and FY2005 budget of $73.7 million will result in: • $114.5 million lost federal match. • 2,360 jobs lost
Maryland	Medicaid: Good Medicine for MD's Economy,2003, Advocates for Children and Youth	Effect of $1 million in Medicaid cuts would result in: • $2.27 million in lost business activity • $800,000 in lost wages • 22 lost jobs
Mississippi	B. Blair and M. Millea, Economic Impacts of Federal Medicaid Expenditures on the State of Mississippi in 2002, August 2003, Mississippi Health Policy Research Center, Mississippi State University	Mississippi's 2002 Medicaid expenditure of approximately $620 million resulted in: • $1.98 billion federal match • $2.69 billion in additional economic output • $1.39 billion of the state's GSP was attributable to federal Medicaid funding • 39,059 jobs supported by Medicaid inflow • $1.05 billion in personal income • Increase in personal income generated $60.7 million in tax revenue
North Carolina	K. Kilpatrick, et al, The Economic Impact of Proposed Reductions in Medicaid Spending in North Carolina, April 11, 2002, Institute for Public Health, School of Public Health, University of North Carolina, Chapel Hill.	High reduction (-$408,309,631 federal + state) • Employment impact: 9,700 lost jobs • Economic output loss: $706,257,420 Federal reduction only under the high scenario (-$278,593,774) • Employment impact: 6,590 lost jobs • Economic output loss: $479,846,829 Low reduction (-$399,292,466 federal + state) • Employment impact: 9,500 lost jobs • Economic output loss: $690,432,383

State	State Study	Findings
North Carolina	C. Dumas, W. Hall and P Garrett .The Economic Impacts of Medicaid in North Carolina, March/April 2008 North Carolina ,Journal of Medicine 69,(2)	Federal reduction only under the low scenario (-$272,467,295) • Employment impact: 6,454 lost jobs • Economic output loss: $469,094,951 North Carolina state Medicaid expenditures of $2.36 billion resulted in: • $3.941 billion in federal dollars • 182,000 jobs (including full and part time positions) • $6.11 billion in wages, salaries and sole proprietorship/partnership profits • $1.892 billion in rents, interest and corporate dividend payments to NC citizens • $2.2 billion in government tax revenues
Ohio	R. Greenbaum and A. Desai, Uneven Burden: Economic Analysis of Medicaid Expenditure Changes in Ohio ,April 2003 , School of Public Policy and Management, The Ohio State University A. Desai, Y. Kim, and R. Greenbaum Estimating Local Effects of Medicaid Expenditure Changes ,June 2005, Health Policy Institute of Ohio and The Health Foundation of Greater Cincinnati	Ohio's FY 2001 state expenditure of $3.6 billion for Medicaid expenditures resulted in the following: • Employment impact: 132,028 jobs • Income impact: $4.1 billion • New business activity: $11.5 billion A reduction of $491 million in state Medicaid expenditures would result in : • Reduced economic activity: $1.5 billion over a two-year period • Employment impact: 16,500 jobs • Fiscal impact: $22 million in tax revenue (tax revenue figure includes only state income taxes and does not estimate the effect on sales and other taxes) Cuts proposed in state spending in SFY2006 ($3.26 million) and SFY2007 ($5.98 million) budget include: • A $3 billion reduction in economic activity over the two year period • 30,000 jobs lost over the two year period
South Carolina	Division of Research Moore School of Business University of South Carolina Economic ,Impact of Medicaid on South Carolina, January 2002, Fiscal Analytics, Ltd.	South Carolina's 2001 state expenditure for Medicaid resulted in: • $2.1 billion federal matching funds • Support of more than 61,000 jobs • Generation of $1.5 billion in income for state citizens

State	State Study	Findings
Virginia	The Impact of Additional Medicaid Spending in Virginia ,June 2003	A $250 million increase in state Medicaid spending would result in support of 10,000 to 15,000 jobs RIMS II calculations (using Virginia-specific multiplier of 2.5 from Medicaid; Good Medicine for State Economies, Families U.S.A.): • $250 million federal match • $626 million in new business activity IMPLAN calculations (using multiplier of 1.7): • $250 million federal match • $426 million in new business activity
West Virginia	Christiadi and T. Witt, Economic Impact of Medicaid Federal-Match on the West Virginia Economy FY 2002 ,January 2003 ,Bureau of Business and Economic Research, College of Business and Economics, West Virginia University	West Virginia's FY 2002 state expenditure of $371 million for Medicaid generated: • $1.133 billion federal match • Total employment of: 32,685 jobs • Total income of $667.3 in employee compensation • Total business volume of $1.881.0 billion • $955.2 million of value added

APPENDIX F: MEDICAID COVERAGE AND SPENDING: HEALTH REFORM

TABLE 31 - NATIONAL AND STATE-BY-STATE RESULTS FOR ADULTS AT OR BELOW 133 PERCENT FPL (STANDARD PARTICIPATION SCENARIO)

	Coverage in 2019			Spending in 2014-2019 (in millions)				Change From Baseline 2014-2019			
	Total New Medicaid Enrollees*	Previously Uninsured Newly Enrolled	% Reduction in Uninsured Adults < 133% FPL	State Spending	Federal Spending	Total Spending	% Federal Spending	Enrollment in 2019	State Spending	Federal Spending	Total Spending
Northeast											
Connecticut	114,083	75,864	48.0%	$263	$4,686	$4,949	94.7%	20.1%	1.2%	21.0%	11.1%
Maine	43,468	27,877	47.4%	-$118	$1,857	$1,738	100%*	11.8%	-1.5%	12.9%	7.7%
Massachusetts**	29,921	10,401	10.2%	-$1,274	$2,137	$864	100%*	2.0%	-2.1%	3.5%	0.7%
New Hampshire	55,918	34,625	48.7%	$63	$1,204	$1,267	95.0%	38.8%	1.1%	21.3%	11.2%
New Jersey	390,490	292,489	45.3%	$533	$9,030	$9,563	94.4%	38.1%	1.2%	20.9%	11.1%
New York	305,945	223,175	14.8%	$50	$8,049	$8,099	99.4%	6.0%	0.0%	3.3%	1.7%
Pennsylvania	482,366	282,014	41.4%	$1,054	$17,086	$18,140	94.2%	21.7%	1.4%	17.7%	10.5%
Rhode Island	41,185	29,147	50.6%	$70	$1,559	$1,629	95.7%	20.0%	0.7%	14.6%	8.1%
Vermont	4,484	3,214	10.2%	-$26	$112	$86	100%*	2.8%	-0.6%	1.9%	0.9%
Midwest											
Illinois	631,024	429,258	42.5%	$1,202	$19,259	$20,461	94.1%	25.8%	1.6%	25.9%	13.8%
Indiana	297,737	215,803	44.2%	$478	$8,535	$9,013	94.7%	29.4%	2.5%	22.9%	16.1%
Iowa	114,691	74,498	44.1%	$147	$2,800	$2,947	95.0%	25.3%	1.4%	15.7%	10.3%
Kansas	143,445	89,265	50.9%	$166	$3,477	$3,643	95.4%	42.0%	1.7%	24.0%	14.8%
Michigan	589,965	430,744	50.6%	$686	$14,252	$14,938	95.4%	30.2%	2.0%	21.5%	14.8%
Minnesota	251,783	132,511	44.2%	$421	$7,836	$8,257	94.9%	32.9%	1.2%	22.0%	11.6%
Missouri	307,872	207,678	45.5%	$431	$8,395	$8,826	95.1%	29.8%	1.7%	19.5%	13.0%
Nebraska	83,898	50,364	53.9%	$106	$2,345	$2,451	95.7%	36.2%	1.5%	23.5%	14.4%
North Dakota	28,864	17,198	45.1%	$32	$595	$627	94.9%	44.0%	1.4%	16.9%	10.8%
Ohio	667,376	462,024	50.0%	$830	$17,130	$17,960	95.4%	31.9%	1.6%	19.2%	12.8%
South Dakota	31,317	18,594	51.9%	$32	$717	$748	95.8%	25.9%	1.1%	16.4%	10.5%
Wisconsin	205,987	127,862	50.6%	$205	$4,252	$4,457	95.4%	20.8%	0.9%	12.7%	8.0%
South											
Alabama	351,567	244,804	53.2%	$470	$10,305	$10,776	95.6%	36.9%	3.6%	35.9%	25.7%
Arkansas	200,690	154,836	47.6%	$455	$9,401	$9,856	95.4%	27.9%	4.7%	38.9%	29.1%
Delaware	12,081	7,916	15.9%	$3	$387	$390	99.2%	6.7%	0.1%	6.2%	3.3%
District of Columbia	28,900	15,308	49.1%	$42	$902	$944	95.6%	16.1%	0.9%	8.3%	6.1%
Florida	951,622	683,477	44.4%	$1,233	$20,050	$21,283	94.2%	34.7%	1.9%	24.3%	14.3%
Georgia	646,557	479,138	49.4%	$714	$14,551	$15,265	95.3%	40.4%	2.7%	28.9%	19.8%
Kentucky	329,000	250,704	57.1%	$515	$11,878	$12,393	95.8%	37.3%	3.5%	32.2%	24.0%
Louisiana	366,318	277,746	50.7%	$337	$7,273	$7,610	95.6%	32.4%	1.7%	21.6%	14.4%
Maryland	245,996	174,484	46.2%	$533	$9,112	$9,645	94.5%	32.4%	1.7%	29.6%	15.6%
Mississippi	320,748	256,920	54.9%	$429	$9,865	$10,294	95.8%	41.2%	4.8%	37.0%	28.9%
North Carolina	633,485	429,272	46.6%	$1,029	$20,712	$21,741	95.3%	38.2%	2.6%	29.0%	19.7%
Oklahoma	357,150	261,157	53.1%	$549	$12,179	$12,728	95.7%	51.2%	4.0%	48.2%	32.7%
South Carolina	344,109	247,478	56.4%	$470	$10,919	$11,389	95.9%	38.4%	3.6%	36.0%	26.3%
Tennessee	330,932	245,691	43.3%	$716	$11,072	$11,788	93.9%	20.9%	2.5%	20.4%	14.3%
Texas	1,798,314	1,379,713	49.4%	$2,619	$52,537	$55,156	95.3%	45.5%	3.0%	38.9%	24.7%
Virginia	372,470	245,840	50.6%	$498	$9,629	$10,127	95.1%	41.8%	1.8%	35.1%	18.4%
West Virginia	121,635	95,675	56.7%	$164	$3,781	$3,945	95.9%	29.5%	2.4%	20.4%	15.6%
West											
Alaska	42,794	33,106	48.4%	$117	$2,046	$2,163	94.6%	38.5%	2.1%	36.9%	19.5%
Arizona	105,428	81,095	13.6%	$56	$2,091	$2,147	97.4%	7.7%	0.2%	4.2%	2.9%
California	2,008,796	1,406,101	41.5%	$2,982	$44,694	$47,676	93.7%	20.1%	1.5%	23.0%	12.3%
Colorado	245,730	166,471	50.0%	$286	$5,917	$6,203	95.4%	47.7%	1.8%	37.1%	19.4%
Hawaii	84,130	42,381	50.0%	-$28	$2,999	$2,971	100%*	38.0%	-0.5%	46.8%	24.0%
Idaho	85,883	59,078	53.9%	$101	$2,402	$2,502	96.0%	39.4%	2.5%	27.1%	19.4%
Montana	57,356	37,978	49.6%	$100	$2,178	$2,278	95.6%	54.5%	3.7%	40.0%	27.9%
Nevada	136,563	100,813	47.0%	$188	$3,445	$3,633	94.8%	61.7%	2.9%	49.8%	27.1%
New Mexico	145,024	111,279	52.6%	$194	$4,510	$4,704	95.9%	28.3%	2.1%	21.3%	15.5%
Oregon	294,600	211,542	56.7%	$438	$10,302	$10,739	95.9%	60.6%	3.6%	50.6%	33.1%
Utah	138,918	78,284	52.5%	$174	$4,129	$4,304	96.0%	56.1%	3.7%	35.3%	26.2%
Washington	295,662	189,463	52.2%	$380	$8,271	$8,651	95.6%	25.2%	1.2%	26.0%	13.6%
Wyoming	29,899	19,099	53.0%	$32	$683	$715	95.6%	40.0%	1.2%	26.8%	14.0%
Total	**15,904,173**	**11,221,455**	**44.5%**	**$21,148**	**$443,530**	**$464,678**	**95.4%**	**27.4%**	**1.4%**	**22.1%**	**13.2%**

*Includes newly enrolled 1115 waiver eligible population.

** Massachusetts has a low share of uninsured within the newly enrolled due to low levels of uninsurance in the baseline.

Note: These estimates relate solely to the Medicaid expansion and do not account for other changes in health reform such as access to subsidized coverage in the exchanges or state or federal savings from reduced uncompensated care or the transition of individuals from state-funded programs to Medicaid in 2014.

Source: Medicaid Coverage and Spending in Health Reform. Kaiser Commission on Medicaid and the Uninsured. www.kff.org/healthreform/upload/ Medicaid-Coverage-and-Spending-in-Health-Reform-National-and-State-By-State-Results-for-Adults-at-or-Below-133-FPL.pdf.

APPENDIX G: MEDICAID COVERAGE AND SPENDING: HEALTH REFORM

TABLE 32 - NATIONAL AND STATE-BY-STATE RESULTS FOR ADULTS AT OR BELOW 133 PERCENT FPL (ENHANCED PARTICIPATION SCENARIO)

	Coverage in 2019			Spending in 2014-2019 (in millions)				Change From Baseline 2014-2019			
	Total New Medicaid Enrollees*	Previously Uninsured Newly Enrolled	% Reduction in Uninsured Adults < 133% FPL	State Spending	Federal Spending	Total Spending	% Federal Spending	Enrollment in 2019	State Spending	Federal Spending	Total Spending
Northeast											
Connecticut	154,664	113,876	72.1%	$440	$5,048	$5,488	92.0%	27.3%	2.0%	22.6%	12.3%
Maine	59,502	41,858	71.1%	-$65	$2,105	$2,040	100%*	16.2%	-0.8%	14.7%	9.1%
Massachusetts**	75,569	43,508	42.9%	-$628	$2,783	$2,155	100%*	5.2%	-1.0%	4.5%	1.8%
New Hampshire	76,744	52,146	73.4%	$117	$1,470	$1,586	92.6%	53.3%	2.1%	26.0%	14.0%
New Jersey	567,852	455,627	70.6%	$1,078	$11,129	$12,207	91.2%	55.4%	2.5%	25.7%	14.1%
New York	820,623	706,575	46.7%	$2,859	$17,170	$20,030	85.7%	16.0%	1.2%	7.1%	4.1%
Pennsylvania	682,880	458,200	67.2%	$2,041	$19,489	$21,530	90.5%	30.8%	2.7%	20.2%	12.4%
Rhode Island	53,841	40,850	70.9%	$100	$1,768	$1,868	94.6%	26.2%	1.1%	16.5%	9.2%
Vermont	15,509	13,443	42.9%	$8	$283	$291	97.4%	9.7%	0.2%	4.9%	2.9%
Midwest											
Illinois	911,830	694,012	68.8%	$2,468	$22,109	$24,577	90.0%	37.2%	3.3%	29.7%	16.6%
Indiana	427,311	337,987	69.1%	$899	$10,112	$11,010	91.8%	42.2%	4.8%	27.1%	19.6%
Iowa	163,264	117,621	69.6%	$257	$3,298	$3,555	92.8%	36.1%	2.4%	18.4%	12.4%
Kansas	192,006	131,528	75.1%	$260	$4,033	$4,293	93.9%	56.2%	2.6%	27.8%	17.5%
Michigan	812,818	635,231	74.6%	$1,096	$16,944	$18,040	93.9%	41.6%	3.2%	25.6%	17.9%
Minnesota	348,684	211,781	70.7%	$745	$9,116	$9,861	92.4%	45.6%	2.1%	25.6%	13.9%
Missouri	437,735	324,276	71.0%	$773	$10,228	$11,001	93.0%	42.4%	3.1%	23.8%	16.2%
Nebraska	110,820	71,053	76.0%	$155	$2,732	$2,886	94.6%	47.8%	2.2%	27.4%	16.9%
North Dakota	40,017	26,457	69.4%	$57	$709	$766	92.5%	61.0%	2.5%	20.2%	13.2%
Ohio	901,023	670,992	72.6%	$1,335	$19,578	$20,913	93.6%	43.1%	2.6%	22.0%	14.9%
South Dakota	41,847	27,160	75.8%	$46	$844	$890	94.9%	34.6%	1.6%	19.3%	12.5%
Wisconsin	277,116	188,043	74.3%	$314	$4,912	$5,226	94.0%	28.0%	1.4%	14.7%	9.4%
South											
Alabama	455,952	335,547	72.9%	$693	$11,404	$12,097	94.3%	47.9%	5.3%	39.7%	28.9%
Arkansas	286,347	234,695	72.1%	$761	$11,523	$12,284	93.8%	39.9%	7.9%	47.7%	36.3%
Delaware	28,839	23,317	46.9%	$90	$686	$776	88.4%	15.9%	1.6%	11.0%	6.6%
District of Columbia	38,763	22,891	73.4%	$62	$1,068	$1,129	94.5%	21.5%	1.3%	9.9%	7.3%
Florida	1,376,753	1,073,391	69.7%	$2,537	$24,260	$26,797	90.5%	50.2%	3.8%	29.4%	18.0%
Georgia	907,203	721,558	74.4%	$1,233	$17,916	$19,149	93.6%	56.7%	4.6%	35.6%	24.9%
Kentucky	423,757	337,987	77.0%	$695	$13,220	$13,915	95.0%	48.1%	4.7%	35.8%	26.9%
Louisiana	507,952	409,869	74.8%	$536	$8,937	$9,472	94.3%	44.9%	2.8%	26.5%	17.9%
Maryland	348,140	267,555	70.8%	$1,060	$10,881	$11,941	91.1%	45.9%	3.4%	35.3%	19.4%
Mississippi	419,571	350,091	74.8%	$581	$10,959	$11,539	95.0%	53.9%	6.4%	41.1%	32.4%
North Carolina	887,560	661,292	71.8%	$1,791	$24,720	$26,511	93.2%	53.5%	4.6%	34.6%	24.0%
Oklahoma	470,358	367,541	74.8%	$789	$13,436	$14,225	94.5%	67.4%	5.8%	53.2%	36.6%
South Carolina	443,020	334,296	76.2%	$615	$12,109	$12,724	95.2%	49.4%	4.7%	39.9%	29.4%
Tennessee	474,240	372,894	65.7%	$1,523	$13,128	$14,651	89.6%	29.9%	5.4%	24.2%	17.8%
Texas	2,513,355	2,055,888	73.6%	$4,514	$62,056	$66,570	93.2%	63.5%	5.1%	45.9%	29.8%
Virginia	504,466	365,514	75.2%	$863	$11,129	$11,992	92.8%	56.7%	3.1%	40.5%	21.8%
West Virginia	156,582	129,185	76.5%	$217	$4,182	$4,399	95.1%	37.9%	3.2%	22.6%	17.4%
West											
Alaska	59,914	49,061	71.7%	$219	$2,379	$2,598	91.6%	53.9%	3.9%	42.9%	23.4%
Arizona	305,634	273,008	45.6%	$739	$4,861	$5,600	86.8%	22.4%	2.9%	9.9%	7.5%
California	2,986,362	2,291,221	67.6%	$6,544	$54,936	$61,481	89.4%	29.9%	3.4%	28.3%	15.8%
Colorado	337,706	249,208	74.8%	$470	$6,925	$7,395	93.6%	65.6%	2.9%	43.4%	23.2%
Hawaii	110,203	64,167	75.7%	$30	$3,414	$3,444	99.1%	49.7%	0.5%	53.3%	27.8%
Idaho	115,730	85,523	78.1%	$133	$2,896	$3,028	95.6%	53.1%	3.3%	32.7%	23.5%
Montana	78,840	56,889	74.3%	$155	$2,558	$2,713	94.3%	75.0%	5.7%	47.0%	33.3%
Nevada	196,168	156,025	72.7%	$338	$4,100	$4,438	92.4%	88.6%	5.2%	59.3%	33.1%
New Mexico	201,855	163,105	77.1%	$278	$5,608	$5,885	95.3%	39.4%	3.0%	26.5%	19.4%
Oregon	386,845	292,651	78.4%	$555	$11,723	$12,279	95.5%	79.6%	4.6%	57.6%	37.9%
Utah	180,478	113,872	76.3%	$227	$4,695	$4,921	95.4%	72.8%	4.8%	40.2%	30.0%
Washington	395,577	276,096	76.1%	$567	$9,573	$10,139	94.4%	33.6%	1.8%	30.1%	15.9%
Wyoming	40,041	27,488	76.2%	$49	$818	$867	94.3%	53.6%	1.9%	32.0%	17.0%
Total	22,809,862	17,524,046	69.5%	$43,218	$531,958	$575,176	92.5%	39.3%	2.9%	26.5%	16.4%

*Includes newly enrolled 1115 waiver eligible population.

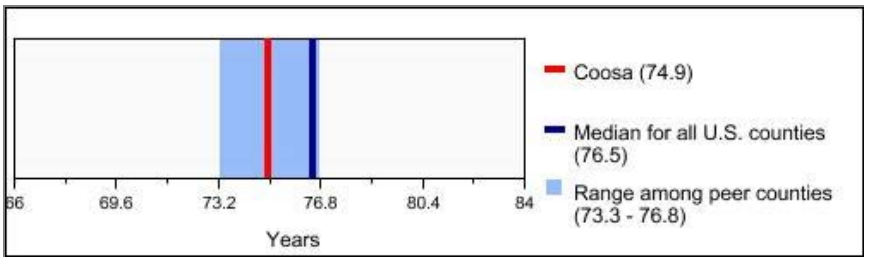
** Massachusetts has a low share of uninsured within the newly enrolled due to low levels of uninsurance in the baseline.

Note: These estimates relate solely to the Medicaid expansion and do not account for other changes in health reform such as access to subsidized coverage in the exchanges or state or federal savings from reduced uncompensated care or the transition of individuals from state-funded programs to Medicaid in 2014.

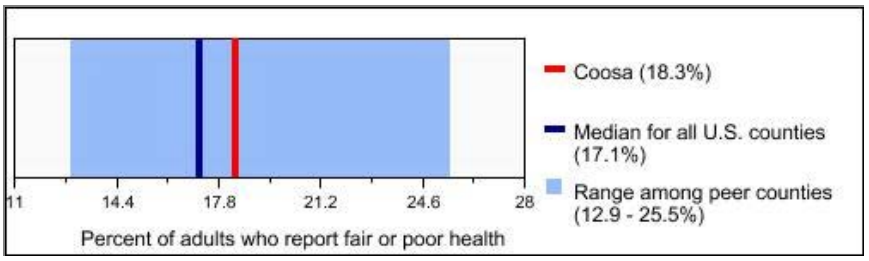
Source: Medicaid Coverage and Spending in Health Reform. Kaiser Commission on Medicaid and the Uninsured. www.kff.org/healthreform/upload/ Medicaid-Coverage-and-Spending-in-Health-Reform-National-and-State-By-State-Results-for-Adults-at-or-Below-133-FPL.pdf.

APPENDIX H: CDC COMMUNITY HEALTH STATUS INDICATORS SAMPLE: COOSA COUNTY, ALABAMA

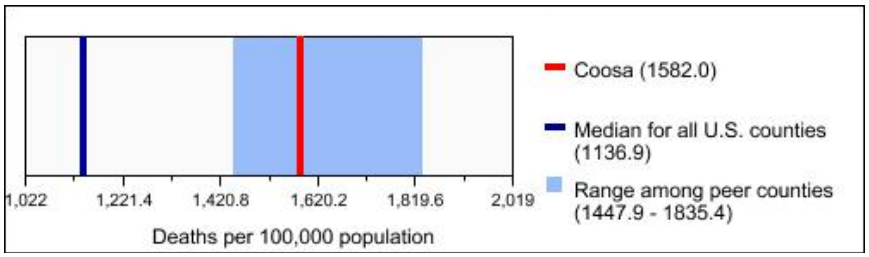
[1] AVERAGE LIFE EXPECTANCY



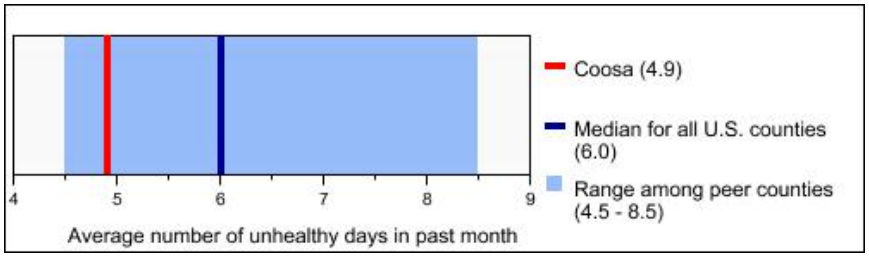
[2, 3] SELF-RATED HEALTH STATUS



[2] ALL CAUSES OF DEATH



[3] AVERAGE NUMBER OF UNHEALTHY DAYS IN PAST MONTH



nda: No data available; nrf: No report, survey sample size fewer than 50

Notes:

1. Murray et al., PLoS Medicine 2006 Vol. 3, No. 9, e260 doi:10.1371/journal.pmed.0030260.
2. NCHS. Vital Statistics Reporting System, 1996-2005.
3. CDC. Behavioral Risk Factor Surveillance System, 2000-2006.

APPENDIX I: DEFINITION OF ELIGIBLE LOCATION FOR RURAL HEALTH CLINIC

§ 491.2 Definition of shortage area for Rural Health Clinic (RHC) purposes. Shortage area means a geographic area that meets one of the following criteria. It is— (a) Designated by the Secretary as an area with shortage of personal health services under section 330(b)(3) of the Public Health Service Act; (b) Designated by the Secretary as a health professional shortage area under section 332(a)(1)(A) of the public Health Service Act because of its shortage of primary medical care professionals; (c) Determined by the Secretary to contain a population group that has a health professional shortage under section 332(a)(1)(B) of that Act; or (d) Designated by the chief executive officer of the State and certified by the Secretary as an area with a shortage of personal health services. [68 FR 74816, Dec. 24, 2003]

Source: 42CFR491.2 as referenced on CMS.gov website November 3, 2011.

APPENDIX J: NEGOTIATED RULEMAKING COMMITTEE: DRAFT EXCEPTIONAL MEDICALLY UNDERSERVED POPULATION (EMUP), OCTOBER 12, 2011

DEFINITION Exceptional Medically Underserved Population (EMUP)
The original Exceptional Medically Underserved Population designation authority was established in Public Law 99-280 (1986) and remains in force at Section 330_____of the PHS Act. This provision is intended to allow designation of a population group that does not meet the established MUA and/ or MUP criteria but has an "unusual local conditions which are a barrier to access to or the availability of personal health services" for the population. The EMUP designation would be used only if a community could not be designated under the general MUA and/ or MUP criteria, normally because the access barrier or other unusual local condition involved is not covered by the standard MUA/P criteria. The EMUP must allow for detailing unusual local conditions, access barriers, and availability indicators that would indicate a need for an exceptional designation.

The request for EMUP needs to include a written recommendation for the designation from the Governor or other CEO of the State, and may include recommendations of other local officials. This process also allows for experts to weigh in with opinions on the proposed exceptional designation of an appropriately needy population in a locality.

DEFINITION EMUP SERVICE AREA
The EMUP service area does not need to be an existing RSA or PCSA as defined for geographic designations. The EMUP may have its own unique service area boundaries, if the unusual local conditions which are a barrier to access to or the availability of personal health services cross or the boundaries of or are a subset within an existing RSA or PCSA. The EMUP's service area boundaries must be an area in which the population can both reasonably access the services provided and support the state and or federal resources assigned or allocated to serve that population.

GUIDANCE FOR EMUP DESIGNATIONS
Designation requested by Governor; should address all factors:

- An area or population group that does not meet the regular MUP and/ or MUA criteria
- Unusual local conditions which show:
- A barrier to accessing primary medical care or indication of medical under-service not covered by the regular
- MUA/P criteria is present**;**
- documented data showing high disease or mortality rates for the requested population group; and/or
- Significant negative changes in a community profile; such as but not limited to high unemployment, high increase in school lunch program enrollment, high increase in WIC program, major employer closings or other community distress.
- Compare to national or state norms; include data and source of data; should be a minimum of two examples of unique high morbidity/mortality and or significant changes in community profile.
- Focus on why this area or population group is "exceptional"; what makes it stand out from other similar areas, the surrounding areas, the county, and the state. provide a comparison of the local, regional, state, and/or national data for whatever factors are involved to show they are worse than the rest of the state and/or nation.

UPDATES TO EMUP

No designation will be held in perpetuity. Updates to the EMUPs will occur at least one to two years post availability of the decennial census data. The first EMUP re-designation or update will be upon availability of the complete 2010 decennial census; another shall be made following the 2020 census. (There was not consensus on this…a compromise could be every 5 years). Governor's Designation Secretary Certified (GDSC) (added at the pleasure of a Committee member who wanted to make sure we were not making changes to this…)

A GDSC was created in the Omnibus Budget Reconciliation Act of 1989 under section 6213(c). "areas designated by the Governor of a State and certified by the Secretary as having a shortage of personal health services." The Negotiated Rule Making Committee will not make any regulatory or guidance recommendations on said Act.

Source: www.HRSA.gov/advisorycommittees…/draftexceptionalmup.pdf

APPENDIX K: METHODOLOGY FOR ARC HEALTH CARE COST AND ACCESS INDEX

1 DIMENSIONS OF COST AND ACCESS

Following the logic and procedure of the ARC's "County Economic Status Classification System," (ARC Economic Status Index), the proposed Health Care Cost and Access Index should include a relatively small number of core indicators and compare these indicators with national values. The ARC's Economic Status Index is quite simple and straightforward in its composition and generally intuitive in interpretation. Further, it makes use of data sources that are reliable, publicly available, and constructed and validated by federal government sources using nationally uniform data collection strategies. Further the index makes use of sources that are transparent and rely upon justifiable validated small area analysis techniques for making county level estimates. Thus, the official sources for the data used in the Economic Status Index include: the U.S. Department of Labor, Bureau of Labor Statistics (unemployment levels), U.S. Department of Commerce, Bureau of Economic Analysis (per capita market income), and the U.S. Department of Commerce, Census Bureau (poverty level). It is evident that for the component indicators of the index, consistency and reliability are preferred over currency of information in choosing indicators. In other words, the index seeks to tap into stable structural trends in the Appalachian Region, the component states, and the United States as a whole, and to assess these trends relative to the national situation.

For example, a three-year average unemployment statistic is chosen over a single year's unemployment rate. This approach serves to control year to year volatility within counties in these rates due to local circumstances (e.g., plant closings and openings), as well as to reflect the fact that variations in employment levels can have an enduring effect on the community. As a result, for any given year, the unemployment rates used in the index will lag by an interval of two to four years. Similarly, there is likely to be a two-year lag in the per capita market income level. Finally the poverty level, another component of the index, was historically measured in decennial census years. Hence, the range of lag time range from one to ten years depending on the year for which the estimate is made. (It should be noted that the Census Bureau does construct and disseminate small area estimates of the poverty rate, and income distribution relative to the poverty rate, on a regular basis, and that it would be helpful to use these estimates as data in health related access measures (e.g., small area health insurance estimates). In the future, the poverty level will be measured annually in the American Community Survey (ACS).

To build the index on the foundation, we explored both the literature on healthcare access and published national databases.

2 CRITERIA FOR CONSTRUCTING HEALTH CARE COST AND ACCESS INDICES

2.1 CONCEPT

An index that could be used by the Appalachian Regional Commission to measure disparities associated with healthcare access, cost and coverage at the county level requires consistent, available data that reliably reflect the issues.

Composite measures combining several items may represent distinct but inter-related aspects of a single underlying concept. Indices used to assess healthcare cost and access disparities should be relatively transparent, simple to understand, comparable across the entire U.S., and easily replicable.

Whenever possible the subcomponents of the index should be drawn from publically available, periodically updated official sources of data. Despite the fact that there may be a time lag between data collection and reporting, it is preferable to use uniformly collected and reported data that have been well validated rather than more recent, but not so well validated data.

However, locally available estimates may be used for comparisons to better understand the limitations of the national data. Healthcare data are not always collected and compiled with the same frequency as economic data, nor is there as much consensus about the way in which various kinds of health related phenomena should be measured, or who has the best measurement strategy or the best raw data that can be used. There are three dimensions upon which healthcare cost and access disparities will be assessed: access, cost and status/outcomes; we will discuss these in some detail below.

2.2 HEALTHCARE ACCESS

Healthcare access is measured in terms of two primary sub-dimensions: resource availability and financial access. Resource availability refers to the physical presence of resources within a local community (i.e. presence of short term general hospital beds, presence of physicians of various types and specialties). Financial access means having of the economic means to access these resources (chiefly through the presence of health insurance). The presence of certain dedicated resources for underserved and uninsured population within a county reflects both of these dimensions (e.g., Rural Health Clinics, Community Health Centers, and Federally Qualified Health Centers).

2.3 HEALTH CARE COSTS

2.3.1 DEFINITIONS

Costs to those who pay for healthcare (payers) are measured by the expenditures of public and private insurance in per capita terms. Generally this means aggregate expenditures over an annual period divided by the number of "participants" (users and nonusers who were eligible to use the service over the time period observed). In some cases, particularly where relatively few eligibles actually make use of the service, the appropriate denominator might be the number of actual users, rather than merely the eligibles. This means that coverage of the population must be specified (e.g., Private Insurance, "Uninsurance," Medicaid, Medicare, and Veterans Administration). This has to be carefully done to assure that denominators are available and consistently applied for the same years as the numerator data.

Actual costs to deliver care are more difficult to measure. The most uniform of existing measurements is the wage index used by CMS to adjust payments to account for labor cost differences. The wage index is expressed as a ratio of the local to the national wage average.

CMS and the Congressional Budget Office also track healthcare expenditures by state, for federal budgeting purposes. In 2011, CMS reported National Health Expenditures online for the year 2004 at www.cms.gov/NathionalHealth/ExpendData.

2.3.2 CMS EXPENDITURE REPORTS

2.3.2.1 NATIONAL HEALTH EXPENDITURES

- Historical annual health spending in the U.S. by type of service delivered (hospital care, physician services, nursing home care, etc.) and source of funding for those services (private health insurance, Medicare, Medicaid, out-of-pocket spending, etc.), by year through 2009.
- Projections based on the National Health Expenditures. These estimates spending for healthcare in the U.S. through 2020. Projections are presented by type of service delivered (hospital care, physician services, nursing home care, etc.) and by source of funding for those services (private health insurance, Medicare, Medicaid, out-of-pocket spending, etc.). The projections include a simulation of personal healthcare and Medicare per-enrollee spending using the age-mix of future selected years and include adjustments for health reform from the Office of the Actuary Health Reform Model (OHRM).

2.3.2.2 STATE HEALTH EXPENDITURES

- Personal healthcare (PHC) expenditures by State of Provider are estimates of health spending by the location of healthcare providers in the 50 States and in the District of Columbia. These estimates are presented by the type of establishment delivering care (hospitals, physicians, nursing homes, etc.) and by source of funding (Medicare and Medicaid).
- PHC expenditures by State of Residence are based on State of Provider estimates adjusted for the flow of residents between states in order to consume healthcare services. These estimates present health spending on behalf of residents in the 50 States and in the District of Columbia. Included are estimates of aggregate and per capita health spending by type of establishment delivering care (hospital, physicians, nursing home, etc.). Per enrollee spending for Medicare and Medicaid are also presented by type of establishment.
- PHC estimates by type of service and source of funding are customarily separated into seven age groups: 0-18, 19-44, 45-54, 55-64, 65-74, 75-84, and 85 and over. Some databases consolidate the information in three main age groups: Children (ages 0-18), Working-age Adults (ages 19-64), and Elderly (ages 65 and over).

2.3.2.3 SPONSORS: BUSINESS, HOUSEHOLD AND GOVERNMENT HEALTHCARE SPENDING

- Estimates of healthcare spending by sponsor: Businesses, Households and Governments. These estimates provide context for discussion of who ultimately pays for healthcare, the underlying pressures and the burden that affect these sponsors and their decisions to finance healthcare in the United States. The estimates are derived from a subset of the National Health Expenditure Accounts by the Office of the Actuary. State level data are assembled periodically. The most recent published in July 2011 are for the year 2009.
- In 2004, healthcare spending by state of residence continued to vary significantly, ranging from an average of $6,683 per resident in Massachusetts to $3,972 in Utah. The national average spent for personal healthcare services in the United States was $5,283 per resident.

On this report, Appalachian states divided almost evenly above and below the national average.

TABLE 33 - APPALACHIAN STATE HEALTH CARE SPENDING BY STATE OF RESIDENCE RANK ORDERED*

State	Total All Payers Per Capita Personal Health Care Expenditures (PHCE) 2009
Georgia	$4,600
Virginia	$4,822
Mississippi	$5,059
South Carolina	$5,114
Alabama	$5,135
North Carolina	$5,191
Tennessee	$5,464
Kentucky	$5,473
Maryland	$5,590
Ohio	$5,725
Pennsylvania	$5,933
West Virginia	$5,954
New York	$6,535
U.S. Average	**$5,283**

Source: Centers for Medicare & Medicaid Services, Office of the Actuary, National Health Statistics Group (https://www.cms.gov/NationalHealthExpendData/downloads/res-states.pdf).

*Note the table above is includes the most recent data available.

Nationwide, Medicare expenditures per beneficiary were highest in Louisiana ($8,659) and lowest in South Dakota ($5,640) in 2004; for Medicaid, expenditures per enrollee were highest in Alaska ($10,417) and lowest in California ($3,664).

Residents cross state borders for healthcare for reasons such as ease of travel, proximity to state borders, and the availability of facilities and services that cannot be found in one's home state.

In 2004, states where spending by state-of-residence was significantly greater than spending by state-of-provider included Wyoming, Idaho, West Virginia, New Mexico, and Vermont. This indicates that residents of these states travel outside of their state for healthcare in greater proportions than others travel into that state for care. On the other hand, spending by state-of-residence was less than spending by state-of-provider for North Dakota, Tennessee, South Dakota, Minnesota, and the District of Columbia. Use controls, age and travel barriers account for their differences.

2 3.2.4 NATIONAL HEALTH EXPENDITURE SURVEY

The Center for Disease Control, National Center for Health Statistics also tracks personal health expenditures through the National Health Expenditure Survey, which is conducted by sampling individuals and providers. These data are not available at the county level.

The Agency for Healthcare Research and Quality (AHRQ) conducts a bi-annual Medical Expenditure Panel Survey (MEPS) in which it samples families, providers and insurance companies for data on healthcare charges and employer contributions. Geographically, these are aggregated only for the four quadrants of the country. Reported expenditures tend to be lower than those reported by the CMS Office of the Actuary.

2.3.2.5 American Community Survey – U.S. Census

Through the American Community Survey, the U.S. Census staff samples type of health insurance coverage and extends the sample to the Congressional District level. This can be approximately contoured to the Appalachian Region. However, the data set has only consumer expenditure survey information and is dependent on recall over a full year.

2.3.3 Geographic Wage Index

2.3.3.1 Description

To reflect the difference in cost of healthcare from one area to another, CMS maintains several geographic healthcare wage indices. Initially, focused only on hospitals, the indices now include one for hospitals, one for physicians, one for skilled nursing and facilities, one for end stage renal disease and a separate one for home health. With the exception of home health and physicians, the wage indices are based in some way on the hospital index. Some have a rural floor factor. Annually, CMS sets the wage index to one as the national norm. Indices are calculated for three Core Based Statistical Areas (CBSA) in each state: based on Metropolitan, Micropolitan and Other. For the most part, Census definitions set the boundaries. In some cases, Congressional action may assign a provider or a geographic area to a higher paying CBSA. Every provider certified to bill Medicare is then assigned a wage index on the basis of its address.

Figure 47 - Core Based Statistical Areas per OMB

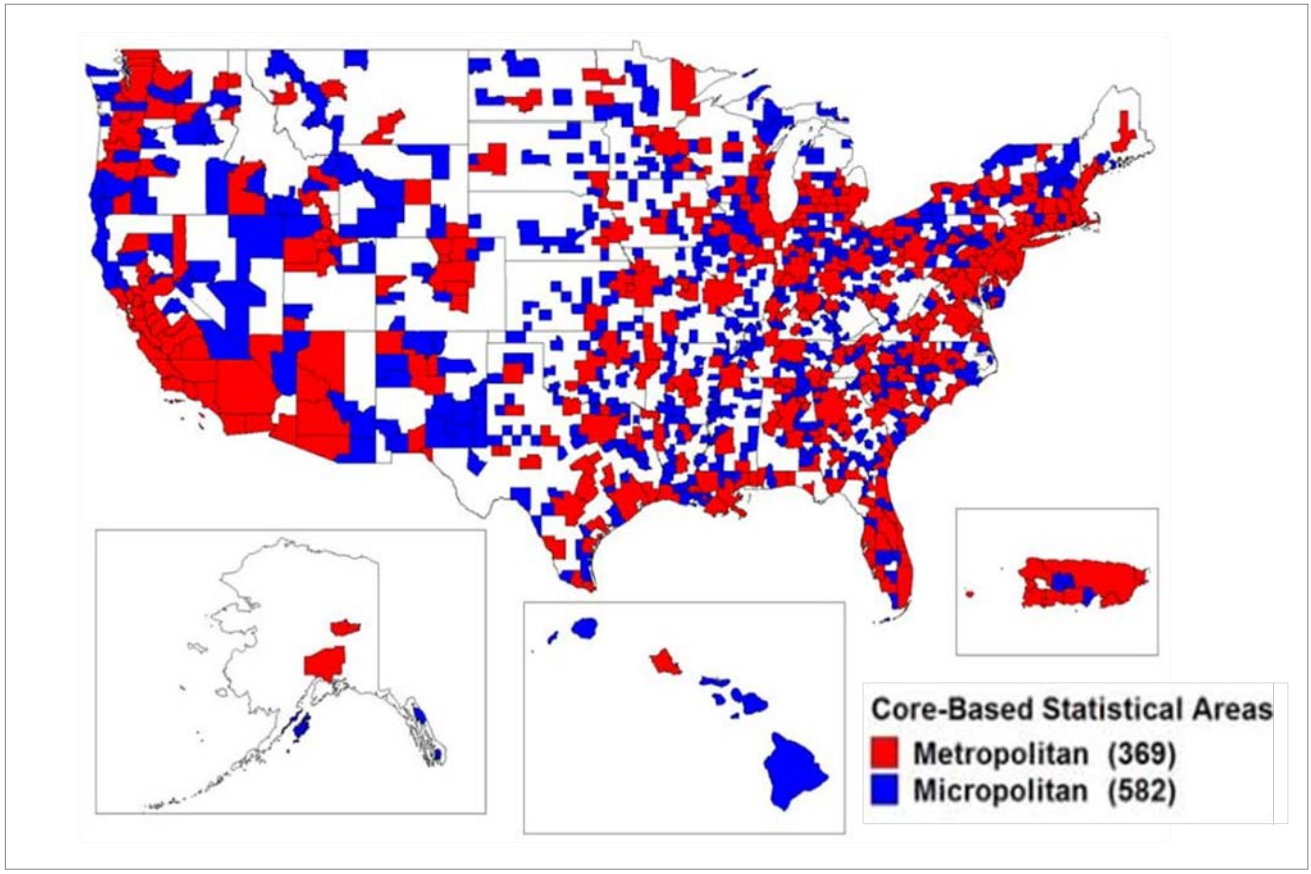


Figure 47 illustrates the distribution of the CBSA's nationwide. A close look shows much of West Virginia and Appalachian Kentucky fit in the "Other" or non-core classification.

The Geographic Wage Index itself is a three-year average, with the most recent year as much as five years behind. The 2011 index includes data from years: 2003, 2004 and 2005. By statute, the Wage Index is used to adjust Medicare payments. In practice, Medicaid and private insurers set their payment schedules as a multiple of Medicare. The Index tends to reflect higher wages than the BLS wage index.[93] Many Appalachian counties are classed as non-core or rural under this grouping and these tend to get the lower indices.

2.3.3.2 ORIGIN

Section 1886(d) (3) (E) of the Social Security Act requires that, as part of the methodology for determining prospective payments to hospitals, the Secretary must adjust the standardized amounts "for area differences in hospital wage levels by a factor (established by the Secretary) reflecting the relative hospital wage level in the geographic area of the hospital compared to the national average hospital wage level." This adjustment factor is the wage index.

CMS currently defines hospital geographic areas (labor market areas) based on the definitions of Core-Based Statistical Areas (CBSAs) established by the Office of Management and Budget and announced in December 2003. The wage index also reflects the geographic reclassification of hospitals to another labor market area in accordance with sections 1886(d) (8) (B) and 1886(d) (10) of the Act.

The Act further requires that CMS update the wage index annually, based on a survey of wages and wage-related costs of short-term, acute care hospitals. Data included in the wage index derive from the Medicare Cost Report, the Hospital Wage Index Occupational Mix Survey, hospitals' payroll records, contracts, and other wage-related documentation. In computing the wage index, CMS derives an average hourly wage (AHW) for each labor market area (total wage costs divided by total hours for all hospitals in the geographic area) and a national AHW (total wage costs divided by total hours for all hospitals in the nation). A labor market area's wage index value is the ratio of the area's AHW to the national AHW. The wage index adjustment factor is applied only to the labor portion of the standardized amounts.[94]

2.3.3.3 MODIFICATIONS

The index has been a source of significant political debate; and work-around amendments often occur. For example, to protect hospitals in sparsely populated Frontier states, the ACA requires CMS to adopt a hospital wage index that is not less than 1.0000 for hospitals located in frontier states, beginning in FY 2011. Frontier states are defined in the law as states where at least 50 percent of the counties have a population density of less than six people per square mile. In the final rule, CMS is basing the frontier county and state determinations on the most recently available Annual Population Estimates from the U.S. Census. As a result, 51 IPPS hospitals in five states - Montana, Nevada, North Dakota, South Dakota, and Wyoming - will benefit from this provision in FY 2011.

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[93] MaCurdy, Thomas, Thomas Deleire, Karla Lopez de Nava, Paulette Kamenecka, Yang Tan, Sean McClellan. Revision of Medicare Wage Index Final Report, Part 1. April 2009. Accumen, LLC. Burlingame, CA.
https://www.cms.gov/AcuteInpatientPPS/03_wageindex.asp#TopOfPage. Accessed January 3, 2011.

[94] Centers for Medicare & Medicaid Services (CMS). "Wage Index". http://www.cms.gov/ AcuteInpatientPPS/03_wageindex.asp.

An amendment to the Medicare statute added a Geographic Adjustment Factor (GAF) to the index. Its intended purpose was to correct for higher costs that particularly rural communities may pay to compete for staff from nearby urban or metropolitan counties.

2.4 HEALTH STATUS / HEALTH OUTCOMES

We have chosen three-year average YPLL_75-75 as the key measure of health outcomes. This is a mortality based measure rather than a health status measure, but it disproportionately weights mortality that occurs in younger ages, because more years of life are lost by the death of a younger person over time.

It would be helpful to have another measure that deals with illness severity or long term disability over the life course or risks such as estimates of morbidity. However, most such estimates are secondary to the use of health resources (e.g., hospital discharge data) or based on statistical models that lack sufficient precision at the local level (e.g., model based BFRSS surveys or health risks or health behavior).

2.5 DATA REDUCTION STRATEGIES.

2.5.1 SELECTION OF CANDIDATE SOURCES

The selection process involved three key drivers.

- The criterion: uniform data available at the county level quickly narrowed the selection process for data. Even then, more items are available than needed to construct a valid index.
- Where multiple items are indicative of a single concept, we used multivariate data reduction techniques to assess the contribution of each discrete item to the underlying hypothetical construct representing the underlying concept.
- Factor analysis was used for data reduction. This locates Items which "load" on factors help guide selection of final items for inclusion in the indices. As core indicators of access, we selected two to five items that are both substantively meaningful and statistically indicative of health access.

2.5.2 SMALL AREA ANALYSIS

When population based data are not available for a small geographic area such as a county, estimates are made. These estimates can involve a variety of methods, but typically use one of three basic approaches: direct estimates; synthetic estimates; or estimates based on geographic "smoothing".

- Direct estimates are generally made from samples of individuals residing within the boundaries of the small area. However, in order to generate valid and reliable estimates, there must be a sufficient number of cases to generate a stable estimate. Generally this would be in excess of 100 cases. Further, the method of selection should be known, and if possible, random. Direct estimates are thought to be preferred to other methods, when there are sufficient data points in a small area and simple random sampling is used.
- Synthetic estimates (model-based estimates) use data from large national, regional, or statewide samples to make estimates for small geographic areas like counties, but do not use direct methods from the data points actually within that geographic area. Instead, a statistical model relating the characteristic of interest (e.g., "uninsurance") to a set of demographic predictors, e.g., age, sex, race, educational level, job type, etc. If these population characteristics can be reconstructed from

local areas, then the statistical model can be applied and a local area estimate can be made using the population characteristics of the local area.

  - The validity of these estimates depends on how well the statistical model predicts the characteristic of interest. If important characteristics are left out of the statistical model, the validity decreases. Characteristics can be missing because they are not available in the original dataset (e.g., unionization status of individual), or the predictors have a more complex relationship than the statistical model will support.
  - The Small Area Health Insurance Estimates are model-based or synthetic estimates of numbers and percentages in communities based on information from large national surveys reporting the insurance status of individuals and households. These are combined with locally applied estimates of the population characteristics of a given county and re-aggregated up to the county level to yield estimates of the numerators and denominators needed to measure the insured and uninsured populations.

- Geographic smoothing is a variation of direct estimation in which the deficiencies of having a small number of actual data points is compensated for by extending out the radius of the "small area" to include data points from adjacent areas and using these points (with some down-weighting factors for remote areas) to increase the sample size. The focal and peripheral counties are then combined into an estimate.

When empirical tests of these three methods are applied against population-based data, results have revealed that direct estimation is the least reliable, and that model-based estimates of health characteristics are generally much more reliable, assuming the model is reasonably robust. SAHIE and YPLL_75 are both validated model-based estimates.

2.6 Summary of Items Relevant to Health Disparities Index Construction

2.6.1 Data Elements

Data elements and related sources that the study team reviewed for possible inclusion in an index of health cost and access measurement of health disparities, separated into five categories. The following sections describe each element in order of the particular dimension of access or cost measured or examined.

- Items 1 through 12 are potential access indicators which are also arrayed by sub-domain: items 1 through 2 reflect resource availability indicators; 3 through 4 reflect access indicators involving use of services. Items 5 through 10 represent financial aspects of Access to Care; items 11 and 12 represent more of a policy dimension, i.e., dedicated facilities or resources designed to promote access;
- Items 13 through 16 represent a healthy physical and social environment; items 17 through 19 represent socioeconomic status; Item 20 represents health status or health outcomes; and
- Finally the cost of care is represented by the remaining items 21 through 16. For each of the 26 items profiled, the source, most recent year, and smallest level of geographic data availability is provided along with a brief definition, the actual database source and a website where available.

2.6.2 Measures of Health Cost and Access

1. Primary Care Physicians per 100,000 American Medical Association. 2009. Physician Masterfile 2008. From: Department of Health and Human Services, Health Resources and Services Administration, Bureau of Health Professions, Office of Workforce Policy and Performance Management (HRSA). 2010. Area Resource File 2009-2010 [Compact Disc]. Rockville, MD: HRSA. 2010.

   American Osteopathic Association. 2007. Physician File for 2007. From: Department of Health and Human Services, Health Resources and Services Administration, Bureau of Health Professions, Office of Workforce Policy and Performance Management (HRSA). 2010. Area Resource File 2009-2010 [Compact Disc]. Rockville, MD: HRSA. 2010.

2. Dentists per 100,000 American Dental Association. 2007. Distribution of Dentists in the U.S. for 2007. From: Department of Health and Human Services, Health Resources and Services Administration, Bureau of Health Professions, Office of Workforce Policy and Performance Management (HRSA). 2010. Area Resource File 2009-2010 [Compact Disc]. Rockville, MD: HRSA. 2010.

3. At-Risk Adults With Routine Checkups National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control (CDC). 2010. Behavioral Risk Factor Surveillance System 2009 [online data]. Atlanta, GA: Centers for Disease Control. Available at ftp://ftp.cdc.gov/pub/ data/brfss/CDBRFS09ASC.zip, retrieved December 18, 2010.

4. Adequacy of Prenatal Care National Center for Health Statistics, Centers for Disease Control (CDC). 2010. National Vital Statistics System 2008 [online data]. Atlanta, GA: CDC. Available at 205.207.175.93/ VitalStats/ReportFolders/reportFolders.aspx, retrieved December 18, 2010.

2.6.3 Measures of Finance

5. Adults Could Not See Doctor Because Of Cost National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control (CDC). 2010. Behavioral Risk Factor Surveillance System 2009 [online data]. Atlanta, GA: CDC. Available at ftp://ftp.cdc.gov/pub/data/brfss/CDBRFS09ASC.zip, retrieved December 18, 2010.

6. Nonelderly Adults (ages 18–64) Insured Department of Commerce, U.S. Census Bureau (Census Bureau). 2010. Small Area Health Insurance Estimates (SAHIE) for Counties and States 2007 [online data]. Washington, DC: Census Bureau. Available at www.census.gov/did/www/sahie/data/ 2007/files/sahie07all.txt., retrieved November 11, 2010

7. Children (ages 0–17) Insured Department of Commerce, U.S. Census Bureau (Census Bureau). 2010. Current Population Survey, Annual Social and Economic (ASEC) Supplement 2009 [online data]. Washington, DC: Census Bureau. Available at www.census.gov/hhes/www/cpstables/ 032010/health/toc.htm, retrieved December 19, 2010.

8. Uninsured Individuals (age under 65) Department of Commerce, U.S. Census Bureau (Census Bureau). 2010. Small Area Health Insurance Estimates (SAHIE) for Counties and States 2007 [online data]. Washington, DC: Census Bureau. Available at www.census.gov/did/www/sahie/data/ 2007/files/sahie07all.txt., retrieved November 11, 2010.

9. Medicare Beneficiaries Department of Health and Human Services, Centers for Medicare & Medicaid Services (CMS). 2010. Medicare Aged and Disabled by State and County 2007 [online data]. Washington, DC: CMS. Available at www.cms.gov/MedicareEnRpts/Downloads/ County2007.zip. Retrieved October 15, 2010.

   Department of Health and Human Services, Centers for Medicare & Medicaid Services (CMS). 2010. State County Penetration Data for Medicare Advantage Files, as of December 2009.From: Department of Health and Human Services, Health Resources and Services Administration, Bureau of Health Professions, Office of Workforce Policy and Performance Management (HRSA). 2010. Area Resource File 2009-2010 [Compact Disc]. Rockville, MD: HRSA. 2010.

10. Medicaid Beneficiaries Department of Health and Human Services, Centers for Medicare & Medicaid Services (CMS). 2010. Medicaid Analytic Extract (MAX) Person-Summary Files for 2004-2005. From: Department of Health and Human Services, Health Resources and Services Administration, Bureau of Health Professions, Office of Workforce Policy and Performance Management (HRSA). 2010. Area Resource File 2009-2010 [Compact Disc]. Rockville, MD: HRSA. 2010

11. Community/Migrant Health Centers Department of Health and Human Services, Centers for Medicare & Medicaid Services (CMS). 2010. Number of Community Mental Health Centers for 2008. From: Department of Health and Human Services, Health Resources and Services Administration, Bureau of Health Professions, Office of Workforce Policy and Performance Management (HRSA). 2010. Area Resource File 2009-2010 [Compact Disc]. Rockville, MD: HRSA. 2010.

12. Health Professional Shortage Areas (HPSA) Department of Health and Human Services, Centers for Medicare & Medicaid Services (CMS). 2010. HPSA Code for 2009. From: Department of Health and Human Services, Health Resources and Services Administration, Bureau of Health Professions, Office of Workforce Policy and Performance Management (HRSA). 2010. Area Resource File 2009-2010 [Compact Disc]. Rockville, MD: HRSA. 2010.

2.6.4 Measures of Physical and Social Health

13. Access to Healthy Foods Department of Commerce, U.S. Census Bureau (Census Bureau). 2010. County Business Patterns (CBP) 2008 [online data]. Washington, DC: Census Bureau. Available at ftp.census.gov/econ2008/CBP_CSV/cbp08co.zip, retrieved December 18, 2010.
14. Liquor Store Density Department of Commerce, U.S. Census Bureau (Census Bureau). 2010. ZIP Code Business Patterns (ZBP) 2008 [online data]. Washington, DC: Census Bureau. Available at ftp.census.gov/econ2008/CBP_CSV/zbp08totals.zip, retrieved December 18, 2010.
15. Public Health Funding Trusts for America's Health. 2009. Prevention for a Healthier America: Investments in Disease Prevention Yield Significant Savings, Stronger Communities. Washington, DC: Trusts for America's Health. Available at healthyamericans.org/reports/prevention08/ Prevention08.pdf, retrieved December 19, 2010.
16. Immunization Coverage National Immunization Program and the National Center for Health Statistics, Centers for Disease Control (CDC). 2010. U.S. Vaccination Coverage Reported via National Immunization Survey (NIS) 2009 [online data]. Atlanta, GA: CDC. Available at www.cdc. gov/vaccines/stats-surv/nis/tables/09/tab02_antigen_iap.xls, retrieved December 18, 2010.

2.6.5 Measures of Socioeconomic Status

17. Unemployment Rate Department of Labor, Bureau of Labor Statistics (BLS). 2010. Local Area Unemployment Statistics [online data]. Washington, DC: BLS. Available at ftp.bls.gov/pub/time.series/la, retrieved December 19, 2010.
18. Income Inequality Department of Commerce, U.S. Census Bureau (Census Bureau). 2010. American Community Survey 2009 [online data]. Washington, DC: Census Bureau. Available at www.census.gov/acs/www, retrieved December 19, 2010.
19. Children in Poverty Department of Commerce, U.S. Census Bureau (Census Bureau). 2010. Small Area Income and Poverty Estimates 2009 [online data]. Washington, DC: Census Bureau. Available at www.census.gov/did/www/saipe/, retrieved December 19, 2010.

2.6.6 Measures of Health Status and Outcomes

20. Years of Potential Life Lost Before 75 (YPLL_75) National Center for Health Statistics, Centers for Disease Control (CDC). 2010. Compressed Mortality File (CMF) on CDC WONDER On-line Database [online data]. Atlanta, GA: CDC. Available at wonder.cdc.gov/wonder/help/cmf.html, retrieved November 22, 2010.

2.6.7 Measures of Cost of Care

21. Preventable Hospitalizations The Dartmouth Institute for Health Policy and Clinic Practice. 2010. The Dartmouth Atlas of Health Care 2007. Lebanon, NH: , The Dartmouth Institute for Health Policy and Clinic Practice.
22. Hospital Admissions for Pediatric Asthma per 100,000 Children Agency for Healthcare Research and Quality (AHRQ). 2010. HCUP State Inpatient Databases (SID). Healthcare Cost and Utilization Project (HCUP). 2003-2004. Rockville, MD : AHRQ. 2010.
23. Total Single Premium per Enrolled Employee Agency for Healthcare Research and Quality (AHRQ). 2010. Medical Expenditure Panel Survey (MEPS), Insurance Component State and Metro Area Tables 2009 [online data]. Rockville, MD : AHRQ. Available at www.meps.ahrq.gov/mepsweb/data_stats/ quick_tables_search.jsp?component=2&subcomponent=2, retrieved December 19, 2010.
24. Total Medicare (Parts A & B) Reimbursements per Enrollee The Dartmouth Institute for Health Policy and Clinic Practice. 2010. Medicare Reimbursements by Enrollee 2007 [online data]. Lebanon, NH: , The Dartmouth Institute for Health Policy and Clinic Practice. Available at www. dartmouthatlas. org/data/topic/ topic.aspx?cat=21, retrieved December 18, 2010.
25. Bankruptcies Filed Administrative Office of the U.S. Courts. 2010. Bankruptcy Statistics [online data]. Washington, DC: Administrative Office of the U.S. Courts. Available at www.uscourts. gov/uscourts/Statistics/BankruptcyStatistics/BankruptcyFilings/2010/0310_f2.xls, retrieved December 19, 2010.
26. Medical Bankruptcies David U. Himmelstein, M.D; Deborah Thorne, Ph.D.; Elizabeth Warren, J.D.; Steffie Woolhandler, M.D., M.P.H. “Medical bankruptcy in the United States, 2007: Results of a national study.” American Journal of Medicine, June 4, 2009. Availble at www.pnhp. org/new_bankruptcy_study/Bankruptcy-2009.pdf, retrieved December 19, 2010.

3 CONSTRUCTION OF THE ARC HEALTH COST AND ACCESS INDEX

3.1 SELECTION OF DATA ELEMENTS

In this section we explain how the health access index was constructed. We will first explain how three distinct subcomponent indices were constructed and then how the three were combined into a single index.

3.2 HEALTH RESOURCE ACCESS INDEX CONSTRUCTION

Our intent in examining health resources indices was to start with the distribution of primary care physicians, which have frequently been used as an overarching measure of healthcare access and to compare this distribution with more specialized physicians.

TABLE 34 - NUMBER AND PERCENT OF COUNTIES WITHOUT PHYSICIANS, 2008 (U.S. AND ARC COUNTIES)

Counties without:	All U.S. Counties (N=3141)		Appalachian Counties (N=420)	
	Number	Percent	Number	Percent
Primary Care MDs or Dos	157	5.0%	3	0.7%
General Surgeons	1196	38.1%	134	31.9%
General OBGYNs	1486	47.3%	170	40.5%
Medical Subspecialists	1442	45.9%	140	33.3%
Surgical Subspecialists	1410	44.9%	187	44.5%
Hospital Specialties	1313	41.8%	150	35.7%
Mental Health Specialists	1669	53.1%	197	46.9%
Emergency Medicine	1480	47.1%	159	37.9%
Any of the above non primary care specialties	633	20.2%	44	10.5%
Number of Counties	**3141**	**100.0%**	**420**	**100.0%**

Source: ARF 2010.

Table 34 compares physician shortages in Appalachian counties to all U.S. counties and county surrogates. Appalachian counties are less inclined to lack any physicians than are counties elsewhere in the U.S. Only three Appalachian counties (less than one percent) had no primary care physicians in 2008. This stands in contrast to 5 percent of all U.S. counties that lack primary care physicians. Clearly, this difference may be evidence of the success of the long-standing efforts to build a primary care workforce in the Appalachian Region through a variety of federal and state programs.

Similarly, only 44 Appalachian counties (less than 11 percent) had none of the physician specialists we identified in our analysis, while nationally 633 counties (over 20 percent of the counties in the nation) lacked any of these non-primary care specialties.

However, as Table 35 reveals, when Appalachian and non-Appalachian counties are compared by population, there is very little difference between the mean values in physician to population ratios.

TABLE 35 - MEAN VALUES OF PHYSICIANS TO POPULATION RATIOS OF VARIOUS TYPES (APPALACHIAN AND NON-APPALACHIAN COUNTIES, 2008)

Physicians Per 100,000 population	Non Appalachian Counties N=2721			Appalachian Counties N=420		
	Mean	Std. Dev.	Skew	Mean	Std. Dev.	Skew
Primary Care (MD or DO)	66.18	47.29	3.055	66.34	69.10	10.951
General Surgeons	6.27	8.60	4.549	6.77	11.65	9.562
General Obstetrics Gynecology	5.20	7.01	2.104	5.11	6.88	4.445
Medical Sub Specialists	11.95	23.78	6.346	12.98	39.19	15.175
Surgical Sub Specialists	11.08	18.12	4.705	10.79	20.96	8.761
Hospital Specialists	12.19	21.47	6.731	11.15	24.62	10.984
Mental Health Specialists	4.95	9.73	4.914	4.24	6.53	2.986
Emergency Medicine Specialists	4.96	7.92	4.114	4.78	7.54	6.995
Combined non-primary Care	**162.63**	**628.14**	**16.73**	**139.39**	**534.47**	**18.38**

Source: ARF 2010.

No statistically significant differences between the Appalachian counties and the non-Appalachian counties were found, either in the percentage of counties lacking a specific specialty or in the mean physician to population ratios for each of the different types of physicians counted separately or combined. In some cases the mean Appalachian county appeared to have a slightly higher physician to population ratio (primary care, general surgery, medical subspecialists, obstetrician-gynecologists), while in other cases it appeared slightly lower (e.g., mental health, emergency medicine, obstetrics gynecology, surgical subspecialists, hospital specialists). Yet, when all the non-primary care specialties are combined, the difference appears to favor the non-Appalachian counties. This is largely attributable to the highly concentrated geographic clustering of many U.S. subspecialists in very large metropolitan areas outside of Appalachia.

However, given the high degree of skewness of the distribution of county level physician-to-population ratios, it is important to examine other properties of the physician-population ratios to determine if such measures can be useful in discriminating physicians at the lower levels of physician to population ratios.

When the information about physician population ratios is displayed in percentile form, it becomes evident that there are a number of challenges to meaningful discrimination between counties in terms of physician availability especially at the low end of the distribution and among non-primary care physician specialties.

TABLE 36 - PHYSICIANS PER 100,000 POPULATION, APPALACHIAN AND NON-APPALACHIAN COUNTIES, ARRAYED BY PERCENTILE

Type of Physician	Type of County	Percentile Level						
		5th	10th	25th	50th	75th	90th	95th
Primary Care (MD or DO)	Non Appalachian	00	17.91	37.83	59.06	86.91	118.48	142.99
	Appalachian	14.72	22.65	37.28	56.91	78.90	109.69	140.01
General Surgeons	Non Appalachian	0	0	0	4.69	9.40	14.94	19.61
	Appalachian	0	0	0	5.12	9.25	13.75	17.89
Gen OBGYN	Non Appalachian	0	0	0	2.25	8.75	14.29	18.27
	Appalachian	0	0	0	3.96	7.78	12.50	18.02
Medical Sub-Specialists	Non Appalachian	0	0	0	2.46	15.42	34.58	51.85
	Appalachian	0	0	0	5.85	14.70	28.30	40.91
Surgical Sub-Specialists	Non Appalachian	0	0	0	3.89	16.80	31.11	41.76
	Appalachian	0	0	0	4.91	14.73	26.31	37.51
Hospital Specialists	Non Appalachian	0	0	0	4.74	16.90	33.61	46.09
	Appalachian	0	0	0	5.41	14.42	27.57	41.50
Mental Health Specialists	Non Appalachian	0	0	0	.00	6.50	14.57	20.74
	Appalachian	0	0	0	1.90	6.50	10.58	17.51
Emergency Medicine Physicians	Non Appalachian	0	0	0	1.82	7.79	13.77	18.25
	Appalachian	0	0	0	3.38	6.68	11.79	15.82
Combined Non Primary Care Physician Groups	**Non Appalachian**	**0**	**0**	**16.05**	**65.19**	**149.58**	**312.34**	**490.69**
	Appalachian	**0**	**0**	**38.33**	**76.38**	**149.43**	**250.14**	**341.42**

In Table 36, at least 25 percent of the counties in the U.S., and a comparable percentage of counties in the Appalachian Region, lack most of the physician specialty groups that we have identified. Note zeros in columns representing 25th percentile and below. For many of these specialist groups, the typical (50th percentile) Appalachian county has a higher physician to population ratio than does the typical (50th percentile) U.S. County.

On the other hand, relatively fewer Appalachian counties are in the top quartile (i.e. at the 75th percentile) in terms of physician to population ratios for almost any of the identified physician groups.

Because of the uneven distribution of specialist physicians in particular, it is quite difficult to make comparisons at the lower end of any of the physician availability measures except for primary care. Hence comparing Appalachian and non-Appalachian counties may prove to be relatively difficult because so many counties are "tied" at "zero" for the various types of physician specialties. Even when all the non-primary care physician groups are combined as in the last row of the table, at least 10 percent of counties have none of the non-primary care physician groups we have examined.

We remedied this situation of a "lumpy" distribution by adopting two approaches: (1) extending the physician availability measures from a single point in time to include physicians present in a county over a three-year period; and (2) arraying the counties which have no physicians of a given type for a given year in order of their population for purposes of establishing a percentile rank. Each of these two strategies can be justified as a measurement strategy.

First of all, single point in time estimates of physician-to-population ratios can be quite inaccurate especially for counties with small populations and small numbers of physicians, because the retirement, in-migration or out-migration of a single physician can dramatically change that ratio from one year to another. Further, the health impact of a physician is likely to endure beyond a single year meaning that a county that loses its sole physician can plausibly be characterized as having had better healthcare access in the subsequent year, than would a county that did not have a physician in either year. In fact, migration of physicians in and out of rural counties and states is quite substantial and has been well documented for both primary care physicians and specialists.[95] Such a pattern of migration can make counties with small population change from being without a doctor in one year, to having a quite favorable physician to population ratio in another year.

Our second approach is arraying counties with a persistent experience of zero physicians in order of their overall population. This is based on the logic that a more populated county without a physician experiences a greater population health burden in terms of access than would a smaller county without a physician. Further, doctor-less counties are often counties where populations are not only small but in decline, rather than growing, making acquisition of a new physician even more difficult.

By using these two techniques together—yearly averaging and selective ordering of counties without physicians, and by assessing these parameters separately for primary care physicians and non-primary care physicians, we can effectively discriminated counties with a various degrees of physician availability from one another in a more meaningful way—especially among those counties that lack a variety of different kinds of health resources—and thereby produced a more valid and stable index.

3.3 SELECTION OF RESOURCE ITEMS

Given the complexity of the distributions of different non-primary care specialties, we selected the following four items as indicators of healthcare resource access:

- Primary care physicians per 100,000 population (average of three consecutive years: 2006-2008),
- Non-primary care physicians per 100,000 population (average of three consecutive years: 2006-2008),
- Dentists per 100,000 population for 2007, most recent year available,
- Hospital beds per 10,000 population for 2008 or most recent year available.

Each of the four variables was sorted for all counties in the U.S. and a rank value assigned on that basis. In cases where counties were tied, with zero practitioners or no hospital beds, counties with larger populations were assumed to have less favorable access scores and were ranked accordingly. A county's combined raw score on the healthcare resource access component is the average of the ranks on the four items. Raw scores were then converted to percentiles and this is the final component score for each county.

[95] Ricketts, T.R., S.E. Tropman, R. Slifkin, T.R. Konrad. Migration of Obstetricians-Gynecologists In to and Out of Rural Areas. Medical Care. May 1996. 34(5)428-438. Also T.R. Konrad, Li Hong. Migrating Docs: Studying Physician Practice Location. JAMA. December 27, 1995. 274(24):1914

3.4 HEALTH INSURANCE ACCESS COMPONENT CONSTRUCTION

The Health Insurance Access component consists of a combination of those health insurance variables that are available at the county level. All four SAHIE based measures, which are available from the Census for every U.S. County, are very highly inter-correlated, but each reflects different age and income groups. The four were selected from the database in the following table.

TABLE 37 - HEALTH INSURANCE ACCESS COMPONENT CONSTRUCTION

Age Group (Census Est.)	Relevant Subgroup	Insurance Variable	Source	Most Recent Year	Interpretation
0-19	All income group	Percent Insured*	SAHIE	2007	Extent of coverage of **all** children by public or private health insurance
0-19	Below 200% of Poverty	Percent Insured*	SAHIE	2007	Extent of coverage of **poor** children by public or private health insurance
18-64	All income group	Percent Insured*	SAHIE	2007	Extent of coverage of **all** working age adults by public or private health insurance
40-64	All income group	Percent Insured*	SAHIE	2007	Extent of coverage of **middle aged** adults by public or private health insurance
65+	Medicare Part A	Ratio of HI (Pt. A) to est. pop 65+	CMS	2007	Extent of coverage of **older** adults by Medicare hospital insurance
65+	Medicare Part B	Ratio of SMI (Pt. B) to est. pop 65+	CMS	2007	Extent of coverage of **older** adults by Medicare supplementary medical (physician) insurance
65+& Medicare beneficiaries <65	Medicare Part C	Medicare Advantage Penetration. 2008	CMS	2007	Extent to which eligible Medicare beneficiaries have Medicare advantage coverage (Part C)
65+& Medicare beneficiaries <65	Medicare Part D	Medicare Part D Penetration. 2008	CMS	2007	Extent to which eligible Medicare beneficiaries have drug coverage through Medicare Part D.
18-64	All income group	Medicare Disabled beneficiaries	CMS	2008	Percent of **working age** population with Medicare coverage by reason of a disability
18-64	All income group	SSA / SSI Recipients	SSA	2008	Percent of **working age** population with a dependency that enables them to receive Supplemental Security Income
Age 18+	Veterans	Unique VA Users	VA	2009	Percent of **Veterans** who have used the VA healthcare system in the last year.

*Estimates of the Percent Uninsured, exactly equal to 100-Pct Insured, have been calculated for SAHIE, but yield no additional information

For children, the lack of available health insurance is more closely associated with poverty, while for middle-aged adults the need for health insurance is greater with the onset of chronic disease. The use of all four SAHIE based indicators in effect gives us information about the entire population of children and working age adults as well as up-weighting for the presence of health insurance among two especially vulnerable groups: poor children and middle aged adults.

Similarly, the percent of working age population with both Supplemental Security Income (SSI) payments and Medicare are two different measures of insurance coverage for a disabled adult population. These two variables are moderately correlated, have a high degree of variability across counties, and both are markedly and statistically significantly higher in Appalachian counties.

In fact, when we combined the two indicators, we found an estimated 6.3 percent of the working age population is on one of these two sources of disability payments in non-Appalachian counties, whereas and estimated 10.3 percent of the working age population in Appalachian counties has one of the two sources of income or insurance.

We considered and discarded the idea constructing the Health Insurance Access index by ranking each of the 11 health insurance access items across all counties in the U.S. and then taking the average rank. This rank was rescaled to percentiles to represent the final health insurance access rank for that county. That approach was both complex and unnecessary.

3.5 Labor Cost Index Construction

3.5.1 Geographic Wage Index

The Geographic Wage Index was used in its raw form. Each county has an index based on the hospital providers located in the country. The index uses 1.0 as the national average. Counties with no hospital are aggregated with the nearest hospital inside the state. Limitation of granularity to three clusters in each state: metropolitan, micropolitan, and other non-core does limit distinctions and some argue misrepresents the actual cost of care. Alone, this component has equal weight with the other access items.

3.5.2 Health Care Utilization Measures - Dartmouth Atlas

Healthcare utilization measured in dollars spent is often cited in discussion of healthcare costs. This is difficult to measure uniformly, because there is no national database of healthcare expenditures. CMS estimates expenditures at the state and regional level using data from sample surveys, but there is no national source for private insurance payments at the county level. Most public studies of healthcare expenditures rely on Medicare claims files. These are available in a five percent sample without restriction, and the claims file is very expensive to manipulate.

An enterprising group of researchers, led by John E. Wennberg, PhD, began mining Medicare claims files in the mid 1990's. Year over year, they noticed significant variations in per capita Medicare payments that could not be explained easily. They published their findings in a series of maps under the title Dartmouth Atlas of Health Care Expenditures.[96]

[96] Wennberg, John E. "Dartmouth Atlas of Health Care Expenditures". The Dartmouth Atlas of Health Care: Atlases & Reports". http://www.dartmouthatlas.org/publications/reports.aspx.

Certain areas like McAllen, Texas drew national attention when the New Yorker Magazine drew data from the atlas and ran a feature article on the correlation between physician owned hospitals and the high expenditures in this community.[97]

The atlas measures only expenditures for hospital care and only expenditures for Medicare. Medicare beneficiaries are persons over 65, persons certified as disabled by the Social Security Administration, persons with end stage renal disease, and blind persons.

Recently, the atlas has drawn criticism from researchers who can find explanations for some of the variations. For these reasons we did not include utilization data in the index.

3.6 COMBINED INDEX MEASUREMENT

The overall Healthcare Cost, Coverage, and Access (HCCA) Index is an average of three components: the healthcare cost (HCC), the insurance access (HIC), and the resource access (HCRA). Following the logic of the Appalachian Regional Commission's (ARC) Economic Status Index, the combined HCCA Index was converted to percentiles and a percentile value assigned to each county in the U.S.

TABLE 38 - SUMMARY OF SUBCOMPONENT INDICES

Element	Source	Measure	Units
Coverage per Capita	ARF – 2006 CMS – 2007 ARF – 2009 ARF – 2005 ARF – 2005 VA File	Insurance Coverage - Under 65 (Insured and Uninsured) Medicare B – Medicare C – Medicaid – Over 65 – Medicaid – Under 65 VA - Users	Coverage Participation Participation Dual Eligibility Participation
Resource Availability per Capita	ARF -2008 ARF -2008 ARF -2008 ARF -2008 ARF -2007 ARF -2008	Primary Care Surgeons + OB Surgical Specialties Hospital Specialties DDS - Dentists Behavioral Health	Primary Specialty Primary Specialty Primary Specialty Primary Specialty Primary Specialty Primary Specialty
Cost	CMS 2010	Geographic Wage Index	Normalized to 1=national average

The rationale for choosing these elements is that they measure three dimensions of access:

- Purchasing capacity of the individual,
- Availability of resources to serve the individual, and
- The labor cost of serving the individual.

[97] Gawande, Atul. The Cost Conundrum. The New Yorker. June 1, 2009. http://www.newyorker.com/reporting/2009/06/01/090601fa_fact_gawande

Labor is the most variable of healthcare costs and makes up 60 percent of the healthcare expense and 35 percent of all hospital costs.[98] All of the data elements meet the test of availability, scalability and uniformity. All are collected by federal agencies.

We similarly excluded the VHA per capita spending measure. VHA spending is a resource consumption measure. It does show disparities, which are discussed in Chapter 3.

3.7 CALCULATION OF INDEX

The HCCA is calculated by standardizing each of the components to a per capita measure and summing the per capita measures for each county. These were then normalized to multiples of a national average and grouped in percentiles.

The resource availability component is calculated by summing the per capita counts for each of the professional groups and normalizing to national by percentile. To get a county Geographic Wage Index, we started with the CMS Medicare Hospital Geographic Wage index for the county. The geographic wage index is already set to 1.0 as the national average, so it requires no further normalization.

3.8 FORMULA

The formula from the Healthcare Cost, Coverage, and Access (HCCA) Index is:

Geographic Wage Index + Health Insurance Coverage per capita component + Health Resource per capita component / 3.

(HCC + HIC + HCRA) / 3

The following tables show how the normalized data were combined with the wage index to provide the HCCA.

TABLE 39 – HCC COMPONENT CONSTRUCTION AND FOR CONSTRUCTING THE FINAL HCCA INDEX INDICATOR

Component Item	Component Item Definition	Time Periods	Basic Scaling Method	Component Item	Component Item Definition
Health Care Cost	HCC= CMS Hospital Geographic Wage Index Rescaled	2005	Percentile Value	The CMS Hospital Geographic Wage Index was Rank ordered then converted to a percentile. Tied counties were given tied ranks for percentile ranking	HCC_R
Combined Health Access Index	**CHAI= (HCRA_R + HIC_R + HCC_R) /3**		**Percentile Value**	**Rank ordered then converted to a percentile**	**CHAI_R**

[98] American Hospital Association. "The Cost of Caring". March 2010. http://www.fiercehealthcare.com/story/labor-costs-are-key-driver-hospital-cost-growth/2010-03-15. Accessed December 2010.

TABLE 40 - STEPS IN HIC COMPONENT CONSTRUCTION

Component Item	Component Item Definition	Time Periods	Basic Scaling Method	Computation Refinements	Component Item Definition
HI_KIDS	Pct. of children 0-19 insured by public or private sources	2007 (latest available data)	Percentile Value	Rank ordered then converted to a percentile	HI_KIDS_R
HI_POORKIDS	Pct. of children age 0-19in families with incomes less than 200% poverty insured by public or private sources	2007 (latest available data)	Percentile Value	Rank ordered then converted to a percentile	HI_POORKIDS_R
HI_ADULTS	Percent of all adults 19-64 insured by public or private sources	2007 (latest available data)	Percentile Value	Rank ordered then converted to a percentile	HI_ADULTS_R
HI_ 45-64	Percent of adults aged 45-64 insured by public or private sources	2007 (latest available data)	Percentile Value	Rank ordered then converted to a percentile	HI_ 45-64_R
MC_A	Ratio of HI (Pt. A) to est. pop 65+	2007	Percentile Value	Rank ordered then converted to a percentile	MC_A_R
MC_B	Ratio of SMI (Pt. B) to est. pop 65+	2007	Percentile Value	Rank ordered then converted to a percentile	MC_B_R
MC_C	Medicare Advantage Penetration. 2008	2007	Percentile Value	Rank ordered then converted to a percentile	MC_C_R
MCF_D	Medicare Part D Penetration. 2008	2007	Percentile Value	Rank ordered then converted to a percentile	MCF_D_R
MC_Disab	Medicare Disabled beneficiaries as a percent of population of working age	2008	Percentile Value	Rank ordered then converted to a percentile	MC_Disab_R
SSA	SSA Recipients as a percent of population of working age.	2008	Percentile Value	Rank ordered then converted to a percentile	SSA_R
VETS	Number of unique veterans using VA services as a percentage of VA estimates of Veteran Users	2009	Percentile Value	Rank ordered then converted to a percentile	VETS_R
Health Insurance Coverage	**HIC= Avg. of the 11 rescaled percentile items above (HI_KIDS_R…. VETS_R)**		**Percentile Value**	**Rank ordered then converted to a percentile**	**HIC_R**

TABLE 41 - STEPS IN HCRA COMPONENT CONSTRUCTION

Component Item	Component Item Definition	Time Periods	Basic Scaling Method	Computation Refinements	Final Rescaled Variable Name
PCP	Primary Care Physicians per 100K pop	Averaged across the 3 most recent years	Percentile value	Those 5-10%% of U.S. counties without physicians (tied at zero) were arrayed so most populated counties have a greatest degree of physician shortage	PCP_R
NPCP	Non-primary care Physicians per 100K pop	Averaged across the 3 most recent years	Percentile Value	Those 10-20% of U.S. counties without physicians (tied at zero) were arrayed so most populated counties have a greatest degree of physician shortage	NPCP_R
DDS	Dentists per 100K pop	2007 (latest available data)	Percentile Value	Those 5-10%% of U.S. counties without dentists (tied at zero) were arrayed so most populated counties have a greatest degree of physician shortage	DDS_R
HOSPBEDS	Short term general hospital beds per 10K population	Averaged across the3 most recent years	Percentile value	For those counties without hospitals (tied at zero) were arrayed so most populated counties have a greatest degree of physician shortage.	HOSBEDS_R
Health Care Resource Availability Index.	**HCRA= (PCP_R + NPCP_R + DDS_R + HOSPBEDS_R)/4**		**Average of the 4 percentile values or PCP**	**The average or the 4-item summed percentile scores is then again rank ordered and converted to a percentile across all U.S. counties**	**HCRA_R**

3.9 RATIONALE FOR SELECTION OF MEASURES

The measurements were selected by first isolating measures that were reliably collected and maintained, such that they could be updated annually at the county level. This screen narrowed the access and resource list to elements available on the ARF or OSCAR files. The team seriously considered using the UNC Sheps Center Disparity Index, which relies on socioeconomic data and count of primary care providers. Though well tested and respected by many, the index requires a complex mathematical analysis of expected utilization by a normative age, race, sex and income mix of the population. Dramatic changes in healthcare utilization that are expected as a result of health reform would make it difficult to choose, much less predict, behavior of this normative population.

Moreover, recent studies suggest that many of the problems in rural healthcare access are associated with the lack of surgical specialties in rural hospitals. [99] These issues caused the team to use the basic elements available through the Sheps Center modeling efforts, but to use them in a more elemental format, reflective of the raw resource.

Classic work by Ricketts has documented significant differences in health insurance coverage.[100] Though we did run a regression analysis to determine correlation or lack thereof, between total insurance coverage and resources, this element was a major focus of the ACA and should change dramatically after 2014. Timeliness of data at present is a major concern. In some cases, the most current available data are five years old. However, with several top-level commissions and task forces focused on the issue of timeliness and consistency of coverage data, we expect currency to improve before the year 2014, when most of the health reform measures become effective.

The final measure, the CMS Geographic Wage Index is the best available national index of healthcare labor cost. The hospital index is one of several geographic wage indices employed by CMS. Data are collected annually, on cost reports filed by providers who are certified to participate in Medicare reimbursement. The index is published annually and used to calculate Medicare reimbursement for most Medicare facilities.

CMS and actuarial groups routinely engage in cost accounting for individual services, and report total dollars spent. However, those calculations include both utilization and cost. The Geographic Wage Index alone measures raw cost. It is indexed to an average wage and normalized to a national average wage. It can be traced to the county level by matching metropolitan and urban designations within the state. All other areas are designated "Other." It can also be traced to the county level using the geographic address for each hospital provider in the state. We combined and rejected a more complex model for counties without hospitals; the index can adopt nursing home, then rural health clinic, then home health agency. A county without any of these providers would have no healthcare labor cost. We chose instead to group counties in the way that CMS groups them from the hospital wage index.

We also rejected a more current index, the Health Care and Social Assistance Index, which is assembled as part of the Employment Cost Index (ECI) by the Bureau of Labor Statistics, because it is not granular enough. These data are published quarterly from information collected as part of the National Compensation Survey and assembled to produce the ECI.[101] However, these survey data represent only 150 local areas nationwide. We considered this and the measure of Health Insurance Cost also collected by BLS. Although the ECI is attractive because it provides 12-month percent changes in employer costs for health as reference tests, ECI data are too sparse to be used in county-based comparisons.

[99] Poley, Stephanie, Thomas Ricketts, Ph.D., Daniel Belsky and Katie Gold. Pediatric Surgeons: Subspecialists Increase Faster than Generalists. ACS/HPR Institute. July 2009.
[100] Ricketts, Thomas C., et al. Designating Places and Populations as Medically Underserved, a Proposal for a New Approach. JL for Poor and Underserved. (2007). 567-589.
[101] Bureau of Labor Statistics, Chapter 8, National Compensation Measures. http://www.bls.gov/opub/hom/pdf/homch8.pdf. Downloaded December 2010.

4 DATA SOURCES

4.1 ACCESS MEASURES

All access measures selected for use in the proposed index are drawn from the Area Resource File (ARF) file. ARF is compiled from multiple national databases by the Health Resource and Service Administration (HRSA) of the U.S. Department of Health and Human Services (DHHS). The Cecil B. Sheps Center of the University of North Carolina Chapel Hill (Sheps Center) has worked with these files and understands and has documented statistical variation in each measure. The Sheps Center and other have used ARF data in multiple analytic studies.

Cost measures for the index are reduced to one, the hospital Geographic Wage Index used by CMS. Data are 100 percent samples drawn from the cost reports prepared by Medicare certified facilities. All locations are coded to FIPS codes. Some of the 420 counties have no facility. However, the Wage Index has a default for "Other" counties. This default permits assignment of an index to all counties. Nationwide, counties are assigned to the "Other" default and within the state boundaries. These are typically rural counties, and have been the source of significant policy decisions to create additional indices. For example, the Frontier Index was developed to offset the otherwise low "Other" value for counties with fewer than six persons per square mile. Overlays like Frontier status and rural minima are used to make adjustments to the Geographic Wage Index. To avoid distortions we used the unadjusted Geographic Wage Index.

4.2 INSURANCE RELATED ACCESS

Small Area Health Insurance Estimates (SAHIE) is the name given to insurance survey data compiled by the U.S. Census Bureau. Table 42 represents the SAHIE data that were extracted from the ARF. The latest year available is 2007.

TABLE 42 – SAHIE EXTRACTED DATA FROM ARF

Age	Group	Insurance	Income Level
0-19	Children	Insured/Uninsured	All income levels
0-19	Children	Insured/Uninsured	Up to 200% of poverty level
0-64	Children / Adults	Insured/Uninsured	All income levels
0-64	Children / Adults	Insured/Uninsured	Up to 200% of poverty level

These measures have been calculated as percentages of the relevant denominators in the ARF. They were verified and items used where the fields are populated. They are available at the county level and can be described in per capita terms.

The measures in Table 42 exclude the over 65 population. According to Census data for the American Community Survey, in 2009, approximately 99 percent of people are covered. See discussion in Chapter 4. All persons over 65 who are legal citizens qualify for Medicare Part A, facility coverage. This is minimum coverage. Unfortunately, there are no uniform measures of Part B, C, D and E coverage. Insurance policies are not uniform and "coverage" definitions vary from one area to another.

Separating insurance coverage by working and not working people is also not possible at the county level. Experts at Kaiser and Research Data Assistance Center (ResDAC) agree.

5 Statistical Issues with Data

5.1 Limited Data at the County Level

The data sources ARF, SAHIE, and CMS were chosen because they were available at the county level without manipulation, easily replicable, publically acceptable, and transparent.

5.2 Recent Data / Data for a Constant Year

The proposed Healthcare Cost, Coverage, and Access (HCCA) Index is based on ARF, SAHIE, and CMS data. The ARF data used is from 2006-2008; the SAHIE data is from 2007; and the CMS data are from 2005. These data were the most recent available from the three sources. We chose to use data from different years, as opposed to consistently using 2005 data, noting that CMS used 2005 data for 2011 rate setting.

5.3 Double Counting of Insurance Coverage

The Health Insurance Coverage (HIC) component describes health insurance coverage and includes eleven inputs. After consideration, seven of the inputs and three of the remaining four inputs were combined. Inputs were eliminated after discovering that some Medicaid enrollees and children below 200 percent poverty were being double counted.

APPENDIX L: USE OF VETERANS HEALTH ADMINISTRATION SERVICES IN APPALACHIAN COUNTIES, 2009

TABLE 43 – UNIQUE USERS AS A PERCENTAGE OF VA ELIGIBLES BY NATIONAL PERCENTILE GROUP

State Name	Number of Counties by Percentile Group					
	00 to 20	20 to 39	40 to 59	60 to 79	80 to 99	Grand Total
Alabama	7	13	9	2	6	37
Georgia	24	8	5	0	0	37
Kentucky	0	4	8	12	30	54
Maryland	0	1	1	1	0	3
Mississippi	0	2	6	13	3	24
New York	0	7	1	5	1	14
North Carolina	1	8	10	7	3	29
Ohio	0	5	12	12	3	32
Pennsylvania	6	17	6	15	8	52
South Carolina	2	4	0	0	0	6
Tennessee	6	12	11	7	16	52
Virginia	2	5	6	8	4	25
West Virginia	1	2	10	13	29	55
Grand Total	**49**	**88**	**85**	**95**	**103**	**420**

Source: Data from United States Department of Veterans Affairs, Health Economics Resource Center Second Quarter 2010, VA National Patient Care Database, analysis by UNC Sheps Center and PDA, Inc, 2011.

TABLE 44 – UNIQUE USERS AS A PERCENTAGE OF VA ELIGIBLES

State Name	Number of Counties by Percentage Group					
	00 to 20	20 to 39	40 to 59	60 to 79	80 to 99	Grand Total
Alabama	9	26	2	0	0	37
Georgia	27	10	0	0	0	37
Kentucky	0	39	14	1	0	54
Maryland	0	3	0	0	0	3
Mississippi	0	23	1	0	0	24
New York	1	12	1	0	0	14
North Carolina	1	28	0	0	0	29
Ohio	1	31	0	0	0	32
Pennsylvania	9	42	1	0	0	52
South Carolina	3	3	0	0	0	6
Tennessee	9	39	4	0	0	52
Virginia	3	22	0	0	0	25
West Virginia	2	37	16	0	0	55
Grand Total	**65**	**315**	**39**	**1**	**0**	**420**

Source: Data from United States Department of Veterans Affairs, Health Economics Resource Center Second Quarter 2010, VA National Patient Care Database, analysis by UNC Sheps Center and PDA, Inc, 2011.

APPENDIX M: MULTIVARIATE REGRESSION ANALYSIS OF HCCA INDEX

CONTROLLING FOR THE ECONOMIC DISTRESS INDEX

We tested the hypothesis that the HCCA and its components have a direct, independent relationship to the rate of premature mortality (YPLL_75) which we took to reflect a global measure of health status at the county level. Multiple regression models were employed to examine the joint relationships with the socio-economic variable, (the ARC_EDI) as well as health system variables reflected by the new HCCA index. In addition, at the national level, we included a variable reflecting whether or not a county was in the ARC region. These results are reported for all counties at the national level in Table 45 in Appendix M, again for all counties in the 13 Appalachian states in Table 46 in Appendix M, and for the ARC counties in Table 47 in Appendix M. In all three analyses, the socioeconomic status of counties, as reflected in the ARC_EDI, seems to have a substantial relationship to premature mortality. However, at the national level, our proposed HCCA Index exhibits an independent relationship to premature mortality as well.

Relationships between the HCCA, the ARC_EDI and the YPLL_75 are significant nationally, but not in Appalachian states or counties. This suggests that something other than economic distress could be affecting premature mortality rates in the Appalachian states. Further, Appalachian counties experienced higher rates of premature mortality (YPLL_75) than would be predicted on the basis of their scores on ARC_EDI and HCCA alone, suggesting that there may be an unmeasured factor at work in counties located in the Appalachian Region over and beyond the combined impact of socioeconomic status (ARC_EDI) and health system characteristics (HCCA). All of these relationships were highly statistically significant ($p<.001$) when measured at the national level. The same statistical models were applied to a smaller number of counties in the 13 ARC states (Table 47 in Appendix M), and to the Appalachian counties alone (Table 48 in Appendix M). The relationships observed at the national level were repeated to some extent at the level of the 13 states and the ARC counties alone, although the HCCA did not relate as well on the smaller samples of counties in the Appalachian Region. Please see Appendix M for the complete statistical analysis and commentary.

In the flowing tables, blue shading shows stronger relationships. Each table is followed by a scatter plot showing how closely the actual data distributed in the regression matches the predicted values.

TABLE 45 - REGRESSION MODEL: PREDICTIVE VALUE OF YEARS OF POTENTIAL LIFE LOST_75[1] BY ARC ECONOMIC DISTRESS INDEX AND HCCA, FOR ALL COUNTIES IN THE U.S. (N=3007 COUNTIES)

All Predictor U.S. Counties N=3007[2]	Unstandardized Coefficients		Std. Coeff	t	Sig. Level
	B	Std. Error	Beta		
(Constant)	8612.301	8.748		984.533	.000
ARC Economic Distress Index Rank (1 = Best; 3,110 = Worst)	.182	.005	**.558**	**35.181**	**.000**
Combined Healthcare Cost, Coverage and Access Index - percentile	1.823	.159	**.178**	**11.453**	**.000**
Flag for ARC County (0/1)	43.682	11.599	**.052**	**3.766**	**.000**

[1] Predictors of YPPL_75 per 100,000 population (logged), for U.S. Counties, 2005-2007.
[2] N=3007 because some counties have a missing value for the some variables.

LnYPLL_75x100K = 8612.301 + 0.182*ARC_EDI + 1.823*HCCA_Index + 3.682* ARC County

- Economic Distress is more important than either the HCCA or presence in the Appalachian Region as a predictor of variance. Log of YPLL_75 times 100,000 equals a consistent multiple of these three variables.
- Adjusted R square means equation explains 46.2 percent of the variation; above 40 percent is good. Significance level less than .001 is good; t value tells how significant; a 1.96 value is 95% chance of correct. Above 1.96 is good. Betas are standardized; value above 0.05 is good.

R	R Square	Adjusted R Square	Std. Error of the Estimate
.680[a]	**.462**	**.462**	**215.34130**

FIGURE 48 - SCATTER PLOT REGRESSION MODEL: PREDICTIVE VALUE OF YPLL_75 BY ARC_EDI AND HCCA INDEX FOR ALL COUNTIES IN THE U.S. (N=3007 COUNTIES)

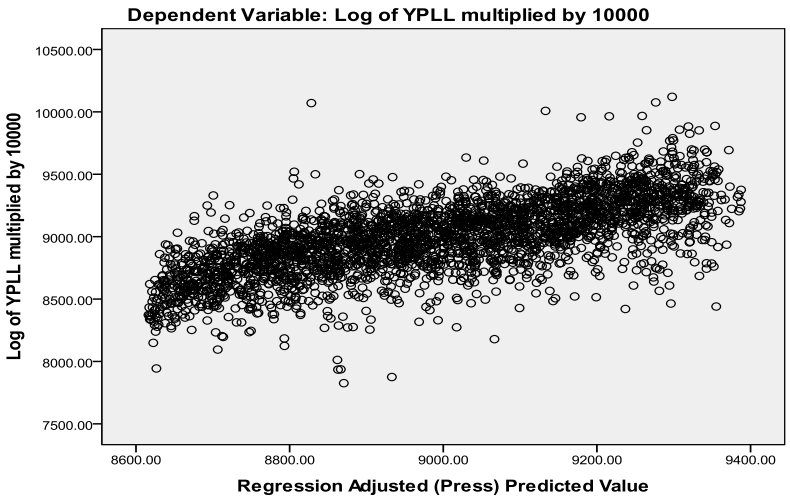


TABLE 46 - REGRESSION MODEL: PREDICTIVE VALUE OF YPLL_75[1] BY ARC_EDI AND HCCA INDEX FOR ALL COUNTIES IN THE 13 APPALACHIAN STATES (N=1069 COUNTIES)

All Predictor Counties in the 13 Appalachian States, N=1069[2]	Unstandardized Coefficients		Std. Coeff	t	Sig. Level
	B	Std. Error	Beta		
(Constant)	8698.380	13.806		630.025	.000
ARC Economic Distress Index Rank (1 = Best; 3,110 = Worst)	.210	.008	.708	**26.591**	**.000**
Combined Healthcare Cost, Coverage and Access Index - percentile	.480	.255	.049	1.879	.061
Flag for ARC County (0/1)	-22.301	11.330	-.042	-1.968	.049

[1] Predictors of YPLL_75 per 100,000 Population (logged), for U.S. Counties, 2005-2007.
[2] N=1069 because some counties have a missing value for the dependent variable.

LnYPLL_75x100K=8698.38+ .0.21*ARC_EDI + 0.48*HCCA_Index-22.30* ARC County

Within the Appalachian States, the Economic Distress Index is the better predictor of variance

R	R Square	Adjusted R Square	Std. Error of the Estimate
.733[a]	**.537**	**.536**	**178.13009**

FIGURE 49 - SCATTERPLOT OF REGRESSION MODEL: PREDICTIVE VALUE OF YPLL_75 BY ARC_EDI AND HCCA INDEX, FOR ALL COUNTIES IN THE 13 APPALACHIAN STATES (N=1069 COUNTIES)

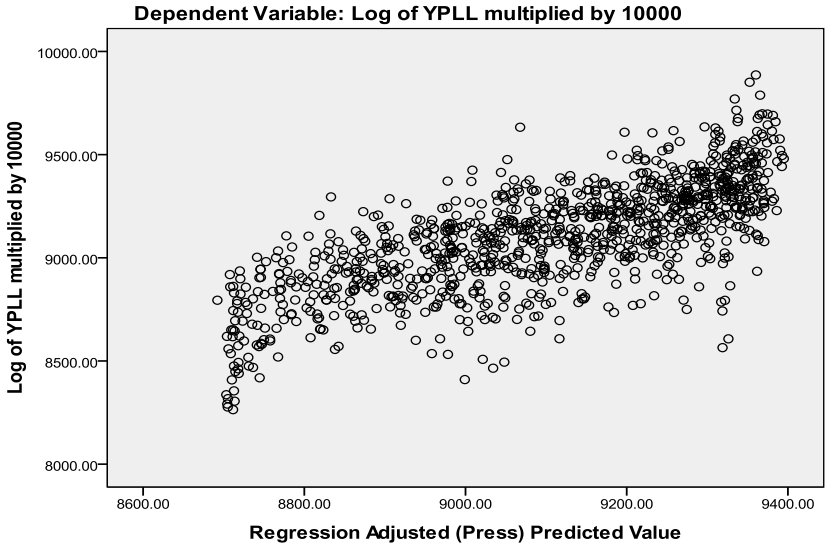


TABLE 47 - REGRESSION MODEL: PREDICTIVE VALUE OF YPLL_75[1] BY ARC_EDI AND HCCA INDEX FOR ALL COUNTIES IN THE APPALACHIAN REGION (N=419 COUNTIES)

All Predictor Appalachian Counties N=419[2]	Unstandardized Coefficients		Std. Coeff	t	Sig. Level
	B	Std. Error	Beta		
(Constant)	8772.504	28.727		305.379	.000
ARC Economic Distress Index Rank (1 = Best; 3,110 = Worst)	.174	.014	.565	**12.123**	**.000**
Combined Healthcare Cost, Coverage and Access Index - percentile	.076	.435	.008	.174	.862
ARC County (1/0)	NA	NA	NA	NA	NA

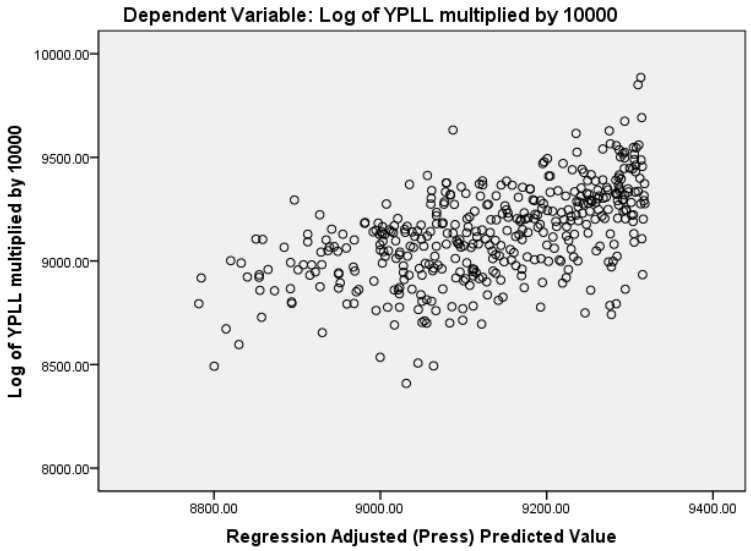
[1] Predictors of YPLL_75 per 100,000 Population (logged) and multiplied by 100,000, for U.S. Counties, 2005-2007.
[2] N=419 because one county has missing values for the dependent variable.

LnYPLL_75x100K=8772.504 + 0.174*ARC_EDI + 0.076* HCCA_Index

The ARC Economic Distress Index is a better predictor of YPLL_75 variance in the Appalachian Region.

R	R Square	Adjusted R Square	Std. Error of the Estimate
.569[a]	**.324**	**.320**	**185.75601**

FIGURE 50 - REGRESSION MODEL: PREDICTIVE VALUE OF YPLL_75 BY ARC_EDI AND HCCA INDEX FOR ALL COUNTIES IN THE APPALACHIAN REGION (N=419 COUNTIES)



Note: The ceiling and floor effect are caused by ranking the counties.

TESTING THE RELATIONSHIPS TO HEALTH STATUS AND ECONOMIC DISTRESS

Tables 48 through 50 in Appendix M show linear regressions of the components of the HCCA and the ARC_EDI against YPLL_75 rates for United States, Appalachian states and Appalachian counties. Blue shading shows highly significant relationships.

The county ARC_EDI has the strongest relationship with county health status of any of the variables in the equations at all levels: United States, Appalachian states, and Appalachian counties. Even though the healthcare resource component (HCRA) has a relatively high correlation with county health status (YPLL_75), HCRA has little relationship to county health status, once the ARC_EDI has been statistically controlled. This is true at the national, Appalachian state and Appalachian county levels. The other two components of the HCCA index have complex relationships with health status depending on the geographic focus of the analysis:

- At the national level, once ARC_EDI is controlled for, less health insurance coverage and lower reimbursements continue to be significantly correlated with health status. Similarly, being an ARC county has a small, but still statistically significant, relationship with poorer YPLL_75, the measure of health status ($p < .05$). Please see Table 48.
- At the 13-state level, once ARC _EDI is controlled for, less health insurance coverage is not related to health status, but lower reimbursements continue to be significantly correlated with poorer health status. Similarly, being an ARC county has a statistically significant relationship with health status ($p < .001$). Please see Table 49.
- When examining only the Appalachian counties, once ARC_EDI is controlled for, more health insurance coverage and lower payments for health services are associated with poorer health status, but these relationships do not achieve the same level of statistical significance (i.e., $p < .001$). This phenomenon may be related to intersection of a relatively high proportion of insurance coverage consisting of Medicaid and Medicare Disability, along with a relatively low level of reimbursement to providers by these programs in Appalachian counties. Please see Table 50.

TABLE 48 - REGRESSION MODEL: YPLL_75[1] BY ARC_EDI AND COMPONENTS OF HCCA INDEX FOR ALL COUNTIES IN THE UNITED STATES (N=3007 COUNTIES)

All U.S. Counties N=3007[2]	Unstandardized Coefficients		Std. Coeff	t	Sig. Level
	B	Std. Error	Beta		
(Constant)	8576.849	10.547		813.238	.000
ARC _EDI Value Rank (1 = Best; 3,110 = Worst)	.181	.005	**.552**	**34.802**	**.000**
HCRA (1=best;100=worst)	.181	.150	.018	1.204	.229
Health Insurance Coverage Component (1=best;100=worst)	.679	.146	**.066**	**4.637**	**.000**
Health Care Cost Component (1=best;100=worst)	1.759	.156	**.174**	**11.290**	**.000**
Flag for ARC County (0/1)	25.640	11.900	.030	**2.155**	.031

[1] Predictors of YPLL_75 per 100,000 Population (logged), for all U.S. Counties, 2005-2007.
[2] N=3007 because some counties have a missing value for the some variables.

LnYPLL_75x100K = 8576.849 + .181*ARC_EDI + .181*Access_Comp + .679*Coverage_Comp + 1.759*Cost_Comp + 25.64* ARC County

R	R Square	Adjusted R Square	Std. Error of the Estimate
.686	**.471**	**.470**	**213.68456**

TABLE 49 - REGRESSION MODEL: YPLL_75[1] BY ARC_EDI AND COMPONENTS OF HCCA INDEX FOR ALL COUNTIES IN THE 13 APPALACHIAN STATES (N=1069 COUNTIES)

All Counties in the 13 Appalachian States N=1069[2]	Unstandardized Coefficients		Std. Coeff	t	Sig. Level
	B	Std. Error	Beta		
(Constant)	8692.132	16.996		511.427	.000
ARC Economic Distress: Index Rank (1 = Best; 3,110 = Worst)	.203	.008	**.682**	**24.175**	**.000**
Health Care Resource Availability Component (1=best;100=worst)	.211	.205	.024	1.030	.303
Health Insurance Coverage Component (1=best;100=worst)	-.162	.251	-.014	**-.647**	.518
Health Care Cost Component (1=best;100=worst)	.784	.246	**.086**	**3.188**	**.001**
Flag for ARC County (0/1)	-30.717	11.726	**-.057**	**-2.619**	.009

[1] Predictors of YPLL_75 per 100,000 Population (logged), for U.S. Counties, 2005-2007.
[2] N=1069 because some counties have a missing value for the dependent variable.

LnYPLL_75x100K = 8692.132+ .203*ARC_EDI + .211*Access_Comp - .162* Coverage_Comp + .784*Cost_Comp + -30.717* ARC County

R	R Square	Adjusted R Square	Std. Error of the Estimate
.735	**.540**	**.538**	**177.69279**

TABLE 50 - REGRESSION MODEL: YPLL_75[1] BY ARC_EDI AND COMPONENTS OF HCCA INDEX FOR ALL COUNTIES IN THE APPALACHIAN REGION (N=419 COUNTIES)

Appalachian Counties N=419[2]	Unstandardized Coefficients		Std. Coeff	t	Sig. Level
	B	Std. Error	Beta		
(Constant)	8774.442	35.032		250.470	.000
ARC Economic Distress: Index Rank (1 = Best; 3,110 = Worst)	.153	.016	**.496**	**9.725**	**.000**
Health Care Resource Availability Component (1=best;100=worst)	.387	.344	.049	1.125	.261
Health Insurance Coverage Component (1=best;100=worst)	-.995	.390	**-.103**	**-2.548**	.011
Health Care Cost Component (1=best;100=worst)	1.017	.442	**.110**	**2.302**	.022

[1] Predictors of YPLL_75 per 100,000 Population (logged) and multiplied by 100,000, for U.S. Counties, 2005-2007.
[2] N=419 because one county have a missing value for the dependent variable.

LnYPLL_75x100K = 8774.442. + .153*ARC_EDI + .387*Access_Comp -.995 * Coverage_Comp + 1.017*Cost_Comp

R	R Square	Adjusted R Square	Std. Error of the Estimate
.735	**.540**	**.538**	**177.69279**

CONTROLLING FOR PERSISTENT POVERTY

Tables 51 through Table 56 repeat the analyses in Table 51 through Table 53. The exception is that a dichotomous variable indicating a persistent poverty county is substituted for the ARC_EDI as a measure of socioeconomic status. Blue shading indicates high significance and scatter plots follow the tables to show the distribution of data.

The scatter plots show how well the values of the predicted YPLL_75 variable from the multiple regression equations (on the X-axis) fit to the observed distribution (on the Y-axis). Consistent with the larger multiple regression coefficients in the equations involving the ARC_EDI, those statistical models show a more consistent relationship between the predicted and observed values, than do the equations involving the persistent poverty index.

TABLE 51 - REGRESSION MODEL: YPLL_75[1] BY PERSISTENT POVERTY OF THE COUNTY AND HCCA INDEX, FOR ALL COUNTIES IN THE U.S. (N=3007 COUNTIES)

All U.S. Counties N=3007[2]	Unstandardized Coefficients		Std. Coeff	t	Sig. Level
	B	Std. Error	Beta		
(Constant)	8765.919	8.965		977.828	.000
Persistent Poverty (1=yes;0=no)	255.170	14.200	**.290**	**17.970**	**.000**
Combined Healthcare Cost, Coverage and Access Index - percentile	3.623	.165	**.354**	**21.918**	**.000**
Flag for ARC County (0/1)	111.852	12.881	**.132**	**8.684**	**.000**

[1] Predictors of YPLL_75 per 100,000 Population (logged), for U.S. Counties, 2005-2007.
[2] N=3007 because some counties have a missing value for the some variables.

LnYPLL_75x100K=8765.919 + 255.170*Pers_Pov + 3.623* HCCA_Index + 111.852* ARC County

Explained variance is not as good because socioeconomic status (persistent poverty) is only a "yes" or "no" variable.

R	R Square	Adjusted R Square	Std. Error of the Estimate
.560	**.313**	**.312**	**243.38126**

FIGURE 51 - REGRESSION MODEL: YPLL_75 BY PERSISTENT POVERTY OF THE COUNTY AND HCCA INDEX, FOR ALL COUNTIES IN THE U.S. (N=3007 COUNTIES)

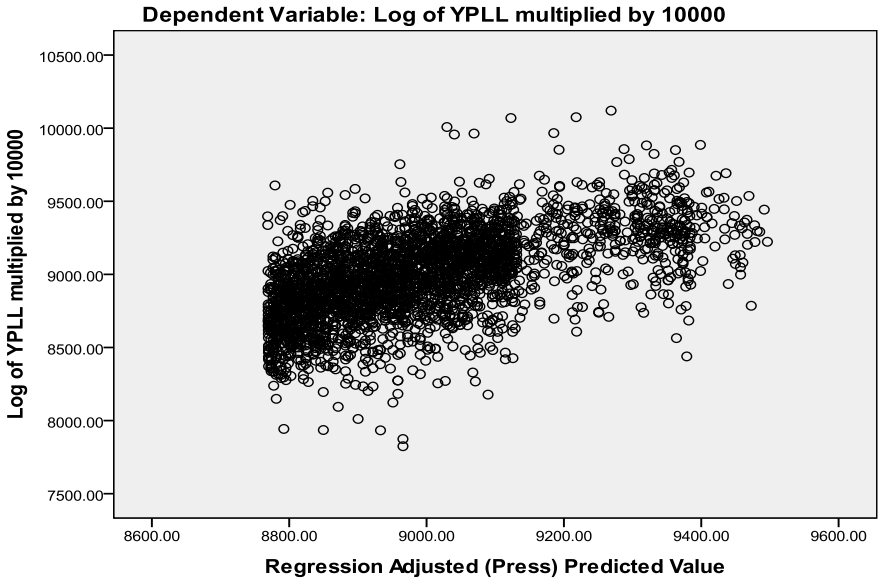


TABLE 52 - REGRESSION MODEL: YPLL_75[1] PERSISTENT POVERTY OF THE COUNTY AND HCCA INDEX FOR ALL COUNTIES IN THE 13 APPALACHIAN STATES (N=1069 COUNTIES)

All Counties in the 13 Appalachian Counties N=1069[2]	Unstandardized Coefficients		Std. Coeff	t	Sig. Level
	B	Std. Error	Beta		
(Constant)	8866.800	15.145		585.448	.000
Persistent Poverty (1=yes;0=no)	238.733	17.713	**.361**	**13.478**	**.000**
Combined Healthcare Cost, Coverage and Access Index - percentile	3.273	.261	**.337**	**12.520**	**.000**
Flag for ARC County (0/1)	34.015	13.383	.064	2.542	.011

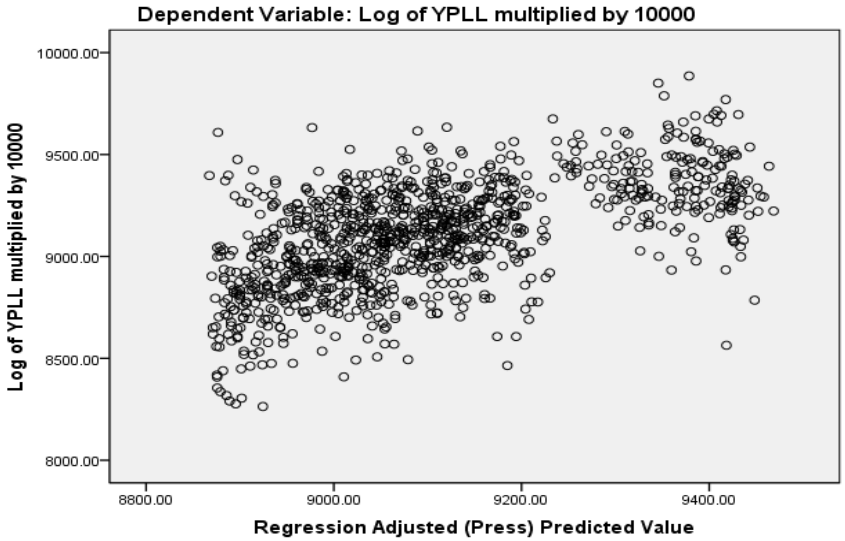
[1] Predictors of YPLL_75 per 100,000 Population (logged), for U.S. Counties, 2005-2007.
[2] N=1069 because some counties have a missing value for the dependent variable.

LnYPLL_75x100K = 8866.800 + 238.733*Pers_Pov + 3.273* HCCA_Index + -34.015* ARC County

By controlling for poverty, we remove pieces that were not controlled in the ARC Economic Distress Index

R	R Square	Adjusted R Square	Std. Error of the Estimate
.585	**.342**	**.341**	**212.35163**

FIGURE 52 - REGRESSION MODEL: YPLL_75 BY PERSISTENT POVERTY OF THE COUNTY AND HCCA INDEX FOR ALL COUNTIES IN THE 13 APPALACHIAN STATES (N=1069 COUNTIES)



Note: Dense areas on the left are counties with the higher income, less dense areas on the right are persistent poverty counties.

TABLE 53 - REGRESSION MODEL: YPLL_75[1] BY PERSISTENT POVERTY OF THE COUNTY AND HCCA FOR ALL COUNTIES IN THE APPALACHIAN REGION (N=419 COUNTIES)

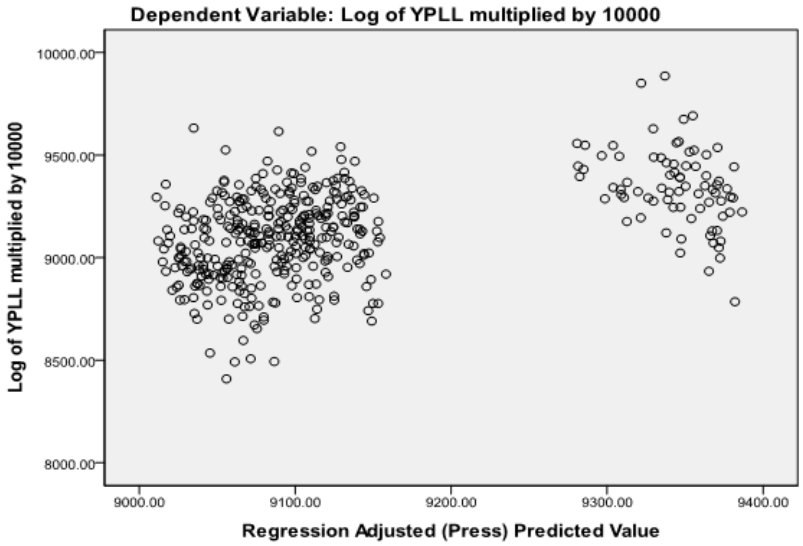
Appalachian Counties N=419[2]	Unstandardized Coefficients		Std. Coeff	t	Sig. Level
	B	Std. Error	Beta		
(Constant)	9002.378	25.199		357.254	.000
Persistent Poverty (1=yes;0=no)	228.794	26.563	**.393**	**8.613**	**.000**
Combined Healthcare Cost, Coverage and Access Index - percentile	1.527	.427	**.163**	**3.579**	**.000**
ARC County (1/0)	NA	NA	NA	NA	NA

[1] Predictors of YPLL_75 per 100,000 Population (logged) and multiplied by 100,000, for U.S. Counties, 2005-2007.
[2] N=419 because one county has missing values for the dependent variable.

LnYPLL_75x100K=9002.378 + 228.794*Pers_Pov + 1.527* HCCA_Index

R	R Square	Adjusted R Square	Std. Error of the Estimate
.473	**.224**	**.220**	**199.04304**

FIGURE 53 - REGRESSION MODEL: YPLL_75 BY PERSISTENT POVERTY OF THE COUNTY AND HCCA, FOR ALL COUNTIES IN THE APPALACHIAN REGION (N=419 COUNTIES)



Note: Points on the right are persistent poverty counties, on left are not persistent poverty counties.

The regression shows significant correlation between the HCCA and premature mortality in counties, even when the equation is controlled for designation as a Persistent Poverty county. With few exceptions Appalachian counties with high persistent poverty had higher premature mortality and, with a few exceptions, the level of premature mortality was close to what would be predicted by the county's HCCA score. The discontinuity on the regression scatter plot reflects the yes/no nature of the Persistent Poverty classification. The scatter plot in Figure 53 also shows that a few Persistent Poverty counties have much lower than expected premature mortality, as represented by the few low mortality scores in the right hand cluster.

TABLE 54 - REGRESSION MODEL: YPLL_75[1] BY PERSISTENT POVERTY OF THE COUNTY AND COMPONENTS OF HCCA INDEX FOR ALL COUNTIES IN THE UNITED STATES (N=3007 COUNTIES)

All U.S. Counties N=3007[2]	Unstandardized Coefficients		Std. Coeff	t	Sig. Level
	B	Std. Error	Beta		
(Constant)	8688.943	11.870		732.018	.000
ARC Economic Distress: Index Rank (1 = Best; 3,110 = Worst)	246.108	14.171	**.279**	**17.368**	**.000**
Health Care Resource Availability Component (1=best;100=worst)	1.256	.164	**.122**	**7.668**	**.000**
Health Insurance Coverage Component (1=best;100=worst)	1.277	.164	**.125**	**7.802**	**.000**
Health Care Cost Component (1=best;100=worst)	2.685	.173	**.265**	**15.552**	**.000**
Flag for ARC County (0/1)	89.330	13.295	**.105**	**6.719**	**.000**

[1] Predictors of YPLL_75 per 100,000 Population (logged), for all U.S. Counties, 2005-2007.
[2] N=3007 because some counties have a missing value for the some variables.

LnYPLL_75x100K = 8688.943+ 246.108 *Pers_Pov + 1.256*Access_Comp + 1.277* Coverage_Comp + 2.685*Cost_Comp + 89.330 *ARC

R	R Square	Adjusted R Square	Std. Error of the Estimate
.569	**.324**	**.322**	**241.60900**

TABLE 55 - REGRESSION MODEL: YPLL_75[1] BY PERSISTENT POVERTY OF THE COUNTY AND COMPONENTS OF HCCA INDEX FOR ALL COUNTIES IN THE 13 APPALACHIAN STATES (N=1069 COUNTIES)

All Counties in the 133 Appalachian States N=1069[2]	Unstandardized Coefficients		Std. Coeff	t	Sig. Level
	B	Std. Error	Beta		
(Constant)	8797.858	19.914		441.782	.000
ARC Economic Distress: Index Rank (1 = Best; 3,110 = Worst)	212.092	17.741	**.321**	**11.955**	**.000**
Health Care Resource Availability Component (1=best;100=worst)	1.479	.228	**.167**	**6.485**	**.000**
Health Insurance Coverage Component (1=best;100=worst)	.159	.293	.014	.542	.588
Health Care Cost Component (1=best;100=worst)	3.012	.255	**.332**	**11.798**	**.000**
Flag for ARC County (0/1)	2.736	13.809	.005	.198	.843

[1] Predictors of YPLL_75 per 100,000 Population (logged), for U.S. Counties, 2005-2007.
[2] N=1069 because some counties have a missing value for the dependent variable.

LnYPLL_75x100K = 8797.858 + 212.092*Pers_Pov + 1.479*Access_Comp + .159* Coverage_Comp + 3.012*Cost_Comp + 2.736*ARC

R	R Square	Adjusted R Square	Std. Error of the Estimate
.610	**.372**	**.369**	**207.66614**

TABLE 56 - REGRESSION MODEL: YPLL_75[1] BY PERSISTENT POVERTY OF THE COUNTY AND COMPONENTS OF HCCA INDEX, FOR ALL COUNTIES IN THE APPALACHIAN REGION (N=419 COUNTIES)

Appalachian Counties N=419[2]	Unstandardized Coefficients		Std. Coeff	t	Sig. Level
	B	Std. Error	Beta		
(Constant)	8926.903	36.199		246.604	.000
Persistent Poverty (1=yes;0=no)	191.767	26.417	**.330**	**7.259**	**.000**
Health Care Resource Availability Component (1=best;100=worst)	1.140	.340	**.145**	**3.353**	**.001**
Health Insurance Coverage Component (1=best;100=worst)	-1.155	.407	-.120	-2.839	.005
Health Care Cost Component (1=best;100=worst)	2.348	.411	**.253**	**5.715**	**.000**

[1] Predictors of YPLL_75 per 100,000 Population (logged) and multiplied by 100,000, for U.S. Counties, 2005-2007.
[2] N=419 because one county have a missing value for the dependent variable.

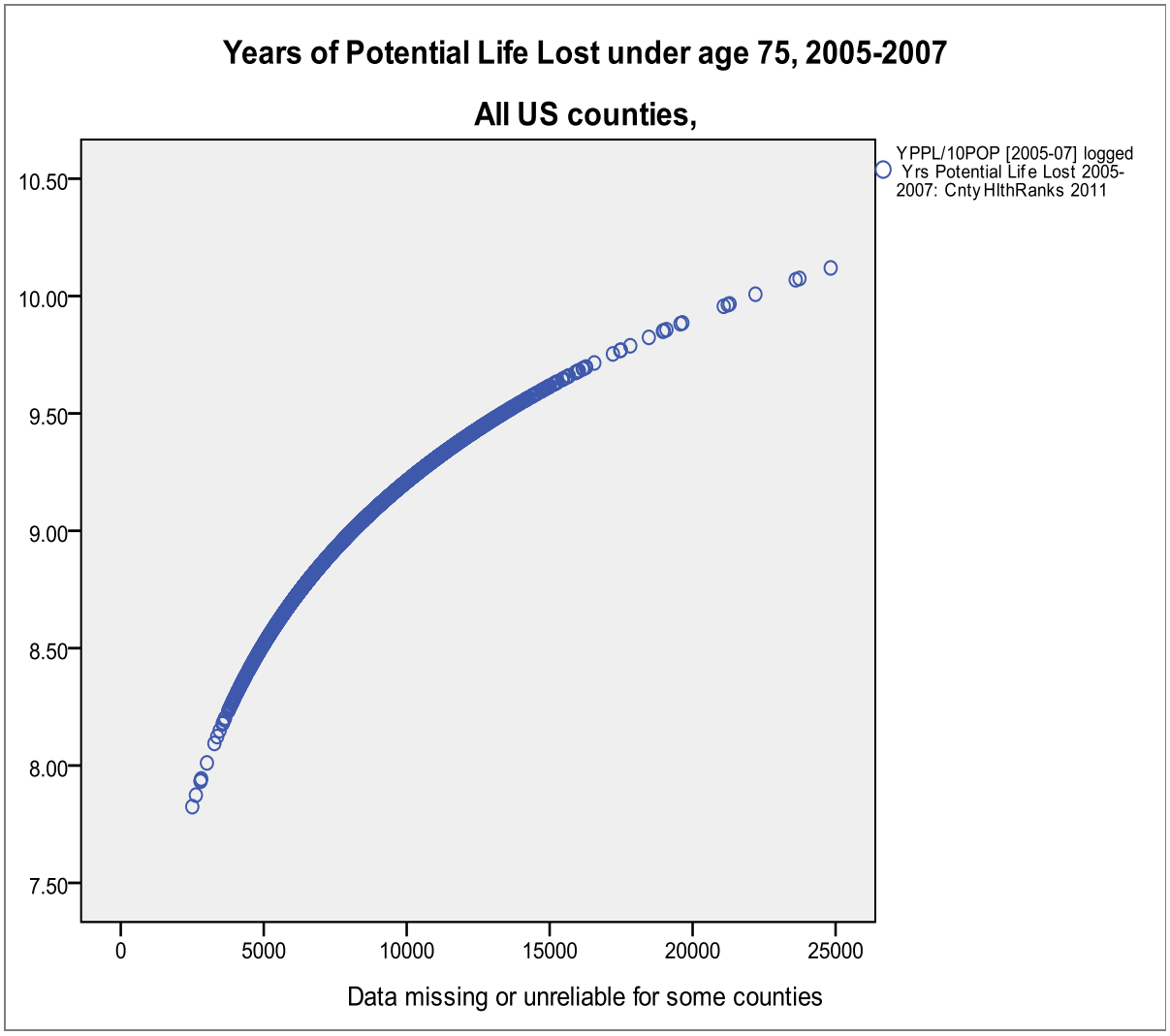
LnYPLL_75x100K = 8926.903 + 191.767*Pers_Pov + 1.140*Access_Comp -1.155* Coverage_Comp + 2.348*Cost_Comp

R	R Square	Adjusted R Square	Std. Error of the Estimate
.532	**.283**	**.276**	**191.75721**

ADDITIONAL MATERIAL

The additional material provides supporting documentation for the YPLL_75 analyses including the flag for presence of county in Appalachia.

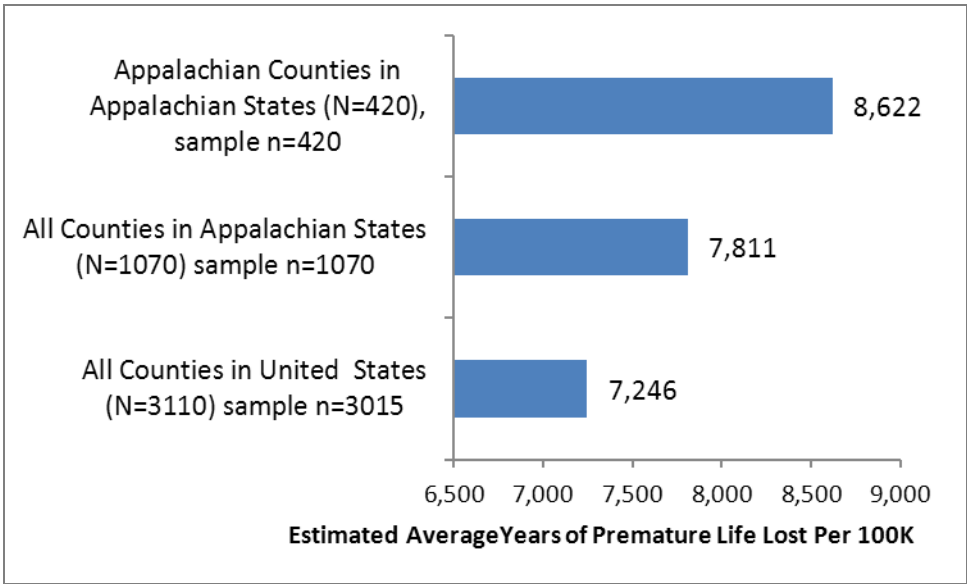
FIGURE 54 - LOGRITHMIC TRANFORMATION OF YEARS OF POTENTIAL LIFE LOST PER 10,000 POPULATION UNDER AGE 75



The absolute level of years of preventable life lost estimated for each county has been standardized by the population of the county. This quantity is measured along the horizontal axis. This quantity is rescaled using a natural logarithmic transformation. That result is displayed along the vertical axis. This, mathematically, makes the subsequent statistical manipulations more statistically stable and interpretable and less affected by extreme values.

YPLL_75 per 100,000 population from the Wisconsin 2005-2007 County Population Health Ranking files were used in the regression; the regression creates a "mean" for the values used. This is a mean of the premature mortality rates. Differences in these means are more apparent when expressed in terms of their natural logarithms.

FIGURE 55 - COMPARISON OF ESTIMATED PREVENTABLE MORTALITY RATES IN 2005-2007 AVERAGE OF YEARS OF POTENTIAL LIFE LOST UNDER AGE 75 PER 100,000 POPULATION

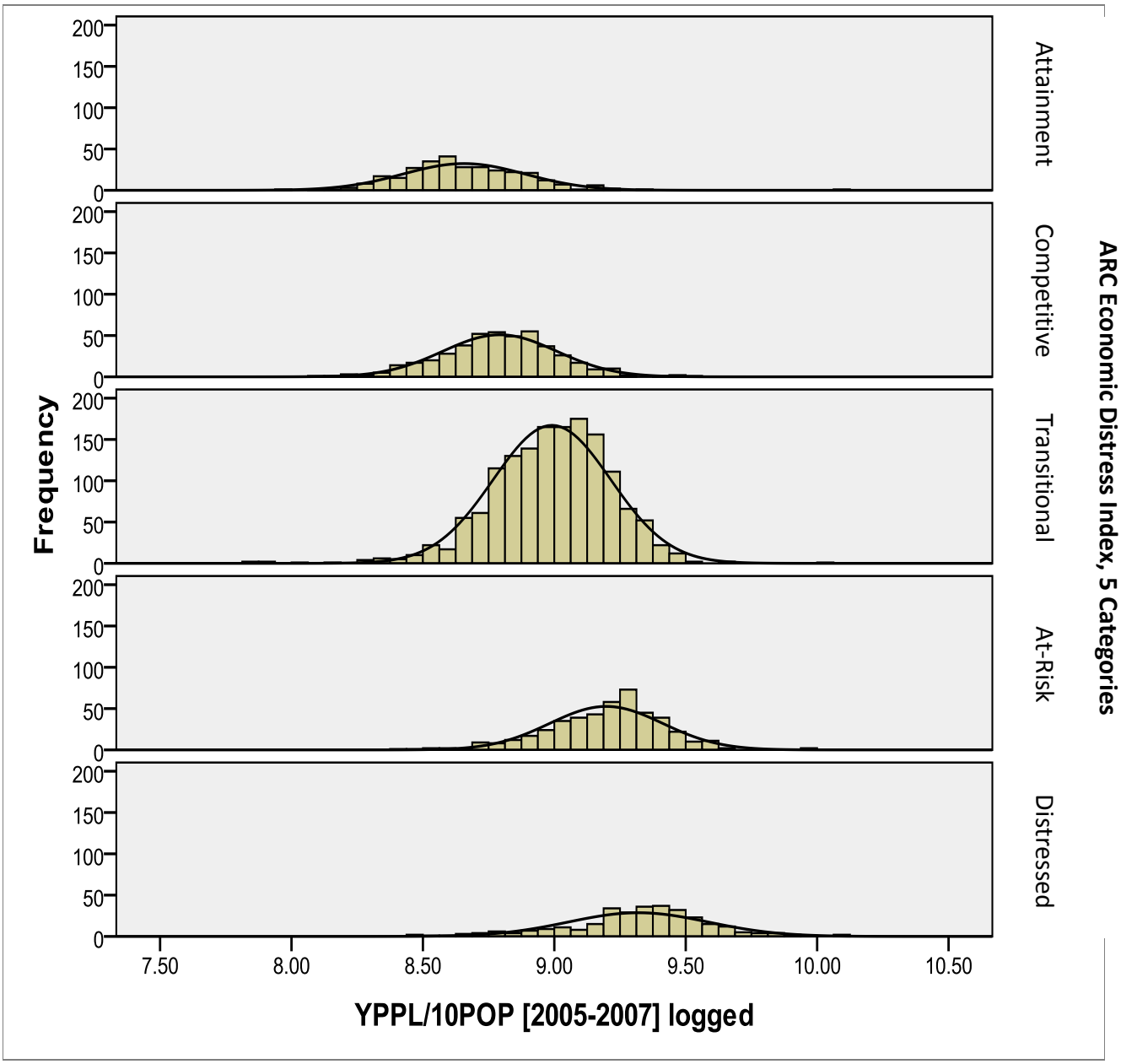


Source: University of Wisconsin County Health Rankings, Premature mortality was estimated with the equation: County YPLL_75 / 100K x county population 2008 / 100,000. Mortality was summed for all counties and divided by the total population times 100,000

YPLL_75 is a rate. To demonstrate its meaning, Figure 55 illustrates the number of people under 75 who would have died prematurely in the years 2005 through 2007, if 100,000 people were randomly selected from three different populations: Appalachia, Appalachian states and the United States. During that period, 18 percent more Appalachians than U.S. residents would have died prematurely.

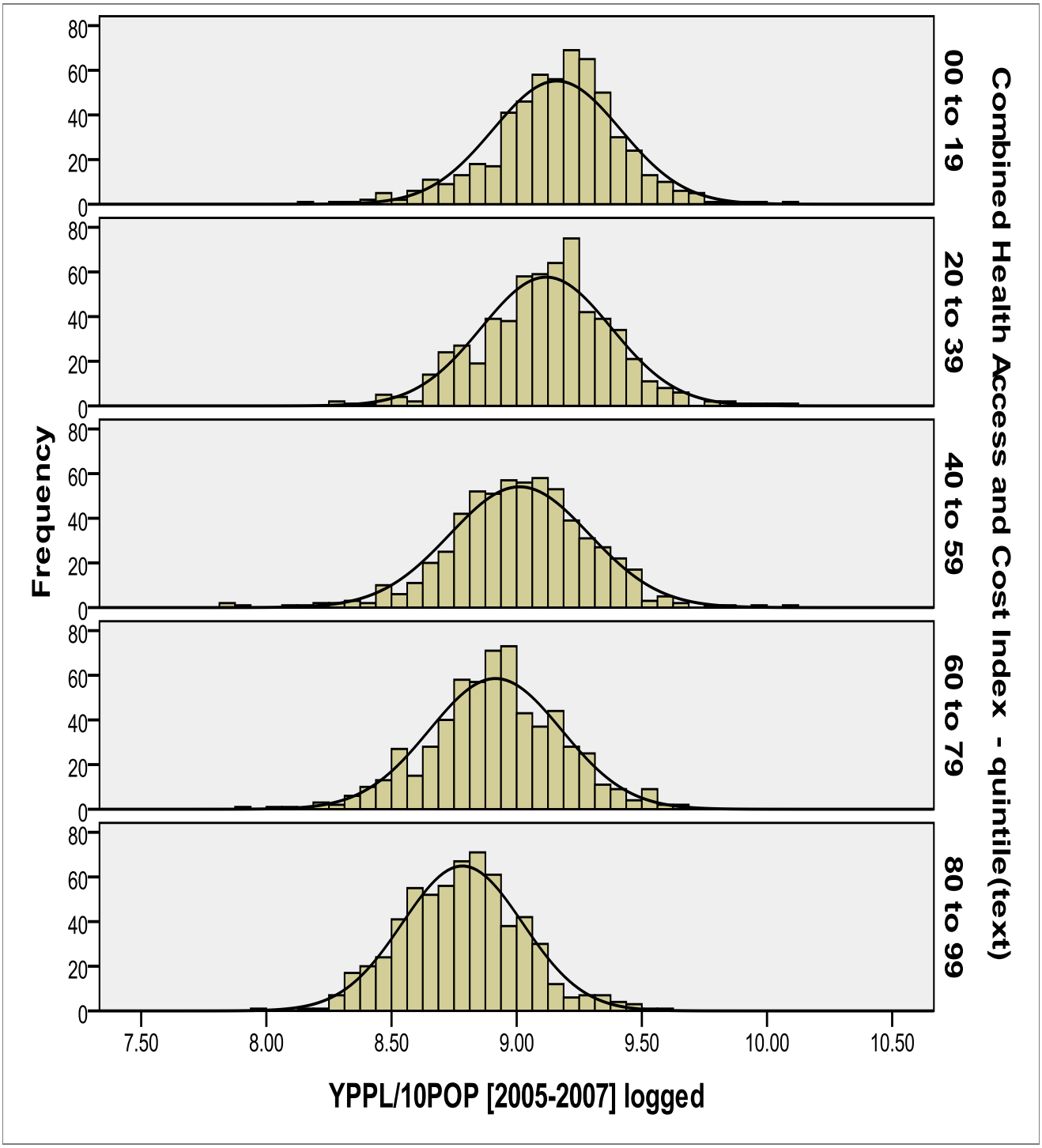
$$(8{,}622 / 7{,}246 - 1) / 100 = 18\%$$

FIGURE 56 - CORRESPONDENCE BETWEEN ARC_EDI AND YPLL_75 PER 10,000 POPULATION IN ALL U.S. COUNTIES, 2005-2007



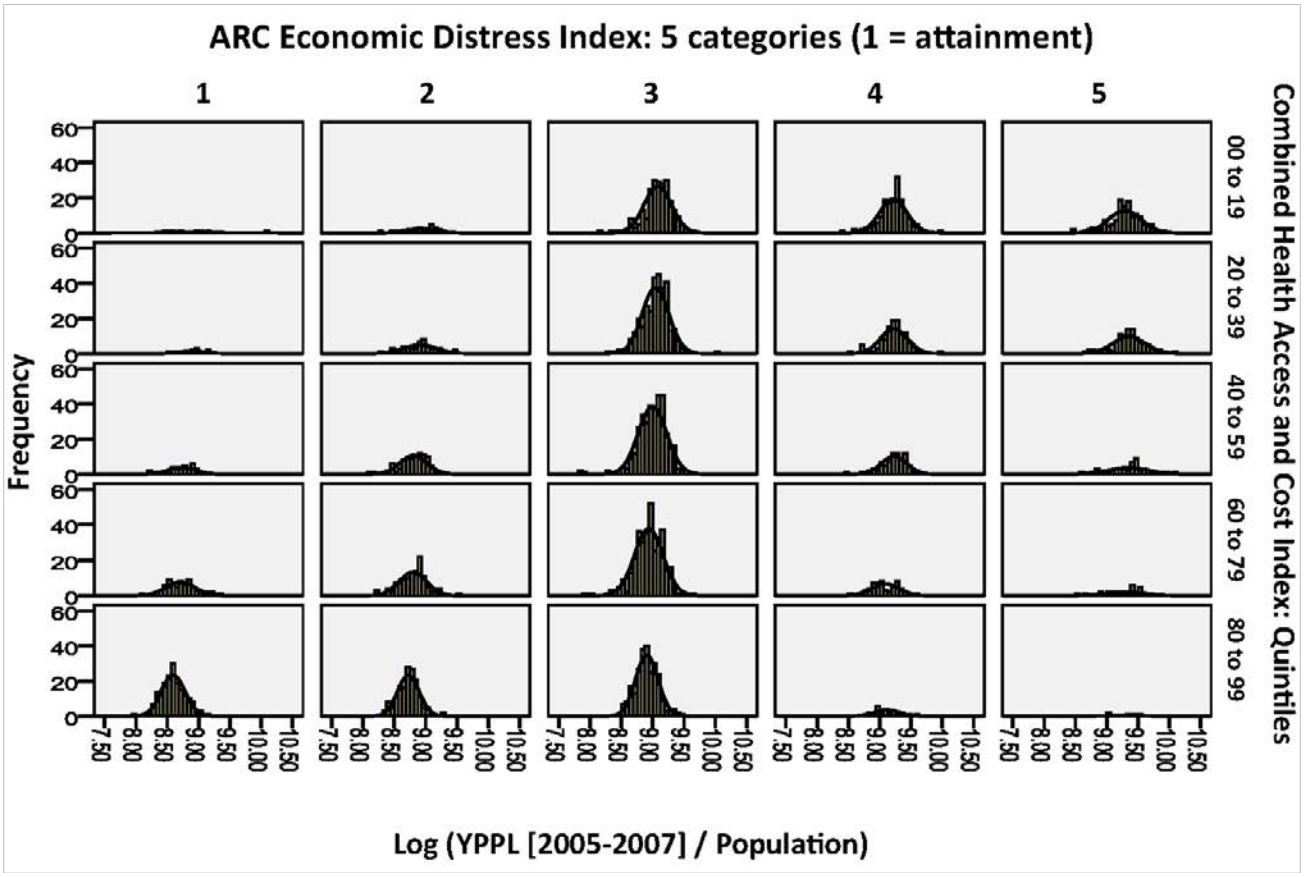
People who live in more economically distressed communities tend to die younger of potentially preventable causes.

FIGURE 57 - CORRESPONDENCE BETWEEN HCCA INDEX AND YPLL_75, ALL U.S. COUNTIES, 2005-2007



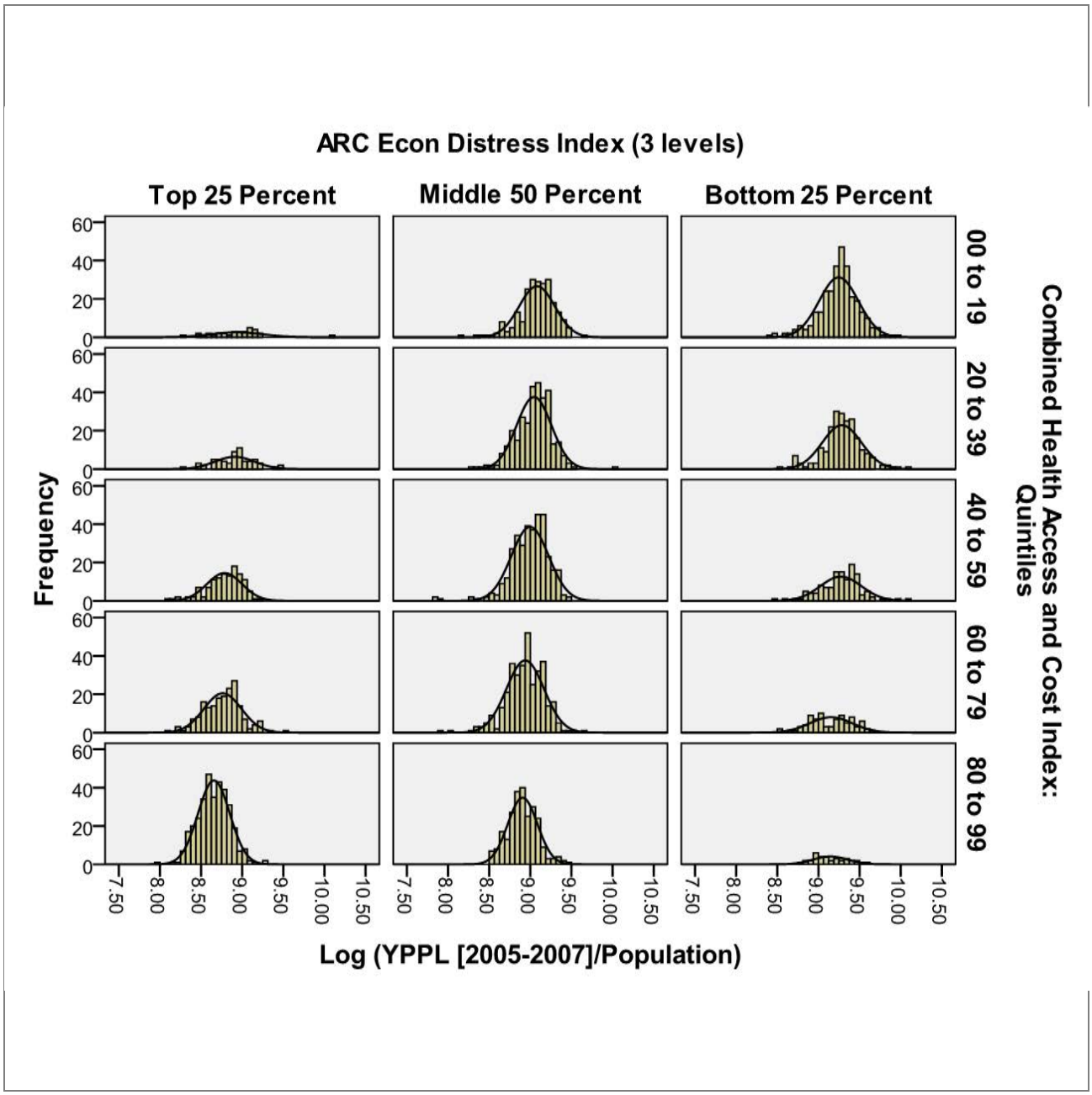
People who live in counties with a less favorable Health Access and Cost profile tend to die younger of potentially preventable causes.

FIGURE 58 – YPLL_75, ALL U.S. COUNTIES, 2005-2007 – ARRAYED BY ARC_EDI (5LEVELS) AND HCCA INDEX



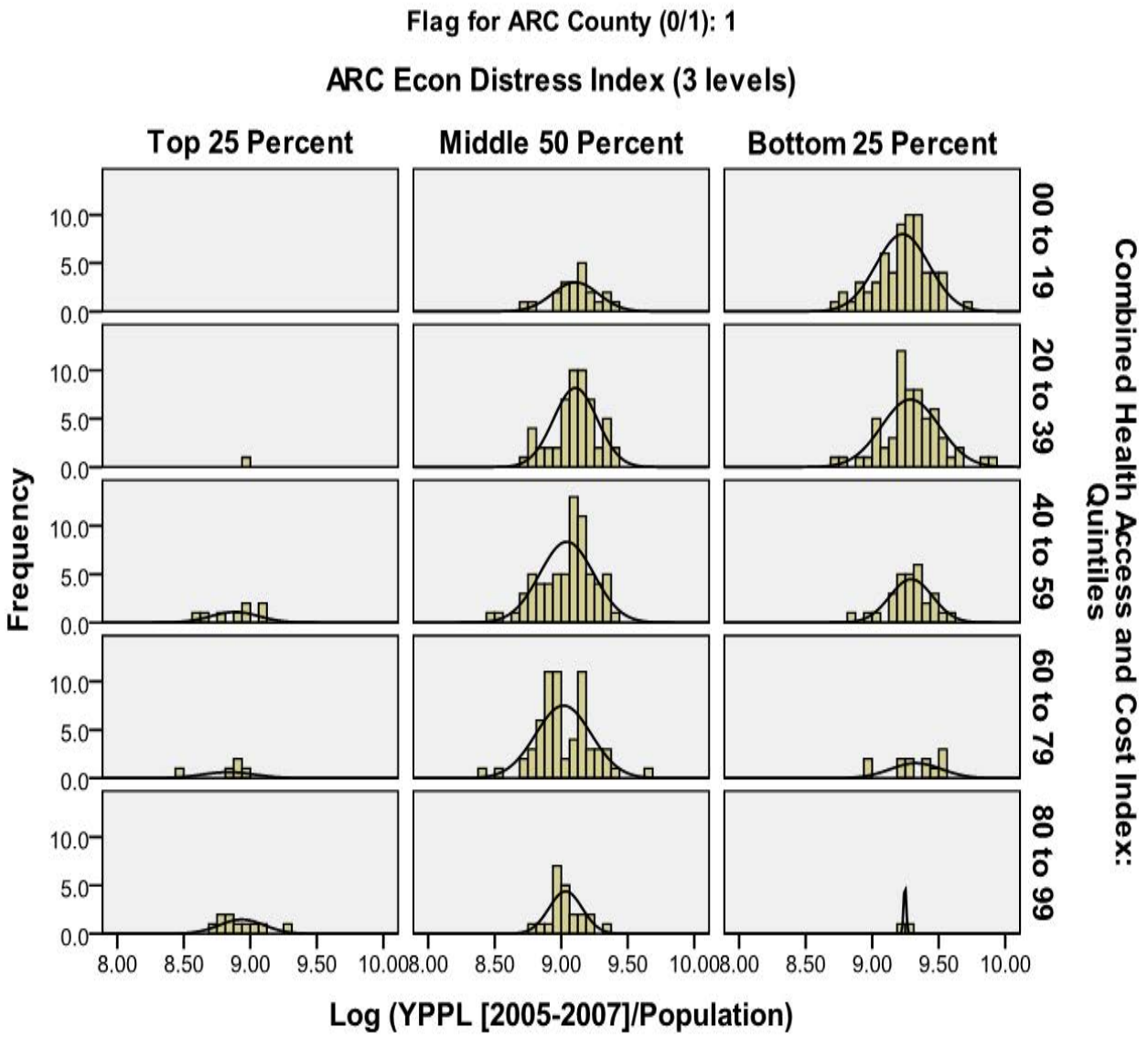
Both economic distress and healthcare access problems tend to occur in the same counties. However both factors seem to be associated with years of potential life lost. This pattern is observed when the ARC EDI is arrayed into 5 categories.

FIGURE 59 – YPLL_75, ALL U.S. COUNTIES, 2005-2007 – ARRAYED BY ARC_EDI (3LEVELS) AND HCCA INDEX



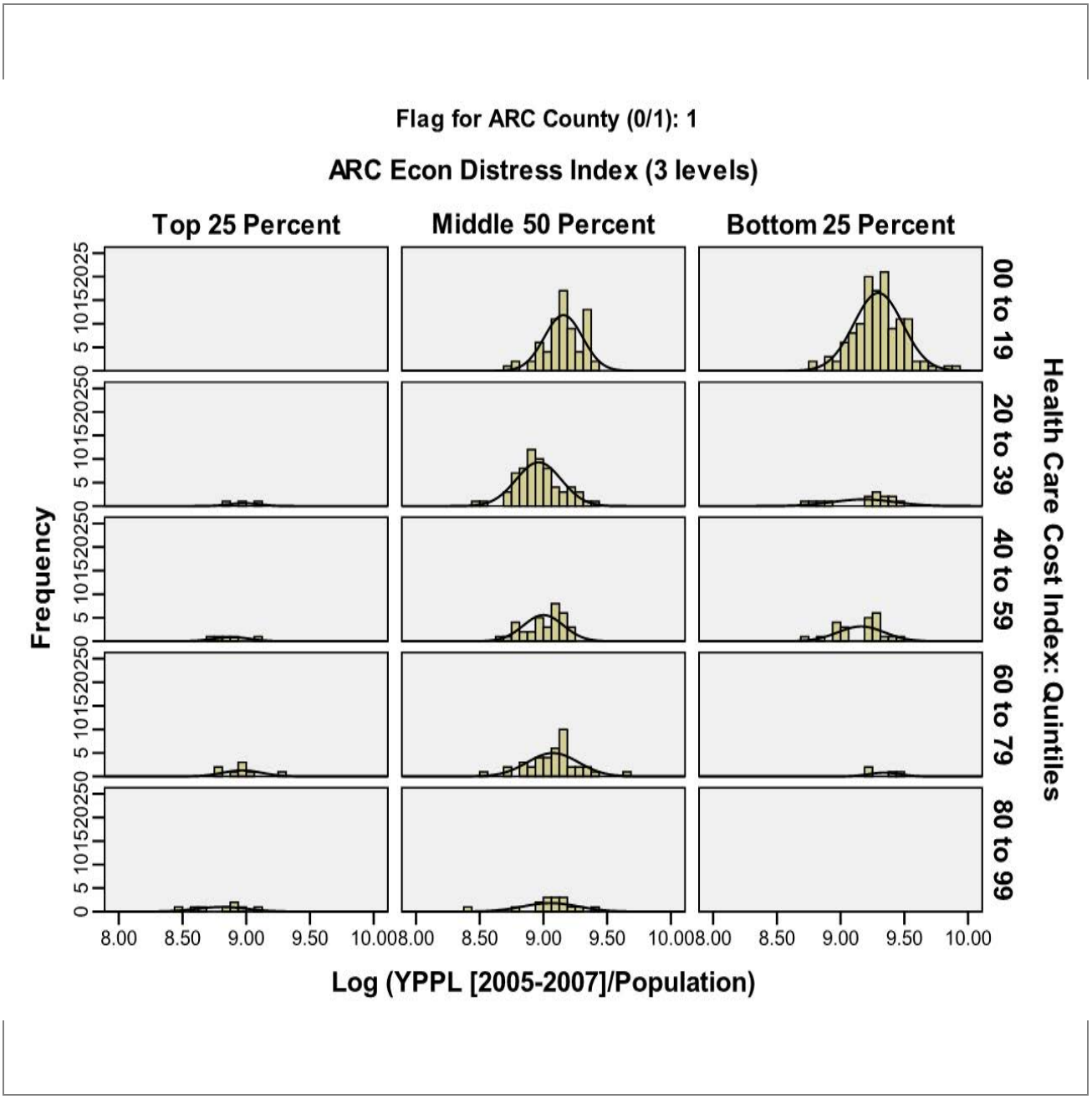
Both economic distress and healthcare access problems tend to occur in the same counties. However both factors are associated with years of potential life lost. A similar pattern is seen when the ARC EDI is arrayed into 3 categories.

FIGURE 60 – YPLL_75, APPALACHIAN COUNTIES, 2005-2007 – ARRAYED BY ARC_EDI (3LEVELS) AND HCCA INDEX



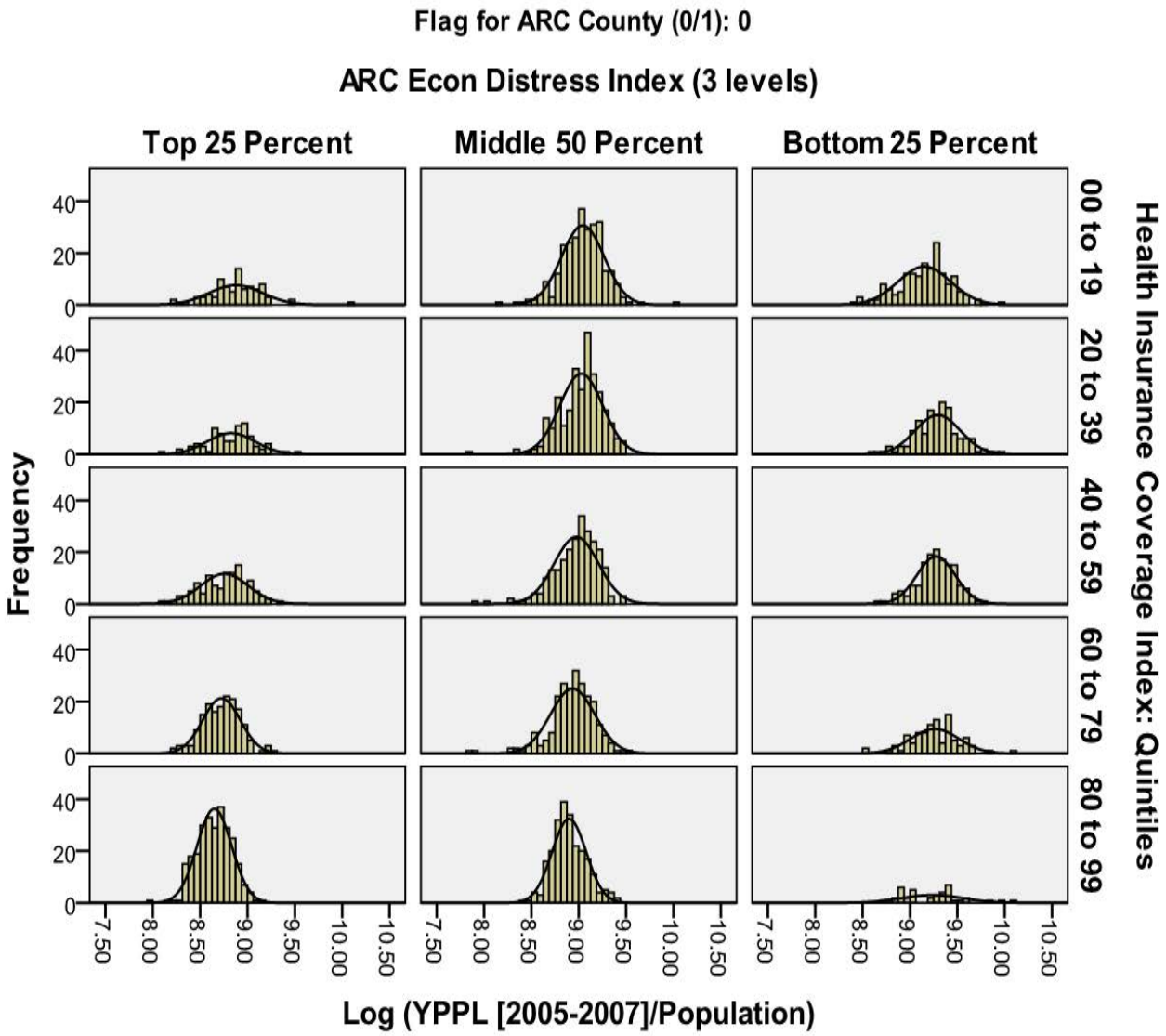
A similar pattern of economic distress and healthcare access problems occurring in the same counties is found in Appalachia. There are a high number of counties in the bottom 25% of counties nationally in terms of economic distress, and also in the bottom two quintiles in terms of health access and cost. (Two cells in the upper right corner of the graph above). Conversely, almost no counties in Appalachia are both in the top 25 percent in terms of their economic distress index and in the top two quintiles in terms of their health access and cost profile.

FIGURE 61 –YPLL_75, APPALACHIAN COUNTIES, 2005-2007ARRAYED BY ARC_EDI (3 LEVELS) AND HCC COMPONENT



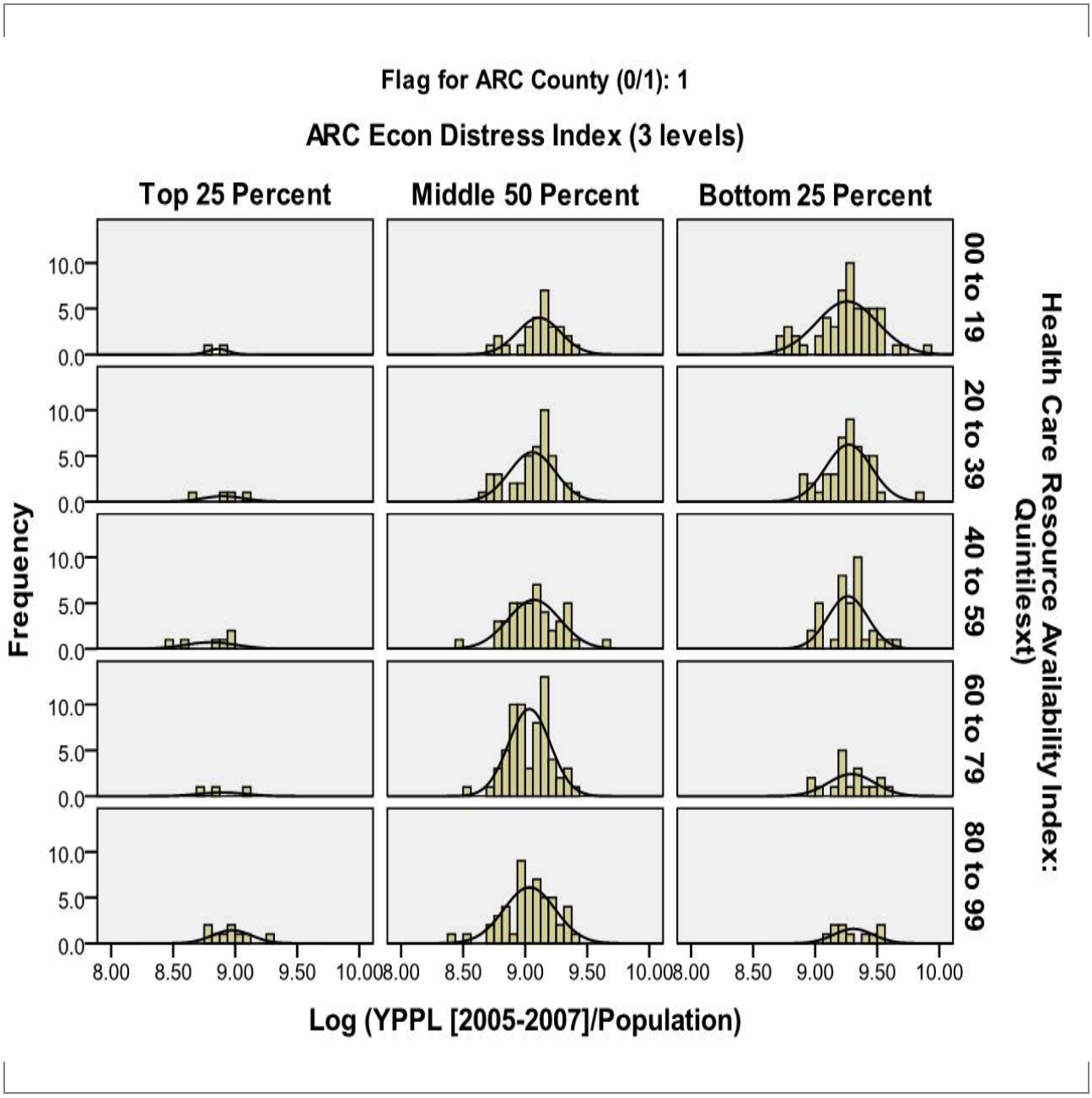
A very high proportion of Appalachian counties are both economically distressed and providers in those counties are reimbursed at relatively low levels. Residents of these counties have disproportionately high levels of mortality in terms of years of potential life lost (see the upper right hand cell of table above).

FIGURE 62– YPLL_75, APPALACHIAN COUNTIES, 2005-2007 ARRAYED BY ARC_EDI (3 LEVELS) AND HIC COMPONENT



Higher insurance coverage is more closely associated with decreases in mortality in Appalachian counties that have a more advantaged profile.

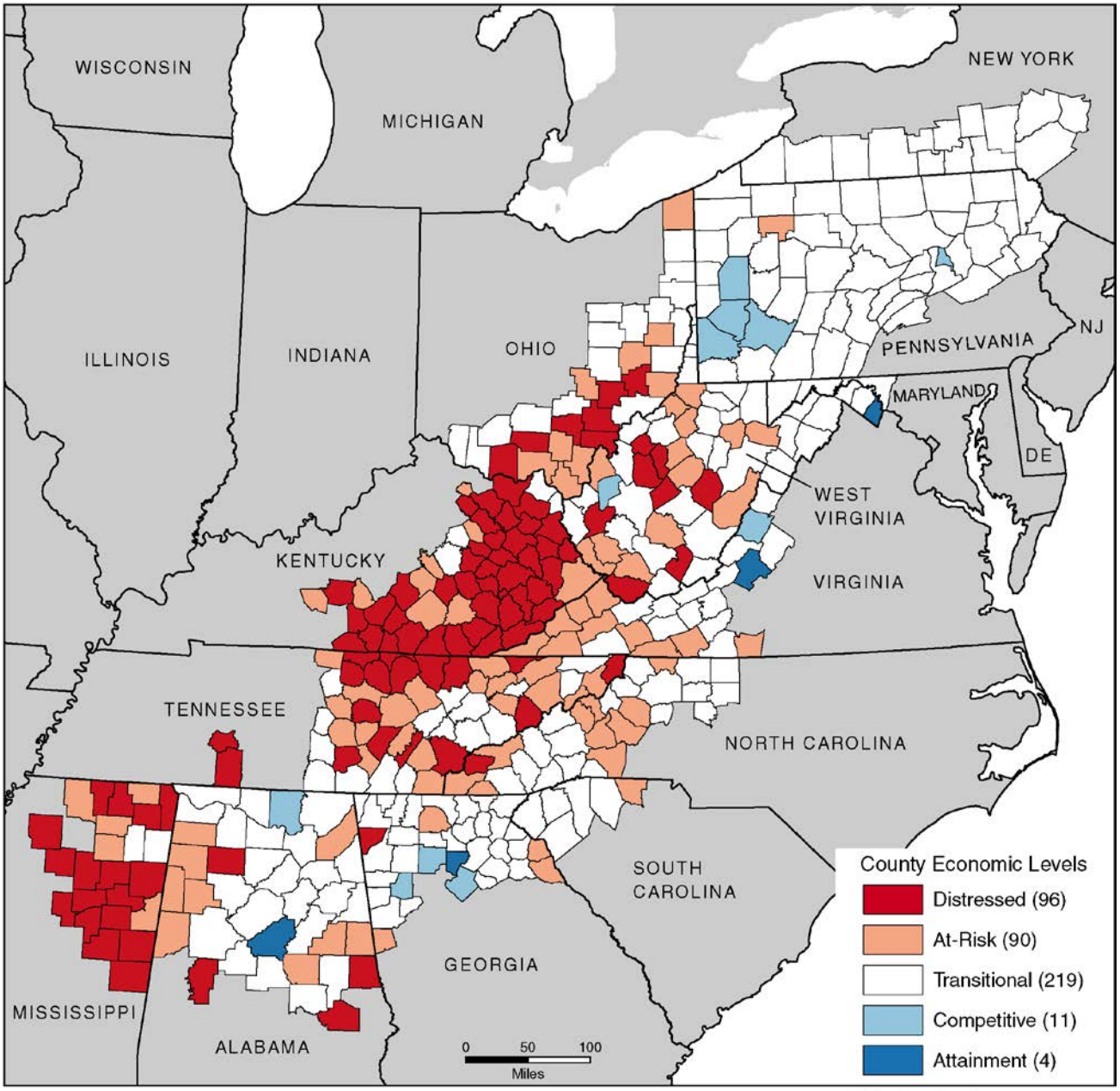
FIGURE 63 – YPLL_75, APPALACHIAN COUNTIES, 2005-2007 ARRAYED BY ARC_EDI (3 LEVELS) AND HCRA COMPONENT



More extensive health resources seem to have a more consistent and pronounced effect on lengthening life in the most economically distressed Appalachian counties, i. e. those in the bottom 25 percent.

APPENDIX N: COUNTY ECONOMIC STATUS IN APPALACHIA, FY 2012

FIGURE 64 – COUNTY ECONOMIC STATUS IN APPALACHIA, FY 2012



Created by the Appalachian Regional Commission, March 2011
Data Sources:
Unemployment data: U.S. Bureau of Labor Statistics, LAUS, 2007–2009
Income data: U.S. Bureau of Economic Analysis, REIS, 2008
Poverty data: U.S. Census Bureau, American Community Survey, 2005–2009

Effective October 1, 2011
through September 30, 2012