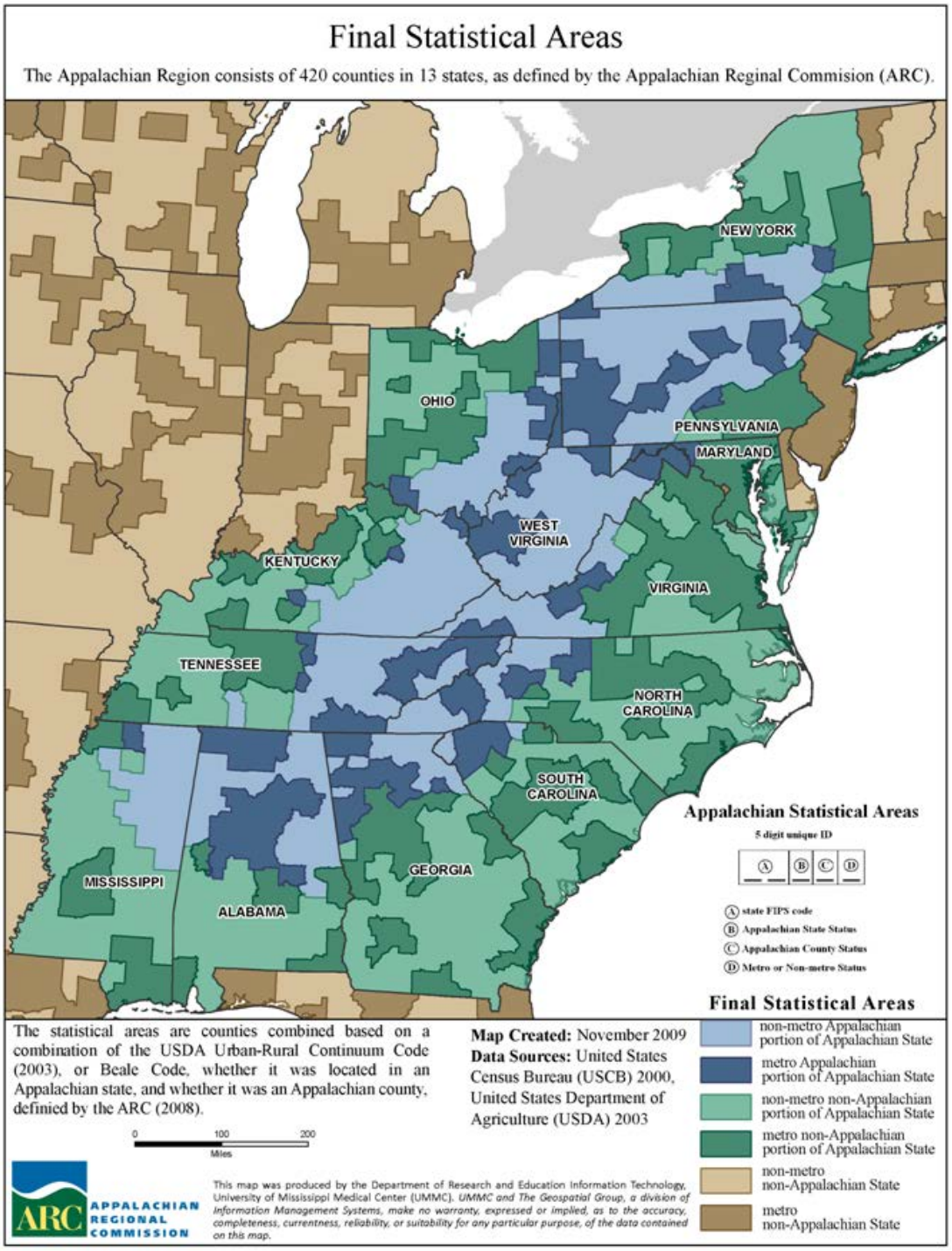
APPENDICES

Appendices A through C, and Appendices E through G were prepared, in 2010, by a research team associated with the University of Mississippi Medical Center, under contract CO-16034-2008 to the Appalachian Regional Commission.

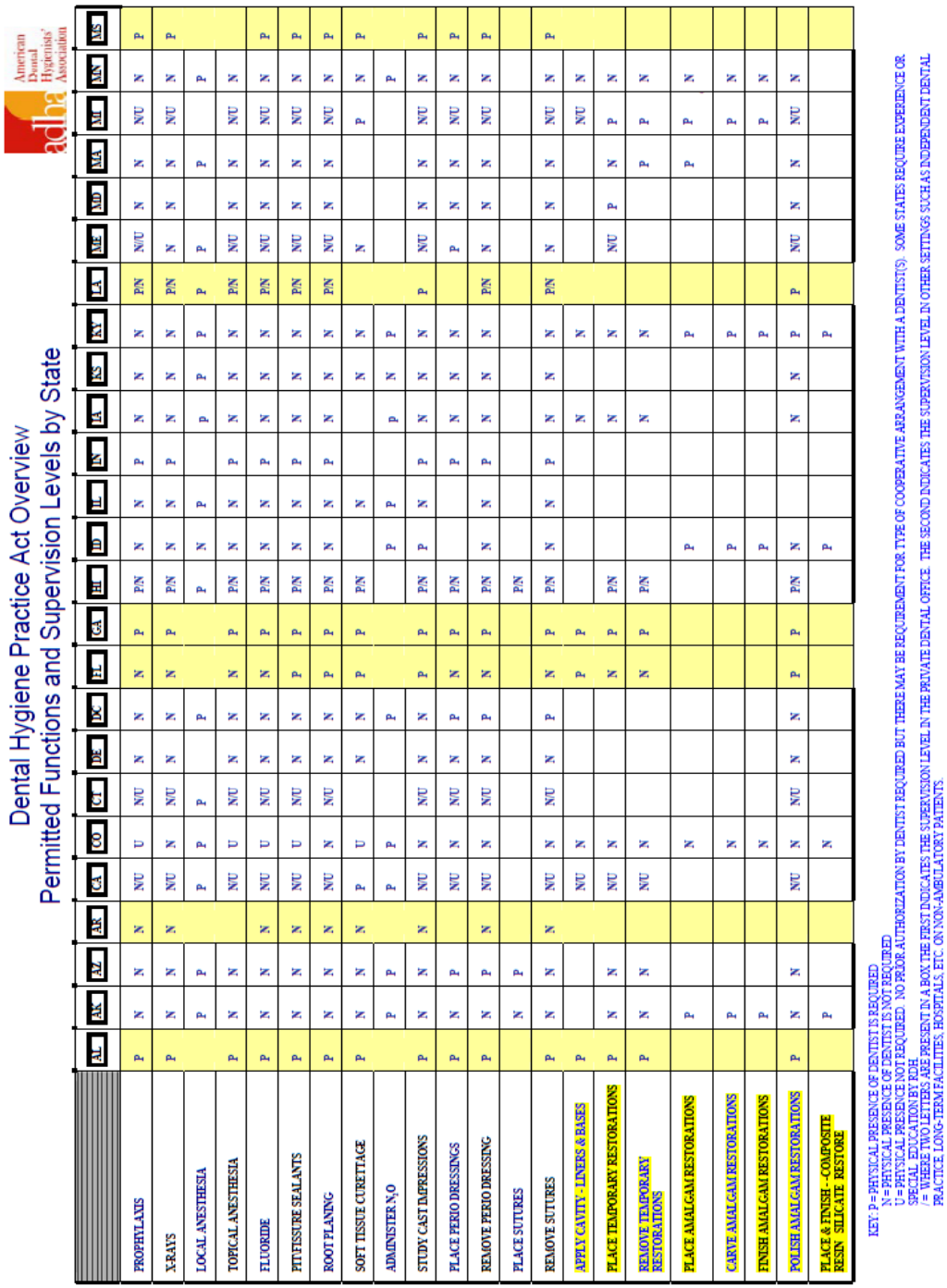
APPENDIX A: METROPOLITAN AND NON-METROPOLITAN AREAS IN APPALACHIA

FIGURE 22 - METROPOLITAN AND NON-METROPOLITAN AREAS, APPALACHIAN REGION



APPENDIX B: PERMITTED FUNCTIONS AND SUPERVISION LEVELS BY STATE REGISTERED DENTAL HYGIENISTS

FIGURE 23- DENTAL HYGIENE PRACTICE ACT OVERVIEW



Dental Hygiene Practice Act Overview
Permitted Functions and Supervision Levels by State

	MO	MT	NE	NV	NH	NJ	NM	NY	NC	ND	OH	OK	OR	PA	RI	SC	SD	TN	TX	UT	VT	VA	WA	WV	WI	WY
PROPHYLAXIS	N/U	N	N/U	N/U	N	P/N	N/U	N	P/N	N	N	N	N/U	P/N	N	N	N	N	N	N	N	N	N/U	P	N/U	N
X-RAYS	N	N	N	N/U	N	P/N	N/U	N	P/N	N	N	N	N/U	P/N	N	N	N	N	N	N	N	N	N	P	N	N
LOCAL ANESTHESIA	P	P	P	P/U	P*		P	P			P	P	N		P	P	P	P		P	P	P	P	P	p	P
TOPICAL ANESTHESIA	N	N	N	N/U	N	P/N	N	N	P	N	N	N	N/U	P/N	N	P	N	N	N	N	N	N	N	P	N	N
FLUORIDE	N/U	N	N/U	N/U	N	P/N	N/U	N	P/N	N	N	N	N/U	P/N	N	N	N	N	N	N	N	N	N/U	P	N	N
PIT/FISSURE SEALANTS	N/U	N	N/U	N/U	N	P	N	N	P/N	N	P	N	N/U	P/N	N	P/N	N	N	N	N	N	N	N/U	P	N	P
ROOT PLANING	N	N	N	P/U	N	N	N	N	P	N	P	N	N/U	P/N	N	P/N	N	N	N	N	N	N	N/U	P	N	N
SOFT TISSUE CURETTAGE	N	N	N	N			N			N	P	N	N/U				N	N		N			P/U			
ADMINISTER N_2O	P			P/U	P			P			P	P	P				P	P		P		P	P			P
STUDY CAST IMPRESSIONS	N	N	N	N/U	N	P	N	P	P	P	N	N	N/U	P	P	P		P	N	N	N	N	N	P	N	N
PLACE PERIO DRESSINGS	N	N	N	N/U		P		P		P	P	N	N/U		P				N	N	N	N	P	P	N	P
REMOVE PERIO DRESSING	P	N	N	N/U	N	P	N	P	P	P	N	N	N/U		P	P	N	P	N	N	N	N	P	P	N	P
PLACE SUTURES									P											N						
REMOVE SUTURES	N	N	N	N/U	N	P		P	P	P	P	N	N/U	P	P	P		P	N	N	N	N	P	P	N	N
APPLY CAVITY - LINERS & BASES	P				N				P									P						P		
PLACE TEMPORARY RESTORATIONS	P	N	N	N/U	N	P		P	P	P		N	N/U			P/N		P	N					P	N	N
REMOVE TEMPORARY RESTORATIONS	P	N	N		N			P	P	P								P	N							
PLACE AMALGAM RESTORATIONS	N				N								P					P					P			P
CARVE AMALGAM RESTORATIONS	P												P										P	P		P
FINISH AMALGAM RESTORATIONS	P												P										P			N
POLISH AMALGAM RESTORATION	N	N	N	N/U	N	P	N		P	P	P	N	N/U		P	P	N	P	N	N			U	P		N
PLACE & FINISH – COMPOSITE RESIN SILICATE RESTORE	P												P										P			P

KEY: P = PHYSICAL PRESENCE OF DENTIST IS REQUIRED
N = PHYSICAL PRESENCE OF DENTIST IS NOT REQUIRED
U = PHYSICAL PRESENCE NOT REQUIRED. NO PRIOR AUTHORIZATION BY DENTIST REQUIRED BUT THERE MAY BE REQUIREMENT FOR TYPE OF COOPERATIVE ARRANGEMENT WITH A DENTIST(S). SOME STATES REQUIRE EXPERIENCE OR SPECIAL EDUCATION BY RDH.
/ = WHERE TWO LETTERS ARE PRESENT IN A BOX THE FIRST INDICATES THE SUPERVISION LEVEL IN THE PRIVATE DENTAL OFFICE. THE SECOND INDICATES THE SUPERVISION LEVEL IN OTHER SETTINGS SUCH AS INDEPENDENT DENTAL PRACTICE, LONG-TERM FACILITIES, HOSPITALS, ETC. ON NON-AMBULATORY PATIENTS.
* = RULES PENDING

PDA, Inc., Cecil. G. Sheps Center/UNC-Chapel Hill, University of Mississippi Medical Center, and Mississippi State University
ARC Contract Nos.: CO-16034-2008 and CO-16835-2010

APPENDIX C: STATISTICAL ANALYSIS OF SOCIOECONOMIC STATUS AND ORAL HEALTH INDICATORS

DATA AND METHODS

Four of the socioeconomic variables used for this study came from the 2007 Area Resource File (ARF). The ARF is maintained by the Health Resources and Services Administration of the U.S. Department of Health and Human Services (HRSA. 2006). It provides national county-level health resource information. The four indicators of socioeconomic status obtained from the ARF for this study included unemployment, percent urban population median household Income and percent of adults living in poverty. Because the ARF does not contain the most up-to-date information for some variables, a fifth indicator of socioeconomic status—percent of persons without health insurance—was downloaded from the Small Area Health Insurance Estimates (SAHIE) at www.census.gov/did/www/sahie. The SAHIE are prepared by the Census Bureau to provide state- and county-level estimates of health insurance coverage (Fisher and Turner 2003). These indicators provide an examination of county-level differences within the Appalachian Region.

The complete Behavioral Risk Factor Surveillance System (BRFSS) dataset for 1999-2006 contains 2,085,241 individual records based on yearly probability samples aimed at estimating prevalence of health indicators and health behaviors for all 50 states. Of these, 543,204 individuals from the Appalachian Region in the 13 states responded to the survey. Four oral health indicators were obtained from the BRFSS datasets: dental visits within one year, any tooth removal for ages 35 to 44, six or more teeth removed for ages 35 to 44, and all teeth missing for ages 65 and older. The socioeconomic status indicators for the Appalachian Region consisted of data collected over several years; however, the oral health indicators are not collected each year in every state. The prevalence estimates for dental visits within one year are based on all who responded that their most recent visit to a dentist or dental clinic was in the past 12 months; however, age-specific estimates of prevalence of health indicators/behaviors for the remaining three variables are based on respondents within each specified age categorization. Table 10 lists the number of respondents to each oral health/behavior question per year in the Appalachian Region.

TABLE 10 – SAMPLE SIZES FOR ORAL HEALTH BEHAVIOR INDICATORS, BRFSS, 1999-2006

Oral Health Indicator			
Year	Visit < 1 year	Tooth Removal	
		(35-44)	(65+)
1999	40,898	8,919	7,864
2000	9,766	2,268	1,578
2001	15,599	3,306	2,901
2002	67,931	13,747	14,273
2003	23,965	4,840	4,660
2004	79,227	14,771	18,082
2005	9,511	1,638	2,293
2006	95,441	16,614	25,230
Total	**342,338**	**65,614**	**76,881**

Source: CDC BRFSS survey database. Note sum of (35-44) should be 65,614.

METHODS

Oral health indicators were obtained from the BRFSS survey, which is an extensive, continuous telephone health survey used for monitoring health conditions and health-risk behaviors across the entire United States, the District of Columbia, Puerto Rico, U.S. Virgin Islands, and Guam. The survey is designed to estimate state-level information on health behaviors and disease prevalence through the use of a probability sample accomplished through a random selection of telephone numbers. For this study, we were interested in estimating oral health status in much smaller geographic regions. The CDC supplies county of residence for individuals as the smallest available geographic region for the BRFSS. Because population and socioeconomic data are available from the U.S. Census for individual counties, counties would be the ideal basic geographic unit to use for this study. The BRFSS survey was not intended to be used for county level analysis, but in recent years researchers and statisticians have harnessed its wealth of information to do just that.

Because of the length and expense of the questionnaire, some modules are optional, and are not asked every year in every state. It is left up to the discretion of individual states. Unfortunately, the oral health module is typically an optional module made up of only three oral health questions. The CDC suggests that estimates based on fewer than 50 individual observations are not reliable and should not be used. This makes it difficult to gain enough responses per county to be usable. In order to obtain large enough sample sizes for the oral health questions, data were merged from several years of BRFSS survey data (1999-2006). Even after merging several years of survey data, there were still many counties that did not have sufficient sample sizes to be included in this study.

In order to aggregate up to larger, but analyzable geographic areas, we chose to use four geographic regions within each state for those states that contain an Appalachian Region as part of their territory. Within each of the 13 states, counties were coded as either belonging to the Appalachian Region or not. In addition, Beale codes, obtained from the Census Bureau, were used to classify counties as metropolitan or non-metropolitan areas. Thus, our four geographic regions within each state that are of interest are: metropolitan/Appalachian, metropolitan/non-Appalachian, non-metropolitan/Appalachian, and non-metropolitan/non-Appalachian.

Note that West Virginia is entirely within the Appalachian Region. In addition, Ohio does not report county identifiers for smaller rural counties, so it is not possible to separately estimate the Appalachian and non-Appalachian regions for non-metropolitan areas in that state. Therefore, there are a total of eleven states that provide estimates of all four defined regions, one state (WV) that provides estimates for only two regions (metro/non-metro), and one state (OH) that provides estimates for non-metro, metro/non-Appalachian and metro/Appalachian regions. That is, there are 49 separate regions to be estimated for these 13 states.

The analysis is, therefore, multi-level. The first level of estimation uses individual responses for the BRFSS on each of the four oral health/behavior indicators as dependent variables in a simple estimation of the prevalence proportions. The indicators were dichotomized to 0 for a negative response and 1 for a positive response. For example, if the individual respondent to the BRFSS survey that they had visited the dentist within the past year, they were coded as “1” and if they responded otherwise, they were coded as “0”. Those who did not respond were coded as missing and do not contribute to the analysis. Similar definitions were made for each of the other variables with the appropriate restriction to specific age categories based on self-reported age in the BRFSS dataset.

The simple model for the first level estimation is a basic cell means model aimed at estimating, within each state, the prevalence estimates for each of the geographic regions.

$$E(Y_{ii}) = \pi_i$$

Where Y_{ij} represents the j^{th} individual BRFSS respondent for one of the four oral health indicators within the i^{th} geographic region, i = 1,2,…,49, and π_i (i=1,2,…,49) represents the 49 separate prevalence proportions. That is, the first level of analysis estimates the prevalence proportion for the four oral health/behavior indicators in each of the 49 regions. Based on the sample data, therefore, we have a collection of 49 observed proportions, pi. The Central Limit Theorem guarantees that these estimates are approximately distributed as N (π_{ij}, σ) due to the large number of individuals within each region on which the estimates are based. These estimates are carried forward into the next level of analysis.

Next, county-level census data were aggregated to the larger geographic region using a similar model to find averages for each of the 49 defined geographic regions. That is, Average (Yij)=πi, where Yij represents the county-level census data for each economic indicator for the jth county in the ith region (i=1,2,…49). Here, all county-level data within a region are aggregated to the larger region defined earlier. We point out that, theoretically, the census variables are not random variables but represent true population values.

By aggregating the BRFSS data to a geographic unit smaller than the state but larger than the county, we satisfy the CDC sample size requirements for small area estimation using a simple approach that is suitable for our purposes. The first-level estimates are well-estimated as evidenced by the small standard errors seen in the reports. The BRFSS uses a probability-based sampling approach and prevalence estimates require the use of the sample weights. For our analyses, we used the final sample weights derived by the CDC and distributed with the raw data. Data were analyzed using Survey Procedures in the SAS system.

The second level of analysis assumes the $p_{ij} \sim N(\pi_{ij}, \sigma)$ (ij=1,2,…,49). Several models of interest are investigated using the estimated prevalence proportions as outcomes in the second level models. Our basic model for analysis is the cell means model

$$E(p_{ii}) = \alpha_i$$

Where α_i are the average prevalence proportions for Appalachian/metro, non-Appalachian/metro, Appalachian/non-metro, non-Appalachian/non-metro. This can be accomplished in a regression setting using three indicator variables with non-Appalachian/non-metro as the baseline and coding 0/1 for the other groups. Although the design could be considered a two-way ANOVA design with main effects for Appalachian/non-Appalachian and metro/non-metro, we chose to model the means directly in order to estimate simple effects. That is, we are most interested in comparing the means for Appalachian Region to non-Appalachian Region for metro areas and the same comparison within non-metro areas. As an example, suppose the four means are $\pi 1$, $\pi 2$, $\pi 3$, and $\pi 4$ for Appalachian/metro, non-Appalachian/metro, Appalachian/non-metro, non-Appalachian / non-metro, respectively. We are most interested in the contrasts of $\pi 1$-$\pi 2$ and $\pi 3$-$\pi 4$ that represent simple effects comparing Appalachian to non-Appalachian regions within each metro/non-metro grouping.

In addition to the ANOVA models, we also used the estimated proportions and aggregated Census data to investigate correlations between the variables. Each of these, therefore, uses the 49 estimated or aggregated data values as variables. To identify those economic indicators that are associated with better oral health/behaviors, we used the aggregated data in several regressions using dental indicators as outcomes and economic indicators as predictors. Models for these regressions follow the form:

$$E(p_{ii}) = \beta_0 + \beta_1 X_i$$

Where p_{ij} are the estimated prevalence proportions for oral health/behavior indicators, β_0 is the intercept and β_1 is the slope. Tests of the slope parameters are performed using a traditional Fisher's "F" statistic.

Finally, stepwise regression models using significant economic indicators were performed to identify the best predictive models for each of the oral health/behavior indicators. Least squares means are reported for these models so that estimates of relationship between predictor and outcome are adjusted for all other variables in that particular model and tested using Type III analyses that are, basically, regression approaches to the General Linear Model.

RESULTS

The BRFSS uses a probability-based sampling approach and prevalence estimates require the use of the sample weights. For our analyses, we used the final sample weights derived by the CDC and distributed with the raw data. The following estimates for all 13 states that encompass the Appalachian Region utilize those weights:

TABLE 11 - PREVALENCE ESTIMATES FOR ORAL HEALTH/BEHAVIOR INDICATORS, APPALACHIAN STATES

Variable	N	Prevalence	Std. Error	95% CI
Visit within 1 year	342,338	68.70%	0.13%	68.4 %-69.0 %
Any teeth removed (ages 35-44)	65,614	43.50%	0.30%	42.9 %-44.0 %
Major tooth removal (ages 35-44)	76,881	24.20%	0.25%	23.7 %-24.7 %
Major/all tooth removal (age 65+)	65,614	9.63%	0.19%	9.26 %-10.00 %

Of the respondents to each of the oral health/behavior indicators, only 68.7 percent have seen the dentist for a regular yearly check-up in the past year. Of those aged 65 or older, nearly 10 percent have all teeth removed. For those in the 35 to 44 year age range, a large proportion has experienced at least some tooth removal as a result of disease or decay (43.5%), defined here as having had any teeth removed, while almost one-fourth have experienced major tooth removal (24.2%), defined here as having had six or more teeth removed. Since tooth removal is preventable through proper hygiene and care, the magnitudes of the prevalence estimates oral health/behavior indicators for the states that encompass the Appalachian Region are of some concern.

The above estimates are regional estimates for all states that encompass the Appalachian Region. For the next level, we estimated the prevalence for each state. As illustrated in Tables 12-15, the BRFSS estimates are reasonably well-estimated at the state level by using data across years, assuming there is little year-to-year change within each state. There is considerable state-by-state variability in all four indicators. For example, 73.0 percent visited the dentist within the past year for Maryland, while only 59.4 percent had a visit for West Virginia. Any tooth removal within the 35-44 year olds ranged from a low of 36.6 percent for Virginia, to a high of 56.3 percent for Mississippi. Major tooth removal in the 35-44 year olds ranged from 5.5 percent for Maryland, to 18.2 percent for West Virginia, over 3 times the prevalence. For those over age 65, all teeth removed ranged from 18.3 percent for New York to a high of 41.9 percent for West Virginia. Overall, it appears that West Virginia scores very low in terms of the oral health/behavior indicators.

These are limited measures that do not shed much light on the underlying causes. Other studies indicate that poor oral health is often a reflection of a lifetime of poor oral health hygiene, limited exposure to dental professionals and limited knowledge of good oral health practices.

Next, in Tables 12 through 15, we examined the state-level prevalence associated with each of the four dependent variables.

TABLE 12 - PREVALENCE OF DENTAL VISIT WITHIN THE PAST YEAR, APPALACHIAN STATES

State	N	Prevalence	Std Error	Rank
Alabama	12,076	64.7%	0.6%	9
Georgia	20,082	66.2%	0.5%	8
Kentucky	27,422	63.8%	0.5%	10
Maryland	30,494	73.0%	0.4%	1
Mississippi	21,812	57.7%	0.4%	12
New York	24,191	70.0%	0.4%	4
North Carolina	45,953	66.8%	0.4%	7
Ohio	25,747	70.8	0.5%	3
Pennsylvania	39,970	70.0%	0.4%	4
South Carolina	32,794	67.1%	0.3%	5
Tennessee	14,412	67.0%	0.5%	6
Virginia	34,213	71.1%	0.4%	2
West Virginia	13,172	59.4%	0.5%	11

*Note that New York and Pennsylvania are tied for 4th place in this ranking.

Variations across Appalachian states in dental visits in the previous year are wide. Maryland tops the list at 73.0 percent, and Mississippi has the lowest rate at 57.7 percent. The top four states (Maryland, Virginia, Ohio and Pennsylvania) are all in Northern and Central Appalachian regions; while the four states with the lowest rates of dental visits in the previous year (Mississippi, West Virginia, Kentucky and Alabama) were all in Central and Southern Appalachia.

TABLE 13 - PREVALENCE OF ANY TEETH REMOVED (AGES 35-44), APPALACHIAN STATES

State	N	Prevalence	Std Error	Rank
Alabama	2,134	52.8%	0.1%	11
Georgia	4,042	45.3%	1.0%	6
Kentucky	4,935	48.4%	1.0%	9
Maryland	6,470	35.0%	0.8%	1
Mississippi	3,863	56.3%	0.9%	12
New York	4,850	43.9%	0.9%	5
North Carolina	8,599	49.4%	0.8%	10
Ohio	4,828	40.8%	1.1%	3
Pennsylvania	7,583	41.4%	0.8%	4
South Carolina	6,095	47.3%	0.8%	8
Tennessee	2,749	47.0%	1.2%	7
Virginia	7,131	36.6%	0.8%	2
West Virginia	2,335	57.2%	0.1%	13

State variations in the prevalence of any teeth removed in young adults (ages 35-44) also show wide variation (Table 13). The top ranked states are Maryland, Virginia, Ohio and Pennsylvania. In these states, more than one-third of the residents between 35 and 44 years of age have some teeth removed. At the other extreme, West Virginia has the highest rate of any teeth removed among young adults, followed by Mississippi and Alabama, where more than half of the young adults aged 35-44 have had at least one tooth removed.

TABLE 14 - PREVALENCE OF SIX OR MORE TEETH REMOVED (AGES 35-44), APPALACHIAN STATES

State	N	Prevalence	Std Error	Rank
Alabama	2,134	12.5%	0.8%	10
Georgia	4,042	10.2%	0.6%	7
Kentucky	4,935	15.0%	0.7%	11
Maryland	6,470	5.5%	0.4%	1
Mississippi	3,863	16.7%	0.7%	12
New York	4,850	7.9%	0.5%	2
North Carolina	8,599	9.7%	0.5%	5
Ohio	4,828	9.8%	0.7%	6
Pennsylvania	7,583	8.5%	0.5%	3
South Carolina	6,095	11.5%	0.5%	8
Tennessee	2,749	12.1%	0.8%	9
Virginia	7,131	8.9%	0.5%	4
West Virginia	2,335	18.2%	0.9%	13

The rankings for the average rates of six or more teeth removed for young adults (ages 35-44) (Table 14) indicate that the states with the lowest rates of major tooth removal in young adults are Maryland (5.5%), New York (7.9%), and Pennsylvania (8.5%), the states that comprise Northern Appalachia. The states with the highest rates of major tooth removal in young adults are West Virginia (18.2%), Mississippi (16.7%) and Kentucky (15.0%).

TABLE 15 - PREVALENCE OF MAJOR TOOTH REMOVAL (65+), APPALACHIAN STATES

State	N	Prevalence	Std Error	Rank
Alabama	2,820	29.8%	1.0%	9
Georgia	4,041	26.4%	1.0%	7
Kentucky	6,956	39.5%	0.8%	12
Maryland	5,929	18.5%	0.7%	2
Mississippi	5,326	30.8%	0.8%	10
New York	5,182	18.3%	0.7%	1
North Carolina	10,824	27.3%	0.7%	8
Ohio	5,764	23.4%	0.9%	5
Pennsylvania	9,578	25.9%	0.7%	6
South Carolina	7,149	23.3%	0.7%	4
Tennessee	3,262	31.2%	1.0%	11
Virginia	6,723	18.9%	0.7%	3
West Virginia	3,327	41.9%	1.0%	13

The fourth and final dependent variable is a measure of all teeth removed among the elderly population (65+), and is presented in Table 15. New York (18.3%), Maryland (18.5%) and Virginia (18.9 %) represent the Appalachian states with the lowest prevalence of all teeth removed among the elderly. West Virginia (42%), Kentucky (39.5%) and Tennessee (31.2%) are the states with the highest prevalence of all teeth removed among the elderly.

SUB-STATE ANALYSES

The BRFSS survey was designed for state-level estimation of health behaviors, as in the previous tables, and the yearly estimates are reasonably good approximations of the state-level population prevalence. Areas of estimation smaller than the state level require attention to sample size issues. The data may become sparse when estimating small local areas, particularly for the three age-specific oral health/behavior indicators. As previously mentioned, the CDC suggests that estimates be based on at least 50 individual observations for a specific small area. As a first attempt at analysis, we estimated the prevalence proportions for each of the four indicators at the county level. In the Appalachian Region, there are a total of 1,099 areas, 1,070 individual counties and 29 independent cities. Of these, only 531 areas had at least one respondent to at least one of the oral health/behavior indicator questions. The strict requirement of at least 50 observations retains estimates for a reduced number of counties as listed in the following table:

TABLE 16 - ASSESSMENT OF APPALACHIAN COUNTIES AND INDEPENDENT CITIES REPRESENTED IN BRFSS DATA

Indicator	Number of areas with 1+ observations	Number of areas with 50+ observations
Visit Within 1 Year	504	496
Any/Major Removal (35-44)	503	260
Major Removal (65+)	503	311

Therefore, difficulties with sample size requirements for the BRFSS county-level estimates warranted other approaches for identifying differences between Appalachian and non-Appalachian Regions within the Appalachian states. Initially, we considered using the county-level prevalence estimates of the oral health/behavior indicators from the 1999-2006 BRFSS data. The removal of nearly half of the county-level estimates due to small sample sizes, however, warranted other approaches to the small area estimation.

Because of suspected differences in behaviors based on proximity to services, we considered separating the counties into those in close proximity versus those farther from large population centers. Beale codes are codes that are assigned to each county of the United States according to its proximity to a metropolitan area and provided a reasonable approach to the analysis. Because dental services may differ for metro and non-metro areas, we used the Beale codes to assign each of the 1,099 counties within states that encompass the Appalachian Region to either a metropolitan area or a non-metropolitan area within the state. Because the BRFSS data provides the county of residence for each participant if demanded, each individual observation of the BRFSS data was assigned according to the county-level or independent city Beale code, to belong to either a metro or non-metro area within a state.

We were most interested in comparing Appalachian Regions to non-Appalachian regions within a state. The BRFSS data, using county identifiers, were assigned to one of the two regions, Appalachian or non-Appalachian, within each state.

Again, using this scheme, we estimated the prevalence proportions for each of the four oral health/behavior indicators for four geographic regions within each state: Appalachian/metro, Appalachian/non-metro, non-Appalachian/metro and non-Appalachian/non-metro. All counties in West Virginia are listed as belonging to the Appalachian Region, so West Virginia has only prevalence estimates for metro and non-metro regions. All 12 other states have four prevalence estimates, with the exception of Ohio that provides estimates for non-metro, metro/non-Appalachian and metro/Appalachian regions. Thus, we estimated 49 separate oral health/behavior prevalence proportions for the described geographic regions.

The tables on the following few pages give the prevalence estimates for each of the four oral health/behavior indicators for each of the geographic regions described in the previous paragraph. As mentioned, West Virginia does not include a non-Appalachian Region. In addition, Ohio does not appear to list the county of residence for those in rural counties and, so, the estimate for non-metropolitan Appalachian regions is not available for further analysis.

As evidenced in the tables, the prevalence estimates for dental visit within the last year range from a low of 54.4 percent to a high of 74.2 percent. The standard errors, however, indicate that the estimates are relatively precise in their estimation. This is understandable since the aggregation to the four geographic regions is nearer to that of state-level data than of county-level data, a reminder that the original intention of the BRFSS study is to estimate state-level prevalence.

Only those states with Appalachian regions were used in the main analyses, although a separate comparison of Appalachian regions to the rest of the states is also reported. West Virginia is entirely within the Appalachian Region but the other 12 states had Appalachian and non- Appalachian regions. County-level census data were merged with the BRFSS data. The data was aggregated from the county level to the Appalachian and non-Appalachian regions within each state. Beale codes were added to the data and separated into metro and non-metro areas in the analyses. Four groups were formed from the aggregated data: metro Appalachian, metro non-Appalachian, non-metro Appalachian and non-metro non-Appalachian. Comparisons of the aggregated data were made using ANOVA models with pre-specified contrasts to compare the proportions for metro versus non-metro areas as well as Appalachian versus non-Appalachian areas. Analyses based on the ANOVA contrasts comparing Appalachian versus non-Appalachian areas, separately for metro and non-metro areas, are also reported.

Univariate normal probability plots of most of the proportions did not show gross departures, so the parametric ANOVA models were assumed robust enough to determine differences. In the initial screening of the variables, we reported $p<0.05/4 = 0.0125$ as evidence of difference by adjusting for multiple contrasts ($k=4$) but without adjusting multiple outcomes. Pearson's correlations between economic indicators and dental outcomes are reported along with p-values. Finally, stepwise selection was performed to identify predictive models of each of the four outcome variables and those were further investigated in ANCOVA models that included a variable to compare the groups, metro/Appalachia, metro/non-Appalachia, non-metro/Appalachia and non-metro/non-Appalachia. Each dental outcome was considered separately with $p<0.05$ as an indication of significant differences followed by Bonferroni post-hoc procedure for the pairwise comparisons of the four least-squares adjusted means.

The first set of tables compares means on all pertinent variables, but only Appalachian states divided into metro/non-metro and Appalachian/non-Appalachian Region. Respondents who reside in states that do not fall into the Appalachian Region are not included in these analyses. Only significant results are discussed (the p values are in bold when they fall below 0.05).

Table 17 shows the results for the mean comparisons of metro residents in Appalachian states to non-metro residents in Appalachian states; therefore, residents in areas that are not considered to be in Appalachia are included in these analyses, as long as they live in a state that is at least partially in Appalachia.

Non-metro Appalachian state residents are slightly older (mean age 37.7) than metro Appalachian state residents (mean age 36.3). In part, this mean age difference would be related to the fact that non-metro Appalachian state residents are more likely to be 65+ (14.5%) than metro Appalachian state residents (12.5%). Non-metro Appalachian state residents are also more likely to be in poverty (17.5%) than metro Appalachian state residents (14.3%), as median household income is lower for those non-metro residents ($35,211) than for metro residents ($42,281).

As for the oral health variables, non-metro Appalachian state residents are less likely to have had a dental visit in the last year, more likely to have lost teeth between the ages of 35 and 44, more likely to experience six or more teeth removed in that same age range and more likely to have had experienced all teeth removed among the elderly population. In other words, all four measures of oral health are statistically significantly worse in the non-metro areas of the Appalachian states than in the metro areas of these same states.

TABLE 17 - COMPARING MEANS, METRO VERSUS NON-METRO AREAS, APPALACHIAN STATES

Variables	Metro	Non-metro	P Value
Percent males	48.7	49.0	0.107
Percent whites	77.4	83.9	0.060
Percent other race	1.4	0.8	0.071
Median age	36.3	37.7	**0.004**
Percentage > 65	12.5	14.5	**<0.001**
Percent adults poverty	14.3	17.5	**0.013**
Percent urban	52.6	28.3	**<0.001**
Unemployment rate	5.0	5.8	0.048
Median household income	42,281	35,211	**<0.001**
Percent uninsured	16.3	16.9	0.352
Dental visit within past year	67.9	63.8	**0.011**
Any tooth removal (35-44)	42.9	51.4	**0.001**
Six or more teeth removed (35-44)	9.5	14.5	**0.001**
Complete tooth removal (>65)	24.2	31.2	**0.001**

Source: Appalachian states divided by metropolitan and non-metropolitan areas

Table 18 shows the results for the mean comparisons of Appalachian residents in Appalachian states to non-Appalachian residents in Appalachian states; therefore, all residents in Appalachian states are included in these analyses and the table compares those who live in Appalachian counties to those who do not live in Appalachian counties (but who live in an Appalachian state).

Residents of non-Appalachian regions of Appalachian states are less likely to be white (72.7%) than those residing in Appalachian regions of Appalachian states (88%). Also, residents of Appalachian regions of Appalachian states are more likely to be 65+ (14.2%) than those residing in non-Appalachian regions of Appalachian states (12.8%). Residents of Appalachian regions of Appalachian states are less likely to live in an urban area (36.3%) than those who reside in non-Appalachian regions of Appalachian states (44.8%); that is, Appalachian counties have a higher rural population than those that are not in Appalachia. Finally, household income is higher among residents of non-Appalachian regions of Appalachian states ($41,523) than it is among Appalachian regions in Appalachian states ($36,183); in other words, Appalachian residents are poorer, on average, than residents in non-Appalachian counties.

As for the dental variables, residents of Appalachian and non-Appalachian regions of Appalachian states do not experience significantly different oral health status, using these four measures (dental visits, any tooth removal, six or more teeth removed and all teeth removed in old age). That is, residents of Appalachian states have similar oral health whether they are living in an Appalachian county or not. Although there are numerical differences, the tests of statistical significance indicate that these differences are within the realm of statistical probability.

TABLE 18 - COMPARING MEANS, APPALACHIA VERSUS NON-APPALACHIA, APPALACHIAN STATES

Variables	Appalachia	Non-Appalachia	P Value
Percent males	49.1	48.8	0.239
Percent whites	88.0	72.7	**<0.001**
Percent other race	0.8	1.5	0.026
Median age	37.5	36.4	0.013
Percentage > 65	14.2	12.8	**0.003**
Percent adults poverty	16.3	15.5	0.520
Percent urban	36.3	44.9	**0.009**
Unemployment rate	5.5	5.3	0.485
Household income	36,183	41,523	**0.003**
Percent uninsured	16.8	16.3	0.510
Dental visit within past year	64.6	67.2	0.110
Any tooth removal (35-44)	48.3	45.8	0.283
Six or more teeth removed (35-44)	12.9	10.9	0.164
Complete tooth removal (>65)	29.5	25.7	0.062

Source: Appalachian states divided by metropolitan and non-metropolitan areas

Table 19 shows the results of the mean comparisons of Appalachian residents in Appalachian states to non-Appalachian residents in Appalachian states, but only compares those who live in metropolitan areas. Therefore, all metropolitan residents in Appalachian states are included in these analyses and the table compares metropolitan residents who live in Appalachian counties to metropolitan residents who do not live in Appalachian counties (but who live in an Appalachian state).

Residents of metropolitan areas in non-Appalachian regions of Appalachian states are less likely to be white (69.1%) than are those living in metropolitan areas in Appalachian regions of Appalachian states (85.1%). Also, residents of metropolitan areas in Appalachian regions of Appalachian states are more likely to be 65+ (13.7%) than those residing in metropolitan areas in non-Appalachian regions of Appalachian states (11.3%). Finally, household income is higher among those living in metropolitan areas in non-Appalachian regions of Appalachian states ($46,523) than it is among those living in metropolitan areas in Appalachian regions of Appalachian states ($38,539).

As for the dental variables, residents of metropolitan areas in Appalachian regions and those living in metropolitan areas in non-Appalachian regions of Appalachian states do not experience significantly different oral health status, using these four measures (dental visits, any teeth removed for ages 35-44, six or more teeth removed for ages 35-44 and all teeth removed in old age). That is, metropolitan residents of Appalachian states have similar oral health whether they are living in an Appalachian county or not. Although there are numerical differences, the tests of statistical significance indicate that these differences are within the realm of statistical probability.

TABLE 19 - COMPARING MEANS, APPALACHIAN VERSUS NON-APPALACHIAN METRO AREAS, APPALACHIAN STATES

Variable	Appalachian	Non-Appalachian	P-Value
Percent males	48.9	48.5	0.076
Percent whites	85.1	69.1	**0.001**
Percent other race	0.8	2.0	0.014
Median age	37.1	35.5	0.019
Percentage > 65	13.7	11.3	**0.001**
Percent adults poverty	15.0	13.5	0.394
Percent urban	48.3	57.2	0.050
Unemployment rate	5.2	4.9	0.606
Household income	38,539	46,335	**0.002**
Percent uninsured	16.4	15.9	0.701
Dental visit within past year	65.8	70.2	0.059
Any tooth removal (35-44)	45.0	40.8	0.224
Six or more teeth removed (35-44)	10.9	8.0	0.178
Complete tooth removal (>65)	26.5	21.7	0.097

Source: All data divided by metropolitan and non-metropolitan areas.

Table 20 shows the results for the mean comparisons of Appalachian residents in Appalachian states to non-Appalachian residents in Appalachian states, but only compares those who live in non-metropolitan areas. Therefore, all non-metropolitan residents in Appalachian states are included in these analyses and the table compares non-metropolitan residents who live in Appalachian counties to non-metropolitan residents who do not live in Appalachian counties (but who live in an Appalachian state).

Residents of non-metropolitan areas of non-Appalachian regions in Appalachian states are less likely to be white (76.3%) than those living in non-metropolitan areas of Appalachian regions in Appalachian states (90.9%). Other than this distinction, there are no statistically significant variations in measures of demographics and socioeconomics when comparing non-metropolitan residents of Appalachian states who are or are not in Appalachian counties.

Non-metropolitan Appalachian residents and non-metropolitan non-Appalachian residents in Appalachian states do not experience significantly different oral health status, using these four measures (dental visits, any teeth removed for ages 35-44, six or more teeth removed for ages 35-44 and all teeth removed in old age). So, non-metropolitan residents of Appalachian states have similar oral health status whether they are living in an Appalachian county or not. Although there are numerical differences, the tests of statistical significance indicate that these differences are within the realm of statistical probability.

TABLE 20 - COMPARING MEANS, APPALACHIAN VERSUS NON-APPALACHIAN NON-METRO AREAS, APPALACHIAN STATES

Variables	Appalachian	Non-Appalachian	P Value
Percent males	49.0	49.0	0.8985
Percent whites	90.9	76.3	**0.0034**
Percent other race	0.7	1.0	0.4926
Median age	38.0	37.3	0.2287
Percentage > 65	14.8	14.2	0.4226
Percent adults poverty	17.5	17.5	0.9595
Percent urban	24.3	32.6	0.0678
Unemployment rate	5.9	5.6	0.6362
Household income	33,827	36,711	0.2308
Percent uninsured	17.1	16.6	0.5827
Dental visit within past year	63.6	64.2	0.7007
Any tooth removal (35-44)	51.9	50.9	0.7560
Six or more teeth removed (35-44)	15.2	13.8	0.5241
Complete tooth removal (>65)	32.7	29.7	0.3137

Source: Appalachian states divided by metropolitan and non-metropolitan areas.

Table 21 shows the results for the mean comparisons of Appalachian residents in all states to non-Appalachian residents in all states, but only compares those who live in metropolitan areas. Therefore, all metropolitan residents in the United States are included in these analyses and the table compares metropolitan residents who live in Appalachian counties to metropolitan residents who do not live in Appalachian counties.

Metropolitan Appalachian residents are less likely to report being an "other" race (less than 1%) than are metropolitan non-Appalachian residents (3.6%). Also, metropolitan Appalachian residents are more likely to be age 65+ (13.7 %) than metropolitan non-Appalachian residents (11.6 %). The percent living in urban areas is much higher in metropolitan areas outside of Appalachia (64.7%) than it is in metropolitan areas within Appalachia (48.3%), which indicates a higher concentration of population in non-Appalachian metropolitan areas than in Appalachian metropolitan areas. Finally, household income is higher among metropolitan non-Appalachian residents ($47,838) than it is among metropolitan Appalachian residents ($38,539). In other words, metropolitan residents in Appalachian counties are, on average, poorer than residents in non-Appalachian counties, nationwide.

Compared to metropolitan residents outside of Appalachia, metro Appalachian residents are less likely to have had a dental visit in the last year, more likely to have had teeth removed between the ages of 35 and 44, more likely to experience six or more teeth removed in that same age range and more likely to have experienced all teeth removed among the elderly population. In other words, all four measures of oral health are statistically significantly worse in the metro areas of the Appalachian Region than in the metro areas across the United States.

TABLE 21 - COMPARING MEANS, APPALACHIAN VERSUS NON-APPALACHIAN IN METRO AREAS, ALL STATES

Variable	Appalachian	Non-Appalachian	P Value
Percent males	48.9	49.0	0.791
Percent whites	85.1	76.6	0.056
Percent other race	0.8	3.6	**0.007**
Median age	37.1	35.6	0.016
Percentage > 65	13.7	11.6	**0.001**
Percent adults poverty	15.0	12.1	0.026
Percent urban	48.3	64.7	**<0.001**
Unemployment rate	5.2	4.4	0.073
Household income	38,539	47,838	**<0.001**
Percent uninsured	16.4	14.7	0.273
Dental visit within past year	65.8	70.9	**0.004**
Any tooth removal (35-44)	45.0	36.3	**0.001**
Six or more teeth removed (35-44)	10.9	6.8	**0.001**
Complete tooth removal (>65)	26.5	19.6	**0.000**

Source: All BRFSS database separated by Appalachia and non-Appalachia, and divided by metropolitan and non-metropolitan areas.

Table 22 shows the results of the mean comparisons of Appalachian residents in all states to non-Appalachian residents in all states, but only compares those who live in non-metropolitan areas. Therefore, all non-metropolitan residents in the United States are included in these analyses and the table compares non-metropolitan residents who live in Appalachian counties to non-metropolitan residents who do not live in Appalachian counties.

There is a slight difference in the gender distribution of non-metropolitan Appalachian county residents compared to non-metropolitan residents in the rest of the country. Although this is statistically significant, substantively this is not a meaningful variation. The remaining demographic and socioeconomic characteristics do not vary by whether a non-metropolitan resident is in an Appalachian county or in a non-Appalachian county, nationwide. In other words, Appalachian non-metropolitan residents are strikingly similar to non-metropolitan non-Appalachian residents across the nation. However, there are statistical and substantive differences in oral health when comparing Appalachian residents and non-Appalachian residents nationwide.

Compared to non-metropolitan residents outside of Appalachia, non-metro Appalachian residents are more likely to have had teeth removed between the ages of 35 and 44, more likely to experience having six or more teeth removed in that same age range and more likely to have had all teeth removed among the elderly population. Appalachian non-metropolitan residents were no more or no less likely to have had a dental visit in the previous year, compared to non-Appalachian non-metropolitan residents. Though there are clear differences in tooth removal, we do not find associated differences in dental visits.

TABLE 22 - COMPARING MEANS, APPALACHIAN VERSUS NON-APPALACHIAN IN NON-METRO AREAS, ALL STATES

Variable	Appalachian	Non-Appalachian	P Value
Percent males	49.0	49.7	**0.008**
Percent whites	90.5	83.1	0.109
Percent other race	0.7	2.4	0.111
Median age	38.2	38.2	0.982
Percentage > 65	14.8	14.6	0.710
Percent adults poverty	17.6	15.2	0.078
Percent urban	24.3	34.0	0.019
Unemployment rate	5.9	5.0	0.051
Household income	33,827	38,410	0.027
Percent uninsured	17.2	17.0	0.762
Dental visit within past year	63.6	65.0	0.376
Any tooth removal (35-44)	51.9	43.7	**0.001**
Six or more teeth removed (35-44)	15.2	10.4	**0.000**
Complete tooth removal (>65)	32.7	25.3	**0.000**

Source: All BRFSS database separated by Appalachia and non-Appalachia and divided by metropolitan and non-metropolitan areas.

The next set of tables presents the prevalence for each of the four oral health indicators from the BRFSS data for each of the 49 regions (determined by state, metropolitan status, and Appalachian Region status) across the 13 Appalachian states. Each of tables includes a ranking of the 49 regions in order to identify patterns.

Table 23 for the oral health indicator 'Dental Visit in Last Year' shows the range of prevalence at a high of 74.2 percent having visited the dentist within the past year for non-Appalachia, metropolitan Virginia to a low of 39.2 percent having visited a dentist in Appalachia, metropolitan Mississippi. The lowest prevalence (rank 49) is substantially lower than the 48th rank of 54 percent in non-Appalachia, non-metropolitan Mississippi. For the most part, the metropolitan regions have a higher prevalence than the non-metropolitan areas. In other words, there is little difference in the prevalence of visits to the dentist in the past year between Appalachia and non-Appalachia metropolitan areas.

Table 24, 'Adults Ages 35-44 with Any Teeth Removed', shows the range of prevalence from a low of 31.1 percent in non-Appalachia, metropolitan Virginia to a high of 71.5 percent in Appalachia, metropolitan Mississippi. In general, metropolitan areas have a lower prevalence of adults aged 35 to 44 with any teeth removed than non-metropolitan areas, although there is little difference in prevalence between Appalachian and non-Appalachian areas. Within the Appalachian areas of the 13 Appalachian states, the prevalence ranges from 32.3 percent in metropolitan Georgia to 71.5 percent in metropolitan Mississippi. This indicates, again, that in metropolitan areas within the Appalachian Region, there is a lower likelihood that adults aged 35 to 44 will have had any teeth removed compared to adults aged 35 to 44 in non-metropolitan areas within the Appalachian Region.

Table 25, "Adults Ages 35-44 with 6 or More Teeth Removed", shows the range of prevalence from a low of 2.9 percent in Appalachian, non-metropolitan Georgia to a high of 30.7 percent in Appalachian, metropolitan Mississippi. Interestingly, the lowest and the highest prevalence are both in Appalachian areas. Metropolitan areas have a lower prevalence of adults aged 35 to 44 with 6 or more teeth missing than non-metropolitan areas. There is little difference in prevalence between Appalachian and non-Appalachian areas. Within the Appalachian areas of the 13 Appalachian states, the prevalence seems to be lower in the northern-most states, with the exception of Georgia which is located in the southern portion of the Appalachian Region. This does not appear to be the case for the non-Appalachian areas.

Table 26 presents the prevalence for the oral health indicator 'Adults 65+ with All Teeth Removed' and shows the range of prevalence from a low of 14.2 percent in Appalachia, non-metropolitan Tennessee to a high of 54.3 percent in Appalachia, non-metropolitan Kentucky. As with the previous table, metropolitan areas have a lower prevalence of adults age 65 or older with all teeth removed than non-metropolitan areas. There is also little difference in prevalence between Appalachian and non-Appalachian areas. An examination of the Appalachian Region only finds that metropolitan areas within the Appalachian Region are also more likely to have a lower prevalence than the non-metropolitan areas.

These findings suggest that, at least for some parts of the Appalachian Region, classification as being within the Appalachian Region is not a sufficient explanation for higher prevalence. For the most part, however, metropolitan status within the Appalachian states does matter. This is most likely due to the issue of access to dentists in non-metropolitan areas, although it may also be linked to higher rates of uninsurance, poverty, and unemployment in non-metropolitan areas.

TABLE 23 - DENTAL VISIT IN THE PAST YEAR BY REGION, STATE, AND METROPOLITAN STATUS

State	Beale	Region	N	Prevalence	Std. Error	Rank
Alabama	Metro	AR	4935	67.3%	0.8%	25
Alabama	Non-metro	AR	617	61.0%	2.4%	43
Georgia	Metro	AR	2259	70.3%	1.3%	9
Georgia	Non-metro	AR	115	69.1%	5.0%	17
Kentucky	Metro	AR	1252	63.8%	1.7%	36
Kentucky	Non-metro	AR	7750	55.5%	0.8%	47
Maryland	Metro	AR	2319	70.2%	1.1%	11
Maryland	Non-metro	AR	504	65.8%	2.7%	31
Mississippi	Metro	AR	107	39.2%	5.6%	49
Mississippi	Non-metro	AR	2548	57.6%	1.3%	45
New York	Metro	AR	401	67.5%	3.1%	24
New York	Non-metro	AR	266	67.9%	3.5%	21
North Carolina	Metro	AR	5183	66.7%	1.0%	28
North Carolina	Non-metro	AR	1511	64.8%	1.9%	33
Ohio	Metro	AR	2759	70.9%	1.1%	7
Pennsylvania	Metro	AR	15036	69.0%	0.6%	18
Pennsylvania	Non-metro	AR	3049	67.6%	1.55%	22
South Carolina	Metro	AR	6377	67.3%	0.7%	26
South Carolina	Non-metro	AR	989	62.7%	1.1%	38
Tennessee	Metro	AR	3300	68.9%	1.0%	19
Tennessee	Non-metro	AR	145	70.6%	4.3%	8
Virginia	Metro	AR	361	70.2%	2.9%	10
Virginia	Non-metro	AR	781	60.8%	2.2%	44
West Virginia	Metro	AR	6052	64.6%	0.7%	34
West Virginia	Non-metro	AR	3539	56.3%	1.0%	46
Alabama	Metro	Non-AR	1872	66.4%	1.4%	29
Alabama	Non-metro	Non-AR	4652	62.0%	0.9%	40
Georgia	Metro	Non-AR	7727	69.8%	0.8%	13
Georgia	Non-metro	Non-AR	9981	62.0%	0.7%	41
Kentucky	Metro	Non-AR	7185	69.8%	0.8%	12
Kentucky	Non-metro	Non-AR	11235	61.0%	0.7%	42
Maryland	Metro	Non-AR	23859	73.5%	0.4%	2
Maryland	Non-metro	Non-AR	3812	69.2%	1.2%	16
Mississippi	Metro	Non-AR	7627	62.9%	0.7%	37
Mississippi	Non-metro	Non-AR	11530	54.4%	0.6%	48
New York	Metro	Non-AR	18328	71.0%	0.4%	6
New York	Non-metro	Non-AR	5196	67.1%	0.8%	27
North Carolina	Metro	Non-AR	23601	69.7%	0.5%	14
North Carolina	Non-metro	Non-AR	15658	64.3%	0.6%	35
Ohio	Metro	Non-AR	16358	72.4%	0.6%	4
Ohio	Non-metro	Non-AR	6630	69.3%	0.7%	15
Pennsylvania	Metro	Non-AR	15319	72.7%	0.5%	3
Pennsylvania	Non-metro	Non-AR	6566	65.9%	0.8%	30
South Carolina	Metro	Non-AR	16260	68.4%	0.5%	20
South Carolina	Non-metro	Non-AR	9168	65.1%	0.7%	32
Tennessee	Metro	Non-AR	5121	71.2%	0.9%	5
Tennessee	Non-metro	Non-AR	5846	62.5%	0.8%	39
Virginia	Metro	Non-AR	16923	74.2%	0.5%	1
Virginia	Non-metro	Non-AR	16148	67.5%	0.59%	23

TABLE 24 - ADULTS AGES 35-44 WITH ANY TEETH REMOVED BY REGION, STATE, AND METROPOLITAN STATUS

State	Beale	Region	N	Prevalence	Std. Error	Rank
Alabama	Metro	AR	903	47.9%	1.9%	32
Alabama	Non-metro	AR	117	56.3%	5.0%	39
Georgia	Metro	AR	517	32.3%	2.5%	2
Georgia	Non-metro	AR	30	32.8%	8.8%	3
Kentucky	Metro	AR	197	49.6%	4.5%	35
Kentucky	Non-metro	AR	1343	65.2%	1.7%	48
Maryland	Metro	AR	448	40.5%	2.7%	12
Maryland	Non-metro	AR	93	46.3%	6.4%	27
Mississippi	Metro	AR	25	71.5%	9.7%	49
Mississippi	Non-metro	AR	419	52.2%	2.8%	36
New York	Metro	AR	67	40.8%	6.5%	14
New York	Non-metro	AR	39	40.4%	8.5%	11
North Carolina	Metro	AR	914	45.9%	2.2%	25
North Carolina	Non-metro	AR	263	58.8%	4.0%	43
Ohio	Metro	AR	446	35.9%	3.9%	5
Pennsylvania	Metro	AR	2674	41.2%	1.4%	15
Pennsylvania	Non-metro	AR	561	48.8%	3.1%	33
South Carolina	Metro	AR	1211	45.4%	1.7%	24
South Carolina	Non-metro	AR	171	57.0%	4.5%	40
Tennessee	Metro	AR	621	41.5%	2.4%	17
Tennessee	Non-metro	AR	29	37.5%	10.6%	7
Virginia	Metro	AR	60	44.6%	7.6%	23
Virginia	Non-metro	AR	135	63.6%	4.5%	46
West Virginia	Metro	AR	1063	47.6%	1.7%	30
West Virginia	Non-metro	AR	622	64.3%	2.1%	47
Alabama	Metro	Non-AR	323	46.7%	3.1%	29
Alabama	Non-metro	Non-AR	791	59.7%	2.0%	44
Georgia	Metro	Non-AR	1601	40.5%	1.6%	13
Georgia	Non-metro	Non-AR	1894	53.3%	1.5%	38
Kentucky	Metro	Non-AR	1376	41.5%	1.8%	16
Kentucky	Non-metro	Non-AR	2019	49.2%	1.6%	34
Maryland	Metro	Non-AR	5261	34.6%	0.9%	4
Maryland	Non-metro	Non-AR	668	36.6%	2.4%	6
Mississippi	Metro	Non-AR	1454	47.6%	1.6%	31
Mississippi	Non-metro	Non-AR	1965	62.9%	1.3%	45
New York	Metro	Non-AR	3751	43.2%	1.0%	20
New York	Non-metro	Non-AR	993	46.6%	1.9%	28
North Carolina	Metro	Non-AR	4689	40.2%	1.0%	10
North Carolina	Non-metro	Non-AR	2733	58.4%	1.4%	42
Ohio	Metro	Non-AR	3137	37.6%	1.4%	8
Ohio	Non-metro	Non-AR	1245	44.2%	1.7%	21
Pennsylvania	Metro	Non-AR	3110	38.9%	1.2%	9
Pennsylvania	Non-metro	Non-AR	1238	45.9%	1.9%	26
South Carolina	Metro	Non-AR	3159	42.7%	1.1%	18
South Carolina	Non-metro	Non-AR	1554	57.7%	1.6%	41
Tennessee	Metro	Non-AR	1066	44.3%	2.0%	22
Tennessee	Non-metro	Non-AR	1033	52.5%	1.8%	37
Virginia	Metro	Non-AR	3783	31.1%	1.0%	1
Virginia	Non-metro	Non-AR	3153	43.2%	1.1%	19

TABLE 25 - ADULTS AGES 35-44 WITH SIX OR MORE TEETH REMOVED BY APPALACHIAN REGION, STATE, AND METROPOLITAN STATUS

State	Beale	Region	N	Prevalence	Std. Error	Rank
Alabama	Metro	AR	903	9.7%	1.2%	21
Alabama	Non-metro	AR	117	20.1%	4.1%	43
Georgia	Metro	AR	517	4.5%	1.0%	2
Georgia	Non-metro	AR	30	2.9%	2.8%	1
Kentucky	Metro	AR	197	14.3%	3.6%	38
Kentucky	Non-metro	AR	1343	25.0%	1.6%	48
Maryland	Metro	AR	448	8.6%	1.4%	15
Maryland	Non-metro	AR	93	8.8%	2.9%	16
Mississippi	Metro	AR	25	30.7%	10.4%	49
Mississippi	Non-metro	AR	419	13.6%	2.0%	36
New York	Metro	AR	67	5.0%	2.5%	3
New York	Non-metro	AR	39	13.4%	6.2%	35
North Carolina	Metro	AR	914	11.8%	1.6%	29
North Carolina	Non-metro	AR	263	14.1%	3.3%	37
Ohio	Metro	AR	446	5.7%	1.7%	5
Pennsylvania	Metro	AR	2674	8.4%	0.8%	13
Pennsylvania	Non-metro	AR	561	9.7%	1.9%	20
South Carolina	Metro	AR	1211	11.7%	1.1%	27
South Carolina	Non-metro	AR	171	9.6%	2.8%	19
Tennessee	Metro	AR	621	9.8%	1.4%	22
Tennessee	Non-metro	AR	29	22.9%	10.5%	47
Virginia	Metro	AR	60	7.7%	4.5%	11
Virginia	Non-metro	AR	135	20.6%	4.2%	44
West Virginia	Metro	AR	1063	13.3%	1.2%	33
West Virginia	Non-metro	AR	622	21.7%	1.9%	46
Alabama	Metro	Non-AR	323	8.2%	1.9%	12
Alabama	Non-metro	Non-AR	791	15.9%	1.4%	40
Georgia	Metro	Non-AR	1601	8.5%	0.9%	14
Georgia	Non-metro	Non-AR	1894	13.3%	1.0%	34
Kentucky	Metro	Non-AR	1376	9.3%	1.2%	17
Kentucky	Non-metro	Non-AR	2019	16.9%	1.2%	42
Maryland	Metro	Non-AR	5261	5.0%	0.4%	4
Maryland	Non-metro	Non-AR	668	9.8%	1.8%	23
Mississippi	Metro	Non-AR	1454	11.7%	1.0%	28
Mississippi	Non-metro	Non-AR	1965	20.6%	1.1%	45
New York	Metro	Non-AR	3751	7.2%	0.6%	8
New York	Non-metro	Non-AR	993	10.2%	1.2%	25
North Carolina	Metro	Non-AR	4689	6.0%	0.5%	6
North Carolina	Non-metro	Non-AR	2733	12.4%	1.0%	30
Ohio	Metro	Non-AR	3137	7.3%	0.8%	9
Ohio	Non-metro	Non-AR	1245	12.5%	1.2%	32
Pennsylvania	Metro	Non-AR	3110	7.4%	0.8%	10
Pennsylvania	Non-metro	Non-AR	1238	11.0%	1.2%	26
South Carolina	Metro	Non-AR	3159	9.5%	0.7%	18
South Carolina	Non-metro	Non-AR	1554	16.0%	1.2%	41
Tennessee	Metro	Non-AR	1066	10.0%	1.2%	24
Tennessee	Non-metro	Non-AR	1033	14.9%	1.3%	39
Virginia	Metro	Non-AR	3783	6.1%	0.6%	7
Virginia	Non-metro	Non-AR	3153	12.5%	0.8%	31

TABLE 26 - ADULTS AGES 65 OR OLDER WITH ALL TEETH REMOVED BY REGION, STATE, AND METROPOLITAN STATUS

State	Beale	Region	N	Prevalence	Std. Error	Rank
Alabama	Metro	AR	1106	29.2%	1.6%	30
Alabama	Non-metro	AR	148	35.1%	4.4%	44
Georgia	Metro	AR	362	22.4%	2.8%	12
Georgia	Non-metro	AR	20	24.3%	11.3%	18
Kentucky	Metro	AR	358	34.3%	2.8%	42
Kentucky	Non-metro	AR	1824	54.3%	1.6%	49
Maryland	Metro	AR	560	24.9%	2.1%	19
Maryland	Non-metro	AR	123	33.8%	5.8%	41
Mississippi	Metro	AR	27	28.5%	9.4%	27
Mississippi	Non-metro	AR	641	30.4%	2.2%	34
New York	Metro	AR	114	18.4%	4.5%	6
New York	Non-metro	AR	87	28.6%	5.8%	29
North Carolina	Metro	AR	1305	25.3%	1.6%	20
North Carolina	Non-metro	AR	445	29.9%	2.8%	33
Pennsylvania	Metro	AR	3950	29.6%	1.2%	31
Pennsylvania	Non-metro	AR	780	29.7%	2.5%	32
South Carolina	Metro	AR	1350	26.6%	1.5%	25
South Carolina	Non-metro	AR	252	28.0%	3.4%	26
Tennessee	Metro	AR	817	28.6%	1.8%	28
Tennessee	Non-metro	AR	44	14.2%	5.2%	1
Virginia	Metro	AR	66	14.7%	4.7%	3
Virginia	Non-metro	AR	167	34.8%	4.3%	43
West Virginia	Metro	AR	1505	37.0%	1.4%	46
West Virginia	Non-metro	AR	937	49.2%	1.8%	48
Alabama	Metro	Non-AR	419	21.9%	2.3%	11
Alabama	Non-metro	Non-AR	1147	32.5%	1.6%	38
Georgia	Metro	Non-AR	1393	21.0%	1.6%	8
Georgia	Non-metro	Non-AR	2266	30.7%	1.4%	36
Kentucky	Metro	Non-AR	1794	32.4%	1.4%	37
Kentucky	Non-metro	Non-AR	2980	40.9%	1.2%	47
Maryland	Metro	Non-AR	4270	17.4%	0.8%	5
Maryland	Non-metro	Non-AR	976	24.0%	2.5%	17
Mississippi	Metro	Non-AR	1686	26.1%	1.4%	23
Mississippi	Non-metro	Non-AR	2972	33.4%	1.1%	40
New York	Metro	Non-AR	3819	16.3%	0.8%	4
New York	Non-metro	Non-AR	1162	23.8%	1.6%	15
North Carolina	Metro	Non-AR	5093	23.1%	0.9%	14
North Carolina	Non-metro	Non-AR	3981	30.5%	1.2%	35
Ohio	Metro	Non-AR	3525	21.1%	1.1%	10
Ohio	Non-metro	Non-AR	1468	25.4%	1.3%	21
Pennsylvania	Metro	Non-AR	3286	18.9%	0.9%	7
Pennsylvania	Non-metro	Non-AR	1562	33.0%	1.6%	39
South Carolina	Metro	Non-AR	3363	21.1%	1.0%	9
South Carolina	Non-metro	Non-AR	2184	23.8%	1.3%	16
Tennessee	Metro	Non-AR	1012	26.4%	1.8%	24
Tennessee	Non-metro	Non-AR	1389	36.2%	1.5%	45
Virginia	Metro	Non-AR	2943	14.4%	0.9%	2
Virginia	Non-metro	Non-AR	3547	22.5%	0.9%	13

There are strong associations between socioeconomic indicators —poverty, percent urban, unemployment, income and uninsurance status— as shown in Table 27. With higher rates of poverty, residents are less likely to have had a dental visit in the last year and more likely to have teeth removed. With higher levels of percent of residents living in urban areas, the likelihood of a dental visit is higher and tooth removal is lower; that is, those living in rural populations are less likely to have had a dental visit and are more likely to experience tooth removal. Unemployment patterns are identical to those seen for poverty, but the magnitude or strength of the relationship is slightly lower. As for median household income, populations with higher incomes are more likely to have visited a dentist in the last year and less likely to experience tooth removal (using all three measures). Finally, percent uninsured is correlated negatively with dental visit (uninsured populations are less likely to have been to the dentist in the last year) and positively correlated with adult tooth removal (ages 35-44).

TABLE 27 - BIVARIATE CORRELATIONS OF DENTAL OUTCOMES WITH SOCIOECONOMIC INDICATORS

	Dental visit (1 year)		Any Tooth Removal (35-44)		Six or More Teeth Removed (35-44)		Complete Tooth Removal (65+)	
Percent adults in poverty	-0.72	***	0.73	***	0.70	***	0.48	***
Percent urban	0.61	***	-0.59	***	-0.60	***	-0.55	***
Unemployment ratio	-0.55	***	0.52	***	0.52	***	0.31	*
Median household income	0.69	***	-0.72	***	-0.67	***	-0.57	***
Percent uninsured	-0.45	***	0.32	*	0.17		0.19	

*** p < .001, ** p < .01, * p < .05

A regression model with outcome, dental visit in the past year, was fit to the data using the non-metro / Appalachian group as a referent group. Results are presented in Table 28.

For all states in the Appalachian Region, the estimates were created for the four groups as follows: (1) metro counties in Appalachian regions of Appalachian states, (2) metro counties in non-Appalachian regions of Appalachian states, (3) non-metro counties in Appalachian regions of Appalachian states, and (4) non-metro counties in non-Appalachian regions of Appalachian states. These are expressed in all tables as metro Appalachia, metro non-Appalachia, non-metro Appalachia and non-metro non-Appalachia, respectively.

Other predictor variables entered into the initial model were percent adults living in poverty, unemployment rate, median household income, percent uninsured, median age, percent male, percent white, percent other, and percent > 65. A stepwise regression model that forced inclusion of the Appalachian/metro variables was performed and all predictors except percent adults living in poverty were eliminated due to non-significance. ANOVA table results for the final model follow:

TABLE 28 - STEPWISE REGRESSION, DENTAL VISIT IN PAST YEAR
(MODEL $R^2 = 0.56$)

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Group	3	0.01	0.00	1.51	0.23
Percent Adults in Poverty	1	0.06	0.06	37.37	0.00

Group	Mean % Annual Visit
Metro/Appalachia	0.65
Metro/Non-Appalachia	0.68
Non-metro/Appalachia	0.65
Non-metro/Non-Appalachia	0.66

Pairwise p-values i/j	Metro/ Appalachia	Metro/ Non-Appalachia	Non-metro/ Appalachia	Non-metro/ Non-Appalachia
Metro/Appalachia		0.08	0.85	0.79
Metro/Non-Appalachia	0.08		0.07	0.16
Non-metro/Appalachia	0.85	0.07		0.65
Non-metro/Non-Appalachia	0.79	0.15	0.65	

After adjusting for percent adults living in poverty, the four groups no longer are significantly different (p=0.23). The least squares means are similar with metro/non-Appalachia being slightly higher than the others in terms of magnitude. This is seen in the table of pairwise p-values (unadjusted) where we see some slight indication that metro/non-Appalachia differs from metro/Appalachia and non-metro/Appalachia, but the difference is not significant after adjusting for percent adults living in poverty.

A regression model with outcome, any tooth removal for adults (ages 35-44), was fit to the data using the non-metro/Appalachia group as a referent group. Results are presented in Table 29. Other predictor variables entered into the initial model were percent adults living in poverty, unemployment rate, median household income, percent uninsured, median age, percent male, percent white, percent other, and percent > 65. A stepwise regression model that forced inclusion of the Appalachia/metro variables was performed and all predictors except percent adults living in poverty were eliminated due to non-significance. ANOVA table results for the final model follow:

TABLE 29 - STEPWISE REGRESSION, ANY TEETH REMOVED, ADULTS AGED 35-44
(MODEL $R^2 = 0.58$)

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Group	3	0.02	0.01	1.84	0.15
Percent Adults in Poverty	1	0.15	0.15	36.72	0.00

Group	Mean % Any Tooth Removal
Metro/Appalachia	0.46
Metro /Non-Appalachia	0.44
Non-metro/ Appalachia	0.50
Non-metro/Non-Appalachia	0.49

Pairwise p-values i/j	Metro/ Appalachia	Metro/ Non-Appalachia	Non-metro/ Appalachian	Non-metro/ Non-Appalachian
Metro/Appalachia		0.39	0.17	0.30
Metro/Non-Appalachia	0.39		0.04	0.08
Non-metro/Appalachia	0.17	0.04		0.72
Non-metro/Non-Appalachia	0.30	0.08	0.72	

After adjusting for percent adults living in poverty, the four groups no longer are significantly different (p=0.15). The least squares means are similar with non-metro Appalachia and non-metro non-Appalachia being slightly higher than the two metro estimates.

A regression model with outcome, major tooth removal for young adults (age 35-44), was fit to the data using the non-metro/Appalachia group as a referent group. Results are presented in Table 30. Other predictor variables entered into the initial model were percent adults living in poverty, unemployment rate, median household income, percent uninsured, median age, percent male, percent white, percent other, and percent > 65. A stepwise regression model that forced inclusion of the Appalachia/metro variables was performed and all predictors except percent adults living in poverty were eliminated due to non-significance. ANOVA table results for the final model follow:

TABLE 30 - STEPWISE REGRESSION, MAJOR TOOTH REMOVAL, ADULTS AGED 35-44
(MODEL $R^2 = 0.56$)

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Group	3	0.01	0.00	2.02	0.12
Percent Adults in Poverty	1	0.05	0.05	31.93	0.00

Group	Mean % Major Tooth Removal
Metro/Appalachia	0.12
Metro /Non-Appalachia	0.10
Non-metro/ Appalachia	0.14
Non-metro/Non-Appalachia	0.13

Pairwise p-values i/j	Metro/ Appalachia	Metro/ Non-Appalachia	Non-metro/ Appalachian	Non-metro/ Non-Appalachian
Metro/Appalachia		0.30	0.14	0.48
Metro/Non-Appalachia	0.30		0.02	0.10
Non-metro/Appalachia	0.14	0.02		0.44
Non-metro/Non-Appalachia	0.48	0.10	0.44	

After adjusting for percent adults in poverty, the four groups no longer are significantly different (p=0.12). The least squares means are similar with non-metro Appalachian and non-metro non-Appalachian being slightly higher than the two metro estimates, but the difference is not significant after adjusting for percent adults living in poverty.

A regression model with outcome, major tooth removal for elderly adults (age 65+), was fit to the data using the non-metro/Appalachia group as a referent group. Results are presented in Table 31. Other predictor variables entered into the initial model were percent adults living in poverty, unemployment rate, median household income, percent uninsured, median age, percent male, percent white, percent other, and percent > 65. A stepwise regression model that forced inclusion of the Appalachian/metro variables was performed and all predictors except percent white and percent adults living in poverty were eliminated due to non-significance. ANOVA table results for the final model follow:

TABLE 31 - STEPWISE REGRESSION, MAJOR TOOTH REMOVAL, ADULTS AGED 65 OR OLDER
(MODEL R^2 = 0.49)

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Group	3	0.01	0.00	0.58	0.63
Percent Adults in Poverty	1	0.07	0.07	18.20	0.00
Percent White	1	0.04	0.04	10.54	0.00

Group	Mean % Major Tooth Removal (65+)
Metro/Appalachia	0.30
Metro /Non-Appalachia	0.28
Non-metro/ Appalachia	0.28
Non-metro/Non-Appalachia	0.29

Pairwise p-values i/j	Metro/ Appalachia	Metro/ Non-Appalachia	Non-metro/ Appalachian	Non-metro/ Non-Appalachian
Metro/Appalachia		0.57	0.50	0.20
Metro/Non-Appalachia	0.57		0.99	0.59
Non-metro/Appalachia	0.50	0.99		0.59
Non-metro/Non-Appalachia	0.20	0.59	0.59	

After adjusting for percent white and percent adults living in poverty, the four groups no longer are significantly different (p=0.63). The least squares means are with three percentage points, with non-metro non-Appalachia experiencing the highest rate of tooth removal among the elderly and metro Appalachia experiencing the lowest rate of tooth removal among the elderly. However, the difference is not significant after adjusting for percent white and percent adults living in poverty.

SUMMARY

Two-thirds (69%) of people living in Appalachia have seen a dentist in the previous year, but nearly half of adults ages 35-44 (43.5%) also have experienced some tooth removal. Nearly one-quarter have experienced six or more teeth removed (6 or more teeth) and nearly 10 percent of persons ages 65 or older living in Appalachia have had all their teeth removed. However, examining the region as a whole provides limited value as there are wide variations by state and even sub-state regions.

The first level of analysis involved looking at each Appalachian state. Maryland and other Northern and Central Appalachian states had the highest rates of dental visits in the past year, while Mississippi and other Central and Southern Appalachian states had the lowest rates. The highest rates of tooth removal are seen in Central and Southern Appalachian states while the lowest rates of tooth removal are found in Northern Appalachian states.

Looking at other sub-regional variations, we found that all four measures of oral health are statistically significantly worse in the non-metro areas of the Appalachian states than in the metro areas of these same states, but comparing residents in Appalachian states who are not in the Appalachian Region to those who do live in the Appalachian Region finds no meaningful differences (even when metropolitan status is also taken into account). We also compared metropolitan Appalachian residents to metropolitan residents elsewhere in the country, finding that Appalachian residents are less likely to have had a dental visit in the last year and more likely to experience all measures of tooth removal. However, in comparing non-metropolitan Appalachian residents to non-metropolitan residents elsewhere in the nation, differences are seen on all measures of tooth removal, but non-metropolitan non-Appalachian residents are not more likely to have seen a dentist than are non-metropolitan Appalachian residents. These findings suggest that, at least for some parts of the Appalachian Region, classification as being within the Appalachian Region is not a sufficient explanation for higher prevalence of tooth removal. All of these results were confirmed in separate state-by-state metropolitan/nonmetropolitan analyses (Tables19 through 22). For the most part, however, metropolitan status within the Appalachian states does appear to be a predictor of oral health status. This is most likely due to the issue of lack of access to dentists in non-metropolitan areas, although it may also be linked to higher rates of uninsurance, poverty, and unemployment in non-metropolitan areas.

Prior to regression analyses, correlations were examined. All results indicate strong positive correlations between measures of socioeconomic status and oral health. Regression results were presented for each oral health indicator in Tables 28 through 31. In all regression analyses, for each of the four oral health indicators (dependent variables), Appalachian Region, metropolitan status and percent living in poverty explain half or more of the variation in oral health indicators. Only on one oral health indicator (tooth removal among the elderly) did another independent variable (percent white) have a significant effect on its variation. These results imply that access to oral health care providers (rurality and poverty) are important predictors (half of variation) in oral health.

APPENDIX D: DENTAL VISITS IN THE PAST YEAR, BY SELECTED CHARACTERISTICS: UNITED STATES, SELECTED YEARS 1997-2009

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Characteristic	2 years and over			2–17 years			18–64 years			65 years and over[1]		
	1997	2008	2009	1997	2008	2009	1997	2008	2009	1997	2008	2009
	Percent of persons with a dental visit in the past year[2]											
Total[3]	65.1	63.9	65.4	72.7	77.3	78.4	64.1	60.4	62.0	54.8	57.6	59.6
Sex												
Male	62.9	61.3	62.6	72.3	76.8	77.6	60.4	56.4	57.9	55.4	56.4	58.4
Female	67.1	66.5	68.0	73.0	77.9	79.3	67.7	64.4	65.9	54.4	58.6	60.5
Race[4]												
White only	66.4	64.9	66.3	74.0	77.6	79.1	65.7	61.8	63.1	56.8	59.4	61.8
Black or African American only	58.9	58.7	59.9	68.8	78.5	76.7	57.0	52.7	55.9	35.4	39.5	38.1
American Indian or Alaska Native only	55.1	55.2	53.1	66.8	70.7	68.5	49.9	48.5	47.3	*	*39.9	*44.2
Asian only	62.5	64.7	67.6	69.9	74.8	76.2	60.3	61.6	65.8	53.9	65.7	62.1
Native Hawaiian or Other Pacific Islander only	---	*	*	---	*	*	---	*	*	---	*	*
2 or more races	---	62.1	63.5	---	72.9	80.0	---	55.1	50.0	---	*35.0	58.5
Black or African American; White	---	63.3	67.1	---	65.6	78.7	---	58.9	45.3	---	*	*
American Indian or Alaska Native; White	---	52.1	56.0	---	77.7	76.5	---	45.0	47.9	---	*	58.3
Hispanic origin and race[4]												
Hispanic or Latino	54.0	53.3	56.0	61.0	69.9	73.0	50.8	45.6	48.1	47.8	46.2	47.9
Not Hispanic or Latino	66.4	65.9	67.1	74.7	79.3	80.0	65.7	63.0	64.5	55.2	58.5	60.5
White only	68.0	67.4	68.6	76.4	80.2	81.4	67.5	65.2	66.3	57.2	60.3	62.8
Black or African American only	58.8	58.8	59.8	68.8	78.6	76.7	56.9	52.9	55.9	35.3	39.3	38.4
Percent of poverty level[5]												
Below 100%	50.5	49.5	51.7	62.0	70.1	71.7	46.9	41.3	42.7	31.5	31.1	39.0
100%–199%	50.8	49.1	52.8	62.5	70.1	75.2	48.3	40.9	45.3	40.8	41.2	42.3
200%–399%	66.2	61.8	63.3	76.1	78.1	77.1	63.4	56.7	59.1	60.7	58.5	60.9
400% or more	78.9	78.5	79.5	85.7	86.9	87.8	77.7	76.6	77.9	74.7	77.9	77.5
Hispanic origin and race and percent of poverty level[4,5]												
Hispanic or Latino:												
Below 100%	45.7	48.8	51.7	55.9	68.1	71.7	39.2	36.1	37.6	33.6	32.4	42.7
100%–199%	47.2	46.0	51.7	53.8	66.2	72.4	43.5	33.7	41.4	47.9	44.9	37.5
200%–399%	61.2	55.1	57.1	70.5	72.0	73.8	57.5	48.6	51.3	57.0	49.6	54.4
400% or more	73.0	68.2	69.2	82.4	81.1	76.9	70.8	65.3	67.1	64.9	62.2	63.5
Not Hispanic or Latino:												
White only:												
Below 100%	51.7	48.6	51.3	64.4	67.5	69.6	50.6	45.3	46.3	32.0	31.4	42.2
100%–199%	52.4	49.2	52.7	66.1	71.3	76.2	50.4	43.5	46.4	42.2	41.1	44.4
200%–399%	67.5	63.5	64.7	77.1	79.4	79.1	65.0	59.1	60.7	61.9	60.5	62.4
400% or more	79.7	80.2	81.1	86.8	88.1	89.9	78.5	78.4	79.4	75.5	79.4	79.4
Black or African American only:												
Below 100%	52.8	51.4	52.6	66.1	76.4	74.0	46.2	38.3	42.1	27.7	23.1	28.8
100%–199%	48.7	52.1	53.0	61.2	74.6	79.2	46.3	43.2	45.1	26.9	37.2	26.9
200%–399%	63.3	59.8	61.6	75.0	82.1	74.4	60.7	53.6	59.5	41.5	42.5	46.7
400% or more	74.6	72.9	74.3	81.8	85.2	85.0	73.4	71.3	74.1	66.1	60.3	55.3

See footnotes at end of table.

[Data are based on household interviews of a sample of the civilian noninstitutionalized population]

Characteristic	2 years and over			2–17 years			18–64 years			65 years and over[1]		
	1997	2008	2009	1997	2008	2009	1997	2008	2009	1997	2008	2009
Disability measure[6]	Percent of persons with a dental visit in the past year[2]											
Any basic actions difficulty or complex activity limitation	. . .	. . .	. . .	. . .	. . .	. . .	55.1	52.3	55.8	49.0	50.1	53.3
Any basic actions difficulty	. . .	. . .	. . .	. . .	. . .	. . .	54.7	52.8	56.1	48.7	49.8	53.6
Any complex activity limitation	. . .	. . .	. . .	. . .	. . .	. . .	51.0	44.9	50.4	44.6	42.0	47.6
No disability	. . .	. . .	. . .	. . .	. . .	. . .	67.4	63.4	64.4	64.2	70.7	70.2
Geographic region												
Northeast	69.6	70.9	71.1	77.5	82.4	82.6	69.6	68.4	69.3	55.5	63.8	60.9
Midwest	68.4	66.2	67.6	76.4	79.0	80.5	67.4	63.3	64.2	57.6	57.3	62.0
South	60.2	59.2	60.8	68.0	75.3	76.8	59.4	55.2	56.7	49.0	51.0	54.0
West	65.0	63.9	65.9	71.5	75.0	75.8	62.9	59.8	62.4	61.9	63.8	65.2
Location of residence[7]												
Within MSA	66.7	65.1	66.5	73.6	77.7	79.0	65.7	61.5	63.1	57.6	60.3	61.8
Outside MSA	59.1	57.9	59.5	69.3	75.1	75.5	58.0	54.5	55.9	46.1	48.3	51.3

* Estimates are considered unreliable. Data preceded by an asterisk have a relative standard error (RSE) of 20%–30%. Data not shown have an RSE greater than 30%.
- - - Data not available.
. . . Category not applicable.
[1]Based on the 1997–2009 National Health Interview Surveys, about 24%–30% of persons 65 years and over were edentulous (having lost all their natural teeth). In 1997–2009, about 69%–73% of older dentate persons compared with 17%–21% of older edentate persons had a dental visit in the past year.
[2]Respondents were asked "About how long has it been since you last saw or talked to a dentist?" See Appendix II, Dental visit.
[3]Includes all other races not shown separately and unknown disability status.
[4]The race groups white, black, American Indian or Alaska Native, Asian, Native Hawaiian or Other Pacific Islander, and 2 or more races include persons of Hispanic and non-Hispanic origin. Persons of Hispanic origin may be of any race. Starting with 1999 data, race-specific estimates are tabulated according to the 1997 Revisions to the Standards for the Classification of Federal Data on Race and Ethnicity and are not strictly comparable with estimates for earlier years. The five single-race categories plus multiple-race categories shown in the table conform to the 1997 Standards. Starting with 1999 data, race-specific estimates are for persons who reported only one racial group; the category 2 or more races includes persons who reported more than one racial group. Prior to 1999, data were tabulated according to the 1977 Standards with four racial groups, and the Asian only category included Native Hawaiian or Other Pacific Islander. Estimates for single-race categories prior to 1999 included persons who reported one race or, if they reported more than one race, identified one race as best representing their race. Starting with 2003 data, race responses of other race and unspecified multiple race were treated as missing, and then race was imputed if these were the only race responses. Almost all persons with a race response of other race were of Hispanic origin. See Appendix II, Hispanic origin; Race.
[5]Percent of poverty level is based on family income and family size and composition using U.S. Census Bureau poverty thresholds. Missing family income data were imputed for 1997 and beyond. See Appendix II, Family income; Poverty; Table VII.
[6]Any basic actions difficulty or complex activity limitation is defined as having one or more of the following limitations or difficulties: movement difficulty, emotional difficulty, sensory (seeing or hearing) difficulty, cognitive difficulty, self-care (ADL or IADL) limitation, social limitation, or work limitation. For more information, see Appendix II, Basic actions difficulty; Complex activity limitation. Starting with 2007 data, the hearing question, a component of the basic actions difficulty measure, was revised. Consequently, data prior to 2007 are not comparable with data for 2007 and beyond. For more information on the impact of the revised hearing question, see Appendix II, Hearing trouble.
[7]MSA is metropolitan statistical area. Starting with 2006 data, MSA status is determined using 2000 census data and the 2000 standards for defining MSAs. For data prior to 2006, see Appendix II, Metropolitan statistical area (MSA) for the applicable standards.

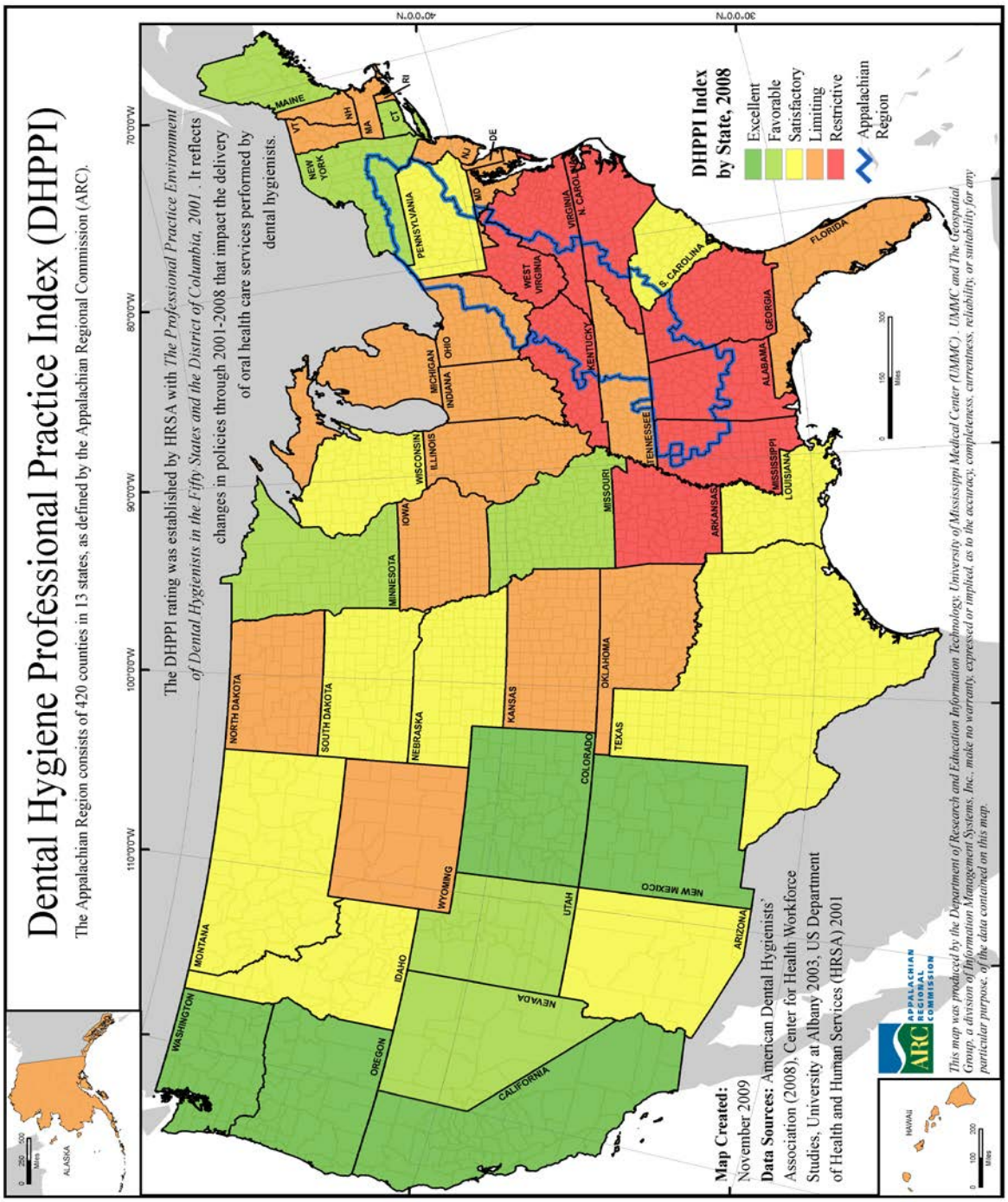
NOTES: In 1997 the National Health Interview Survey questionnaire was redesigned. See Appendix I, National Health Interview Survey. Standard errors for selected years are available in the spreadsheet version of this table. Available from: http://www.cdc.gov/nchs/hus.htm. Data for additional years are available. See Appendix III.

SOURCE: CDC/NCHS, National Health Interview Survey, sample child and sample adult questionnaires.

Source: http://www.cdc.gov/nchs/data/hus/hus10.pdf#093 Health United States 2010, Centers for Disease Control and Prevention.

APPENDIX E: DHPPI BY STATE

FIGURE 24 - DENTAL HYGIENE PROFESSIONAL PRACTICE INDEX BY STATE



APPENDIX F: BEST PRACTICES IN STATE ORAL HEALTH POLICIES

BACKGROUND

According to Thornton, et al., "[b]est practices are the elements and activities of intervention design, planning, and implementation that are recommended on the basis of the best knowledge currently available" (2006:33). Best practices can also be defined as any activity of process that is consistent with improving health promotion (Kahan and Goodstadt. 1999). Generally speaking, measures of clinical practice guidelines, health technology assessment and/or evidence-based medicine are used to assess best practices (Perleth, Jakubowski and Busse. 2001). In a recent CDC publication, Roeber and his colleagues argue that "a more common approach is the use of multiple sources of expertise to identify best practices in population based health interventions" (2004:71). Previous studies have argued for the use of qualitative data to establish best practices related to health care. Sofaer (2002) argued that the application of qualitative methods may allow for an improved assessment of existing programs and policies. Leys (2003) argued that qualitative research is quite valuable in the assessment of health care programs and policies, particularly when the research evaluates perceptions of a program or practice.

The objective of the analyses in this section is to identify programs and policies within the Appalachian Region that seek to improve oral health. The limitations of our methods are outlined here, prior to the presentation of the results. First, the survey was administered to a small number of participants. In order to minimize risk of identification and maintain confidentiality, we were unable to provide specifics such as which stakeholders we interviewed and which states offered which programs. Second, many stakeholders raised concerns over the wording of the close-ended questions. For example, concerning the question regarding the effectiveness of each program and policy, responses frequently discussed were often followed with comments relating to the population served by the program or policy. The categories provided for some of the close ended questions were also rather limiting. An example of this can be found in the responses for the question regarding number of people who benefited from the program or policy. Given the overwhelming response that more than 10,000 individuals benefited from a service, it seems that larger categories were needed. Since many of the practices discussed are state-wide, it may have been more beneficial to create additional categories to where the maximum category would have been 100,000 people or more. Despite a pre-test and revision of the survey instrument, this issue was not raised until the survey was underway.

METHODOLOGY

A supplement to the data provided by the Association of State and Territorial Dental Directors (ASTDD) was obtained by briefly interviewing at least three stakeholders in each of the Appalachian states. These stakeholders included, but are not limited to, a representative from each Appalachian state's oral health division of the Department of Health; a representative from each state's Dental Association; and a representative from each state's Medicaid Dental Division. Contact information for these stakeholders was obtained from an internet search of websites such as the ASTDD's website (http://www.astdd.org), each state's dental association website, and each state's Medicaid website. Stakeholders were interviewed by telephone or email. The interview was tested and approved by the Institutional Review Board for the Protection of Human Subjects in Research at Mississippi State University prior to its implementation.

A total of three individuals in each of the thirteen Appalachian states were contacted for a total of 39 stakeholders. At least one stakeholder from each of Appalachian state agreed to the interview. Overall, 31 individuals agreed to the interview for a response rate of 79%.

Table 32 shows response rates for each of the stakeholder groups. Interview participation rates varied by stakeholder group, and only one stakeholder group had 100% participation. The participation rate for the second stakeholder group was about 85%, while the lowest participation rate came from third stakeholder group at almost 54%. Each stakeholder provided information on an average of 4.3 programs or policies.

TABLE 32 - INTERVIEW RESPONSE RATES

	Stakeholder Group 1	Stakeholder Group 2	Stakeholder Group 3	Total
# Contracted	13	13	13	**39**
# Respondents	13	11	7	**31**
Response Rate	100%	85%	54%	**79%**

The survey instrument that was used is shown at the end of this section (Figure 26). The primary interview question asked was "What programs or practice policies are in place in your state related to oral health?" This was followed by a brief explanation of what types of programs and policies we were interested in for this project, namely fluoridation, screening, sealants, smoking, or community oral health initiatives of which the stakeholder had some knowledge. Respondents were asked to provide the name of the program and a brief program description. Three additional questions were asked regarding each practice mentioned by stakeholders. The first of these questions was "How long has this practice been in place?" Responses fell into one of four categories: more than 5 years; between 1 and 5 years; less than 1 year; or still being implemented. This question was followed by "How effective would you say this program/policy is?" Responses fell into one of five categories: extremely effective, very effective, effective, somewhat effective, or not effective at all. The last question specific to the practices mentioned was "How many people would you say benefit by this program/policy?" Respondents were asked to categorize responses into one of five categories: 1-100; 101-1,000; 1,001-9,999; or 10,000 or more; otherwise, there is no benefit. Interviews were concluded by requesting recommendations on additional individuals to contact regarding oral health programs and practices. Several recommendations of existing stakeholders were made, but few (n=4) recommendations outside of the contacts we were already making were made. To protect the homogeneity of the stakeholders, these few were not contacted. Comparable stakeholders in other states could not have been determined.

Information on 134 programs and policies related to oral health was obtained from the stakeholder interviews. Each of these cases was coded according to the following themes: water fluoridation, workforce, tobacco initiatives, education and outreach, preventive services, adult services, Medicaid initiatives, and access to care. Categorizing of cases into themes was not necessarily mutually exclusive as some programs and policies were designed to address more than one of these areas. A codebook was created to assist coding of cases into the various themes.

Two methods were used to insure the reliability of the coding. The first method involved a test-retest format in which all cases were coded by a single individual. Two weeks after the initial coding, the same individual re-coded all cases. A comparison of each set of coding was conducted, and a reliability score of approximately 92% was achieved. The second method used to determine the reliability of the coding involved a random sampling of 10% of the cases. A second individual was asked to code these randomly selected cases, and a reliability score of 91% was achieved. Given the two reliability scores, it was determined that the coding was largely consistent.

RESULTS

All programs/policies (n=134) were coded into themes: access to care, adult services, oral health education and outreach, Medicaid initiatives, preventive services, tobacco initiatives, water fluoridation, and dental workforce. Categorizing of cases into themes was not mutually exclusive as some programs and policies were designed to address more than one of these areas. Given the lack of exclusive coding, the percentages presented in Figure 25 do not total to 100%. Nearly three-quarters of programs were associated with improving access to oral health care, more than half were coded as being related to prevention, exactly half were oral health education programs. Far fewer programs (roughly 20% each) dealt with dental workforce, adult dental services and/or Medicaid. Even fewer programs on water fluoridation were found and just 3% of all programs were focused on oral health and tobacco.

FIGURE 25 – PROGRAMS AND POLICIES BY THEME

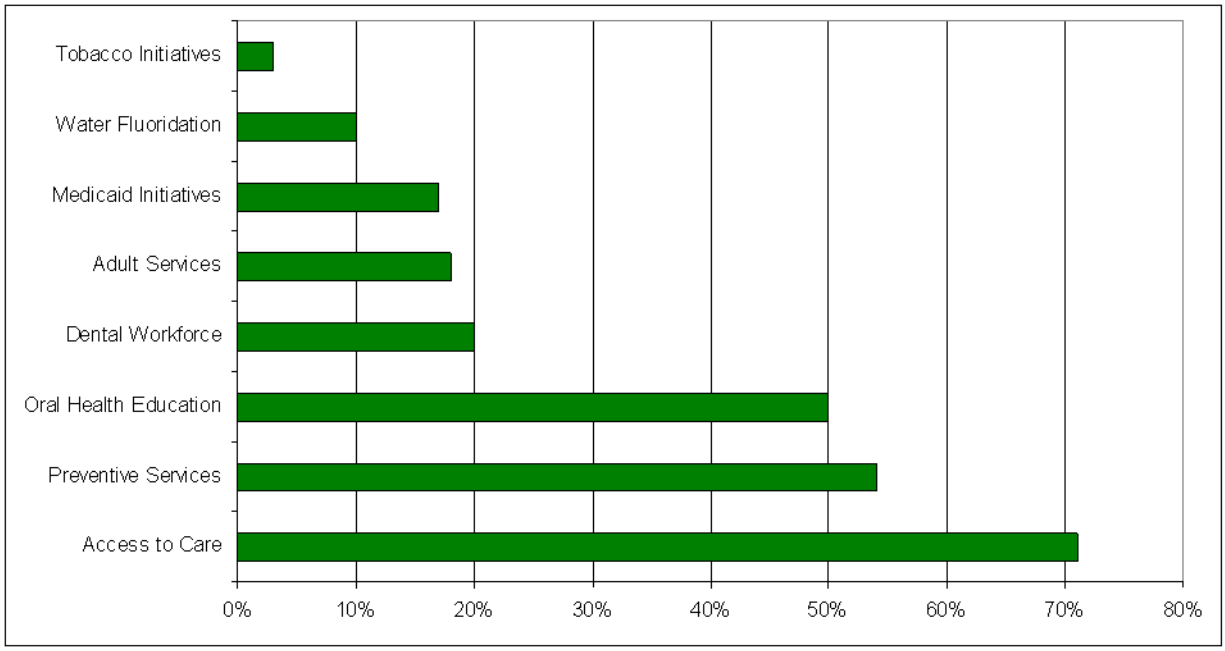


Table 33 shows responses to the question "How long has this practice been in place?" (n=110). About two-thirds of practices (68%) have been in place for more than 5 years, while 19% have been in place between 1 and 5 years. Approximately 7% of the programs/policies have been in place for less than 1 year, and the remaining 5% are still being implemented.

TABLE 33 – RESULTS: "HOW LONG HAS THIS PRACTICE BEEN IN PLACE?"

How long has this practice been in place?	Frequency	Percent
More than 5 years?	75	68
Between 1 and 5 years	21	19
Less than 1 year	8	7
Still being implemented	6	5
Total	**110**	**100**

Table 34 shows responses to the question "How effective would you say this program/policy is?" (n=81). The effectiveness of the programs was predominantly categorized as either extremely effective (37%) or very effective (41%), with the remainder of programs being identified as less effective (23%).

TABLE 34 – RESULTS: "HOW EFFECTIVE WOULD YOU SAY THIS PROGRAM / POLICY IS?

How effective would you say this program is?	Frequency	Percent
Extremely Effective	30	37
Very Effective	33	41
Effective	7	9
Somewhat Effective	11	14
Total	**81**	**100**

Table 35 shows responses to the question "How many people would you say benefit by this program/policy?" (n=96). Nearly three-quarters of programs and policies discussed (71%) were considered to benefit 10,000 or people; most of the remainder (28%) were estimated to benefit fewer than 10,000 people. However, one program was assessed as having provided no benefits to individuals.

TABLE 35 – RESULTS: HOW MANY PEOPLE WOULD YOU SAY BENEFIT BY THIS PROGRAM/POLICY?

How many people benefit by this program?	Frequency	Percent
101-1000	4	4
1001-9999	23	24
10000 or more	68	71
There is no benefit	1	1
Total	**96**	**100**

Access to Care

About 71% of the programs and policies discussed (95 of 134 programs/policies) have the purpose to increase access to care for those in need. Details concerning programs associated with access to oral health care and their associated length of time in place, effectiveness and the number of people benefiting are shown in Table 36. Of these programs and policies in the sample, 68 percent have been in place for more than 5 years. For the remaining practices, 17 percent were implemented between 1 and 5 years ago, 10 percent were implemented in the past year, and 5 percent are still being implemented. The perceived effectiveness of these programs is predominately extremely effective (34%) or very effective (38%). The remaining practices were perceived as effective (9%) or somewhat effective (20%). Overwhelmingly, 10,000 or more people benefit from these practices (69%), while 27 percent of the practices benefit fewer than 10,000 people. Only 3 percent of the practices benefit 1,000 or fewer people, and 2 percent of the practices were reported as having no direct benefit to the population.

Table 36 – Access to Care: Frequency and Percentage

Question/ Response	Frequency	Percentage
How long has practice been in place?		
More than 5 years?	52	68
Between 1 and 5 years	13	17
Less than 1 year	8	10
Still being implemented	4	5
How effective would you say this program is?		
Extremely Effective	19	34
Very Effective	21	38
Effective	5	9
Somewhat Effective	11	20
How many people benefit by this program?		
101-1000	2	3
1001-9999	18	26
10000 or more	47	69
There is no benefit	1	1

PREVENTIVE CARE

About 54 percent (72 of 134) of the programs and policies discussed provided preventive services for those in need. Table 37 shows the preventive services programs/policies in regards to length of time in place, perceived effectiveness, and number of people who benefit. Concerning how long the practices have been in place, 57 percent were implemented more than 5 years ago, while 27 percent were implemented between 1 and 5 years ago. Of the remaining practices, 8 percent were implemented less than 1 year ago, and 8 percent are still being implemented. The perceived effectiveness of the practices are mostly considered to be either extremely effective (36%) or very effective (46%). Roughly 7 percent of the practices were perceived as effective and 11 percent were perceived as somewhat effective. About 64 percent of the practices were reported to benefit 10,000 or more people, whereas, the remaining 36 percent benefit fewer than 10,000 people.

TABLE 37 – PREVENTIVE SERVICES: FREQUENCY AND PERCENTAGE

Question/ Response	Frequency	Percentage
How long has practice been in place?		
More than 5 years?	34	57
Between 1 and 5 years	16	27
Less than 1 year	5	8
Still being implemented	5	8
How effective would you say this program is?		
Extremely Effective	16	36
Very Effective	20	46
Effective	3	7
Somewhat Effective	5	11
How many people benefit by this program?		
101-1,000	2	4
1,001-9,999	16	32
10,000 or more	32	64
There is no benefit	0	0

ORAL HEALTH EDUCATION

One-half (67) of the programs and policies in the sample sought to educate the population about oral health care. Table 38 shows the oral health education and outreach practices in regards to length of time in place, perceived effectiveness, and number of people who benefit. Slightly more than two-thirds (68%) of these practices have been in place for more than 5 years, while 16% have been in place between 1 and 5 years. Of the remaining cases, 7% have been in place less than 1 year, and 9% are still being implemented. More than 80% of the cases were perceived as extremely effective (43%) or very effective (40%). About 10% of the cases were perceived as effective, and 8% were perceived as somewhat effective. Two-thirds (67%) of the practices in the sample benefit 10,000 or more people, while the remaining one-third (33%) benefit fewer than 10,000 people.

TABLE 38 – ORAL HEALTH EDUCATION: FREQUENCY AND PERCENTAGE

Question/ Response	Frequency	Percentage
How long has practice been in place?		
More than 5 years?	38	68
Between 1 and 5 years	9	16
Less than 1 year	4	7
Still being implemented	5	9
How effective would you say this program is?		
Extremely Effective	17	43
Very Effective	16	40
Effective	4	10
Somewhat Effective	3	8
How many people benefit by this program?		
101-1,000	3	7
1,001-9,999	12	26
10,000 or more	31	67
There is no benefit	0	0

DENTAL WORKFORCE

About twenty-seven (20%) of the programs and policies sampled sought to assist the oral health workforce. Table 39 shows the dental workforce practices in regards to length of time in place, perceived effectiveness, and number of people who benefit. Of these, 42% have been in place for more than 5 years, while another 32% were implemented between 1 and 5 years ago. The remaining practices were implemented within the last year or are still being implemented (16% and 11% respectively). The perceived effectiveness of the practices in the sample ranges from 38% as extremely effective to 25% as very effective, 12% as effective to 25% as somewhat effective. Exactly 50% of the practices in the sample benefit 10,000 or more people, while 36% of the practices sampled benefit between 1,001 to 9,999 people. Of the remaining practices in the sample, 7% benefit 1,000 or fewer people, while 7% have no direct benefit to the population as of yet.

TABLE 39 –DENTAL WORKFORCE: FREQUENCY AND PERCENTAGE

Question/ Response	Frequency	Percentage
How long has practice been in place?		
More than 5 years?	8	42
Between 1 and 5 years	6	32
Less than 1 year	3	16
Still being implemented	2	11
How effective would you say this program is?		
Extremely Effective	6	38
Very Effective	4	25
Effective	2	13
Somewhat Effective	4	25
How many people benefit by this program?		
101-1,000	1	7
1,001-9,999	5	36
10,000 or more	7	50
There is no benefit	1	7

ADULT SERVICES

Twenty-four (18%) of the programs and policies in the sample sought to provide services to adults in need. Table 40 shows the adult services practices in regards to length of time in place, perceived effectiveness, and number of people who benefit. In terms of how long the practice has been in place, 83% have been in place for more than 5 years, while 11% have been in place between 1 and 5 years and 6% were implemented less than 1 year ago. The perceived effectiveness of the practices ranges from 33% as extremely effective to 42% as very effective, 8% as effective, or 17% as somewhat effective. Approximately 83% of the practices sampled benefit 10,000 or more people, whereas 17% benefit fewer than 10,000 people.

TABLE 40 – ADULT SERVICES: FREQUENCY AND PERCENTAGE

Question/ Response	Frequency	Percentage
How long has practice been in place?		
More than 5 years?	15	83
Between 1 and 5 years	2	11
Less than 1 year	1	6
Still being implemented	0	0
How effective would you say this program is?		
Extremely Effective	4	33
Very Effective	5	42
Effective	1	8
Somewhat Effective	2	17
How many people benefit by this program?		
101-1,000	2	11
1,001-9,999	1	6
10,000 or more	15	83
There is no benefit	0	0

MEDICAID INITIATIVES

Twenty-three (17%) of the programs and policies in the sample had a Medicaid-related purpose. Table 41 shows the Medicaid initiatives in regards to length of time in place, perceived effectiveness, and number of people who benefit. Of the practices samples, 62% have been in place for more than 5 years; 19% have been in place between 1 and 5 years; 14% have been in place less than 1 year; and 5% are still being implemented. In terms of perceived effectiveness, 50% of the practices sampled were perceived as either extremely effective (25%) or very effective (25%). Of the remaining practices, 19% were perceived as effective and 31% were perceived as somewhat effective. This is the only theme where the largest category of perceived effectiveness was somewhat effective; for all other themes the perceived effectiveness was predominately categorized as either extremely effective or very effective. In regards to the number of people who benefit from these programs, 80% of the practices benefit 10,000 or more while 20% benefit fewer than 10,000.

TABLE 41 – MEDICAID INITIATIVES: FREQUENCY AND PERCENTAGE

Question/ Response	Frequency	Percentage
How long has practice been in place?		
More than 5 years?	13	62
Between 1 and 5 years	4	19
Less than 1 year	3	14
Still being implemented	1	5
How effective would you say this program is?		
Extremely Effective	4	25
Very Effective	4	25
Effective	3	19
Somewhat Effective	5	31
How many people benefit by this program?		
101-1,000	3	15
1,001-9,999	1	5
10,000 or more	16	80
There is no benefit	0	0

WATER FLUORIDATION

Thirteen (10%) of the programs and policies in the sample focused on community water fluoridation. This practice is currently mandated in 12 of the 50 states and 3 of the 13 Appalachian states – Georgia, Kentucky, and Ohio. Table 42 shows the water fluoridation practices in regards to length of time in place, perceived effectiveness, and number of people who benefit. Community water fluoridation was reported to benefit more than 10,000 people in 100% of the cases and to have been in place for more than 5 years in 100% of the cases. It was perceived as either extremely effective (75%) or very effective (25%).

TABLE 42 – WATER FLUORIDATION: FREQUENCY AND PERCENTAGE

Question/ Response	Frequency	Percentage
How long has practice been in place?		
More than 5 years?	11	100
Between 1 and 5 years	0	0
Less than 1 year	0	0
Still being implemented	0	0
How effective would you say this program is?		
Extremely Effective	6	75
Very Effective	2	25
Effective	0	0
Somewhat Effective	0	0
How many people benefit by this program?		
101-1,000	0	0
1,001-9,999	0	0
10,000 or more	11	100
There is no benefit	0	0

TOBACCO INITIATIVES

Only four (3%) of the programs and policies in the sample are related to tobacco and oral cancer initiatives. Table 43 shows the tobacco initiatives in regards to length of time in place, perceived effectiveness, and number of people who benefit. Holding with the trend of the other practices sampled, the majority of these tobacco and oral cancer initiatives have been in place for more than 5 years (75%). The remaining 25% of these practices have been in place between 1 and 5 years. These practices were also perceived as either extremely effective (33%) or very effective (67%). Two-thirds of these practices benefit fewer than 10,000 people, while the remaining one-third benefit 10,000 or more people.

TABLE 43 – TOBACCO INITIATIVES: FREQUENCY AND PERCENTAGE

Question/ Response	Frequency	Percentage
How long has practice been in place?		
More than 5 years?	3	75
Between 1 and 5 years	1	25
Less than 1 year	0	0
Still being implemented	0	0
How effective would you say this program is?		
Extremely Effective	1	33
Very Effective	2	67
Effective	0	0
Somewhat Effective	0	0
How many people benefit by this program?		
101-1,000	1	33
1,001-9,999	1	33
10,000 or more	1	33
There is no benefit	0	0

SUMMARY

PROGRAM EFFECTIVENESS

Although the question regarding program effectiveness is subjective in nature, we grouped and ranked types of programs based on their perceived effectiveness. Programs were first grouped based on name or service provided. The perceived effectiveness of the programs was then examined by group for patterns. Programs perceived to be either extremely effective or very effective were then categorized as most effective, while programs perceived to be either effective or somewhat effective were categorized as least effective. We are not labeling the least effective programs as ineffective, but rather are attempting to rank programs based on type and perceived effectiveness relative to other programs in place that address oral health and oral health issues. Another caveat is that our interview did not ask respondents to expand upon their perceived effectiveness of each program they chose to discuss; therefore we did not draw out what shaped these perceptions. Some assumptions can be made, however.

Overall, for those programs rated based on perceived effectiveness, approximately 78 percent met our criteria for most effective (extremely effective or very effective). Five types of programs seemed to fit into this categorization—community water fluoridation, school-based dental sealant programs, school-based dental screening programs, fluoride varnish programs, and fluoride mouth rinse programs.

Community water fluoridation programs (8 out of 8) were generally perceived to be most effective. This is likely due to the fact that it is an inexpensive method of prevention and reaches a large population. School-based dental sealant programs (11 out of 11) were also generally perceived to be effective. This is most likely due to the nature of sealant programs in that they are a preventive service, potentially alleviating future health care problems such as childhood caries. When targeted to children in the earliest years of their education, dental sealant programs may also introduce a teachable moment by demonstrating the importance of oral health care. Additionally, some school-based dental sealant programs target schools where the students may be considered high-risk (less likely to receive regular dental treatment based on socioeconomic status). School-based dental screenings (7 out of 8) were also generally perceived to be most effective. It is possible that this type of program was perceived as most effective as it seeks to identify problems before they are no longer treatable or before they lead to other health care problems. Fluoride varnish programs (8 out of 10) were also perceived to be effective. These programs target school children, therefore also educating a captive audience on the importance of oral health care. Finally, most fluoride mouth rinse programs (4 out of 5) were generally perceived as effective. These five programs which were perceived as being effective seem to have a commonality in that they reach a large population. Many of these programs have also been in place for several years, so the long-term benefits, such as a decrease in dental caries, may also be more apparent. Therefore, it appears that the programs that reach the most people and that have been in place the longest are *perceived* to be the most effective programs. From these survey data, however, it is not possible to ascertain whether these programs are actually effective or not.

The remaining 22 percent of programs rated lower on their perceived effectiveness. In other words, these programs were perceived by interview participants to be either effective or somewhat effective. One particular type of program seemed to fit into this categorization—public insurance programs. Medicaid and SCHIP (5 out of 5) are programs that were perceived to be less effective. This may be due to inadequate access to dentists who accept Medicaid, as indicated in Section 5. It might also be that these programs are thought to be less effective due to low utilization by those who are eligible.

It may be beneficial to conduct further research exploring specific programs, such as those reviewed here, and their effectiveness.

Discussion of Specific Programs

Access to care seems to be one of the key challenges addressed by these programs and policies. This is not surprising given the distinctive geographic and socioeconomic characteristics of the Region as related to health care (Behringer, et al. 2007). It is also not unexpected given that access to care has been deemed one of the barriers to improving oral health care by the U.S. Surgeon General (DHHS. 2000; Haden, et al. 2003). Additionally, access to care has also been determined to be a leading health indicator (DHHS. 2001). Many of the practices included in the sample seek creative ways to increase access to oral health care. For example, in areas with fewer dentists, allowing primary care physicians to perform basic preventive services is one such mechanism to increase access. At least four of the ARC states—Alabama, North Carolina, South Carolina and Virginia—have such programs in place for young children, who are more likely to visit a primary care physician than a dentist. Furthermore, primary care physicians in some states may be reimbursed by Medicaid for providing these services. The use of mobile clinics may also provide basic access as well as assist patients in finding dental homes. At least one ARC state, North Carolina, considered this to be an effective practice; however, such a program often relies on volunteers and may therefore not be feasible.

Preventive services mentioned in this study primarily focus on children. These services include dental sealants, dental screenings, and fluoride applications, and most, if not all, of these services are offered in some manner in the ARC states. Many of these are administered at schools or by pediatricians in an effort to not only improve oral health, but to educate children about the importance of proper oral hygiene. Dye, et al. (2007) found that dental sealant prevalence among children age 6 to 11 has increased in recent years. Policies regarding dental screenings vary around the nation, yet many states require some sort of dental certificate prior to admittance into school (Booth, et al. 2008). Such a requirement is now found in three states in the Appalachian Region – Georgia, Kentucky, and New York (Booth, et al. 2008).

Oral health education and advocacy is somewhat linked to both access to care and preventive services in this analysis as many of the practices categorized as such also aimed to teach patients about the importance of oral health care. Given that those persons with the greatest need also seem to lack knowledge about its importance (Haden, et al. 2003), it is not unexpected that many practices seek to educate the population about oral health. Furthermore, many oral health diseases, such as dental caries, are perceived as preventable; therefore oral health education should be fundamental to state practices regarding oral health.

Efforts to maximize and continually educate the dental workforce are crucial in areas such as the Appalachian Region given its unique socioeconomic characteristics. Practices that encourage recent dental school graduates to work in rural areas, at least in exchange for tuition, are one such method that addresses the issue of access to care in underserved areas. Haden, et al. (2003) argue that dental schools should support recent graduates in providing at least one year of service in underserved areas in an effort to increase access to care as well as gain knowledge about providing culturally appropriate care. There are other health care workers, such as primary care providers, who, if properly trained, can provide basic dental services geared toward prevention (Selwitz, Ismail and Pitts. 2007). As discussed in Section 7, policies regarding practice restrictions placed on dental hygienists vary by state (BHP 2004). Reducing the restrictions on the level of supervision for dental hygienists has been identified as potentially beneficial for improving access to care in underserved areas (Krause, Mosca and Livingston. 2003). Few of these practices seek to diversify the dental workforce; however, that may be an issue that dental schools are in the best position to address in the recruitment of students.

Practices to improve adult oral health are critical as well. Medicaid coverage for dental services for adults varies by state and is often quite limited (Ellis. et al. 2009). Adults are more likely to have medical insurance that dental insurance (DHHS. 2000). Therefore, some programs and policies have been implemented in ARC states such as Maryland, Mississippi, North Carolina, New York, Ohio, Pennsylvania, South Carolina, Tennessee, Virginia and West Virginia, in order to provide some basic preventive dental services to uninsured adults or insured adults unable to afford costs associated with dental visits. The risk of dental caries continues throughout the lifespan, so it is critical for adults to receive preventive dental care. Adults over the age of 40 who use tobacco are at a greater risk of oral cancer (Selwitz, et al. 2007), so dental utilization is also crucial to oral cancer detection.

Examples of programs and policies that were categorized under Medicaid initiatives included those that seek to increase the number of Medicaid providers, those that rely on Medicaid reimbursement, or others that reduce the amount of paperwork necessary for providers to be reimbursed. Children enrolled in Medicaid are more likely to have dental caries and untreated tooth decay compared to children enrolled in private insurance (GAO. 2008). Savage, et al. (2004) found evidence that children with Medicaid coverage in areas with lower dentist-to-population ratios were less likely to use dental services. Fewer dentists in an area could mean that even fewer dentists participate in Medicaid reimbursement, thus, initiatives to increase the number of Medicaid providers seem warranted. According to a CDC report, an increase in the number of dentists participating in Medicaid occurred in about two-thirds of the states (White, Barker and Lockwood. 2004), perhaps indicating that practices oriented toward this task have been successful.

Given that about one-third of the practices included in the sample relating to Medicaid initiatives have been implemented within the last five years, it is also possible that these practices developed as a response to findings from a year 2000 survey administered by the American Dental Association in which about 75% of dentists did not treat patients insured by Medicaid (Haden, et al. 2003).

Water fluoridation is one relatively inexpensive practice believed to benefit the population (Bailey, et al. 2008; Griffin, Jones and Tomar. 2001; Kohlway. 2008). Not only is community water fluoridation perceived as inexpensive for communities, but it is also perceived as a long term cost-saving mechanism by preventing future expenses related to tooth decay (Kohlway. 2008). However, as of 2006, the CDC reported that only 69% of the population had access to a fluoridated community water system (Bailey, et al. 2008). Given that the rate of water fluoridation varies from state to state, and from county to county in some states, it may be helpful to continue to move forward for those areas that lack community water fluoridation. While water fluoridation has its proponents, it also has its opponents, so education regarding the benefits of water fluoridation may need to be continually addressed in some states (Kohlway. 2008).

Practices related to tobacco initiatives were the only theme not mentioned by at least one stakeholder in each of the 13 states in the Appalachian Region. Given that a significant relationship has been found between tobacco use and dental caries, oral cancer, and other oral diseases (Winn 2001), this is somewhat surprising. However, given that tobacco use is a leading health indicator according to Healthy People 2010 (DHHS. 2001), it is possible that there are programs in place in the Appalachian states, but these programs may not be specific to oral health initiatives. A report generated by the CDC did find evidence that state tobacco cessation programs have been increasing in recent years (White, et al. 2004). Likewise, there is evidence that smoking cessation is successful in tooth removal prevention, particularly as the number of years as a former smoker increase for an individual (Tomar and Asma. 2000; Yanagisawa, et al. 2009).

Due to the nature of the methodology for this section of the study, it is difficult to quantify the effectiveness of these programs from this analysis, particularly for those who are underserved in the Appalachian Region. With the exception of West Virginia (in which all counties are included in the Appalachian Region), this methodology did not uncover to what extent these practices were designed to solely improve the oral health of the residents of the Appalachian Region, although given that many of these practices focus on the underserved, one could infer that the Appalachian Region does benefit. Improvements in the oral health status of the residents of the Appalachian Region may also indicate the effectiveness of these practices.

FIGURE 26 – SURVEY INSTRUMENT

ARC Oral Health Project Interview Protocol

State: _____

Position: _____ State Dental Director
_____ State Dental Association
_____ State Medicaid Dental Division
_____ Other: _____

1. What programs or practice policies are in place in your state?

Examples of programs or practice policies might be related to fluoridation, screening, sealants, smoking, or community oral health initiatives. This should include programs/policies that you are aware of and not be limited to only those with which you are directly involved. [Write title of program and brief description.]

a. _____

b. _____

c. _____

d. _____

e. _____

2. For **each** practice:
   a. How long has this practice been in place?
      i. More than 5 years
      ii. Between 1 and 5 years
      iii. Less than one year
      iv. Still being implemented

b. How effective would you say this program/policy is?
   i. Extremely effective
   ii. Very effective
   iii. Somewhat effective
   iv. Not effective at all

c. How many people would you say benefit by this program/policy?
   i. 1 – 100.
   ii. 101 - 1,000
   iii. 1,001 – 9,999
   iv. 10,000 or more
   v. There is no benefit

3. Are there other people in the state that you think we should interview concerning programs or practices for oral health in [STATE]? [Take name, affiliation, position and telephone number of other parties.]

Name	Affiliation	Position	Phone Number

APPENDIX G: DENTAL WORKFORCE TRENDS IN APPALACHIA

Prepared by Krause, et al., University of Mississippi

TABLE 44 – DENTAL WORKFORCE TRENDS IN APPALACHIAN COUNTIES (SORTED BY GROWTH RATE)

Rank	Dental Workforce Trends in Appalachian Counties		Population Count		Population Change		Active Dentists				Active Dentists Private Practitioners				Median Family Income			
1990-2000			1990	2000	Numerical Change	Growth Rate 1990-2000	1991	2006	Numerical Change	Growth Rate 2006-1991	1991	2006	Numerical Change	Growth Rate 1991-2006	1989	1999	Numerical Change	Growth Rate 1989-1999
1	Forsyth	Georgia	44,083	98,407	54,324	1.23%	12	53	41	3.42%	9	52	43	4.78%	$40,718	$74,003	33285	0.82%
2	Paulding	Georgia	41,611	81,678	40,067	0.96%	5	14	9	1.80%	5	14	9	1.80%	$35,667	$56,039	20372	0.57%
3	Gilmer	Georgia	13,368	23,456	10,088	0.75%	5	8	3	0.60%	5	8	3	0.60%	$24,888	$38,863	13975	0.56%
4	Dawson	Georgia	9,429	15,999	6,570	0.70%	5	11	6	1.20%	5	10	5	1.00%	$30,519	$52,320	21801	0.71%
5	Gwinnett	Georgia	352,910	588,448	235,538	0.67%	172	397	225	1.31%	163	383	220	1.35%	$48,000	$66,693	18693	0.39%
6	Pike	Pennsylvania	27,966	46,302	18,336	0.66%	12	20	8	0.67%	12	19	7	0.58%	$34,379	$49,340	14961	0.44%
7	Pickens	Georgia	14,432	22,983	8,551	0.59%	6	9	3	0.50%	5	9	4	0.80%	$27,790	$47,123	19333	0.70%
8	Cherokee	Georgia	90,204	141,903	51,699	0.57%	29	70	41	1.41%	26	67	41	1.58%	$41,762	$66,419	24657	0.59%
9	Barrow	Georgia	29,721	46,144	16,423	0.55%	5	12	7	1.40%	5	12	7	1.40%	$30,922	$49,722	18800	0.61%
10	White	Georgia	13,006	19,944	6,938	0.53%	3	10	7	2.33%	2	10	8	4.00%	$27,830	$40,704	12874	0.46%
11	Hall	Georgia	95,428	139,277	43,849	0.46%	38	73	35	0.92%	35	72	37	1.06%	$34,147	$50,100	15953	0.47%
12	Monroe	Pennsylvania	95,709	138,687	42,978	0.45%	39	58	19	0.49%	38	56	18	0.47%	$36,514	$51,995	15481	0.42%
13	Shelby	Alabama	99,358	143,293	43,935	0.44%	46	100	54	1.17%	37	89	52	1.41%	$42,549	$64,105	21556	0.51%
14	Lumpkin	Georgia	14,573	21,016	6,443	0.44%	4	5	1	0.25%	4	5	1	0.25%	$30,417	$46,368	15951	0.52%
15	Union	Georgia	11,993	17,289	5,296	0.44%	6	9	3	0.50%	5	9	4	0.80%	$24,334	$39,776	15442	0.63%
16	Banks	Georgia	10,308	14,422	4,114	0.40%	1	1	0	0.00%	1	1	0	0.00%	$28,212	$43,136	14924	0.53%
17	Murray	Georgia	26,147	36,506	10,359	0.40%	2	5	3	1.50%	1	5	4	4.00%	$29,708	$42,155	12447	0.42%
18	Sevier	Tennessee	51,043	71,170	20,127	0.39%	19	27	8	0.42%	18	25	7	0.39%	$26,340	$40,474	14134	0.54%
19	Jackson	Georgia	30,005	41,589	11,584	0.39%	4	8	4	1.00%	4	8	4	1.00%	$28,675	$46,211	17536	0.61%
20	Meigs	Tennessee	8,033	11,086	3,053	0.38%	1	2	1	1.00%	1	2	1	1.00%	$22,605	$34,114	11509	0.51%
21	Towns	Georgia	6,754	9,319	2,565	0.38%	2	3	1	0.50%	2	3	1	0.50%	$23,114	$37,295	14181	0.61%
22	Bartow	Georgia	55,911	76,019	20,108	0.36%	14	33	19	1.36%	13	33	20	1.54%	$31,291	$49,198	17907	0.57%
23	Cumberland	Tennessee	34,736	46,802	12,066	0.35%	8	13	5	0.63%	7	12	5	0.71%	$23,498	$35,928	12430	0.53%
24	Jefferson	Tennessee	33,016	44,294	11,278	0.34%	10	16	6	0.60%	10	16	6	0.60%	$26,133	$38,537	12404	0.47%
25	Elmore	Alabama	49,210	65,874	16,664	0.34%	6	18	12	2.00%	6	15	9	1.50%	$30,853	$47,155	16302	0.53%
26	Alleghany	Virginia	13,176	17,215	4,039	0.31%	1	2	1	1.00%	1	2	1	1.00%	$31,145	$45,843	14698	0.47%
27	Union	Tennessee	13,694	17,808	4,114	0.30%	1	1	0	0.00%	1	1	0	0.00%	$22,544	$31,843	9299	0.41%
28	Blount	Alabama	39,248	51,024	11,776	0.30%	2	6	4	2.00%	2	6	4	2.00%	$26,323	$41,573	15250	0.58%
29	Habersham	Georgia	27,621	35,902	8,281	0.30%	10	20	10	1.00%	8	19	11	1.38%	$28,824	$42,235	13411	0.47%
30	Douglas	Georgia	71,120	92,174	21,054	0.30%	21	50	29	1.38%	19	48	29	1.53%	$40,497	$54,082	13585	0.34%
31	St Clair	Alabama	50,009	64,742	14,733	0.29%	10	21	11	1.10%	10	19	9	0.90%	$27,388	$43,152	15764	0.58%
32	Rabun	Georgia	11,648	15,050	3,402	0.29%	7	8	1	0.14%	6	8	2	0.33%	$24,233	$39,992	15759	0.65%

Rank 1990-2000	Dental Workforce Trends in Appalachian Counties			Population Count 1990	Population Count 2000	Population Change Numerical Change	Population Change Growth Rate 1990-2000	Active Dentists 1991	Active Dentists 2006	Active Dentists Numerical Change	Active Dentists Growth Rate 2006-1991	Private Practitioners 1991	Private Practitioners 2006	Private Practitioners Numerical Change	Private Practitioners Growth Rate 1991-2006	Median Family Income 1989	Median Family Income 1999	Median Family Income Numerical Change	Median Family Income Growth Rate 1989-1999
33	Menifee	,	Kentucky	5,092	6,556	1,464	0.29%	0	1	1	0.00%	0	1	1		$16,538	$26,325	9787	0.59%
34	Henderson	,	North Carolina	69,285	89,173	19,888	0.29%	29	47	18	0.62%	28	44	16	0.57%	$31,331	$44,974	13643	0.44%
35	Sequatchie	,	Tennessee	8,863	11,370	2,507	0.28%	2	3	1	0.50%	2	3	1	0.50%	$23,228	$36,435	13207	0.57%
36	Macon	,	Tennessee	15,906	20,386	4,480	0.28%	3	4	1	0.33%	3	4	1	0.33%	$22,739	$37,577	14838	0.65%
37	Berkeley	,	West Virginia	59,253	75,905	16,652	0.28%	23	39	16	0.70%	22	39	17	0.77%	$32,040	$44,302	12262	0.38%
38	Bledsoe	,	Tennessee	9,669	12,367	2,698	0.28%	1	1	0	0.00%	1	1	0	0.00%	$21,941	$34,593	12652	0.58%
39	Garrard	,	Kentucky	11,579	14,792	3,213	0.28%	2	4	2	1.00%	2	4	2	1.00%	$26,250	$41,250	15000	0.57%
40	Heard	,	Georgia	8,628	11,012	2,384	0.28%	0	1	1	0.00%	0	1	1		$25,066	$39,306	14240	0.57%
41	Monroe	,	Tennessee	30,541	38,961	8,420	0.28%	8	10	2	0.25%	8	10	2	0.25%	$22,999	$34,902	11903	0.52%
42	Johnson	,	Tennessee	13,766	17,499	3,733	0.27%	3	4	1	0.33%	3	2	-1	-0.33%	$18,024	$28,400	10376	0.58%
43	Polk	,	North Carolina	14,416	18,324	3,908	0.27%	7	9	2	0.29%	7	9	2	0.29%	$31,864	$45,096	13232	0.42%
44	Macon	,	North Carolina	23,499	29,811	6,312	0.27%	8	13	5	0.63%	7	10	3	0.43%	$25,655	$37,381	11726	0.46%
45	Gordon	,	Georgia	35,072	44,104	9,032	0.26%	5	12	7	1.40%	4	12	8	2.00%	$31,331	$43,184	11853	0.38%
46	Bibb	,	Alabama	16,576	20,826	4,250	0.26%	2	6	4	2.00%	2	6	4	2.00%	$23,714	$37,230	13516	0.57%
47	Catoosa	,	Georgia	42,464	53,282	10,818	0.25%	6	15	9	1.50%	6	15	9	1.50%	$29,657	$45,710	16053	0.54%
48	Smith	,	Tennessee	14,143	17,712	3,569	0.25%	1	2	1	1.00%	1	2	1	1.00%	$27,393	$41,645	14252	0.52%
49	Loudon	,	Tennessee	31,255	39,086	7,831	0.25%	12	17	5	0.42%	11	16	5	0.45%	$28,712	$46,517	17805	0.62%
50	Davie	,	North Carolina	27,859	34,835	6,976	0.25%	8	10	2	0.25%	7	10	3	0.43%	$34,719	$47,699	12980	0.37%
51	Noble	,	Ohio	11,336	14,058	2,722	0.24%	0	2	2	0.00%	0	2	2		$25,625	$38,939	13314	0.52%
52	Fannin	,	Georgia	15,992	19,798	3,806	0.24%	4	7	3	0.75%	4	7	3	0.75%	$22,619	$35,258	12639	0.56%
53	Jackson	,	North Carolina	26,846	33,121	6,275	0.23%	11	16	5	0.45%	9	14	5	0.56%	$25,826	$40,876	15050	0.58%
54	Madison	,	Kentucky	57,508	70,872	13,364	0.23%	18	27	9	0.50%	18	27	9	0.50%	$27,052	$41,383	14331	0.53%
55	Morgan	,	West Virginia	12,128	14,943	2,815	0.23%	3	6	3	1.00%	3	5	2	0.67%	$28,252	$40,690	12438	0.44%
56	Blount	,	Tennessee	85,969	105,823	19,854	0.23%	32	56	24	0.75%	28	51	23	0.82%	$30,277	$45,038	14761	0.49%
57	Lewis	,	Tennessee	9,247	11,367	2,120	0.23%	1	2	1	1.00%	1	2	1	1.00%	$20,901	$35,972	15071	0.72%
58	Cherokee	,	Alabama	19,543	23,988	4,445	0.23%	0	3	3	0.00%	0	3	3		$24,932	$36,920	11988	0.48%
59	Clay	,	North Carolina	7,155	8,775	1,620	0.23%	2	3	1	0.50%	1	3	2	2.00%	$22,750	$38,264	15514	0.68%
60	Cannon	,	Tennessee	10,467	12,826	2,359	0.23%	1	5	4	4.00%	1	5	4	4.00%	$27,481	$38,424	10943	0.40%
61	Hampshire	,	West Virginia	16,498	20,203	3,705	0.22%	3	6	3	1.00%	3	6	3	1.00%	$24,164	$37,616	13452	0.56%
62	Madison	,	Georgia	21,050	25,730	4,680	0.22%	1	3	2	2.00%	1	2	1	1.00%	$30,065	$42,189	12124	0.40%
63	Carroll	,	Georgia	71,422	87,268	15,846	0.22%	20	31	11	0.55%	19	30	11	0.58%	$30,096	$44,642	14546	0.48%
64	Botetourt	,	Virginia	24,992	30,496	5,504	0.22%	11	14	3	0.27%	10	13	3	0.30%	$37,116	$55,125	18009	0.49%
65	Alexander	,	North Carolina	27,544	33,603	6,059	0.22%	1	4	3	3.00%	1	4	3	3.00%	$30,275	$45,691	15416	0.51%
66	Chilton	,	Alabama	32,458	39,593	7,135	0.22%	8	8	0	0.00%	8	8	0	0.00%	$26,203	$39,505	13302	0.51%
67	Franklin	,	Georgia	16,650	20,285	3,635	0.22%	4	4	0	0.00%	3	4	1	0.33%	$27,517	$38,463	10946	0.40%

Rank 1990-2000	Dental Workforce Trends in Appalachian Counties			Population Count 1990	Population Count 2000	Population Change Numerical Change	Population Change Growth Rate 1990-2000	Active Dentists 1991	Active Dentists 2006	Active Dentists Numerical Change	Active Dentists Growth Rate 2006-1991	Active Dentists Private Practitioners 1991	Active Dentists Private Practitioners 2006	Active Dentists Private Practitioners Numerical Change	Active Dentists Private Practitioners Growth Rate 1991-2006	Median Family Income 1989	Median Family Income 1999	Median Family Income Numerical Change	Median Family Income Growth Rate 1989-1999
68	Laurel	,	Kentucky	43,438	52,715	9,277	0.21%	7	17	10	1.43%	7	17	10	1.43%	$20,977	$31,318	10341	0.49%
69	DeKalb	,	Tennessee	14,360	17,423	3,063	0.21%	2	4	2	1.00%	2	4	2	1.00%	$22,956	$36,920	13964	0.61%
70	Limestone	,	Alabama	54,135	65,676	11,541	0.21%	9	17	8	0.89%	8	15	7	0.88%	$31,739	$45,146	13407	0.42%
71	Putnam	,	Tennessee	51,373	62,315	10,942	0.21%	21	28	7	0.33%	20	25	5	0.25%	$27,015	$39,553	12538	0.46%
72	Brown	,	Ohio	34,966	42,285	7,319	0.21%	4	7	3	0.75%	4	7	3	0.75%	$28,840	$43,040	14200	0.49%
73	Grainger	,	Tennessee	17,095	20,659	3,564	0.21%	1	3	2	2.00%	1	3	2	2.00%	$21,697	$33,347	11650	0.54%
74	Cherokee	,	North Carolina	20,170	24,298	4,128	0.20%	10	11	1	0.10%	10	10	0	0.00%	$22,788	$33,768	10980	0.48%
75	Putnam	,	West Virginia	42,835	51,589	8,754	0.20%	15	28	13	0.87%	14	27	13	0.93%	$31,448	$48,674	17226	0.55%
76	Hawkins	,	Tennessee	44,565	53,563	8,998	0.20%	6	9	3	0.50%	6	9	3	0.50%	$26,402	$37,557	11155	0.42%
77	Pontotoc	,	Mississippi	22,237	26,726	4,489	0.20%	5	6	1	0.20%	4	5	1	0.25%	$24,599	$39,845	15246	0.62%
78	Stokes	,	North Carolina	37,223	44,711	7,488	0.20%	4	6	2	0.50%	4	5	1	0.25%	$31,831	$44,615	12784	0.40%
79	Morgan	,	Kentucky	11,648	13,948	2,300	0.20%	3	4	1	0.33%	3	4	1	0.33%	$16,031	$26,135	10104	0.63%
80	Wayne	,	Pennsylvania	39,944	47,722	7,778	0.19%	11	20	9	0.82%	11	18	7	0.64%	$28,395	$40,589	12194	0.43%
81	Bradley	,	Tennessee	73,712	87,965	14,253	0.19%	25	39	14	0.56%	25	36	11	0.44%	$30,372	$41,779	11407	0.38%
82	Yadkin	,	North Carolina	30,488	36,348	5,860	0.19%	4	7	3	0.75%	4	6	2	0.50%	$30,626	$43,758	13132	0.43%
83	Coffee	,	Tennessee	40,339	48,014	7,675	0.19%	22	31	9	0.41%	21	30	9	0.43%	$28,778	$40,228	11450	0.40%
84	Greenville	,	South Carolina	320,167	379,616	59,449	0.19%	134	238	104	0.78%	129	228	99	0.77%	$34,560	$50,332	15772	0.46%
85	Holmes	,	Ohio	32,849	38,943	6,094	0.19%	5	11	6	1.20%	5	11	6	1.20%	$27,531	$40,230	12699	0.46%
86	Clermont	,	Ohio	150,187	177,977	27,790	0.19%	42	64	22	0.52%	40	60	20	0.50%	$36,511	$57,032	20521	0.56%
87	Jackson	,	Tennessee	9,297	10,984	1,687	0.18%	3	3	0	0.00%	2	3	1	0.50%	$21,834	$32,088	10254	0.47%
88	McDowell	,	North Carolina	35,681	42,151	6,470	0.18%	6	10	4	0.67%	6	9	3	0.50%	$27,018	$37,789	10771	0.40%
89	Cherokee	,	South Carolina	44,506	52,537	8,031	0.18%	4	9	5	1.25%	4	9	5	1.25%	$28,925	$39,393	10468	0.36%
90	Buncombe	,	North Carolina	174,821	206,330	31,509	0.18%	79	137	58	0.73%	66	124	58	0.88%	$30,889	$45,011	14122	0.46%
91	Pickens	,	South Carolina	93,894	110,757	16,863	0.18%	24	49	25	1.04%	21	47	26	1.24%	$32,492	$44,507	12015	0.37%
92	DeKalb	,	Alabama	54,651	64,452	9,801	0.18%	11	17	6	0.55%	11	17	6	0.55%	$24,836	$35,801	10965	0.44%
93	Burke	,	North Carolina	75,744	89,148	13,404	0.18%	19	28	9	0.47%	16	25	9	0.56%	$30,647	$42,114	11467	0.37%
94	Polk	,	Tennessee	13,643	16,050	2,407	0.18%	1	2	1	1.00%	1	2	1	1.00%	$23,934	$36,370	12436	0.52%
95	Monroe	,	West Virginia	12,406	14,583	2,177	0.18%	1	2	1	1.00%	1	2	1	1.00%	$21,530	$35,299	13769	0.64%
96	Jefferson	,	West Virginia	35,926	42,190	6,264	0.17%	12	20	8	0.67%	11	19	8	0.73%	$34,887	$51,351	16464	0.47%
97	Hart	,	Kentucky	14,890	17,445	2,555	0.17%	3	4	1	0.33%	3	4	1	0.33%	$19,587	$31,746	12159	0.62%
98	Haralson	,	Georgia	21,966	25,690	3,724	0.17%	5	6	1	0.20%	5	6	1	0.20%	$27,027	$38,373	11346	0.42%
99	Hart	,	Georgia	19,712	22,997	3,285	0.17%	3	5	2	0.67%	3	4	1	0.33%	$27,561	$39,600	12039	0.44%
100	Rhea	,	Tennessee	24,344	28,400	4,056	0.17%	5	11	6	1.20%	5	11	6	1.20%	$23,789	$35,580	11791	0.50%
101	Lincoln	,	Kentucky	20,045	23,361	3,316	0.17%	3	5	2	0.67%	3	5	2	0.67%	$21,239	$32,284	11045	0.52%
102	Craig	,	Virginia	4,372	5,091	719	0.16%	1	1	0	0.00%	1	1	0	0.00%	$28,530	$41,750	13220	0.46%

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			1990	2000	Numerical Change	Growth Rate 1990-2000	1991	2006	Numerical Change	Growth Rate 2006-1991	1991	2006	Numerical Change	Growth Rate 1991-2006	1989	1999	Numerical Change	Growth Rate 1989-1999
103	Washington	Tennessee	92,315	107,198	14,883	0.16%	40	63	23	0.58%	35	55	20	0.57%	$29,701	$41,162	11461	0.39%
104	Marshall	Alabama	70,832	82,231	11,399	0.16%	18	28	10	0.56%	18	27	9	0.50%	$26,135	$38,788	12653	0.48%
105	Warren	Tennessee	32,992	38,276	5,284	0.16%	5	12	7	1.40%	5	11	6	1.20%	$25,900	$37,835	11935	0.46%
106	Madison	North Carolina	16,953	19,635	2,682	0.16%	2	2	0	0.00%	2	2	0	0.00%	$23,963	$37,383	13420	0.56%
107	Madison	Alabama	238,912	276,700	37,788	0.16%	105	161	56	0.53%	95	153	58	0.61%	$39,264	$54,360	15096	0.38%
108	McMinn	Tennessee	42,383	49,015	6,632	0.16%	14	19	5	0.36%	13	17	4	0.31%	$26,207	$38,992	12785	0.49%
109	Floyd	Virginia	12,005	13,874	1,869	0.16%	3	3	0	0.00%	3	3	0	0.00%	$27,439	$38,128	10689	0.39%
110	Watauga	North Carolina	36,952	42,695	5,743	0.16%	17	24	7	0.41%	16	23	7	0.44%	$27,752	$45,508	17756	0.64%
111	Lee	Mississippi	65,581	75,755	10,174	0.16%	30	48	18	0.60%	25	45	20	0.80%	$29,299	$43,149	13850	0.47%
112	Avery	North Carolina	14,867	17,167	2,300	0.15%	4	7	3	0.75%	4	6	2	0.50%	$24,154	$37,454	13300	0.55%
113	Surry	North Carolina	61,704	71,219	9,515	0.15%	16	23	7	0.44%	16	22	6	0.38%	$27,750	$38,902	11152	0.40%
114	Hardy	West Virginia	10,977	12,669	1,692	0.15%	3	4	1	0.33%	2	3	1	0.50%	$25,843	$37,003	11160	0.43%
115	Vinton	Ohio	11,098	12,806	1,708	0.15%	1	1	0	0.00%	1	1	0	0.00%	$21,963	$34,371	12408	0.56%
116	Montgomery	Kentucky	19,561	22,554	2,993	0.15%	7	9	2	0.29%	7	9	2	0.29%	$24,542	$36,939	12397	0.51%
117	Yancey	North Carolina	15,419	17,774	2,355	0.15%	2	3	1	0.50%	2	3	1	0.50%	$22,659	$35,879	13220	0.58%
118	Whitfield	Georgia	72,462	83,525	11,063	0.15%	21	31	10	0.48%	19	30	11	0.58%	$32,423	$44,652	12229	0.38%
119	Dade	Georgia	13,147	15,154	2,007	0.15%	1	2	1	1.00%	1	2	1	1.00%	$24,051	$39,481	15430	0.64%
120	Marshall	Mississippi	30,361	34,993	4,632	0.15%	2	3	1	0.50%	2	3	1	0.50%	$21,554	$33,125	11571	0.54%
121	Cocke	Tennessee	29,141	33,565	4,424	0.15%	3	4	1	0.33%	3	4	1	0.33%	$20,644	$30,418	9774	0.47%
122	Oconee	South Carolina	57,494	66,215	8,721	0.15%	10	20	10	1.00%	10	20	10	1.00%	$30,858	$43,047	12189	0.40%
123	Hamblen	Tennessee	50,480	58,128	7,648	0.15%	26	31	5	0.19%	25	30	5	0.20%	$27,325	$39,138	11813	0.43%
124	Forsyth	North Carolina	265,878	306,067	40,189	0.15%	122	197	75	0.61%	90	182	92	1.02%	$37,923	$52,032	14109	0.37%
125	Haywood	North Carolina	46,942	54,033	7,091	0.15%	16	24	8	0.50%	15	23	8	0.53%	$26,820	$40,438	13618	0.51%
126	Swain	North Carolina	11,268	12,968	1,700	0.15%	1	2	1	1.00%	1	2	1	1.00%	$19,533	$33,786	14253	0.73%
127	Scott	Tennessee	18,358	21,127	2,769	0.15%	3	5	2	0.67%	3	4	1	0.33%	$18,637	$28,595	9958	0.53%
128	Union	Pennsylvania	36,176	41,624	5,448	0.15%	15	27	12	0.80%	14	23	9	0.64%	$31,776	$47,538	15762	0.50%
129	White	Tennessee	20,090	23,102	3,012	0.15%	8	11	3	0.38%	7	9	2	0.29%	$24,147	$34,854	10707	0.44%
130	Transylvania	North Carolina	25,520	29,334	3,814	0.15%	6	10	4	0.67%	6	10	4	0.67%	$30,613	$45,579	14966	0.49%
131	Union	Mississippi	22,085	25,362	3,277	0.15%	5	7	2	0.40%	5	7	2	0.40%	$26,010	$39,666	13656	0.53%
132	Cullman	Alabama	67,613	77,483	9,870	0.15%	15	22	7	0.47%	15	22	7	0.47%	$25,856	$39,341	13485	0.52%
133	Butler	Pennsylvania	152,013	174,083	22,070	0.15%	64	104	40	0.63%	60	97	37	0.62%	$34,647	$51,215	16568	0.48%
134	Chattooga	Georgia	22,242	25,470	3,228	0.15%	5	7	2	0.40%	5	7	2	0.40%	$24,851	$36,230	11379	0.46%
135	Highland	Ohio	35,728	40,875	5,147	0.14%	10	13	3	0.30%	10	12	2	0.20%	$26,224	$41,091	14867	0.57%
136	Bath	Kentucky	9,692	11,085	1,393	0.14%	1	1	0	0.00%	1	1	0	0.00%	$20,026	$31,758	11732	0.59%
137	Panola	Mississippi	29,996	34,274	4,278	0.14%	5	9	4	0.80%	5	9	4	0.80%	$21,119	$32,675	11556	0.55%

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138	Claiborne	Tennessee	26,137	29,862	3,725	0.14%	5	7	2	0.40%	5	7	2	0.40%	$19,993	$31,234	11241	0.56%
139	Pike	Ohio	24,249	27,695	3,446	0.14%	6	10	4	0.67%	6	10	4	0.67%	$22,567	$35,934	13367	0.59%
140	Morgan	Tennessee	17,300	19,757	2,457	0.14%	3	3	0	0.00%	3	3	0	0.00%	$22,163	$31,901	9738	0.44%
141	Anderson	South Carolina	145,196	165,740	20,544	0.14%	40	65	25	0.63%	39	63	24	0.62%	$31,228	$44,229	13001	0.42%
142	Overton	Tennessee	17,636	20,118	2,482	0.14%	4	5	1	0.25%	4	5	1	0.25%	$21,586	$32,156	10570	0.49%
143	Wayne	Kentucky	17,468	19,923	2,455	0.14%	3	6	3	1.00%	3	6	3	1.00%	$15,967	$24,869	8902	0.56%
144	Knox	Tennessee	335,749	382,032	46,283	0.14%	164	246	82	0.50%	153	230	77	0.50%	$32,614	$49,182	16568	0.51%
145	Itawamba	Mississippi	20,017	22,770	2,753	0.14%	4	5	1	0.25%	4	5	1	0.25%	$24,489	$36,793	12304	0.50%
146	Van Buren	Tennessee	4,846	5,508	662	0.14%	0	0	0	0.00%	0	0	0		$23,242	$34,949	11707	0.50%
147	Campbell	Tennessee	35,079	39,854	4,775	0.14%	7	7	0	0.00%	6	7	1	0.17%	$20,151	$30,197	10046	0.50%
148	Pulaski	Kentucky	49,489	56,217	6,728	0.14%	18	40	22	1.22%	17	37	20	1.18%	$21,792	$32,350	10558	0.48%
149	Rockbridge	Virginia	18,350	20,808	2,458	0.13%	3	3	0	0.00%	3	3	0	0.00%	$28,545	$41,324	12779	0.45%
150	Fentress	Tennessee	14,669	16,625	1,956	0.13%	2	2	0	0.00%	2	2	0	0.00%	$16,405	$28,856	12451	0.76%
151	Powell	Kentucky	11,686	13,237	1,551	0.13%	2	4	2	1.00%	2	4	2	1.00%	$19,540	$30,483	10943	0.56%
152	Montgomery	Virginia	73,913	83,629	9,716	0.13%	19	31	12	0.63%	15	30	15	1.00%	$32,128	$47,239	15111	0.47%
153	Wirt	West Virginia	5,192	5,873	681	0.13%	1	2	1	1.00%	1	2	1	1.00%	$21,193	$33,872	12679	0.60%
154	Braxton	West Virginia	12,998	14,702	1,704	0.13%	2	4	2	1.00%	2	4	2	1.00%	$20,365	$29,133	8768	0.43%
155	Lawrence	Tennessee	35,303	39,926	4,623	0.13%	10	11	1	0.10%	10	11	1	0.10%	$25,197	$35,326	10129	0.40%
156	Franklin	Tennessee	34,725	39,270	4,545	0.13%	6	11	5	0.83%	5	11	6	1.20%	$27,731	$42,279	14548	0.52%
157	Clay	Kentucky	21,746	24,556	2,810	0.13%	5	6	1	0.20%	5	5	0	0.00%	$14,721	$18,925	4204	0.29%
158	Jackson	Kentucky	11,955	13,495	1,540	0.13%	1	3	2	2.00%	1	2	1	1.00%	$14,767	$23,638	8871	0.60%
159	Jackson	Alabama	47,796	53,926	6,130	0.13%	12	15	3	0.25%	12	15	3	0.25%	$25,772	$38,082	12310	0.48%
160	Polk	Georgia	33,815	38,127	4,312	0.13%	6	11	5	0.83%	6	11	5	0.83%	$27,896	$37,847	9951	0.36%
161	Winston	Alabama	22,053	24,843	2,790	0.13%	2	4	2	1.00%	1	4	3	3.00%	$22,023	$32,628	10605	0.48%
162	Greene	Tennessee	55,853	62,909	7,056	0.13%	18	24	6	0.33%	16	24	8	0.50%	$25,600	$36,889	11289	0.44%
163	Randolph	Alabama	19,881	22,380	2,499	0.13%	4	5	1	0.25%	4	5	1	0.25%	$23,994	$34,684	10690	0.45%
164	Edmonson	Kentucky	10,357	11,644	1,287	0.12%	1	1	0	0.00%	1	1	0	0.00%	$17,295	$31,843	14548	0.84%
165	Clark	Kentucky	29,496	33,144	3,648	0.12%	13	22	9	0.69%	12	20	8	0.67%	$29,089	$45,647	16558	0.57%
166	Adair	Kentucky	15,360	17,244	1,884	0.12%	3	5	2	0.67%	3	5	2	0.67%	$20,163	$29,779	9616	0.48%
167	Franklin	Alabama	27,814	31,223	3,409	0.12%	9	10	1	0.11%	9	10	1	0.11%	$22,755	$34,274	11519	0.51%
168	Fleming	Kentucky	12,292	13,792	1,500	0.12%	3	3	0	0.00%	3	3	0	0.00%	$22,564	$33,300	10736	0.48%
169	Rockcastle	Kentucky	14,803	16,582	1,779	0.12%	1	2	1	1.00%	1	2	1	1.00%	$18,144	$30,278	12134	0.67%
170	Metcalfe	Kentucky	8,963	10,037	1,074	0.12%	1	2	1	1.00%	1	2	1	1.00%	$18,543	$29,178	10635	0.57%
171	Spartanburg	South Carolina	226,800	253,791	26,991	0.12%	71	114	43	0.61%	65	108	43	0.66%	$31,857	$45,349	13492	0.42%
172	Oktibbeha	Mississippi	38,375	42,902	4,527	0.12%	9	15	6	0.67%	9	15	6	0.67%	$27,336	$36,914	9578	0.35%

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173	Marion ,	Tennessee	24,860	27,776	2,916	0.12%	1	4	3	3.00%	1	3	2	2.00%	$24,178	$36,351	12173	0.50%
174	Floyd ,	Georgia	81,251	90,565	9,314	0.11%	23	35	12	0.52%	21	33	12	0.57%	$30,998	$42,302	11304	0.36%
175	Washington ,	Virginia	45,887	51,103	5,216	0.11%	21	31	10	0.48%	17	27	10	0.59%	$25,843	$40,162	14319	0.55%
176	Alleghany ,	North Carolina	9,590	10,677	1,087	0.11%	1	1	0	0.00%	1	1	0	0.00%	$22,431	$38,473	16042	0.72%
177	Lawrence ,	Kentucky	13,998	15,569	1,571	0.11%	3	4	1	0.33%	3	4	1	0.33%	$18,123	$26,113	7990	0.44%
178	Graham ,	North Carolina	7,196	7,993	797	0.11%	0	0	0	0.00%	0	0	0		$19,654	$32,750	13096	0.67%
179	Patrick ,	Virginia	17,473	19,407	1,934	0.11%	2	4	2	1.00%	2	4	2	1.00%	$26,879	$36,232	9353	0.35%
180	Green ,	Kentucky	10,371	11,518	1,147	0.11%	2	4	2	1.00%	2	4	2	1.00%	$23,079	$31,852	8773	0.38%
181	Morgan ,	Alabama	100,043	111,064	11,021	0.11%	33	52	19	0.58%	31	52	21	0.68%	$32,912	$45,827	12915	0.39%
182	Cleburne ,	Alabama	12,730	14,123	1,393	0.11%	0	0	0	0.00%	0	0	0		$25,900	$35,579	9679	0.37%
183	Hale ,	Alabama	15,498	17,185	1,687	0.11%	0	3	3	0.00%	0	3	3		$18,272	$31,875	13603	0.74%
184	Russell ,	Kentucky	14,716	16,315	1,599	0.11%	4	8	4	1.00%	4	8	4	1.00%	$20,991	$27,803	6812	0.32%
185	Juniata ,	Pennsylvania	20,625	22,821	2,196	0.11%	2	3	1	0.50%	2	3	1	0.50%	$28,781	$39,757	10976	0.38%
186	Hocking ,	Ohio	25,533	28,241	2,708	0.11%	5	5	0	0.00%	5	5	0	0.00%	$26,715	$40,888	14173	0.53%
187	Rutherford ,	North Carolina	56,918	62,899	5,981	0.11%	12	17	5	0.42%	11	16	5	0.45%	$28,429	$37,787	9358	0.33%
188	Wilkes ,	North Carolina	59,393	65,632	6,239	0.11%	9	18	9	1.00%	9	15	6	0.67%	$26,476	$40,607	14131	0.53%
189	Carter ,	Kentucky	24,340	26,889	2,549	0.10%	2	7	5	2.50%	2	6	4	2.00%	$20,826	$31,278	10452	0.50%
190	Lawrence ,	Alabama	31,513	34,803	3,290	0.10%	1	1	0	0.00%	1	1	0	0.00%	$25,478	$38,565	13087	0.51%
191	Lauderdale ,	Alabama	79,661	87,966	8,305	0.10%	25	45	20	0.80%	24	45	21	0.88%	$29,589	$41,437	11848	0.40%
192	Coosa ,	Alabama	11,063	12,202	1,139	0.10%	0	1	1	0.00%	0	1	1		$23,472	$36,082	12610	0.54%
193	Clay ,	Tennessee	7,238	7,976	738	0.10%	2	2	0	0.00%	2	2	0	0.00%	$21,228	$29,784	8556	0.40%
194	Carter ,	Tennessee	51,505	56,742	5,237	0.10%	11	15	4	0.36%	11	14	3	0.27%	$22,520	$33,825	11305	0.50%
195	Grayson ,	Virginia	16,278	17,917	1,639	0.10%	3	4	1	0.33%	3	4	1	0.33%	$22,526	$35,076	12550	0.56%
196	Carroll ,	Virginia	26,594	29,245	2,651	0.10%	6	9	3	0.50%	6	9	3	0.50%	$24,885	$36,755	11870	0.48%
197	Roane ,	Tennessee	47,227	51,910	4,683	0.10%	12	19	7	0.58%	12	18	6	0.50%	$28,262	$41,399	13137	0.46%
198	Ashe ,	North Carolina	22,209	24,384	2,175	0.10%	4	5	1	0.25%	3	5	2	0.67%	$22,695	$36,052	13357	0.59%
199	Prentiss ,	Mississippi	23,278	25,556	2,278	0.10%	2	7	5	2.50%	2	7	5	2.50%	$21,976	$35,125	13149	0.60%
200	Centre ,	Pennsylvania	123,786	135,758	11,972	0.10%	45	79	34	0.76%	38	76	38	1.00%	$34,313	$50,557	16244	0.47%
201	Tuscaloosa ,	Alabama	150,522	164,875	14,353	0.10%	47	76	29	0.62%	40	70	30	0.75%	$30,135	$45,485	15350	0.51%
202	Caldwell ,	North Carolina	70,709	77,415	6,706	0.09%	12	20	8	0.67%	11	19	8	0.73%	$30,117	$41,665	11548	0.38%
203	McCreary ,	Kentucky	15,603	17,080	1,477	0.09%	2	3	1	0.50%	2	3	1	0.50%	$12,223	$22,261	10038	0.82%
204	Stephens ,	Georgia	23,257	25,435	2,178	0.09%	6	7	1	0.17%	6	7	1	0.17%	$27,768	$35,660	7892	0.28%
205	Alcorn ,	Mississippi	31,722	34,558	2,836	0.09%	15	22	7	0.47%	14	22	8	0.57%	$23,785	$36,899	13114	0.55%
206	Pickett ,	Tennessee	4,548	4,945	397	0.09%	0	0	0	0.00%	0	0	0		$18,379	$31,355	12976	0.71%
207	Carroll ,	Ohio	26,521	28,836	2,315	0.09%	6	7	1	0.17%	6	7	1	0.17%	$29,341	$41,114	11773	0.40%

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208	Casey	,	Kentucky	14,211	15,447	1,236	0.09%	0	1	1	0.00%	0	1	1		$18,176	$27,044	8868	0.49%
209	Mitchell	,	North Carolina	14,433	15,687	1,254	0.09%	5	8	3	0.60%	5	8	3	0.60%	$24,063	$36,367	12304	0.51%
210	Wolfe	,	Kentucky	6,503	7,065	562	0.09%	1	1	0	0.00%	1	1	0	0.00%	$12,469	$23,333	10864	0.87%
211	Rowan	,	Kentucky	20,353	22,094	1,741	0.09%	7	12	5	0.71%	6	12	6	1.00%	$19,432	$34,338	14906	0.77%
212	Yalobusha	,	Mississippi	12,033	13,051	1,018	0.08%	1	2	1	1.00%	1	2	1	1.00%	$20,948	$31,801	10853	0.52%
213	Monongalia	,	West Virginia	75,509	81,866	6,357	0.08%	61	115	54	0.89%	25	66	41	1.64%	$30,426	$43,628	13202	0.43%
214	Talladega	,	Alabama	74,107	80,321	6,214	0.08%	11	16	5	0.45%	10	16	6	0.60%	$25,225	$38,004	12779	0.51%
215	Wythe	,	Virginia	25,466	27,599	2,133	0.08%	6	8	2	0.33%	4	6	2	0.50%	$24,620	$40,188	15568	0.63%
216	Tishomingo	,	Mississippi	17,683	19,163	1,480	0.08%	3	4	1	0.33%	3	4	1	0.33%	$21,749	$34,378	12629	0.58%
217	Grant	,	West Virginia	10,428	11,299	871	0.08%	4	6	2	0.50%	4	6	2	0.50%	$25,327	$33,813	8486	0.34%
218	Elbert	,	Georgia	18,949	20,511	1,562	0.08%	3	6	3	1.00%	3	6	3	1.00%	$24,070	$34,276	10206	0.42%
219	Lewis	,	Kentucky	13,029	14,092	1,063	0.08%	2	3	1	0.50%	2	3	1	0.50%	$19,591	$26,109	6518	0.33%
220	Potter	,	Pennsylvania	16,717	18,080	1,363	0.08%	5	7	2	0.40%	4	7	3	0.75%	$25,448	$38,066	12618	0.50%
221	Tuscarawas	,	Ohio	84,090	90,914	6,824	0.08%	23	30	7	0.30%	23	30	7	0.30%	$29,303	$41,677	12374	0.42%
222	Perry	,	Ohio	31,557	34,078	2,521	0.08%	6	10	4	0.67%	5	8	3	0.60%	$24,985	$40,294	15309	0.61%
223	Jackson	,	Ohio	30,230	32,641	2,411	0.08%	4	8	4	1.00%	4	7	3	0.75%	$22,611	$36,022	13411	0.59%
224	Jackson	,	West Virginia	25,938	28,000	2,062	0.08%	8	10	2	0.25%	8	10	2	0.25%	$25,121	$38,021	12900	0.51%
225	Hamilton	,	Tennessee	285,536	307,896	22,360	0.08%	141	216	75	0.53%	132	206	74	0.56%	$32,185	$48,037	15852	0.49%
226	Adams	,	Ohio	25,371	27,330	1,959	0.08%	5	8	3	0.60%	5	7	2	0.40%	$21,226	$34,714	13488	0.64%
227	Whitley	,	Kentucky	33,326	35,865	2,539	0.08%	13	21	8	0.62%	12	21	9	0.75%	$18,021	$27,871	9850	0.55%
228	Choctaw	,	Mississippi	9,071	9,758	687	0.08%	1	3	2	2.00%	1	3	2	2.00%	$21,067	$31,095	10028	0.48%
229	Clay	,	Alabama	13,252	14,254	1,002	0.08%	2	2	0	0.00%	2	2	0	0.00%	$24,145	$34,033	9888	0.41%
230	Chickasaw	,	Mississippi	18,085	19,440	1,355	0.07%	3	4	1	0.33%	3	4	1	0.33%	$22,331	$33,819	11488	0.51%
231	Sullivan	,	Pennsylvania	6,104	6,556	452	0.07%	1	1	0	0.00%	1	0	-1	-1.0%	$25,316	$37,196	11880	0.47%
232	Grundy	,	Tennessee	13,362	14,332	970	0.07%	0	1	1	0.00%	0	1	1		$19,555	$27,691	8136	0.42%
233	Knox	,	Kentucky	29,676	31,795	2,119	0.07%	3	8	5	1.67%	3	8	5	1.67%	$15,412	$23,136	7724	0.50%
234	Tallapoosa	,	Alabama	38,826	41,475	2,649	0.07%	9	11	2	0.22%	9	10	1	0.11%	$27,247	$38,148	10901	0.40%
235	Clearfield	,	Pennsylvania	78,097	83,382	5,285	0.07%	16	28	12	0.75%	16	27	11	0.69%	$26,192	$38,004	11812	0.45%
236	Unicoi	,	Tennessee	16,549	17,667	1,118	0.07%	4	6	2	0.50%	3	4	1	0.33%	$26,283	$36,871	10588	0.40%
237	Robertson	,	Kentucky	2,124	2,266	142	0.07%	0	0	0	0.00%	0	0	0		$23,788	$35,521	11733	0.49%
238	Tippah	,	Mississippi	19,523	20,826	1,303	0.07%	4	6	2	0.50%	4	5	1	0.25%	$22,500	$34,547	12047	0.54%
239	Lee	,	Kentucky	7,422	7,916	494	0.07%	0	1	1	0.00%	0	1	1		$14,618	$24,918	10300	0.70%
240	Sullivan	,	Tennessee	143,596	153,048	9,452	0.07%	71	108	37	0.52%	65	105	40	0.62%	$30,167	$41,025	10858	0.36%
241	Colbert	,	Alabama	51,666	54,984	3,318	0.06%	14	20	6	0.43%	12	20	8	0.67%	$27,862	$39,294	11432	0.41%
242	Taylor	,	West Virginia	15,144	16,089	945	0.06%	2	4	2	1.00%	2	3	1	0.50%	$22,357	$32,222	9865	0.44%

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243	Perry	Pennsylvania	41,172	43,602	2,430	0.06%	7	9	2	0.29%	7	9	2	0.29%	$32,776	$47,997	15221	0.46%
244	Doddridge	West Virginia	6,994	7,403	409	0.06%	0	0	0	0.00%	0	0	0		$19,830	$30,502	10672	0.54%
245	Ross	Ohio	69,330	73,345	4,015	0.06%	23	33	10	0.43%	21	31	10	0.48%	$28,634	$43,241	14607	0.51%
246	Russell	Virginia	28,667	30,308	1,641	0.06%	2	3	1	0.50%	2	3	1	0.50%	$21,777	$31,491	9714	0.45%
247	Bland	Virginia	6,514	6,871	357	0.05%	3	5	2	0.67%	3	5	2	0.67%	$28,750	$35,765	7015	0.24%
248	Clinton	Kentucky	9,135	9,634	499	0.05%	2	2	0	0.00%	2	2	0	0.00%	$14,627	$25,919	11292	0.77%
249	Cumberland	Kentucky	6,784	7,147	363	0.05%	2	2	0	0.00%	2	2	0	0.00%	$16,084	$28,701	12617	0.78%
250	Bath	Virginia	4,799	5,048	249	0.05%	1	1	0	0.00%	1	0	-1	-1.0%	$29,282	$41,276	11994	0.41%
251	Morgan	Ohio	14,194	14,897	703	0.05%	2	2	0	0.00%	2	2	0	0.00%	$25,847	$34,973	9126	0.35%
252	Crawford	Pennsylvania	86,169	90,366	4,197	0.05%	29	37	8	0.28%	27	34	7	0.26%	$27,828	$40,755	12927	0.46%
253	Estill	Kentucky	14,614	15,307	693	0.05%	3	3	0	0.00%	3	3	0	0.00%	$19,223	$27,284	8061	0.42%
254	Walker	Georgia	58,340	61,053	2,713	0.05%	8	11	3	0.38%	8	9	1	0.13%	$28,250	$39,034	10784	0.38%
255	Marion	Alabama	29,830	31,214	1,384	0.05%	4	6	2	0.50%	4	6	2	0.50%	$22,394	$34,359	11965	0.53%
256	Susquehanna	Pennsylvania	40,380	42,238	1,858	0.05%	7	9	2	0.29%	6	8	2	0.33%	$29,025	$39,564	10539	0.36%
257	Elliott	Kentucky	6,455	6,748	293	0.05%	2	4	2	1.00%	2	3	1	0.50%	$17,134	$27,125	9991	0.58%
258	Guernsey	Ohio	39,024	40,792	1,768	0.05%	10	17	7	0.70%	10	16	6	0.60%	$25,225	$35,660	10435	0.41%
259	Anderson	Tennessee	68,250	71,330	3,080	0.05%	39	49	10	0.26%	36	47	11	0.31%	$31,690	$42,584	10894	0.34%
260	Walker	Alabama	67,670	70,713	3,043	0.04%	14	24	10	0.71%	14	24	10	0.71%	$25,322	$35,221	9899	0.39%
261	Athens	Ohio	59,549	62,223	2,674	0.04%	16	22	6	0.38%	16	20	4	0.25%	$25,702	$39,785	14083	0.55%
262	Bedford	Pennsylvania	47,919	49,984	2,065	0.04%	15	21	6	0.40%	13	20	7	0.54%	$25,355	$37,741	12386	0.49%
263	Clay	Mississippi	21,120	21,979	859	0.04%	4	4	0	0.00%	4	4	0	0.00%	$22,229	$35,461	13232	0.60%
264	Monroe	Mississippi	36,582	38,014	1,432	0.04%	8	10	2	0.25%	6	9	3	0.50%	$24,469	$36,749	12280	0.50%
265	Lowndes	Mississippi	59,308	61,586	2,278	0.04%	15	28	13	0.87%	14	28	14	1.00%	$27,932	$38,248	10316	0.37%
266	Winston	Mississippi	19,433	20,160	727	0.04%	3	6	3	1.00%	3	6	3	1.00%	$23,149	$33,602	10453	0.45%
267	Etowah	Alabama	99,840	103,459	3,619	0.04%	36	47	11	0.31%	31	45	14	0.45%	$27,071	$38,697	11626	0.43%
268	Columbiana	Ohio	108,276	112,075	3,799	0.04%	20	28	8	0.40%	18	26	8	0.44%	$27,666	$40,486	12820	0.46%
269	Clay	West Virginia	9,983	10,330	347	0.03%	1	2	1	1.00%	1	2	1	1.00%	$16,130	$27,137	11007	0.68%
270	Coshocton	Ohio	35,427	36,655	1,228	0.03%	5	8	3	0.60%	5	8	3	0.60%	$28,606	$41,676	13070	0.46%
271	Carbon	Pennsylvania	56,846	58,802	1,956	0.03%	23	29	6	0.26%	21	28	7	0.33%	$30,225	$42,118	11893	0.39%
272	Lincoln	West Virginia	21,382	22,108	726	0.03%	3	4	1	0.33%	3	4	1	0.33%	$16,868	$28,297	11429	0.68%
273	Huntingdon	Pennsylvania	44,164	45,586	1,422	0.03%	10	14	4	0.40%	10	13	3	0.30%	$27,807	$40,388	12581	0.45%
274	Raleigh	West Virginia	76,819	79,220	2,401	0.03%	16	38	22	1.38%	13	37	24	1.85%	$24,391	$35,315	10924	0.45%
275	Monroe	Kentucky	11,401	11,756	355	0.03%	3	6	3	1.00%	3	6	3	1.00%	$19,602	$27,112	7510	0.38%
276	Mason	West Virginia	25,178	25,957	779	0.03%	4	5	1	0.25%	4	4	0	0.00%	$24,125	$32,953	8828	0.37%
277	Muskingum	Ohio	82,068	84,585	2,517	0.03%	33	44	11	0.33%	30	44	14	0.47%	$29,480	$41,938	12458	0.42%

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278	Fulton	Pennsylvania	13,837	14,261	424	0.03%	2	3	1	0.50%	2	3	1	0.50%	$26,866	$40,341	13475	0.50%
279	Wayne	West Virginia	41,636	42,903	1,267	0.03%	8	9	1	0.13%	6	8	2	0.33%	$23,525	$32,458	8933	0.38%
280	Schuyler	New York	18,662	19,224	562	0.03%	3	6	3	1.00%	3	5	2	0.67%	$29,512	$41,441	11929	0.40%
281	Forest	Pennsylvania	4,802	4,946	144	0.03%	0	0	0	0.00%	0	0	0		$23,010	$34,257	11247	0.49%
282	Fayette	Alabama	17,962	18,495	533	0.03%	2	3	1	0.50%	2	3	1	0.50%	$26,002	$35,291	9289	0.36%
283	Bradford	Pennsylvania	60,967	62,761	1,794	0.03%	18	24	6	0.33%	16	23	7	0.44%	$27,914	$40,664	12750	0.46%
284	Ashtabula	Ohio	99,821	102,728	2,907	0.03%	22	36	14	0.64%	22	36	14	0.64%	$28,610	$42,449	13839	0.48%
285	Greene	Pennsylvania	39,550	40,672	1,122	0.03%	9	13	4	0.44%	8	10	2	0.25%	$25,284	$37,435	12151	0.48%
286	Montour	Pennsylvania	17,735	18,236	501	0.03%	6	7	1	0.17%	4	5	1	0.25%	$33,130	$45,224	12094	0.37%
287	Tompkins	New York	94,097	96,501	2,404	0.03%	37	56	19	0.51%	35	54	19	0.54%	$37,874	$53,041	15167	0.40%
288	Breathitt	Kentucky	15,703	16,100	397	0.03%	1	5	4	4.00%	1	5	4	4.00%	$14,908	$23,721	8813	0.59%
289	Galax city	Virginia	6,670	6,837	167	0.03%	4	5	1	0.25%	3	4	1	0.33%		$36,832	36832	
290	Snyder	Pennsylvania	36,680	37,546	866	0.02%	15	22	7	0.47%	14	20	6	0.43%	$30,302	$41,682	11380	0.38%
291	Upshur	West Virginia	22,867	23,404	537	0.02%	5	6	1	0.20%	5	6	1	0.20%	$22,267	$32,399	10132	0.46%
292	Somerset	Pennsylvania	78,218	80,023	1,805	0.02%	21	27	6	0.29%	19	27	8	0.42%	$25,549	$36,822	11273	0.44%
293	Fayette	Pennsylvania	145,351	148,644	3,293	0.02%	45	75	30	0.67%	44	71	27	0.61%	$23,578	$34,881	11303	0.48%
294	Smyth	Virginia	32,370	33,081	711	0.02%	10	14	4	0.40%	10	14	4	0.40%	$25,027	$36,392	11365	0.45%
295	Roane	West Virginia	15,120	15,446	326	0.02%	3	4	1	0.33%	3	3	0	0.00%	$17,898	$29,280	11382	0.64%
296	Clinton	Pennsylvania	37,182	37,914	732	0.02%	9	15	6	0.67%	9	14	5	0.56%	$26,575	$38,177	11602	0.44%
297	Magoffin	Kentucky	13,077	13,332	255	0.02%	2	5	3	1.50%	2	5	3	1.50%	$13,955	$24,031	10076	0.72%
298	Otsego	New York	60,517	61,676	1,159	0.02%	19	26	7	0.37%	16	21	5	0.31%	$30,466	$41,110	10644	0.35%
299	Erie	Pennsylvania	275,572	280,843	5,271	0.02%	133	176	43	0.32%	129	164	35	0.27%	$32,145	$44,829	12684	0.39%
300	Pulaski	Virginia	34,496	35,127	631	0.02%	8	9	1	0.13%	8	9	1	0.13%	$28,057	$42,251	14194	0.51%
301	Giles	Virginia	16,366	16,657	291	0.02%	5	5	0	0.00%	5	5	0	0.00%	$29,416	$42,089	12673	0.43%
302	Pendleton	West Virginia	8,054	8,196	142	0.02%	3	4	1	0.33%	3	4	1	0.33%	$22,500	$34,860	12360	0.55%
303	Delaware	New York	47,225	48,055	830	0.02%	10	15	5	0.50%	9	15	6	0.67%	$28,554	$39,695	11141	0.39%
304	Henry	Virginia	56,942	57,930	988	0.02%	13	15	2	0.15%	13	15	2	0.15%	$29,730	$38,649	8919	0.30%
305	Randolph	West Virginia	27,803	28,262	459	0.02%	6	12	6	1.00%	6	10	4	0.67%	$21,522	$32,632	11110	0.52%
306	Jefferson	Alabama	651,525	662,047	10,522	0.02%	289	561	272	0.94%	236	460	224	0.95%	$31,609	$45,951	14342	0.45%
307	Washington	Ohio	62,254	63,251	997	0.02%	12	22	10	0.83%	12	22	10	0.83%	$29,863	$41,605	11742	0.39%
308	Columbia	Pennsylvania	63,202	64,151	949	0.02%	20	29	9	0.45%	20	28	8	0.40%	$29,355	$41,398	12043	0.41%
309	Mineral	West Virginia	26,697	27,078	381	0.01%	7	10	3	0.43%	7	9	2	0.29%	$26,895	$37,866	10971	0.41%
310	Wise	Virginia	39,573	40,123	550	0.01%	5	7	2	0.40%	5	6	1	0.20%	$23,007	$32,898	9891	0.43%
311	Pocahontas	West Virginia	9,008	9,131	123	0.01%	2	2	0	0.00%	2	2	0	0.00%	$20,595	$32,511	11916	0.58%
312	Nicholas	Kentucky	6,725	6,813	88	0.01%	0	0	0	0.00%	0	0	0		$22,729	$35,491	12762	0.56%

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313	Wood	West Virginia	86,915	87,986	1,071	0.01%	25	44	19	0.76%	22	43	21	0.95%	$30,582	$40,436	9854	0.32%
314	Pickens	Alabama	20,699	20,949	250	0.01%	1	2	1	1.00%	1	2	1	1.00%	$22,474	$32,937	10463	0.47%
315	Lamar	Alabama	15,715	15,904	189	0.01%	1	3	2	2.00%	1	3	2	2.00%	$25,506	$33,050	7544	0.30%
316	Lycoming	Pennsylvania	118,710	120,044	1,334	0.01%	34	46	12	0.35%	34	43	9	0.26%	$30,461	$41,040	10579	0.35%
317	Calhoun	Mississippi	14,908	15,069	161	0.01%	2	2	0	0.00%	2	2	0	0.00%	$23,067	$34,407	11340	0.49%
318	Ritchie	West Virginia	10,233	10,343	110	0.01%	3	3	0	0.00%	3	3	0	0.00%	$20,584	$34,809	14225	0.69%
319	Cameron	Pennsylvania	5,913	5,974	61	0.01%	1	2	1	1.00%	1	2	1	1.00%	$24,006	$39,479	15473	0.64%
320	Preston	West Virginia	29,037	29,334	297	0.01%	3	6	3	1.00%	2	5	3	1.50%	$23,222	$32,904	9682	0.42%
321	Kemper	Mississippi	10,356	10,453	97	0.01%	1	1	0	0.00%	1	1	0	0.00%	$18,183	$30,248	12065	0.66%
322	Scott	Virginia	23,204	23,403	199	0.01%	1	2	1	1.00%	0	2	2		$22,497	$33,163	10666	0.47%
323	Johnson	Kentucky	23,248	23,445	197	0.01%	4	7	3	0.75%	3	7	4	1.33%	$19,114	$29,142	10028	0.52%
324	Lawrence	Ohio	61,834	62,319	485	0.01%	10	18	8	0.80%	9	17	8	0.89%	$23,603	$35,308	11705	0.50%
325	Webster	Mississippi	10,222	10,294	72	0.01%	3	3	0	0.00%	3	3	0	0.00%	$22,654	$34,969	12315	0.54%
326	Hancock	Tennessee	6,739	6,786	47	0.01%	0	1	1	0.00%	0	0	0		$14,745	$25,372	10627	0.72%
327	Elk	Pennsylvania	34,878	35,112	234	0.01%	8	12	4	0.50%	8	12	4	0.50%	$30,176	$46,402	16226	0.54%
328	Mifflin	Pennsylvania	46,197	46,486	289	0.01%	11	13	2	0.18%	11	11	0	0.00%	$27,502	$38,486	10984	0.40%
329	Tioga	Pennsylvania	41,126	41,373	247	0.01%	12	15	3	0.25%	11	15	4	0.36%	$26,564	$37,907	11343	0.43%
330	Martin	Kentucky	12,526	12,578	52	0.00%	1	2	1	1.00%	1	2	1	1.00%	$18,143	$21,574	3431	0.19%
331	Greenup	Kentucky	36,742	36,891	149	0.00%	12	14	2	0.17%	11	14	3	0.27%	$29,054	$38,928	9874	0.34%
332	Gallia	Ohio	30,954	31,069	115	0.00%	11	12	1	0.09%	11	11	0	0.00%	$25,077	$35,938	10861	0.43%
333	Meigs	Ohio	22,987	23,072	85	0.00%	3	3	0	0.00%	3	3	0	0.00%	$21,884	$33,071	11187	0.51%
334	Clarion	Pennsylvania	41,699	41,765	66	0.00%	6	13	7	1.17%	6	13	7	1.17%	$26,488	$37,964	11476	0.43%
335	Wyoming	Pennsylvania	28,076	28,080	4	0.00%	6	11	5	0.83%	5	9	4	0.80%	$31,441	$42,824	11383	0.36%
336	Cabell	West Virginia	96,827	96,784	-43	0.00%	40	56	16	0.40%	38	53	15	0.39%	$28,090	$37,691	9601	0.34%
337	Westmoreland	Pennsylvania	370,321	369,993	-328	0.00%	172	231	59	0.34%	164	226	62	0.38%	$31,360	$45,996	14636	0.47%
338	Benton	Mississippi	8,046	8,026	-20	0.00%	0	0	0	0.00%	0	0	0		$18,737	$29,907	11170	0.60%
339	Jefferson	Pennsylvania	46,083	45,932	-151	0.00%	20	23	3	0.15%	19	23	4	0.21%	$26,208	$37,364	11156	0.43%
340	Cattaraugus	New York	84,234	83,955	-279	0.00%	25	33	8	0.32%	24	30	6	0.25%	$28,178	$39,318	11140	0.40%
341	Steuben	New York	99,088	98,726	-362	0.00%	29	34	5	0.17%	25	32	7	0.28%	$30,213	$41,940	11727	0.39%
342	Pleasants	West Virginia	7,546	7,514	-32	0.00%	2	4	2	1.00%	2	4	2	1.00%	$26,110	$37,795	11685	0.45%
343	Indiana	Pennsylvania	89,994	89,605	-389	0.00%	32	39	7	0.22%	31	38	7	0.23%	$27,893	$38,386	10493	0.38%
344	Noxubee	Mississippi	12,604	12,548	-56	0.00%	2	3	1	0.50%	2	3	1	0.50%	$17,121	$27,312	10191	0.60%
345	Radford city	Virginia	15,940	15,859	-81	-0.01%	9	10	1	0.11%	7	10	3	0.43%		$46,332	46332	
346	Mercer	Pennsylvania	121,003	120,293	-710	-0.01%	41	55	14	0.34%	39	53	14	0.36%	$29,347	$41,776	12429	0.42%
347	Greenbrier	West Virginia	34,693	34,453	-240	-0.01%	14	18	4	0.29%	13	17	4	0.31%	$23,819	$33,292	9473	0.40%

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348	Chenango	,	New York	51,768	51,401	-367	-0.01%	10	15	5	0.50%	9	14	5	0.56%	$30,388	$39,711	9323	0.31%
349	Cortland	,	New York	48,963	48,599	-364	-0.01%	8	18	10	1.25%	8	17	9	1.13%	$32,517	$42,204	9687	0.30%
350	Fayette	,	West Virginia	47,952	47,579	-373	-0.01%	10	16	6	0.60%	10	15	5	0.50%	$20,848	$30,243	9395	0.45%
351	Chambers	,	Alabama	36,876	36,583	-293	-0.01%	5	8	3	0.60%	5	8	3	0.60%	$26,331	$36,598	10267	0.39%
352	Nicholas	,	West Virginia	26,775	26,562	-213	-0.01%	5	9	4	0.80%	5	9	4	0.80%	$21,390	$32,074	10684	0.50%
353	Washington	,	Pennsylvania	204,584	202,897	-1,687	-0.01%	78	119	41	0.53%	73	114	41	0.56%	$31,239	$47,287	16048	0.51%
354	Schoharie	,	New York	31,859	31,582	-277	-0.01%	4	7	3	0.75%	4	7	3	0.75%	$30,215	$43,118	12903	0.43%
355	Buena Vista city	,	Virginia	6,406	6,349	-57	-0.01%	1	3	2	2.00%	1	3	2	2.00%		$39,449	39449	
356	Barbour	,	West Virginia	15,699	15,557	-142	-0.01%	4	4	0	0.00%	4	4	0	0.00%	$19,106	$29,722	10616	0.56%
357	Harrison	,	West Virginia	69,371	68,652	-719	-0.01%	27	43	16	0.59%	25	39	14	0.56%	$25,245	$36,870	11625	0.46%
358	Tioga	,	New York	52,337	51,784	-553	-0.01%	5	8	3	0.60%	5	8	3	0.60%	$36,023	$46,509	10486	0.29%
359	Blair	,	Pennsylvania	130,542	129,144	-1,398	-0.01%	51	69	18	0.35%	48	66	18	0.38%	$28,367	$40,160	11793	0.42%
360	Allegany	,	New York	50,470	49,927	-543	-0.01%	7	11	4	0.57%	7	10	3	0.43%	$28,056	$38,580	10524	0.38%
361	Marion	,	West Virginia	57,249	56,598	-651	-0.01%	18	23	5	0.28%	17	22	5	0.29%	$25,963	$37,182	11219	0.43%
362	Trumbull	,	Ohio	227,813	225,116	-2,697	-0.01%	69	105	36	0.52%	69	104	35	0.51%	$33,313	$46,203	12890	0.39%
363	Belmont	,	Ohio	71,074	70,226	-848	-0.01%	23	29	6	0.26%	22	29	7	0.32%	$25,945	$37,538	11593	0.45%
364	Boone	,	West Virginia	25,870	25,535	-335	-0.01%	5	9	4	0.80%	5	9	4	0.80%	$21,221	$31,999	10778	0.51%
365	Lexington city	,	Virginia	6,959	6,867	-92	-0.01%	5	7	2	0.40%	5	7	2	0.40%		$58,529	58529	
366	Scioto	,	Ohio	80,327	79,195	-1,132	-0.01%	18	27	9	0.50%	16	26	10	0.63%	$21,848	$34,691	12843	0.59%
367	Harrison	,	Ohio	16,085	15,856	-229	-0.01%	1	2	1	1.00%	1	2	1	1.00%	$24,432	$36,646	12214	0.50%
368	Knott	,	Kentucky	17,906	17,649	-257	-0.01%	3	4	1	0.33%	3	4	1	0.33%	$15,998	$24,930	8932	0.56%
369	Schuylkill	,	Pennsylvania	152,585	150,336	-2,249	-0.01%	40	59	19	0.48%	38	54	16	0.42%	$29,041	$41,279	12238	0.42%
370	Armstrong	,	Pennsylvania	73,478	72,392	-1,086	-0.01%	23	27	4	0.17%	21	27	6	0.29%	$27,024	$38,271	11247	0.42%
371	Chautauqua	,	New York	141,895	139,750	-2,145	-0.02%	37	61	24	0.65%	34	58	24	0.71%	$29,926	$41,054	11128	0.37%
372	Montgomery	,	Mississippi	12,388	12,189	-199	-0.02%	2	3	1	0.50%	2	3	1	0.50%	$20,148	$31,602	11454	0.57%
373	Lawrence	,	Pennsylvania	96,246	94,643	-1,603	-0.02%	36	52	16	0.44%	34	51	17	0.50%	$27,490	$41,463	13973	0.51%
374	Lewis	,	West Virginia	17,223	16,919	-304	-0.02%	3	5	2	0.67%	3	5	2	0.67%	$22,273	$32,431	10158	0.46%
375	Monroe	,	Ohio	15,497	15,180	-317	-0.02%	2	2	0	0.00%	2	2	0	0.00%	$24,162	$36,297	12135	0.50%
376	Tyler	,	West Virginia	9,796	9,592	-204	-0.02%	1	2	1	1.00%	1	2	1	1.00%	$25,462	$35,320	9858	0.39%
377	Northumberland	,	Pennsylvania	96,771	94,556	-2,215	-0.02%	27	33	6	0.22%	27	32	5	0.19%	$27,669	$39,551	11882	0.43%
378	Beaver	,	Pennsylvania	186,093	181,412	-4,681	-0.03%	62	85	23	0.37%	59	82	23	0.39%	$29,455	$45,495	16040	0.54%
379	McKean	,	Pennsylvania	47,131	45,936	-1,195	-0.03%	15	18	3	0.20%	15	16	1	0.07%	$28,567	$40,924	12357	0.43%
380	Lackawanna	,	Pennsylvania	219,039	213,295	-5,744	-0.03%	106	161	55	0.52%	103	154	51	0.50%	$31,474	$44,949	13475	0.43%
381	Floyd	,	Kentucky	43,586	42,441	-1,145	-0.03%	15	24	9	0.60%	15	23	8	0.53%	$18,270	$25,717	7447	0.41%
382	Warren	,	Pennsylvania	45,050	43,863	-1,187	-0.03%	11	17	6	0.55%	11	17	6	0.55%	$31,092	$42,658	11566	0.37%

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			1990	2000	Numerical Change	Growth Rate 1990-2000	1991	2006	Numerical Change	Growth Rate 2006-1991	1991	2006	Numerical Change	Growth Rate 1991-2006	1989	1999	Numerical Change	Growth Rate 1989-1999
383	Luzerne	Pennsylvania	328,149	319,250	-8,899	-0.03%	149	206	57	0.38%	134	195	61	0.46%	$30,349	$43,335	12986	0.43%
384	Boyd	Kentucky	51,150	49,752	-1,398	-0.03%	27	38	11	0.41%	25	34	9	0.36%	$30,241	$41,125	10884	0.36%
385	Mahoning	Ohio	264,806	257,555	-7,251	-0.03%	106	149	43	0.41%	100	142	42	0.42%	$29,657	$44,185	14528	0.49%
386	Perry	Kentucky	30,283	29,390	-893	-0.03%	5	16	11	2.20%	5	15	10	2.00%	$19,119	$26,718	7599	0.40%
387	Tazewell	Virginia	45,960	44,598	-1,362	-0.03%	14	18	4	0.29%	11	18	7	0.64%	$23,535	$33,732	10197	0.43%
388	Venango	Pennsylvania	59,381	57,565	-1,816	-0.03%	20	23	3	0.15%	20	23	3	0.15%	$27,161	$39,405	12244	0.45%
389	Mercer	West Virginia	64,980	62,980	-2,000	-0.03%	18	26	8	0.44%	18	25	7	0.39%	$24,020	$33,524	9504	0.40%
390	Calhoun	Alabama	116,034	112,249	-3,785	-0.03%	39	50	11	0.28%	34	48	14	0.41%	$28,340	$39,908	11568	0.41%
391	Macon	Alabama	24,928	24,105	-823	-0.03%	3	3	0	0.00%	3	3	0	0.00%	$20,096	$28,511	8415	0.42%
392	Owsley	Kentucky	5,036	4,858	-178	-0.04%	1	1	0	0.00%	1	1	0	0.00%	$11,110	$18,034	6924	0.62%
393	Kanawha	West Virginia	207,619	200,073	-7,546	-0.04%	86	132	46	0.53%	80	126	46	0.58%	$30,030	$42,568	12538	0.42%
394	Lee	Virginia	24,496	23,589	-907	-0.04%	3	5	2	0.67%	3	4	1	0.33%	$17,783	$28,525	10742	0.60%
395	Highland	Virginia	2,635	2,536	-99	-0.04%	0	0	0	0.00%	0	0	0		$25,714	$37,530	11816	0.46%
396	Calhoun	West Virginia	7,885	7,582	-303	-0.04%	1	1	0	0.00%	0	0	0		$17,671	$26,701	9030	0.51%
397	Allegheny	Pennsylvania	1,336,449	1,281,666	-54,783	-0.04%	774	1178	404	0.52%	696	1076	380	0.55%	$35,338	$49,815	14477	0.41%
398	Chemung	New York	95,195	91,070	-4,125	-0.04%	28	44	16	0.57%	25	40	15	0.60%	$32,014	$43,994	11980	0.37%
399	Bell	Kentucky	31,506	30,060	-1,446	-0.05%	9	11	2	0.22%	9	11	2	0.22%	$15,840	$23,818	7978	0.50%
400	Martinsville city	Virginia	16,162	15,416	-746	-0.05%	10	15	5	0.50%	10	15	5	0.50%		$35,321	35321	
401	Marshall	West Virginia	37,356	35,519	-1,837	-0.05%	7	10	3	0.43%	7	9	2	0.29%	$26,974	$39,053	12079	0.45%
402	Tucker	West Virginia	7,728	7,321	-407	-0.05%	1	4	3	3.00%	1	4	3	3.00%	$22,825	$32,574	9749	0.43%
403	Pike	Kentucky	72,583	68,736	-3,847	-0.05%	23	41	18	0.78%	21	39	18	0.86%	$20,656	$29,302	8646	0.42%
404	Broome	New York	212,160	200,536	-11,624	-0.05%	75	119	44	0.59%	72	112	40	0.56%	$35,824	$45,422	9598	0.27%
405	Brooke	West Virginia	26,992	25,447	-1,545	-0.06%	6	9	3	0.50%	6	9	3	0.50%	$31,407	$39,948	8541	0.27%
406	Bristol city	Virginia	18,426	17,367	-1,059	-0.06%	3	6	3	1.00%	3	6	3	1.00%		$34,266	34266	
407	Letcher	Kentucky	27,000	25,277	-1,723	-0.06%	3	7	4	1.33%	3	5	2	0.67%	$18,229	$24,869	6640	0.36%
408	Cambria	Pennsylvania	163,029	152,598	-10,431	-0.06%	53	76	23	0.43%	50	71	21	0.42%	$26,455	$37,797	11342	0.43%
409	Gilmer	West Virginia	7,669	7,160	-509	-0.07%	1	1	0	0.00%	1	1	0	0.00%	$16,994	$28,685	11691	0.69%
410	Ohio	West Virginia	50,871	47,427	-3,444	-0.07%	30	41	11	0.37%	30	38	8	0.27%	$30,037	$41,261	11224	0.37%
411	Dickenson	Virginia	17,620	16,395	-1,225	-0.07%	1	3	2	2.00%	1	2	1	1.00%	$19,498	$27,986	8488	0.44%
412	Hancock	West Virginia	35,233	32,667	-2,566	-0.07%	11	18	7	0.64%	10	17	7	0.70%	$30,576	$40,719	10143	0.33%
413	Jefferson	Ohio	80,298	73,894	-6,404	-0.08%	22	30	8	0.36%	21	28	7	0.33%	$27,839	$38,807	10968	0.39%
414	Norton city	Virginia	4,247	3,904	-343	-0.08%	1	2	1	1.00%	0	2	2			$30,889	30889	
415	Wetzel	West Virginia	19,258	17,693	-1,565	-0.08%	6	7	1	0.17%	6	7	1	0.17%	$28,122	$36,793	8671	0.31%
416	Summers	West Virginia	14,204	12,999	-1,205	-0.08%	1	2	1	1.00%	1	2	1	1.00%	$20,076	$27,251	7175	0.36%
417	Leslie	Kentucky	13,642	12,401	-1,241	-0.09%	2	2	0	0.00%	2	2	0	0.00%	$16,419	$22,225	5806	0.35%

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418	Harlan	,	Kentucky	36,574	33,202	-3,372	-0.09%	4	8	4	1.00%	4	7	3	0.75%	$18,158	$23,536	5378	0.30%
419	Webster	,	West Virginia	10,729	9,719	-1,010	-0.09%	1	1	0	0.00%	1	1	0	0.00%	$15,489	$25,049	9560	0.62%
420	Covington city	,	Virginia	6,991	6,303	-688	-0.10%	3	4	1	0.33%	3	4	1	0.33%		$36,640	36640	
421	Wyoming	,	West Virginia	28,990	25,708	-3,282	-0.11%	4	6	2	0.50%	4	6	2	0.50%	$20,730	$29,709	8979	0.43%
422	Logan	,	West Virginia	43,032	37,710	-5,322	-0.12%	2	4	2	1.00%	2	3	1	0.50%	$21,100	$29,072	7972	0.38%
423	Buchanan	,	Virginia	31,333	26,978	-4,355	-0.14%	3	4	1	0.33%	3	4	1	0.33%	$22,464	$27,328	4864	0.22%
424	Mingo	,	West Virginia	33,739	28,253	-5,486	-0.16%	3	4	1	0.33%	3	4	1	0.33%	$19,643	$26,581	6938	0.35%
425	McDowell	,	West Virginia	35,233	27,329	-7,904	-0.22%	2	3	1	0.50%	2	2	0	0.00%	$15,756	$20,496	4740	0.30%
	Allegany	,	Maryland	0	74,930	74,930		29	43	14	0.48%	25	42	17	0.68%	$27,069	$39,886	12817	0.47%
	Garrett	,	Maryland	0	29,846	29,846		9	11	2	0.22%	8	11	3	0.38%	$26,365	$37,811	11446	0.43%
	Washington	,	Maryland	0	131,923	131,923		39	64	25	0.64%	36	63	27	0.75%	$34,614	$48,962	14348	0.41%