County-level Estimates of the Number of Uninsured in North Carolina

2002 Update

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Introduction

According to the United States Bureau of the Census, in 2002, 43.6 million people lacked health insurance for the entire year. Approximately 1.4 million of those uninsured Americans lived in North Carolina. A great deal of policy interest has focused on uninsured individuals both nationally and at the state level, especially given annual increases North Carolina has experienced. The percent of North Carolina residents that lack health insurance for a full year has risen from 14.6 percent in 2000 to 19.0 percent in 2002 (Figure 1). Analysis of the rate of uninsured for small areas, such as counties, is often impossible due to data limitations. A number of policy interventions aimed at the uninsured are likely to be most effective at local levels. For example, a health care provider interested in providing low cost or free care for uninsured individuals might consider the rate of health insurance coverage when deciding where to offer services. The lack of small area estimates on the rate of health insurance coverage substantially limits the effectiveness of some possible solutions to the health insurance problem.

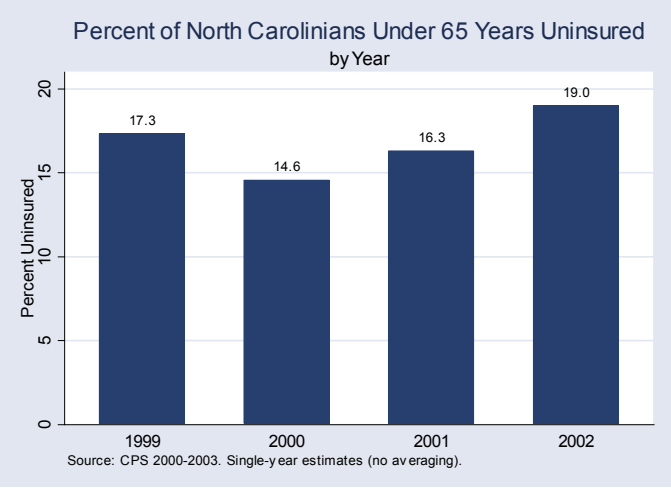

Figure 1: Percent North Carolinians Uninsured: 1999-2002

Background

To address the absence of county-level estimates of the uninsured in North Carolina, in March 2001 the Cecil G. Sheps Center for Health Services Research at the University of North Carolina at Chapel Hill issued a report entitled *County-Level Estimates of the Uninsured in North Carolina, 1995-1999*. That report used data from the U.S. Census Bureau's Current Population Surveys (CPS) and other data sources to estimate the number of persons under the age of 65 years who did not have health insurance in each of North Carolina's 100 counties.[1] Because the sample size of the CPS (the source for most government estimates of health insurance coverage) is insufficient to support estimates at geographic levels smaller than the state, the approach taken by this initial report was to investigate the factors that increase the likelihood of lacking health insurance coverage and then extrapolating those relationships onto data from individual counties. For example, if 20 percent of males and 10 percent of females in North Carolina are uninsured, then these rates can be applied to county level characteristics to generate an estimate of the rate of uninsured in a particular county. The authors of the initial report considered characteristics such as gender, age, race, ethnicity, poverty status, educational attainment, and employment. This report updates that analysis to provide estimates of health insurance coverage for 2002.

Because data sources and methodology differ between the reports, direct comparison of rates from the different periods should be viewed with caution. The data used for the estimates of health insurance coverage are drawn primarily from the U. S. Census

[1] Most North Carolina citizens 65 or over are eligible for Medicare.

Bureau's annual survey of insurance coverage, which reports a statewide rate. In order to make county-level estimates of the uninsured, three years of CPS data are pooled and reported in this analysis. The three-year weighted average creates an overall statewide estimate that differs slightly from the CPS estimates for any year during that period.

Findings in Brief

This report provides annual county-level estimates of the number and percentage of people under the age of 65 who lack health insurance for 2002. The model used pooled data from the U.S. Census Bureau's CPS and population characteristics of each of North Carolina's 100 counties to estimate the proportion of a county's residents that lack health insurance for *all* of 2002. Calculations were made for two subsets of the population: under age 18 years and those 18 to 64 years of age. The county level estimates ranged from a low of 15.9% in Wake County to a high of 26.1% in Duplin County. Along with Wake County, Dare, Davie, Polk and Alexander Counties appeared in the five counties with the lowest rate of uninsured persons under 65 years in 2002. Tyrrell, Greene, Sampson, and Robeson Counties joined Duplin County in the counties with the largest proportion of the population uninsured in 2002 under age 65. As might be expected, the counties with the largest absolute numbers of uninsured had the largest overall populations. Approximately 115,000 residents of Mecklenburg County lacked health insurance for the entire year in 2002. Other counties with large numbers of residents who were uninsured were Wake, Guilford, Cumberland, and Forsyth Counties. Tyrrell County is estimated to have had the fewest uninsured in 2002 at approximately 850.

Developing County-Level Estimates

The goal of this study was to develop county-level estimates of health insurance coverage. The process involved pooling data for three years of CPS statewide surveys and applying those state level estimates to individual county-level data for each of the three years. This procedure adjusts for the specific characteristics prevailing in each county for each of those years. Summing the county level estimates to a statewide number creates a slightly different overall estimate of the number of uninsured in the state from what is reported in the Census Bureau CPS estimates. This difference is then used to adjust the county-level estimates to ensure internal consistency. For example, the statewide estimate of the number of uninsured using the approach described below yielded 1.28 million. This estimate is smaller than the estimate published by the Census Bureau. Because the CPS sampling is structured to create a state-level estimate, we sought to reconcile our county-level estimates with the CPS. To do this, we then adjust the county-level estimates upward by a factor of 1.36 / 1.28 or roughly 6 percent. This adjustment has a theoretical basis.[2] If factors increasing the risk of being uninsured have larger effects if other risk factors exist, then the approach we take will underestimate the number of uninsured. For example, it may be the case that being unemployed increases the risk of being uninsured more for those with less education. In other words, the adjustment accounts for the fact that we do not observe multiplicative effects of having multiple risk factors leading to the lack of health insurance.

Data Sources and Assumptions

The 2001 through 2003 Current Population Surveys[3] contained responses from between 2,674 and 3,941 North Carolina residents each year who were under age 65 and not members of the armed forces. Like the earlier studies, several individual level characteristics were used to quantify the extent to which individual characteristics influence a person's likelihood of having health insurance coverage. The most recent data source was used to update this information, but data sources for some characteristics differed from the earlier reports. The

[2] Rao (*Small Area Estimation,* 2003) suggests this method to ensure consistent estimates. For further details on this and other technical or modeling questions, please contact the authors.

[3] Note that the year of the CPS refers to the previous year of data. That is, the 2003 CPS describes the 2002 circumstances of the household.

selection of variables that are used to make the estimates was limited by the availability of corresponding county-level variables used to make predictions of the number of uninsured in each county in North Carolina. The model for respondents under age 18 included race, ethnicity, and poverty variables (see Table 1). Demographic characteristics, educational attainment, and income at varying degrees of poverty, as well as sector of employment and lack of employment, respectively, were included in the model for persons age 18 to 64 (see Table 2). The data were gathered from several sources:

- The Log Into North Carolina (LINC) database was used to obtain county-level data on the population distribution by age and gender for each county in North Carolina for 2002. These data are based on Census Bureau county-level population estimates by age, gender, and race.
- Information on educational attainment was obtained from the 2000 Census. These data reflect educational attainment for the population 25 years and older. These rates have not been adjusted for the 18 and older population, but are assumed to be the same proportion for the 25 and older population.
- Information on the number of individuals in each county with annual incomes at varying percentages of the Federal Poverty Guidelines in 1999 was derived from the 2000 Census. Cut points for percent of poverty level differed from the earlier report. The percentages of the population falling into various poverty and education categories were assumed to have remained constant throughout the study period.
- Information on unemployment rates and sector of employment were obtained from the Employment Security Commission.

Methods

Linear probability regression models were used to quantify the extent to which individual characteristics influence a person's likelihood of having health insurance coverage. Two separate models were estimated. One model estimated the effect of the characteristics on respondents under age 18, and another model examined the population between ages 18 and 64. For respondents over age 65, Medicare coverage was assumed; hence respondents over age 65 were excluded from the analysis. Members of the armed forces were also excluded. The coefficients derived from the regression were applied to county-level population data. The distribution of the population in each county across the variable categories in Table 2 was used to identify the characteristics of a (fictive) person who is representative of the entire population in that county. For example, if females age 25-29 represent three percent of a county's population, the representative person was assigned a value for that particular variable of 0.03. Using these values, and the coefficients obtained from the regression model, a probability of being uninsured was calculated for this representative person. The probability of being uninsured was then multiplied by the number of persons in that particular county to estimate the total number of uninsured. This process was repeated for every county and for each of the two population subgroups (0 < 18 years; 18 - 64 years). The estimated total number of uninsured

Table 1: Regression Results Ages 0-17

Variable	Coefficient	Std Err	p-value
Race Other Than White	0.027	0.018	0.129
Latino/a	0.175	0.036	0.000
HH Income of Less Than 100% FPL	0.161	0.024	0.000
HH Income 100% FPL-150% FPL	0.100	0.029	0.001
HH Income 150% FPL-200% FPL	-0.002	0.018	0.904
HH Income Above 200% FPL		(Reference)	
Male Aged 0-4	-0.125	0.033	0.000
Male Aged 5-9	-0.084	0.034	0.014
Male Aged 10-14	-0.092	0.032	0.004
Male Aged 15-17	0.013	0.038	0.731
Female Aged 0-4	-0.116	0.032	0.000
Female Aged 5-9	-0.063	0.034	0.064
Female Aged 10-14	-0.108	0.031	0.001
Female Aged 15-17		(Reference)	
Year	0.014	0.010	0.158
Constant	0.133	0.026	0.000

"HH" = Household; "FPL" = Federal Poverty Line

Table 2: Regression Results Ages 18-64

Variable	Coefficient	Std Error	p-value
Race Other Than White	0.037	0.015	0.013
Latino/a	0.300	0.031	0.000
HH Income of Less Than 100% FPL	0.245	0.026	0.000
HH Income 100% FPL-150% FPL	0.150	0.028	0.000
HH Income 150% FPL-200% FPL	0.172	0.026	0.000
HH Income Above 200% FPL	0.000	(reference)	
Education: Less than Ninth Grade	0.000	(reference)	
Education: Some High School	-0.022	0.040	0.581
Education: High School Graduate	-0.054	0.035	0.124
Education: Some College	-0.125	0.035	0.000
Education: College Graduate	-0.157	0.036	0.000
Education: Graduate Degree	-0.159	0.038	0.000
Unemployed	0.118	0.033	0.000
Industry: Agriculture	0.064	0.061	0.294
Industry: Construction	0.155	0.030	0.000
Industry: Manufacturing	-0.075	0.018	0.000
Industry: Transportation	-0.046	0.031	0.137
Industry: Trade	0.006	0.022	0.787
Industry: Health and Education	-0.042	0.017	0.013
Industry: Finance	-0.052	0.023	0.026
Industry: Government	-0.110	0.023	0.000
Year	0.023	0.008	0.003
Male Aged 18-24	0.078	0.041	0.058
Male Aged 25-29	0.091	0.038	0.016
Male Aged 30-34	0.103	0.035	0.003
Male Aged 35-39	0.016	0.035	0.644
Male Aged 40-44	0.050	0.034	0.147
Male Aged 45-49	0.001	0.034	0.975
Male Aged 50-54	-0.029	0.035	0.411
Male Aged 55-59	-0.038	0.033	0.246
Male Aged 60-64	0.033	0.046	0.475
Female Aged 18-24	0.063	0.039	0.106
Female Aged 25-29	0.055	0.036	0.126
Female Aged 30-34	0.053	0.036	0.136
Female Aged 35-39	0.035	0.033	0.290
Female Aged 40-44	0.054	0.034	0.108
Female Aged 45-49	0.041	0.036	0.254
Female Aged 50-54	0.013	0.034	0.706
Female Aged 55-59	-0.029	0.036	0.414
Female Aged 60-64	0.000	(reference)	
Constant	0.193	0.042	0.000

between the ages of 0 and 64 for each county and year was obtained by adding the estimated number of uninsured across the two age groups.

We employed a new weighting technique this year. In order to put more weight on recent observations, we developed an algorithm that determined the optimal weight to place on each year's data. For the estimates presented in this report, our weights were 2003 (.74), 2002 (.22) and 2001 (.04). That is, the observations from CPS 2001 contributed to the overall estimates but the modeling put more weight on data from recent years. This allows recent developments to be captured by our models.

Results

The results of the regression analyses are displayed in Tables 1 (0 < 18 years) and 2 (18 – 64 years). Among respondents under age 18, there is no strong pattern of the effect of age on health insurance coverage, but it appears that younger children are less likely to lack health insurance. Race and gender do not appear to be significant predictors of insurance coverage, but Hispanic ethnicity does predict a lack of health insurance. Not surprisingly, children living in poverty are much more likely to lack health insurance.

For the adult model (Table 2), males below age 35 appear to be much more likely to be uninsured than females. The highest education level completed, being employed, and the industry of the respondent appear to be important predictors of insurance coverage, likely through their role as determinants of the availability of employer-based coverage to the individual. Household income at or near the federal poverty level and being Hispanic or non-white increased a person's likelihood of lacking health insurance coverage. There is a slight increase in the uninsured population between from 2000 to 2002 as echoed in the annual estimates reported in Figure 1.

This increase is reflected in an estimated 1.36 million people in North Carolina who lack insurance in 2002. The estimates reveal substantial variation across counties in the percentage of the

population without insurance. In 2002, the estimated percentage of people under age 65 lacking health insurance ranged from a low of 15.9 percent in Wake County to a high of 26.1 percent in Duplin County. The ranking of counties according to the percentage of the population without coverage (Table 3) for most counties fluctuates only slightly over time.[4]

[4] See previous reports.

Table 3: North Carolina County-Level Estimates of Uninsured, 2002

	Aged 0-17		*Aged 18-64*		*Aged 0-64*		
	Percent	*Number*	*Percent*	*Number*	*Percent*	*Number*	*Rank*
NORTH CAROLINA	12.3%	260,569	21.8%	1,101,475	19.0%	1,362,044	
Alamance	12.3%	4,259	22.4%	17,939	19.4%	22,198	45
Alexander	10.3%	893	19.3%	4,084	16.7%	4,977	5
Alleghany	12.4%	274	24.3%	1,575	21.3%	1,848	72
Anson	13.5%	883	24.9%	3,786	21.5%	4,669	76
Ashe	11.8%	593	23.6%	3,568	20.7%	4,161	63
Avery	12.6%	461	23.5%	2,599	20.8%	3,060	67
Beaufort	13.6%	1,478	24.2%	6,536	21.1%	8,014	70
Bertie	15.4%	797	26.7%	3,037	23.2%	3,833	89
Bladen	14.5%	1,203	24.8%	4,851	21.7%	6,054	77
Brunswick	11.7%	1,934	22.3%	10,251	19.5%	12,185	49
Buncombe	11.3%	5,431	19.6%	25,183	17.3%	30,614	10
Burke	11.8%	2,672	20.8%	11,367	18.2%	14,039	27
Cabarrus	10.5%	3,882	20.7%	17,116	17.5%	20,998	12
Caldwell	10.9%	2,070	20.8%	10,051	18.0%	12,121	25
Camden	10.9%	190	20.2%	885	17.5%	1,075	14
Carteret	11.3%	1,416	19.5%	7,162	17.5%	8,577	11
Caswell	12.4%	695	22.4%	3,332	19.7%	4,027	52
Catawba	11.1%	4,137	20.2%	18,054	17.5%	22,191	13
Chatham	12.5%	1,499	20.4%	6,408	18.2%	7,907	29
Cherokee	11.9%	610	22.4%	3,242	19.7%	3,852	51
Chowan	13.4%	470	23.2%	1,860	20.2%	2,330	58
Clay	11.2%	187	20.7%	1,088	18.4%	1,275	31
Cleveland	11.6%	2,966	22.1%	12,922	18.9%	15,888	39
Columbus	14.6%	2,113	26.3%	8,619	22.7%	10,732	86
Craven	12.4%	2,975	21.1%	11,706	18.4%	14,681	32
Cumberland	13.4%	11,995	23.6%	44,642	20.3%	56,638	61
Currituck	11.0%	528	21.2%	2,463	18.2%	2,991	28
Dare	10.3%	691	17.9%	3,534	16.0%	4,225	2
Davidson	11.0%	4,125	20.6%	18,968	17.8%	23,093	19
Davie	10.4%	934	18.9%	4,118	16.4%	5,051	3
Duplin	16.3%	2,217	30.7%	9,116	26.1%	11,333	100
Durham	13.5%	7,913	21.4%	31,600	19.1%	39,513	42
Edgecombe	14.6%	2,225	27.8%	9,195	23.6%	11,419	94
Forsyth	12.1%	9,577	20.4%	38,986	17.9%	48,563	22
Franklin	12.3%	1,582	23.3%	7,110	20.1%	8,693	56
Gaston	11.1%	5,428	20.7%	24,528	17.9%	29,957	20
Gates	13.3%	375	21.9%	1,361	19.2%	1,736	43
Graham	12.7%	227	25.5%	1,208	22.0%	1,435	79
Granville	12.4%	1,527	21.1%	6,655	18.7%	8,182	36
Greene	15.4%	780	28.1%	3,321	24.3%	4,100	97
Guilford	11.9%	13,226	20.1%	53,274	17.7%	66,500	16
Halifax	15.2%	2,294	27.5%	9,170	23.6%	11,464	95
Harnett	13.2%	3,522	25.3%	14,425	21.4%	17,947	75
Haywood	10.9%	1,263	20.1%	6,529	17.7%	7,791	17
Henderson	11.1%	2,177	19.7%	10,195	17.3%	12,373	9
Hertford	15.2%	885	26.4%	3,531	23.0%	4,416	88
Hoke	14.6%	1,597	26.3%	5,546	22.3%	7,143	84
Hyde	13.4%	157	25.0%	899	22.1%	1,056	83
Iredell	10.6%	3,551	20.2%	15,553	17.2%	19,104	8

Jackson	13.2%	1,058	21.7%	4,522	19.4%	5,580	47
Johnston	12.2%	4,263	23.8%	18,940	20.3%	23,203	60
Jones	13.6%	360	25.8%	1,566	22.1%	1,927	81
Lee	13.7%	1,817	23.7%	7,129	20.7%	8,946	64
Lenoir	13.7%	2,091	24.6%	8,670	21.3%	10,760	74
Lincoln	11.1%	1,846	21.4%	8,690	18.4%	10,536	30
McDowell	11.4%	1,155	21.2%	5,587	18.5%	6,742	33
Macon	11.6%	739	21.8%	3,765	19.0%	4,503	40
Madison	11.9%	547	21.2%	2,556	18.6%	3,104	34
Martin	14.3%	934	25.4%	3,773	22.0%	4,707	80
Mecklenburg	11.7%	22,579	20.2%	92,871	17.7%	115,450	15
Mitchell	11.9%	405	22.1%	2,088	19.4%	2,493	46
Montgomery	14.3%	1,000	26.1%	4,239	22.5%	5,240	85
Moore	11.7%	2,020	20.2%	8,598	17.7%	10,619	18
Nash	12.5%	2,899	23.4%	12,689	20.2%	15,588	57
New Hanover	11.9%	4,476	20.1%	20,951	17.9%	25,427	24
Northampton	14.9%	799	27.2%	3,493	23.6%	4,292	93
Onslow	13.6%	6,131	26.1%	24,579	22.1%	30,710	82
Orange	13.6%	4,193	18.2%	13,930	16.9%	18,123	6
Pamlico	12.8%	345	22.3%	1,729	19.9%	2,074	53
Pasquotank	13.9%	1,283	23.7%	4,944	20.7%	6,227	65
Pender	12.5%	1,236	24.0%	6,228	20.8%	7,463	66
Perquimans	13.3%	350	22.8%	1,507	20.1%	1,857	55
Person	11.6%	1,034	21.8%	4,827	18.9%	5,861	38
Pitt	14.6%	5,430	24.2%	20,512	21.3%	25,942	73
Polk	10.7%	411	18.5%	1,933	16.4%	2,344	4
Randolph	11.5%	3,948	21.9%	17,882	18.8%	21,830	37
Richmond	14.1%	1,786	25.5%	7,028	21.9%	8,814	78
Robeson	16.0%	5,978	29.4%	21,777	24.9%	27,755	99
Rockingham	12.0%	2,674	22.6%	12,670	19.6%	15,344	50
Rowan	11.6%	3,981	21.7%	17,251	18.6%	21,232	35
Rutherford	11.8%	1,837	22.6%	8,496	19.4%	10,333	48
Sampson	15.0%	2,469	28.8%	10,549	24.5%	13,018	98
Scotland	14.1%	1,447	24.0%	5,190	20.8%	6,637	68
Stanly	11.1%	1,691	21.1%	7,410	18.1%	9,101	26
Stokes	10.3%	1,159	21.0%	5,934	17.9%	7,093	23
Surry	12.2%	2,141	24.5%	10,522	20.9%	12,663	69
Swain	13.4%	443	24.5%	1,889	21.2%	2,332	71
Transylvania	10.8%	665	19.1%	3,226	16.9%	3,891	7
Tyrrell	15.7%	149	27.4%	695	24.2%	844	96
Union	10.6%	4,048	21.4%	17,171	17.9%	21,219	21
Vance	14.5%	1,786	27.8%	7,187	23.5%	8,973	92
Wake	10.9%	19,144	18.0%	76,666	15.9%	95,810	1
Warren	14.9%	711	26.9%	3,162	23.5%	3,873	91
Washington	14.9%	528	27.1%	2,141	23.3%	2,669	90
Watauga	15.1%	1,581	21.8%	6,036	20.0%	7,617	54
Wayne	13.1%	4,057	24.0%	16,518	20.6%	20,575	62
Wilkes	11.2%	1,762	22.4%	9,202	19.3%	10,965	44
Wilson	14.2%	2,794	26.6%	11,920	22.8%	14,714	87
Yadkin	11.3%	1,035	22.3%	4,994	19.1%	6,029	41
Yancey	11.9%	469	23.3%	2,494	20.3%	2,964	59

Rank based on estimated percentage of residents 0-64 who lack health insurance.