

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

## 2004 Update

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### Introduction

According to the United States Bureau of the Census, in 2004, 45.8 million U.S. Residents lacked health insurance for the entire year.

Approximately 1.3 million of those uninsured Americans lived in North Carolina. Substantial policy interest has focused on the uninsured both nationally and, given annual increases North Carolina has experienced, it is an especially important issue in this state. The percent of North Carolina residents that lack health insurance for a full year has risen from 15.3 percent in 2000 to 17.5 percent in 2004 (Figure 1). Analysis of the rate of uninsured for small areas, such as counties, is often impossible due to data limitations. 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 ability to effectively target of some possible solutions to the health insurance problem.

### 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.<sup>1</sup> 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 2004.

*Because data sources and methodology differ between the annual reports produced by the Sheps Center, direct comparison of rates from the different periods is not recommended.* The data used for the estimates of health insurance coverage are drawn primarily from the U. S. Census Bureau's annual survey of

<sup>1</sup> Most North Carolina citizens 65 or over are eligible for Medicare.

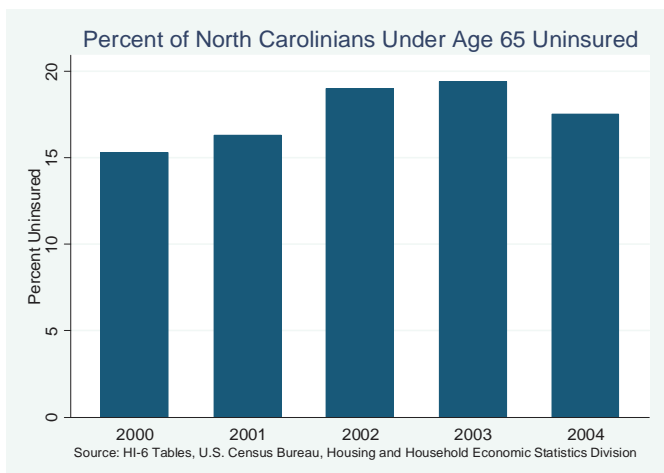


Figure 1: Percent of North Carolinians Uninsured 2000-2004

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 county-level estimates of the number and percentage of people under the age of 65 who lack health insurance for 2004. 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 2004. 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 13.9% in Wake County to a high of 28.3% in Tyrrell County. Along with Wake County, Mecklenburg, Granville, Swain, and Durham Counties appeared in the five counties with the lowest rate of uninsured persons under 65 years in 2004. Onslow, Sampson, Hyde, and Duplin Counties joined Tyrrell County in the counties with the largest proportion of the under age 65 population uninsured in 2004. As might be expected, the counties with the largest absolute numbers of uninsured had the largest overall populations. Approximately 104,000 residents of Mecklenburg County lacked health insurance in 2004. 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 2004 at slightly less than 1000.

### 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. 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 adjust the county-level estimates appropriately.<sup>2</sup> 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 2004 and 2005 Annual Social and Economic Supplement to the Current Population Surveys<sup>3</sup> contained roughly 4000 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 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. Age, sex, race,

<sup>2</sup> 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.

<sup>3</sup> Note that the year of the CPS refers to the previous year of data. That is, the 2005 CPS describes the 2004 circumstances of the household.

ethnicity, poverty, and income, as well as sector of employment (or lack of employment) were included in the model for persons age 18 to 64.<sup>4</sup> The data were gathered from several sources:

- Information on race, age, gender, and ethnicity were obtained from the U.S. Census Bureau, Population Division for 2004.
- Poverty estimates for 2002 were provided by the U.S. Census Bureau, Housing and Household Economic Statistics Division, Small Area Estimates Branch
- Data from Claritas, a marketing group, provide estimates on family income for 2003.

For adults aged 18-64, we also used the following employment characteristics.

- The North Carolina Employment Security Commission publishes information on 2004 unemployment rates as well as industry employment patterns.
- Information on employer size – a key determinant of employment sponsored insurance – was obtained for 2003 from County Business Patterns, published by the U.S. Census Bureau.

Employer size is a notable addition this year and is responsible for some notable geographic patterns. For example, Swain and Washington Counties had marked decreases in the proportion of their residents that are uninsured because large firms (who are more likely to cover employees than small firms) employ a large number of employees in the county.

## 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

<sup>4</sup> For further details, consult earlier versions of this report.

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 was used to identify the characteristics of an (artificial) 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 – 17 years; 18 - 64 years). The estimated total number of uninsured 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 2004 (.766) and 2003 (.234). That is, the observations from CPS 2003 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

Table 1 presents the county-specific estimates of the number and percent of children, adults, and individuals below age 65 who lacked health insurance in 2004. The estimates reveal substantial variation across counties in the percentage of the population without insurance.

*For more information on the uninsured in North Carolina, visit our website at <http://www.shepscenter.unc.edu>*

**Table 1: North Carolina County-Level Estimates of Uninsured, 2004**

| County Name | Ages 0-17 |         |       | Ages 18-64 |         |       | Ages 0-64 |         |       |
|-------------|-----------|---------|-------|------------|---------|-------|-----------|---------|-------|
|             | Number    | Percent | Rank* | Number     | Percent | Rank* | Number    | Percent | Rank* |
| Alamance    | 4,243     | 12.5%   | 58    | 18,192     | 21.3%   | 37    | 22,434    | 18.8%   | 38    |
| Alexander   | 928       | 11.3%   | 21    | 4,409      | 19.8%   | 18    | 5,337     | 17.5%   | 20    |
| Alleghany   | 282       | 13.6%   | 91    | 1,806      | 27.1%   | 91    | 2,088     | 23.9%   | 94    |
| Anson       | 745       | 12.1%   | 44    | 3,453      | 22.4%   | 51    | 4,198     | 19.5%   | 49    |
| Ashe        | 638       | 13.3%   | 82    | 3,882      | 24.6%   | 76    | 4,520     | 22.0%   | 81    |
| Avery       | 454       | 13.4%   | 85    | 2,806      | 24.5%   | 75    | 3,260     | 22.0%   | 80    |
| Beaufort    | 1,339     | 12.5%   | 62    | 6,820      | 24.7%   | 78    | 8,159     | 21.3%   | 76    |
| Bertie      | 622       | 12.7%   | 70    | 2,467      | 21.5%   | 40    | 3,089     | 18.9%   | 41    |
| Bladen      | 1,116     | 13.7%   | 93    | 4,727      | 23.3%   | 62    | 5,843     | 20.5%   | 66    |
| Brunswick   | 2,063     | 11.7%   | 32    | 12,045     | 23.2%   | 60    | 14,108    | 20.3%   | 61    |
| Buncombe    | 5,438     | 11.5%   | 24    | 27,238     | 20.1%   | 24    | 32,676    | 17.8%   | 24    |
| Burke       | 2,612     | 12.3%   | 53    | 10,440     | 18.7%   | 10    | 13,052    | 17.0%   | 11    |
| Cabarrus    | 4,013     | 10.6%   | 8     | 17,494     | 19.0%   | 11    | 21,507    | 16.5%   | 10    |
| Caldwell    | 2,182     | 11.9%   | 38    | 9,940      | 20.0%   | 23    | 12,122    | 17.9%   | 25    |
| Camden      | 204       | 10.9%   | 11    | 1,504      | 27.3%   | 93    | 1,709     | 23.1%   | 91    |
| Carteret    | 1,352     | 11.1%   | 12    | 9,039      | 23.3%   | 61    | 10,391    | 20.4%   | 63    |
| Caswell     | 629       | 11.8%   | 34    | 3,269      | 21.6%   | 42    | 3,899     | 19.1%   | 43    |
| Catawba     | 4,155     | 11.4%   | 22    | 18,349     | 19.4%   | 14    | 22,504    | 17.2%   | 14    |
| Chatham     | 1,550     | 12.2%   | 50    | 7,331      | 20.2%   | 26    | 8,881     | 18.1%   | 30    |
| Cherokee    | 681       | 13.2%   | 80    | 3,888      | 25.6%   | 84    | 4,568     | 22.4%   | 86    |
| Chowan      | 414       | 11.9%   | 36    | 2,095      | 24.9%   | 79    | 2,509     | 21.1%   | 74    |
| Clay        | 201       | 11.6%   | 30    | 1,353      | 23.8%   | 68    | 1,554     | 20.9%   | 71    |
| Cleveland   | 2,846     | 11.6%   | 28    | 12,091     | 20.1%   | 25    | 14,937    | 17.6%   | 21    |
| Columbus    | 1,847     | 13.5%   | 88    | 8,475      | 25.6%   | 83    | 10,322    | 22.0%   | 83    |
| Craven      | 2,662     | 11.1%   | 14    | 11,059     | 20.3%   | 27    | 13,721    | 17.5%   | 19    |
| Cumberland  | 10,494    | 11.5%   | 25    | 41,988     | 22.0%   | 47    | 52,482    | 18.6%   | 35    |
| Currituck   | 578       | 11.2%   | 15    | 3,505      | 24.3%   | 73    | 4,083     | 20.8%   | 68    |
| Dare        | 753       | 10.8%   | 9     | 5,285      | 24.1%   | 72    | 6,039     | 20.9%   | 70    |
| Davidson    | 4,312     | 11.8%   | 33    | 19,757     | 20.4%   | 29    | 24,069    | 18.0%   | 28    |
| Davie       | 1,023     | 11.6%   | 27    | 4,834      | 20.4%   | 28    | 5,857     | 18.0%   | 27    |
| Duplin      | 2,215     | 16.3%   | 100   | 9,940      | 31.4%   | 99    | 12,155    | 26.9%   | 99    |
| Durham      | 6,160     | 10.4%   | 6     | 28,814     | 18.3%   | 6     | 34,974    | 16.1%   | 5     |
| Edgecombe   | 1,795     | 12.4%   | 55    | 7,442      | 22.1%   | 49    | 9,236     | 19.2%   | 46    |
| Forsyth     | 8,948     | 11.2%   | 17    | 36,781     | 18.3%   | 7     | 45,729    | 16.3%   | 8     |
| Franklin    | 1,535     | 11.6%   | 29    | 8,022      | 23.1%   | 57    | 9,557     | 19.9%   | 53    |
| Gaston      | 5,312     | 11.1%   | 13    | 24,174     | 19.8%   | 17    | 29,485    | 17.3%   | 17    |
| Gates       | 324       | 12.1%   | 45    | 1,653      | 24.7%   | 77    | 1,977     | 21.1%   | 73    |
| Graham      | 237       | 13.6%   | 90    | 1,231      | 25.3%   | 82    | 1,468     | 22.2%   | 85    |
| Granville   | 1,488     | 12.0%   | 41    | 5,566      | 16.1%   | 2     | 7,054     | 15.0%   | 3     |
| Greene      | 743       | 15.2%   | 98    | 3,634      | 27.9%   | 94    | 4,377     | 24.4%   | 95    |
| Guilford    | 10,886    | 10.1%   | 4     | 51,839     | 18.6%   | 8     | 62,725    | 16.2%   | 6     |
| Halifax     | 1,799     | 12.6%   | 63    | 9,084      | 27.3%   | 92    | 10,883    | 22.9%   | 90    |
| Harnett     | 3,485     | 12.8%   | 71    | 15,492     | 24.0%   | 71    | 18,977    | 20.7%   | 67    |
| Haywood     | 1,373     | 12.1%   | 47    | 7,238      | 21.5%   | 39    | 8,611     | 19.1%   | 44    |
| Henderson   | 2,436     | 12.2%   | 51    | 11,842     | 21.5%   | 41    | 14,278    | 19.0%   | 42    |
| Hertford    | 690       | 12.5%   | 57    | 3,566      | 24.5%   | 74    | 4,256     | 21.2%   | 75    |
| Hoke        | 1,589     | 13.4%   | 87    | 5,377      | 21.9%   | 45    | 6,966     | 19.1%   | 45    |
| Hyde        | 143       | 13.3%   | 83    | 1,062      | 30.2%   | 97    | 1,205     | 26.2%   | 98    |

| County Name  | Ages 0-17 |         |       | Ages 18-64 |         |       | Ages 65+ |         |       |
|--------------|-----------|---------|-------|------------|---------|-------|----------|---------|-------|
|              | Number    | Percent | Rank* | Number     | Percent | Rank* | Number   | Percent | Rank* |
| Iredell      | 3,723     | 10.8%   | 10    | 17,035     | 19.9%   | 21    | 20,758   | 17.3%   | 16    |
| Jackson      | 885       | 12.0%   | 39    | 5,391      | 23.7%   | 67    | 6,275    | 20.9%   | 69    |
| Johnston     | 4,411     | 11.8%   | 35    | 21,813     | 23.9%   | 69    | 26,224   | 20.4%   | 64    |
| Jones        | 347       | 14.2%   | 95    | 1,656      | 26.1%   | 87    | 2,003    | 22.8%   | 88    |
| Lee          | 1,695     | 13.1%   | 78    | 6,205      | 21.1%   | 33    | 7,901    | 18.6%   | 36    |
| Lenoir       | 1,790     | 12.2%   | 49    | 8,194      | 23.4%   | 64    | 9,984    | 20.1%   | 57    |
| Lincoln      | 2,064     | 12.5%   | 61    | 9,498      | 21.9%   | 46    | 11,561   | 19.3%   | 47    |
| McDowell     | 1,264     | 13.0%   | 76    | 5,892      | 21.7%   | 43    | 7,156    | 19.4%   | 48    |
| Macon        | 798       | 12.9%   | 75    | 4,565      | 25.1%   | 80    | 5,363    | 22.0%   | 82    |
| Madison      | 555       | 12.8%   | 73    | 2,299      | 18.7%   | 9     | 2,853    | 17.1%   | 13    |
| Martin       | 788       | 13.0%   | 77    | 3,782      | 25.6%   | 85    | 4,570    | 21.9%   | 79    |
| Mecklenburg  | 19,009    | 9.4%    | 2     | 85,338     | 16.9%   | 3     | 104,347  | 14.8%   | 2     |
| Mitchell     | 432       | 13.4%   | 86    | 1,999      | 20.6%   | 31    | 2,431    | 18.8%   | 39    |
| Montgomery   | 1,031     | 15.1%   | 96    | 4,064      | 24.0%   | 70    | 5,095    | 21.4%   | 77    |
| Moore        | 1,982     | 11.3%   | 20    | 9,017      | 19.8%   | 19    | 10,998   | 17.5%   | 18    |
| Nash         | 2,578     | 11.3%   | 19    | 12,236     | 21.8%   | 44    | 14,814   | 18.8%   | 37    |
| New Hanover  | 3,762     | 10.1%   | 3     | 23,990     | 21.1%   | 34    | 27,753   | 18.4%   | 31    |
| Northampton  | 602       | 12.3%   | 52    | 2,829      | 22.2%   | 50    | 3,431    | 19.5%   | 51    |
| Onslow       | 5,823     | 12.7%   | 66    | 29,740     | 30.6%   | 98    | 35,563   | 24.8%   | 96    |
| Orange       | 2,754     | 10.4%   | 7     | 14,602     | 18.2%   | 5     | 17,356   | 16.3%   | 7     |
| Pamlico      | 292       | 12.0%   | 42    | 1,745      | 22.4%   | 52    | 2,037    | 20.0%   | 55    |
| Pasquotank   | 1,129     | 12.5%   | 56    | 5,343      | 23.4%   | 63    | 6,472    | 20.3%   | 60    |
| Pender       | 1,265     | 12.6%   | 64    | 7,442      | 26.1%   | 88    | 8,707    | 22.6%   | 87    |
| Perquimans   | 319       | 12.7%   | 69    | 1,600      | 23.1%   | 58    | 1,919    | 20.3%   | 62    |
| Person       | 1,014     | 11.5%   | 23    | 4,508      | 19.5%   | 15    | 5,521    | 17.2%   | 15    |
| Pitt         | 3,927     | 11.2%   | 18    | 20,929     | 22.8%   | 54    | 24,856   | 19.6%   | 52    |
| Polk         | 451       | 12.2%   | 48    | 2,163      | 19.9%   | 22    | 2,615    | 17.9%   | 26    |
| Randolph     | 4,315     | 12.8%   | 74    | 18,122     | 21.2%   | 36    | 22,438   | 18.8%   | 40    |
| Richmond     | 1,603     | 13.2%   | 81    | 7,090      | 25.2%   | 81    | 8,693    | 21.6%   | 78    |
| Robeson      | 4,911     | 13.5%   | 89    | 21,857     | 28.2%   | 95    | 26,768   | 23.5%   | 93    |
| Rockingham   | 2,669     | 12.5%   | 60    | 12,612     | 22.1%   | 48    | 15,280   | 19.5%   | 50    |
| Rowan        | 3,903     | 11.9%   | 37    | 15,768     | 19.0%   | 13    | 19,671   | 17.0%   | 12    |
| Rutherford   | 1,900     | 12.7%   | 68    | 9,013      | 23.5%   | 65    | 10,913   | 20.5%   | 65    |
| Sampson      | 2,455     | 15.2%   | 97    | 11,221     | 29.2%   | 96    | 13,676   | 25.1%   | 97    |
| Scotland     | 1,184     | 12.0%   | 40    | 4,739      | 21.4%   | 38    | 5,923    | 18.5%   | 33    |
| Stanly       | 1,662     | 11.5%   | 26    | 7,436      | 20.6%   | 30    | 9,098    | 18.0%   | 29    |
| Stokes       | 1,239     | 11.7%   | 31    | 6,634      | 23.0%   | 55    | 7,873    | 19.9%   | 54    |
| Surry        | 2,383     | 14.0%   | 94    | 9,878      | 22.6%   | 53    | 12,262   | 20.2%   | 58    |
| Swain        | 405       | 12.8%   | 72    | 1,363      | 17.3%   | 4     | 1,768    | 16.0%   | 4     |
| Transylvania | 658       | 11.2%   | 16    | 3,557      | 21.0%   | 32    | 4,215    | 18.5%   | 34    |
| Tyrrell      | 126       | 15.4%   | 99    | 863        | 32.3%   | 100   | 989      | 28.3%   | 100   |
| Union        | 4,369     | 10.3%   | 5     | 18,667     | 19.0%   | 12    | 23,036   | 16.4%   | 9     |
| Vance        | 1,542     | 12.7%   | 67    | 6,944      | 26.5%   | 89    | 8,485    | 22.1%   | 84    |
| Wake         | 16,878    | 9.1%    | 1     | 75,788     | 15.8%   | 1     | 92,666   | 13.9%   | 1     |
| Warren       | 572       | 13.2%   | 79    | 3,257      | 27.1%   | 90    | 3,829    | 23.4%   | 92    |
| Washington   | 414       | 12.6%   | 65    | 1,565      | 19.9%   | 20    | 1,979    | 17.7%   | 22    |
| Watauga      | 965       | 12.1%   | 46    | 6,917      | 23.5%   | 66    | 7,881    | 21.1%   | 72    |
| Wayne        | 3,605     | 12.1%   | 43    | 14,922     | 21.1%   | 35    | 18,527   | 18.4%   | 32    |
| Wilkes       | 1,877     | 12.4%   | 54    | 8,305      | 19.8%   | 16    | 10,182   | 17.8%   | 23    |
| Wilson       | 2,422     | 12.5%   | 59    | 10,861     | 23.2%   | 59    | 13,283   | 20.1%   | 56    |
| Yadkin       | 1,186     | 13.3%   | 84    | 5,287      | 23.0%   | 56    | 6,474    | 20.3%   | 59    |
| Yancey       | 508       | 13.6%   | 92    | 2,867      | 25.9%   | 86    | 3,376    | 22.8%   | 89    |

Rank based on estimated percentage of residents who lack health insurance, with lower numbers implying higher rates of health insurance coverage.