County Estimates of People Without Health Insurance from The 2004 Florida Health Insurance Studies

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County Estimates of People Without Health Insurance

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Preface

In 1998, the Florida legislature created the Florida Health Insurance Study (FHIS) to provide reliable estimates of the percentage and number of Floridians without health insurance—statewide, for various parts of the state, and for key demographic groups (Hispanics, Blacks, children, and low-income). The telephone survey conducted in 1999 was one of largest statewide studies in the nation, and a series of reports provided valuable data to inform decisions by Florida lawmakers, health planners, and business leaders.

Thanks to the State Planning Grant (SPG) program of the Health Resources and Services Administration (HRSA), funding became available in 2004 to update the 1999 FHIS. The purpose of the planning grants is to assist states to develop plans for providing access to affordable health insurance coverage to all their citizens, an effort that will be informed by reliable estimates from the FHIS 2004 telephone survey in Florida. Florida's Agency for Health Care Administration (AHCA) again provided leadership at the state level, and a team from the University of Florida also conducted the 2004 survey. The award of Florida's planning grant was timely, coming in 2003 as a Governor's Task Force on Access to Affordable Health Insurance and House Select Committee on Affordable Health Care for Floridians were formed to address the issue of health insurance.

More information on various FHIS 2004 research activities can be found at

http://ahca.myflorida.com/Medicaid/quality_management/mrp/Projects/fhis2004/index.shtml

Executive Summary

The primary goals of the FHIS 2004 were to estimate the number and percentage of uninsured Floridians at the state and district level.

In addition, there is considerable interest in estimates for other geographic areas, especially various municipal entities. County level estimates are especially valuable, since ultimate responsibility for the provision of essential services, including health care, often falls to counties.

In this report, we provide estimates of the number and percentage of uninsured people in Florida's 67 counties.

It bears emphasis that the statistical techniques used to generate these estimates are very complex. Furthermore, the methods are themselves the subject of continuing scientific development, debate and refinement. These constraints apply to both the direct estimates derived from the telephone survey and to the synthetic estimates referring to smaller counties. Users should keep these limitations in mind, particularly in reference to Gadsden County.

Introduction

The FHIS 1999 marked the first time that reliable estimates of uninsurance rates were available for sub-state regions within Florida. The district-level design of that study allowed reliable estimation for the seven major metropolitan regions in Florida as well as multi-county districts that were identified and grouped to be as homogenous as possible.

Those estimates were welcomed by health planners, and policy experts, who used the numbers for program planning and projections as well as their consideration of various potential interventions. But planners and policymakers also expressed a desire for estimates at the county level for those 60 counties which were not single-county districts. In response to this request, small area synthetic estimates were made in 2000.

In designing the sample plan for the FHIS 2004, this interest in county-level estimates was taken into consideration. The telephone survey and its sample were designed to support direct, survey-based estimates for 29 additional counties.

In addition, the work plan called for the use of small-area estimation techniques to generate estimates of uninsurance for the 31 less populous counties.

Methodology

For the FHIS 2004, telephone interviews were conducted with 17,435 Florida households, collecting data for about 46,876 individuals. Telephone fieldwork was conducted between April and August of 2004, and was implemented by the Survey Research Center of the University of Florida's Bureau of Economic and Business Research.

Interviews were conducted in English, Spanish, or Haitian Creole depending on the preference of the interviewee. The survey took about 14 minutes to complete, depending on the size of the household. A full household enumeration was conducted, and information was also obtained about health status, access and utilization of health services, and type of employment.

Like other statewide surveys to measure health insurance, the focus of the FHIS is Floridians under age 65, since virtually all Americans age 65 or older have some health coverage through Medicare. Only households with at least one non-elder are included in the survey. The survey questionnaire was kept as similar as possible to the 1999 version to allow for comparisons.

In the table that follows, direct estimates are provided for 36 counties, including seven single-county districts (Broward, Duval, Hillsborough, Miami-Dade, Orange, Palm Beach, and Pinellas) as well as 29 additional counties for which the sample size was sufficient to support reliable estimates with an acceptable standard error (an effective sample size of 275 individuals).

The remaining estimates, generally for less populous counties, were created using model-based techniques, specifically a Hierarchical Bayesian (HB) approach. Technical details on this methodology are provided in the Technical Appendix.

The last column in the table indicates whether the number given is derived from a direct estimate or the HB procedure.

Translating from estimated percentage uninsured to estimated numbers of uninsured persons is accomplished with auxiliary data, specifically the most recent published estimates available at the time of the survey: the 2003 estimate from Population Projections by Age, Sex, Race, and Hispanic Origin for Florida and Its Counties, 2003-2030, Bulletin 139, Volume 37, Number 3, University of Florida Bureau of Economic and Business Research.

Floridians Without Health Insurance, by County, 2004

County	2003 Population Under 65*	Uninsured Under 65		Method Used to Determine Estimate
	Number	Number	Percent	
Alachua	209,030	28,010	13.4	Direct
Baker	21,117	4,302	20.4	HB
Bay	133,718	24,470	18.3	Direct
Bradford	23,450	4,944	21.1	HB
Brevard	405,821	57,221	14.1	Direct
Broward	1,437,313	264,466	18.4	Direct
Calhoun	11,517	2,440	21.2	HB
Charlotte	101,199	22,061	21.8	Direct
Citrus	86,667	18,200	21.0	Direct
Clay	139,904	15,529	11.1	Direct
Collier	221,607	62,050	28.0	Direct
Columbia	50,698	10,322	20.4	HB
DeSoto	27,389	8,106	29.6	HB
Dixie	12,124	2,441	20.1	HB
Duval	740,234	101,412	13.7	Direct
Escambia	262,108	44,296	16.9	Direct
Flagler	44,692	8,974	20.1	HB
Franklin	8,543	1,771	20.7	HB
Gadsden^	40,912	14,791	36.2	HB
Gilchrist	13,402	2,894	21.6	HB
Glades	8,723	2,281	26.2	HB
Gulf	13,253	2,674	20.2	HB
Hamilton	12,455	2,791	22.4	HB
Hardee	23,620	7,271	30.8	HB
Hendry	32,815	10,352	31.6	HB
Hernando	99,952	17,292	17.3	Direct
Highlands	61,400	11,850	19.3	Direct
Hillsborough	952,548	134,309	14.1	Direct
Holmes	16,085	3,273	20.4	HB
Indian River	86,966	20,437	23.5	Direct
Jackson	41,963	8,788	20.9	HB
Jefferson	11,619	2,401	20.7	HB
Lafayette	6,412	1,461	22.8	HB
Lake	180,301	36,781	20.4	Direct
Lee	373,176	86,577	23.2	Direct
Leon	234,064	18,023	7.7	Direct
Levy	30,202	5,964	19.8	HB

County	2003 Population Under 65*	Uninsured Under 65		Method Used to Determine Estimate
	Number	Number	Percent	
Liberty	6,482	1,418	21.9	HB
Madison	16,275	3,472	21.3	HB
Manatee	219,628	46,122	21.0	Direct
Marion	214,183	43,479	20.3	Direct
Martin	97,819	17,705	18.1	Direct
Miami-Dade	2,031,619	581,043	28.6	Direct
Monroe	68,714	13,743	20.0	Direct
Nassau	54,705	9,026	16.5	Direct
Okaloosa	158,199	20,566	13.0	Direct
Okeechobee	31,139	8,186	26.3	HB
Orange	886,856	168,503	19.0	Direct
Osceola	187,746	35,859	19.1	Direct
Palm Beach	942,256	178,086	18.9	Direct
Pasco	283,266	50,988	18.0	Direct
Pinellas	734,076	139,474	19.0	Direct
Polk	420,042	74,347	17.7	Direct
Putnam	58,893	12,030	20.4	HB
St. Johns	118,624	12,100	10.2	Direct
St. Lucie	164,908	41,887	25.4	Direct
Santa Rosa	114,138	13,012	11.4	Direct
Sarasota	243,075	43,997	18.1	Direct
Seminole	352,635	49,369	14.0	Direct
Sumter	44,373	9,291	20.9	HB
Suwannee	30,833	6,304	20.5	HB
Taylor	17,767	3,596	20.2	HB
Union	12,729	2,735	21.5	HB
Volusia	370,492	59,279	16.0	Direct
Wakulla	22,391	4,456	19.9	HB
Walton	39,777	7,917	19.9	HB
Washington	18,562	3,730	20.1	HB

*Note: 2003 estimate from Population Projections by Age, Sex, Race, and Hispanic Origin for Florida and Its Counties, 2003-2030, Bulletin 139, Volume 37, Number 3, University of Florida Bureau of Economic and Business Research

^ The available data in Gadsden County are insufficient to sustain a reliable estimate of the uninsured rate using the statistical method employed in this analysis.

Technical Appendix:

Details on the Calculation of Hierarchical Bayesian Estimates for Less Populous Counties

Small area estimation is concerned with using sample data from a population, scattered over a large domain, to make inferences about some quantitative measure (an average, or total, or proportion) of an attribute within subdomains of that larger population. It frequently occurs that for some such subdomains, the sample may contain few or perhaps even no cases, such that direct estimates are not feasible. In that circumstance available small area estimation techniques may be classified as indirect or model-based. Hierarchical Bayes estimation is one of the model-based techniques, which borrows the strength of auxiliary information that is related to the variable of interest.

The FHIS 2004 used both direct and model based estimation techniques to estimate uninsurance rates at the county level. Direct estimates were used when the available sample size was sufficient to generate a reliable estimate with an acceptable standard error (an effective sample size of 275 individuals). A model-based technique, specifically a Hierarchical Bayesian (HB) approach, was used when counties had smaller sample sizes. Only data that had non-missing covariate values were included in the county-level analysis.

The FHIS 2004 survey yielded person level data that included whether or not a person had health insurance (the outcome variable of primary interest) along with a number of variables related to health insurance status such as age, gender, race/ethnicity, highest education level attained by household members, largest firm size of employed household members, family income as a percent of federal poverty level, and geographic location within the 17 FHIS 2004 districts. Additionally, information is available from the 2000 U.S. Census about characteristics of living in each county. The challenge is to produce county level estimates that synthesize information available from both the FHIS 2004 survey and 2000 U.S. Census data, using methods that have been validated by other researchers. An approach that combines the methods of Popoff, Judson, and Fadali [Measuring the Number of People Without Health Insurance: A Test of Synthetic Estimates Approach for Small Areas Using Survey of Income and Program Participation (SIPP) Microdata, Fall 2001] and Ghosh, Kim, and Sinha [Hierarchical Bayesian Models For Small Domain Estimation, in preparation] was employed.

Popoff et al. devised a small area estimation approach using synthetic estimation techniques. Using 1996 SIPP data for 80,923 individuals, they demonstrated that the characteristics of age, race, gender, and Hispanic origin predicted the proportion of uninsured quite well. They proposed that the proportion of uninsured in a small geographic area could be estimated as follows:

1) Obtain survey data that represents the population as a whole. Estimate the effects of age, gender, race and Hispanic origin on the probability of uninsurance for the population based on the survey data.

2) Divide a small geographic area into domains based on age, gender, race, and Hispanic origin and obtain U.S. Census estimates of the numbers of residents in each domain.

3) A synthetic estimate of the proportion of uninsured in each small geographic area is then found by calculating the number of uninsured within each domain defined by age, gender, race, and Hispanic origin (by overlaying estimates derived from population survey); summing the number of uninsured in each domain; and dividing the estimated number of uninsured by the total number of residents living in a small area. Table 1 illustrates the Popoff et al. approach for estimating the number of uninsured individuals in a domain defined as "White non-Hispanic females less than 18 yrs old." A complete illustration of the method would require extending Table 1 for all other domains (e.g., White non-Hispanic males less than 18 yrs old, Hispanic females less than 18 yrs old, Hispanic males less than 18 yrs old, etc.).

Table 1: Illustration of Synthetic Estimation

Small geographic Area	**# White non-Hispanic females less than 18 yrs old (from Census data)**	**Estimated proportion of White non-Hispanic females less than 18 yrs old who are uninsured (from survey data)**	**Estimated # of uninsured White non-Hispanic females less than 18 yrs old**
1	$n_{1,W,F,<18}$	$p_{1,W,F,<18}$	$n_{1,W,F,<18} \cdot p_{1,W,F,<18}$
2	$n_{2,W,F,<18}$	$p_{2,W,F,<18}$	$n_{2,W,F,<18} \cdot p_{2,W,F,<18}$
3	$n_{3,W,F,<18}$	$p_{3,W,F,<18}$	$n_{3,W,F,<18} \cdot p_{3,W,F,<18}$
…	…	…	…

The HB modeling approach developed by Ghosh et al. was followed to estimate the proportion of individuals without health insurance for domains cross-classified by age, gender, and race/ethnicity. The model is built in stages, hence the name *hierarchical*. As part of the estimation method, available covariates at the individual level are incorporated in the model specification to improve the predictive capacity for estimation at the domain level. Ghosh et al. used data provided by the National Center for Health Statistics (NCHS) to formulate a HB model that provided estimates for proportion of uninsured in cross-classified domains. The NCHS data set included individual level data for more than 100,000 people and included over 800 covariates. In a covariate selection procedure the variables retained for the final model were family size, education level, and family income. The Markov chain Monte Carlo (MCMC) numerical integration technique employing the Gibbs sampler was used to compute estimates and corresponding standard errors for the NCHS study.

For many of the 67 counties there were sufficient data to compute direct estimates of uninsurance. Estimates for the remaining counties are derived by combining the approaches of Popoff et al. and Ghosh et al. to estimate uninsurance proportions using a synthetic estimation approach. The synthetic approach uses HB modeling to estimate uninsurance rates in various subpopulations then overlays these estimates on county level data available from the 2000 U.S. Census to yield a county level estimate of uninsurance. Specifically, the FHIS 2004 county estimates were produced as follows:

1) For each of the FHIS 2004 districts, domains were defined based on age group (0—18, 19—24, 25—44, 45—64), gender (M, F), and race/ethnicity (non-Hispanic White, Hispanic, Black, and Other). A total of 544 domains were thus defined (17 districts × 4 age groups × 2 genders × 4 race/ethnicity categories).

2) For each of the 544 domains, cross-classified by age, gender, and race/ethnicity, a HB modeling procedure was applied to estimate the proportion of individuals without health insurance. The model used the FHIS 2004 survey variables of highest education level attained by household members, largest firm size of employed household members, and family income as a percent of federal poverty level as covariates (following the result of variable selection via logistic regression modeling). Professor Dalho Kim (Kyungpook National University) wrote specialized FORTRAN software to apply MCMC numerical integration that employed the Gibbs sampler to produce the FHIS 2004 hierarchical Bayes (HB) domain estimates. In three of the 544 domains, an estimate could not be calculated due to insufficient data. For these domains the direct statewide uninsurance rate was used.

3) A dataset was prepared using 2000 U.S. Census county data that included the number of residents in each of the domains cross-classified by age, gender, and race/ethnicity. The definition of each domain is given in Table 2. There were 17 sets of domain estimates corresponding to each of the17 districts.

4) For each county, the set of domain estimates was selected that corresponded to the district that contained that county. Then, within each county, the proportion of uninsured was estimated by calculating the number of uninsured in each domain (multiplying the HB domain estimates of proportion of uninsured by the number of individuals in each domain), summing across domains to find the estimated number of uninsured in each county, and dividing the number of uninsured in each county by the total number of people under age 65 living in the county.

5) The resulting FHIS 2004 county level estimates of proportion of uninsured were then calibrated to match the district and any direct county level estimates that were available in that district, by multiplying each county estimate by a constant coefficient that ensured parity between FHIS 2004 district estimates and FHIS 2004 county estimates.

Table 2: Domain definitions

Domain	Definition
1	Non-Hispanic White females 0-18 years of age
2	Non-Hispanic White males 0-18 years of age
3	Hispanic females 0-18 years of age
4	Hispanic males 0-18 years of age
5	Black females 0-18 years of age
6	Black males 0-18 years of age
7	Other females 0-18 years of age
8	Other males 0-18 years of age
9	Non-Hispanic White females 19-24 years of age
10	Non-Hispanic White males 19-24 years of age
11	Hispanic females 19-24 years of age
12	Hispanic males 19-24 years of age
13	Black females 19-24 years of age
14	Black males 19-24 years of age
15	Other females 19-24 years of age
16	Other males 19-24 years of age
17	Non-Hispanic White females 25- 44 years of age
18	Non-Hispanic White males 25- 44 years of age
19	Hispanic females 25- 44 years of age
20	Hispanic males 25- 44 years of age
21	Black females 25- 44 years of age
22	Black males 25- 44 years of age
23	Other females 25- 44 years of age
24	Other males 25- 44 years of age
25	Non-Hispanic White females 45-64 years of age
26	Non-Hispanic White males 45-64 years of age
27	Hispanic females 45-64 years of age
28	Hispanic males 45-64 years of age
29	Black females 45-64 years of age
30	Black males 45-64 years of age
31	Other females 45-64 years of age
32	Other males 45-64 years of age

References

Popoff C, Judson DH and Fadali B. *Measuring the Number of People Without Health Insurance: A Test of a Synthetic Estimates Approach for Small Areas Using SIPP Microdata,* paper presented at the 2001 Federal Committee on Statistical Methodology Conference.

Ghosh M, Kim D and Sinha K. *Hierarchical Bayesian Models for Small Domain Estimation*. Unpublished manuscript.