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# 2004 Oklahoma Health Care Insurance and Access Survey: Select Results

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Report to:



**Oklahoma Health Care  
Authority**

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# Executive Summary

This report presents findings from the 2004 Oklahoma Health Care Insurance and Access Survey, conducted between March 2004 and June 2004. For Oklahoma residents of all ages, this survey estimates that 17.3% were uninsured (584,931 Oklahoma residents). For children ages 0-18, the uninsurance rate was 12.7%; and for adults ages 19-64, the rate was 23.1%.

More than 45 million Americans are uninsured and these numbers are increasing with the continuing economic downturn. Recent data from the US Census indicate that the number of uninsured Americans increased by 1.0 million people nationally from 2002 to 2003—an increase from 15.2% to 15.6% of the population.<sup>1</sup> The problems faced by the uninsured amount to one of America's biggest health challenges. Relative to their insured counterparts, the uninsured are more likely to miss recommended health screenings, have poor health outcomes, and lack access to important prescription medications. Enumerating the uninsured is a necessary first step in crafting options to extend health insurance coverage to those who do not have it.

Conducted by the Oklahoma Health Care Authority with a grant from the U.S. Health Resources and Services Administration State Planning Grant (SPG) Program, the 2004 Oklahoma Health Care Insurance and Access Survey is the most comprehensive survey on health insurance ever fielded in Oklahoma. With these survey data, Oklahoma will better understand the characteristics of the uninsured, thus enhancing the focus of its programs, policies, and outreach activities, and increasing its ability to identify currently uninsured individuals who are eligible for private or public health insurance coverage. The information from the survey can also be used as a baseline for monitoring changes over time.

While there are several national sources of data on the uninsured, states conduct their own surveys because the sample size for a given state is typically larger in a state survey than in a national one; and, larger sample sizes provide better estimates of uninsurance and more detailed information about the health insurance status of subpopulations. For example, the survey collected data about the accessibility of dental and prescription drug coverage in the state to track the degree of underinsurance experienced by Oklahoma's currently insured population. In addition, by allowing state analysts to work "hands-on" with data, such surveys foster state-specific policy development, including simulation of health insurance coverage policy options, marketing and outreach of public programs.

The survey identified the following groupings, or sub-populations, that will be important in the development of coverage expansion options because of their disproportionately high rates of uninsurance. These sub-populations include:

- 19-24 year olds;
- Individuals below 250% of the Federal Poverty Level (FPL) (\$46,000 for a family of four);
- Self-employed workers;

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<sup>1</sup> U.S. Census Bureau, Current Population Survey, 2004 Annual Social and Economic Supplement, . Accessed at [http://ferret.bls.census.gov/macro/032004/health/h06\\_000.htm](http://ferret.bls.census.gov/macro/032004/health/h06_000.htm) November 05, 2004

- Unemployed individuals;
- Temporary and seasonal workers; and
- Employees of firms with 50 or fewer employees.

The survey also captured several important observations that will be critical in developing policies to increase overall health insurance coverage:

- Uninsured adults were more likely than those with public or private insurance to report the emergency room as their usual source of care (8.6% vs. 3.8% and 1.6%). This is of concern because improving uninsured individuals' access to medical services could potentially minimize ER utilization, a high cost and inefficient method of obtaining health care.
- Some insured Oklahomans are concerned that they may lose their coverage or be unable to afford it in the upcoming year. Survey findings suggest that publicly insured individuals experience a greater degree of worry about health care access and insurance than privately insured individuals.
- The two main reasons individuals potentially eligible for employer-sponsored coverage did not enroll were 'too expensive' (45.8%) and 'don't qualify' (25.9%). These results elucidate some of the barriers preventing workers from having employer-sponsored health insurance benefits.
- Of uninsured respondents, 37.0% said they would be willing to pay \$100 per month for health insurance, 24.3% said they would pay \$50 per month, 13.8% said they would pay \$25 per month, 4.2% said they would pay \$10 and 20.7% said they would pay \$0. This information suggests that a majority of the uninsured are not opposed to paying for health insurance and would be willing to pay if offered a plan they felt they could afford.

Finally, a number of themes emerged around the issue of employer-based insurance coverage. In comparing employees with employer-sponsored coverage to those without, the survey showed that:

- Employees in large firms were more likely than those in small firms to have employer-sponsored coverage.
- Employees in high wage firms were more likely than those in low wage firms to have employer-sponsored coverage.
- Workers in the personal service, agriculture, entertainment, and construction industry sectors were the least likely to have employer-sponsored coverage.
- Temporary and seasonal workers were less likely to have employer-sponsored coverage.

The combination of falling state revenues, growing health care expenditures, and increased unemployment suggests that efforts to increase health insurance coverage in Oklahoma will be difficult and that pursuing minor incremental strategies may prove advantageous, at least in the short term. Perhaps, as the economic situation improves, the task will become more manageable. In the meantime, with the results of the 2004 Oklahoma Health Care Insurance and Access Survey, policy makers have a baseline from which to monitor coverage over time, as well as measure the impact of any expansion strategies as they occur.

# Chapter 1

## Introduction

### Why Was a Survey of Oklahoma Insurance Coverage Conducted?

In 2003, the Health Resources and Services Administration (HRSA) in the U.S. Department of Health and Human Services issued State Planning Grants (SPG) to ten states to help them determine rates of health insurance at the state level and develop strategies to increase access to coverage. Oklahoma was one of those states. The aims of the Oklahoma SPG were to measure and describe the uninsured in Oklahoma, and to develop and evaluate a wide range of policy options to expand health insurance coverage and assure adequate safety net structures for citizens of Oklahoma. The in-depth data collection and analysis conducted under the 2004 Oklahoma SPG will equip policy makers to do so.

### Why Is Health Insurance Important?

There are a host of reasons for concern about access to health insurance and the many problems associated with being uninsured. Understanding the characteristics of both the uninsured and the insured allows policy makers and health care providers to make informed decisions and better serve the public by anticipating community needs.

Gaining a better understanding of the characteristics of the uninsured is critical to improving access to health care. Uninsured adults and children are less likely to have a usual physician or source of medical care, and are less likely to receive preventive health care services.<sup>2</sup> In addition, the uninsured often delay seeking medical care when they are sick. As a result, many serious medical conditions are identified late and are consequently more costly to treat. In addition, uninsured persons have higher rates of avoidable hospitalization and higher rates of emergency room use – a high-cost method of receiving care.<sup>3</sup> Recent research suggests that providing health coverage to the uninsured may result in cost savings by decreasing hospital expenditures on uncompensated care.<sup>4</sup>

Studying health insurance coverage enables analysts to identify trends such as the rising costs of health care and health insurance, and reductions in employer-sponsored health insurance. According to a survey by the Employee Benefit Research Institute, between 2001 and 2002 19% of small employers offering health benefits made changes to their health plans – 65% increased deductibles and co-pays, 30% increased the employee share of premiums, and 29% reduced

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<sup>2</sup> Brown, et. al. Monitoring the Consequences of Uninsurance: A Review of Methodologies. *Medical Care Research and Review*. 1998; 55:177-210.

<sup>3</sup> Ahern M, McCoy HV. Emergency Room Admissions: Changes During the Financial Tightening of the 1980s. *Inquiry*. 1992; 26:67-79.

<sup>4</sup> Blewett L, et al. Hospital Provision of Uncompensated Care and Public Program Enrollment. *Medical Care Research and Review*. 2003; 60:509-527.

benefits.<sup>5</sup> Erosion of employer-sponsored coverage not only affects individual employees, but it also affects the overall health and productivity of the business/employer, the viability of the health care system, and the well being of society at large.

Finally, inadequate health insurance coverage can negatively affect other areas of a person's life beyond physical health. For example, recent research shows that the uninsured are three times as likely as the insured to have difficulty paying for basic costs of living such as food, rent, and heating or electric bills.<sup>6</sup> Not having insurance strains resources that are needed for other areas in one's life.

## **Who Conducted the 2004 Oklahoma Health Care Insurance and Access Survey?**

The Survey Center in the Division of Health Services Research at the University of Minnesota conducted the field survey for this study. The State Health Access Data Assistance Center (SHADAC) completed the data analysis and worked with the Oklahoma Health Care Authority on interpreting the results of the data collection. The household survey instrument used for the data collection – the Coordinated State Coverage Survey (CSCS) – was developed by SHADAC and tailored to the special needs of Oklahoma.

The 2004 Oklahoma Health Care Insurance and Access Survey was a random digit dial (RDD) telephone survey. The Survey Research Center in the Division of Health Services Research at the University of Minnesota conducted 5,601 interviews. One person was randomly selected in each household to complete the telephone survey. If the selected person was a child, an adult was asked to respond on behalf of the child.

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<sup>5</sup>Employee Benefit Research Institute. Small Employers and Health Benefits: Findings from the 2002 Small Employer Health Benefits Survey. *EBRI Issue Brief*. January 2003. Accessed at [www.ebri.org/findings/health\\_findings.htm](http://www.ebri.org/findings/health_findings.htm) September 07, 2004.

<sup>6</sup> Lambrew, Jeanne. *How the Slowing U.S. Economy Threatens Employer-Based Health Insurance*. New York: The Commonwealth Fund. November 2001. Accessed at [www.cmf.org](http://www.cmf.org) September 09, 2004.

# Chapter 2

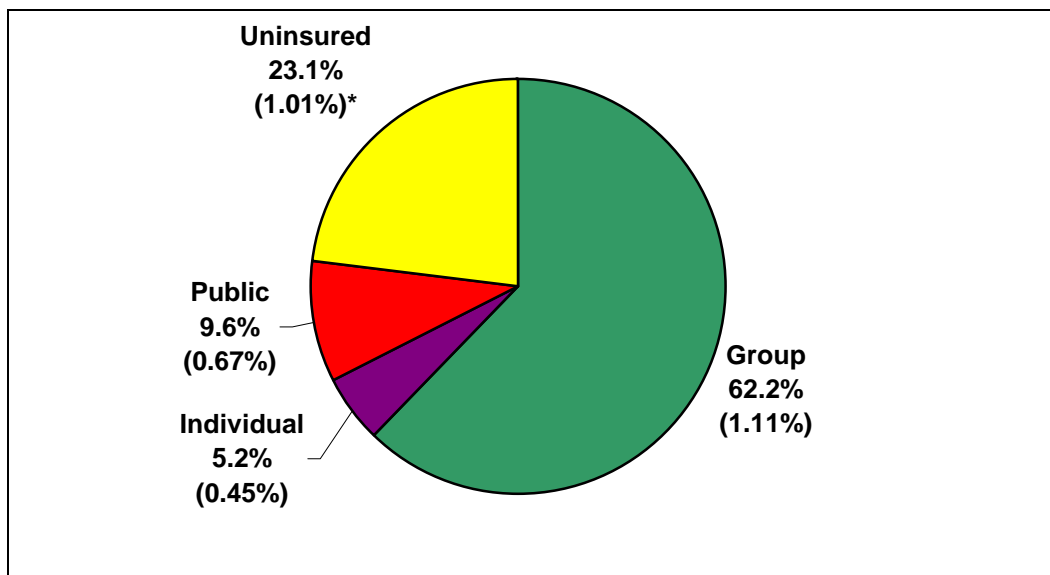
## Uninsured Families and Individuals

This chapter examines the overall level of uninsurance in Oklahoma, presenting detailed information on the characteristics of Oklahoma's uninsured population. Several characteristics of Oklahoma's population were analyzed in addition to the basic health insurance coverage information. Analyses were performed to determine uninsurance rates of subpopulations grouped by age, race/ethnicity, employment status, household income, education, marital status, self-identified health status, and geographic location. Likewise, further analysis assessed whether certain groups are disproportionately uninsured compared to their representation of the population as a whole.

### What Is the Overall Level of Uninsurance in Oklahoma?

Overall, 23.1% of adults, ages 19-64, in Oklahoma were uninsured according to the 2004 Oklahoma Health Care Insurance and Access Survey. The rates of various coverage sources among adults are displayed in Figure 2-1a. The majority (62.2%) of adults in Oklahoma had group coverage. Oklahoma's public programs covered 9.6% of the adult population. An additional 5.2% purchased private individual insurance.

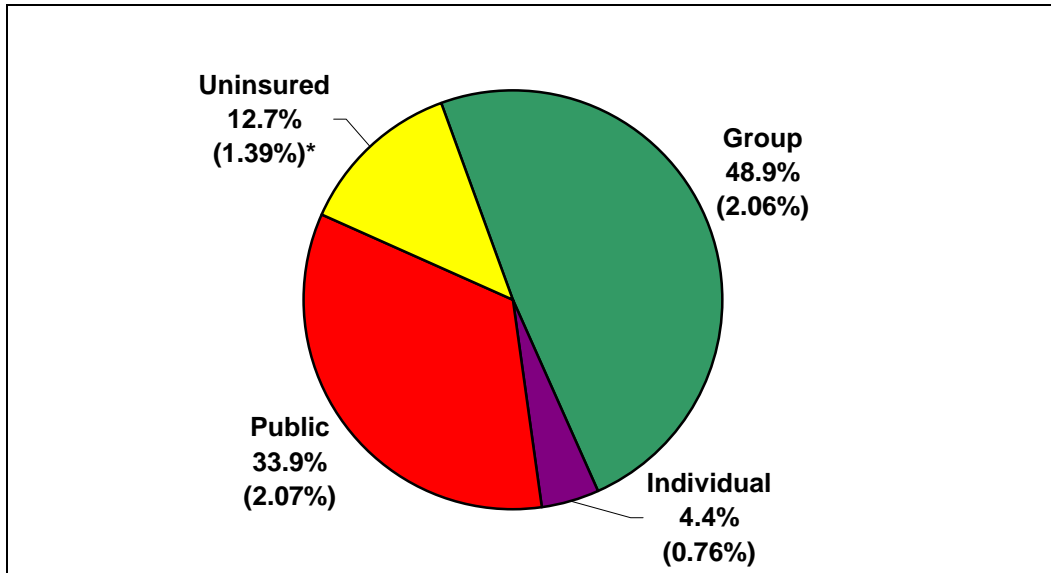
Figure 2-1a. Sources of Health Insurance in Oklahoma, 2004 (Adults 19-64 years)



\* (Standard Error)

In contrast to the adult population, the 2004 Oklahoma Health Care Insurance and Access Survey indicates that 12.7% of children, ages 0-18, were uninsured. The rates associated with various sources of coverage among children are displayed in Figure 2-1b. Oklahoma's public programs covered approximately one-third of Oklahoma's children (33.9%), while 48.9% had group coverage and 4.4% had individual coverage.

Figure 2-1b. Sources of Health Insurance in Oklahoma, 2004 (Children 0-18 years)



\* (Standard Error)

Due to different measurement techniques, there is variance in reported uninsurance rates for Oklahoma. Estimated rates of uninsurance vary with the definitions of “uninsured” which, in turn, depend on the timeframe captured by the measurement. Four general timeframes are commonly used in measuring coverage – the respondent is asked about his/her insurance status: (1) at the time of the survey or point-in-time, (2) over an entire year, (3) for a portion of the year, and (4) at any point during the year.

Table 2-1 displays four different rates of uninsurance for Oklahoma, based on the 2004 survey. The point-in-time measurement is the most commonly used across surveys, where the respondent is queried about his or her current coverage at the time of the interview. This approach minimizes concerns about misclassification, which typically occurs when a respondent is required to think back in time. People who are uninsured at “some point during the year” will be the largest rate, as the numerator comprises the number of full- and part-year uninsured, in addition to anyone who was uninsured for *any* length of time during the period covered by the survey. ***Throughout this report, unless otherwise indicated, the analyses refer to the “point-in-time” uninsured.***

Table 2-1. Alternative Definitions of Uninsurance Rates in Oklahoma, 2004

Definition	Oklahoma Uninsurance Rates % (Standard Error)
Point in Time	17.3% (0.73%)
Uninsured All Year	13.3% (0.65%)
Uninsured Part Year	6.8% (0.49%)
Uninsured at Some Point During Year	20.1% (0.77%)

## **What Are the Characteristics of the Uninsured in Oklahoma?**

Table 2-2 displays Oklahoma's uninsurance rates among select population groupings. Males' rate of uninsurance at 16.9% is comparable to the 17.7% of females who were uninsured. Adults ages 19-24 had the highest rate of uninsurance at 35.3%.

Hispanics, Asians and American Indians had the highest rates of uninsurance (28.6%, 36.5% and 27%, respectively) in comparison to whites. In addition, coverage was disparate across levels of income; those with incomes below 250% Federal Poverty Level (FPL) were significantly more likely to be uninsured than those with incomes 301% FPL and above. Those with more education than a college degree were more likely to have coverage than those with a college degree or less education.

Residents of Oklahoma who were living with a partner (30.5%), never married (25.7%), or divorced (25.3%) had higher rates of uninsurance than people who were married (15.2%). Interestingly, self-perceived health status is also related to insurance coverage. Those reporting poor health status were uninsured at a rate nearly twice that of those reporting excellent health status (24.0% vs. 13.7%).

Table 2-2. Oklahoma's Uninsurance Rates by Selected Population Groups, 2004

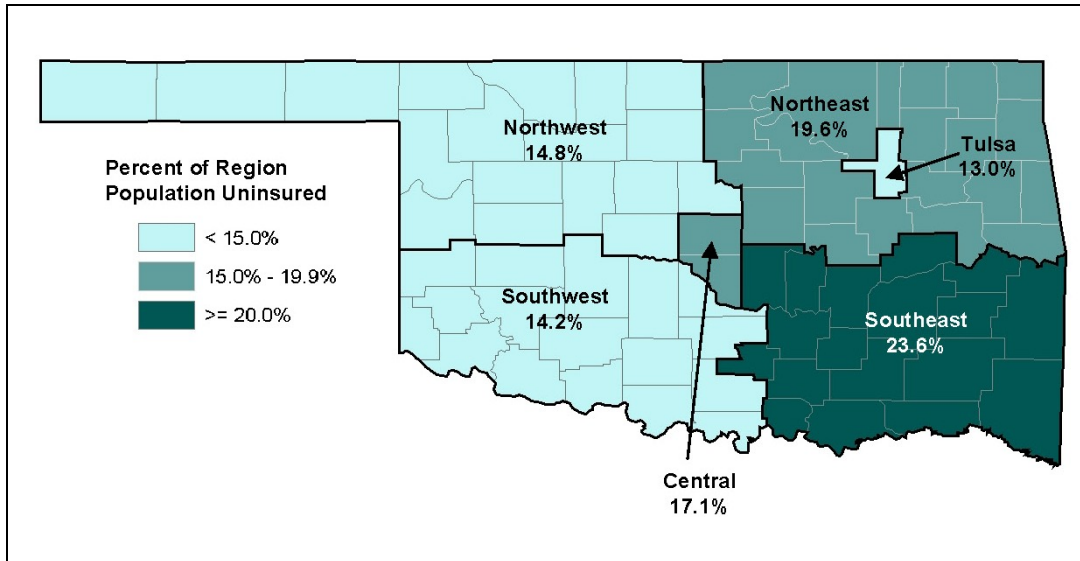
		<b>Uninsurance Rate % (Standard Error)</b>	
<b>Total Population</b>		<b>17.3% (0.73%)</b>	
<b>Gender</b>			
	Male (reference group)	16.9% (1.04%)	
	Female	17.7% (1.02%)	
<b>Age</b>			
	0-5 (reference group)	10.4% (2.24%)	
	6-18	13.8% (1.74%)	
	19-24	35.3% (3.32%)	***
	25-34	29.5% (2.75%)	***
	35-54	20.7% (1.38%)	***
	55-64	15.4% (1.43%)	
	65+	0.5% (0.29%)	***
<b>Race/Ethnicity<sup>a</sup></b>			
	White (reference group)	16.4% (0.80%)	
	African American	11.1% (2.51%)	*
	Hispanic	28.6% (3.55%)	***
	Asian	36.5% (10.14%)	*
	American Indian	27.0% (3.50%)	**
	Other	3.8% (2.68%)	***
<b>Household Income (% FPL)</b>			
	<= 100%	29.2% (2.21%)	***
	101-133%	28.2% (3.61%)	***
	134-150%	26.7% (4.35%)	***
	151-200%	25.3% (2.38%)	***
	201-250%	19.1% (2.11%)	***
	251-300%	13.5% (2.05%)	**
	>301% (reference group)	6.6% (0.63%)	
<b>Level of Education</b>			
	Less than HS	28.1% (2.79%)	***
	HS graduate	20.4% (1.37%)	***
	Some College	18.4% (1.32%)	***
	College Graduate	9.1% (1.36%)	*
	Postgraduate (reference group)	4.6% (1.10%)	
<b>Marital Status</b>			
	Never Married	25.7% (2.55%)	***
	Married (reference group)	15.2% (0.85%)	
	Living with Partner	30.5% (5.47%)	**
	Divorced	25.3% (2.45%)	***
	Separated	20.4% (6.12%)	
	Widowed	4.5% (1.10%)	***
<b>Disability Status</b>			
	No Chronic Condition	18.4% (0.94%)	*
	Chronic Condition (reference group)	15.5% (1.13%)	
<b>Health Status</b>			
	Excellent (reference group)	13.7% (1.18%)	
	Very Good	16.3% (1.24%)	
	Good	19.8% (1.58%)	**
	Fair	23.5% (2.56%)	***
	Poor	24.0% (4.59%)	*
<b>Geographic Location</b>			
	Northwest	14.8% (1.75%)	**
	Central	17.1% (1.54%)	*
	Southwest	14.2% (1.82%)	***
	Tulsa	13.0% (1.58%)	***
	Northeast	19.5% (1.61%)	
	Southeast (reference group)	23.7% (2.22%)	
	Rural	21.4% (1.28%)	***
	Urban (reference group)	14.7% (0.86%)	

\* p<.05 \*\* p<.01 \*\*\* p<.001

a. For those reporting Hispanic ethnicity and some other race, Hispanic was selected as racial classification.

Finally, rates of uninsurance varied across geographical locations within Oklahoma, with the Southeast region of the state having a significantly higher rate of uninsurance than the Northwest, Central, Southwest and Tulsa regions. Moreover, residents of urban areas had lower rates of uninsurance (14.7%) than those living in rural areas (21.4%).

Figure 2.2. Uninsurance Rates by Geographic Location, 2004



As shown in Table 2-3, the survey also explored the employment status of the uninsured. Unemployed respondents were significantly more likely to be without health insurance in comparison to their working counterparts (31.9% vs. 19.1%). Additionally, the likelihood of being uninsured was associated with the number of hours one works per week. Individuals working less than 20 hours per week had higher rates of uninsurance than individuals working 41+ hours per week (41.7% vs. 16.4%).

Temporary and seasonal workers were at higher risk of being uninsured than workers with permanent positions (49.0% and 58.2% vs. 17.3%). Employer size was significantly related to the likelihood of an employee having insurance coverage: 36.7% of people employed by firms with fewer than 11 employees and 26.1% of people employed by firms with 11-50 employees were uninsured; in contrast to 9.1% of people employed by large firms (101+ employees) were without health insurance.

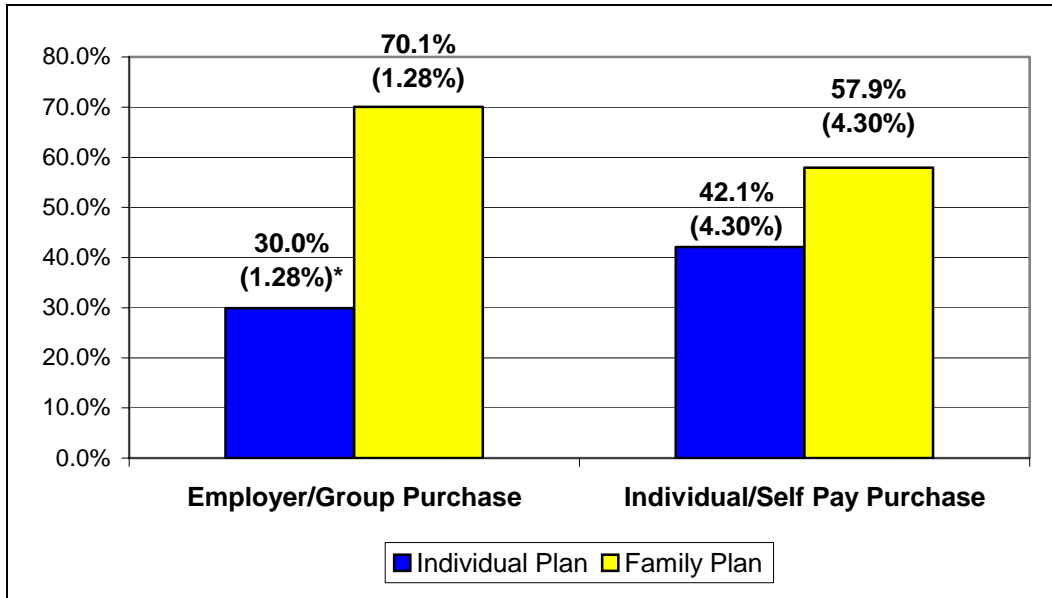
Table 2-3. Insurance Rates (ages 19-64) by Employment Status, 2004

	<b>Uninsurance Rate (Standard Error%)</b>
Total Population of 19-64 year olds	<b>23.1% (1.01%)</b>
<b>Employment Status</b>	
Not Working (reference group)	31.9% (2.05%)
Working	19.1% (1.09%) ***
<b>Hours Worked per Week</b>	
<20	41.7% (5.51%) ***
21-30	25.4% (4.56%)
31-40	18.1% (1.53%)
41+ (reference group)	16.4% (1.65%)
<b>Type of Job</b>	
Permanent (reference group)	17.3% (1.10%)
Temporary	49.0% (6.13%) ***
Seasonal	58.2% (9.01%) ***
<b>Size of Employer</b>	
<11	36.7% (2.63%) ***
11-50	26.1% (3.29%) ***
51-100	19.7% (6.43%)
101+ (reference group)	9.1% (1.15%)

\* p<.05 \*\* p<.01 \*\*\* p<.001

Whether an Oklahoma resident purchased an individual or family health insurance policy was influenced by whether the individual purchased the coverage on her own or through an employer or group. Figure 2-3 displays the type of coverage (individual or family) held by Oklahoma residents by purchasing method (employer/group or individual/self-pay). Respondents who purchased coverage through an employer or group were more likely to have family coverage than individual or self-pay consumers (70.1% vs. 57.9%).

Figure 2-3. Private Coverage Plans Among Adults (19-64 years) by Purchaser Type, 2004



\* (Standard Error)

### What Population Groupings Are Particularly Important in Oklahoma for Developing Targeted Coverage Expansion Options?

Population groupings that characterize the uninsured are often interrelated. The following list highlights the groups that are most at risk for being without coverage and should therefore be considered when developing targeted coverage expansions in Oklahoma.

**Young adults.** Young adults ages 19-24 had one of the highest rates of uninsurance in the state at 35.3%, nearly twice that of the overall state rate (17.3%).

**Low-income families.** Among residents of Oklahoma, uninsurance was most commonly experienced by those living in the lowest income bracket. For the population at or below 250% FPL, rates of uninsurance ranged from 19.1% among those with incomes from 201-250% FPL to 29.2% among families with incomes below 100% FPL.

**Temporary and seasonal workers.** In addition to income, employment status also affected an individual's likelihood of possessing health insurance coverage. Particularly vulnerable to uninsurance were Oklahoma residents working temporary (49.0%) or seasonal (58.2%) jobs.

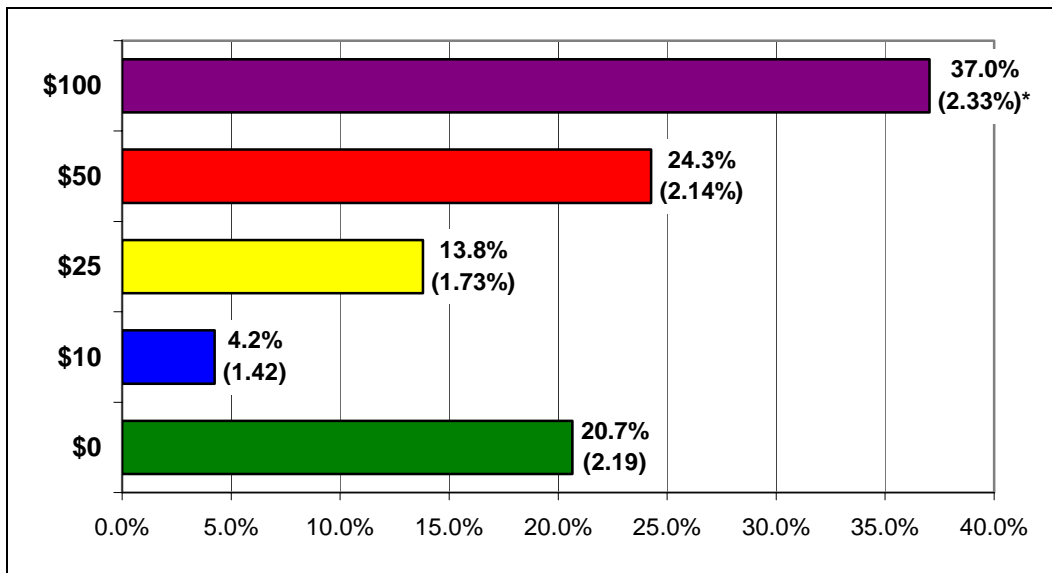
**Employees of small firms.** Over one in three individuals working for small employers (less than 11 employees) were uninsured.

**Residents of Rural Areas.** Oklahoma residents who live in rural areas had significantly higher rates of uninsurance than those in urban areas (21.4% vs. 14.7%).

## What Is Affordable Coverage? How Much Are the Uninsured Willing to Pay?

The survey asked individuals who had reported being without coverage whether or not they would be willing to pay for health insurance. Figure 2-4 displays the results of this question. Approximately 21% indicated unwillingness to pay for insurance coverage; however, 37.0% of uninsured respondents said they would be willing to pay \$100 per month for coverage. An additional 24.3% of people reported willingness to pay \$50 per month. There is some debate in the literature as to the accuracy of willingness to pay measures. While some may argue this survey item is not a reliable measure of the exact amount the uninsured would be willing to pay, the results suggest that the uninsured would be willing to pay some amount for coverage. These findings suggest expansion strategies involving subsidies for coverage may be a promising means of helping Oklahomans who are willing to pay for coverage but cannot afford 100% of health insurance costs.

Figure 2-4. The Uninsured's Willingness to Pay for Health Coverage (\$ per month), 2004



\* (Standard Error)

## Why Don't Uninsured Individuals Participate in Public Programs?

Of particular interest to Oklahoma policy makers are individuals who are potentially eligible for public coverage programs but don't enroll. Table 2-5a displays two subpopulations that appeared to be eligible for public coverage (based on their income) by their insurance status. Survey results suggest that of the population potentially eligible for public coverage, 14.8% of children and 35.2% of parents were without insurance.

Table 2-5a. Uninsured but Potentially Eligible for Public Programs, 2004

	Insurance Type		
	Private % (Standard Error)	Public % (Standard Error)	Uninsured % (Standard Error)
Children under 19 years in families with income <=185% FPL	25.6% (2.76%)	59.6% (3.17%)	14.8% (2.30%)
Parents in families with income <=37% FPL	10.1% (3.47%)	54.7% (6.83%)	35.2% (6.71%)

To better understand Oklahoma residents' general knowledge of public assistance, uninsured respondents were asked whether they had ever requested or been given information about one of Oklahoma's public health programs, such as Medicaid. Over 60% of the uninsured had neither requested nor received information about Oklahoma's public health insurance programs (Table 2-5b). When further queried about interest in public health care coverage, 88.8% of the uninsured said they would be willing to enroll in a public coverage program.

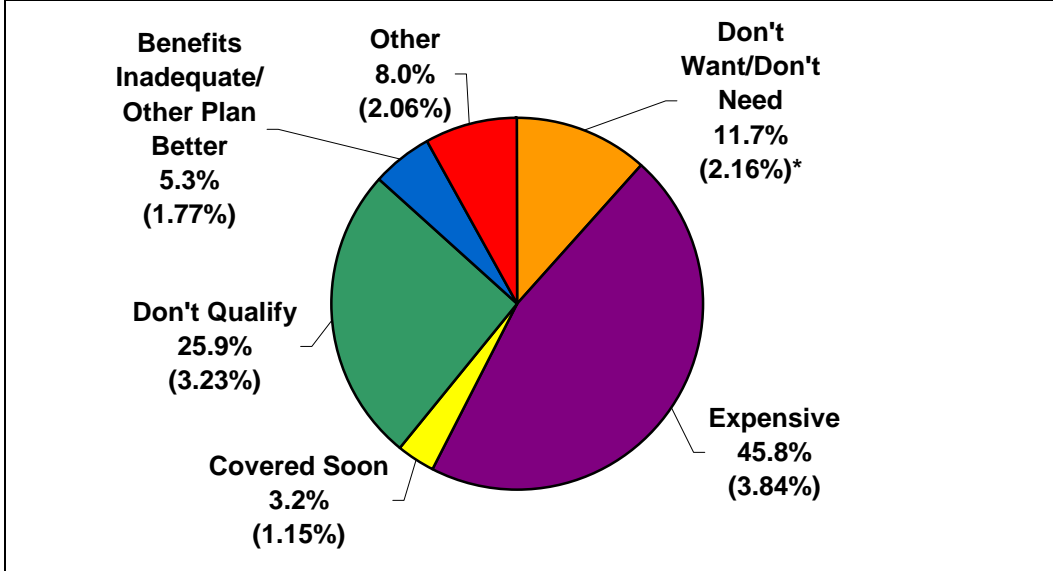
Table 2-5b. Knowledge of and Interest in Public Coverage Among the Uninsured, 2004

	Yes	No
	% (Standard Error)	% (Standard Error)
Have Been Given Information about Public Programs?	37.1% (2.47%)	62.9% (2.47%)
Willing to Enroll?	88.8% (1.56%)	11.2% (1.56%)
Willing to Enroll at No Cost?	70.2% (5.71%)	29.8% (5.71%)

### Why Do Uninsured Individuals and Families Not Participate in Employer Sponsored Coverage for Which They Are Eligible?

Uninsured individuals were asked why they did not participate in employer-sponsored coverage. As shown in Figure 2-5, the most common reason was that coverage is too expensive (45.8%). The second most frequently reported reason (25.9%) was that they did not qualify for employer-sponsored coverage. Finally, about 11.7% of uninsured individuals did not have employer-sponsored coverage because of a lack of desire or need.

Figure 2-5. Uninsured and Working: Reasons for Not Enrolling in Employer-Sponsored Coverage, 2004



\* (Standard Error)

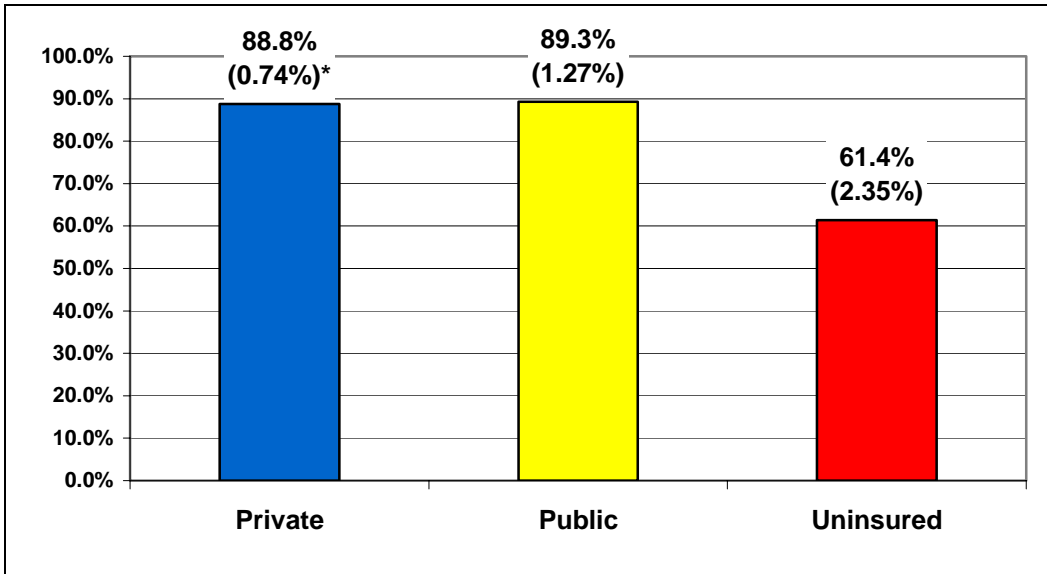
### Are Individuals Likely to Be Influenced by Subsidies, Tax Credits, or Other Incentives?

The most frequently cited reason in the research literature for being without health insurance is cost. As shown in Figure 2-5, the most frequently reported barrier to employer-sponsored coverage was that it is too expensive. Among Oklahoma's uninsured, nearly 90% said they would be willing to enroll in public coverage if it was offered. Findings displayed in Figure 2-4 provide further evidence that public assistance to cover partial costs of health insurance could decrease uninsurance. These findings suggest that subsidies and financial incentives are a potentially promising means of helping the uninsured overcome barriers to coverage.

### How Are the Uninsured Getting Their Medical Needs Met?

Having a usual source of care is associated with fewer delays in receiving care, better preventive care, and enhanced treatment. Figure 2-6 shows that the percentage of uninsured with a usual source of care (61.4%) was significantly lower than the percentage of people with insurance, regardless of whether the source was public (89.3%) or private (88.8%).

Figure 2-6. Percentage of Respondents Who Reported a Usual Source of Care by Insurance Status, 2004



All differences are statistically significant from uninsured at a .001 level  
 \* (Standard Error)

Table 2-6 displays the health care sources used by the insured and uninsured populations with a usual source of care. Publicly and privately insured individuals were significantly less likely than the uninsured to report the emergency room (3.8% and 1.6% vs. 8.6%, respectively) or a clinic (33.9% and 21.2% vs. 45.3%, respectively) as their usual source of care. Uninsured individuals appeared to be less apt than their publicly and privately insured counterparts to use a doctor's office for usual care (43.4% vs. 59.2% and 71.8%).

Table 2-6. Distribution of Health Care Sources for Those with a Usual Source of Care, 2004

	Uninsured % (Standard Error)	Public % (Standard Error)	Private % (Standard Error)
Has a usual source of care	61.4% (2.35%)	89.3% (1.27%)	88.8% (0.74%)
<b>Among those with a usual source of care, where do they go?</b>			
Emergency Room	8.6% (1.62%)	3.8% (0.79%) **	1.6% (0.30%) ***
Clinic	45.3% (2.89%)	33.9% (1.86%) **	21.2% (1.03%) ***
Doctor's office	43.4% (2.84%)	59.2% (1.88%) ***	71.8% (1.14%) ***
Military	1.6% (0.60%)	2.1% (0.45%)	5.0% (0.56%) ***
Other	1.1% (0.53%)	1.0% (0.30%)	0.4% (0.19%)
	100.0%	100.0%	100.0%

\* p<.05 \*\* p<.01 \*\*\* p<.001

Oklahoma residents used different types of clinics for their usual source of care as shown in Table 2-7. Of the respondents who indicated a clinic as their usual source of care, the percentage of uninsured respondents who used private clinics (19.8%) was significantly less than the publicly insured (37.9%) and privately insured (59.8%). In addition, the uninsured were more likely than those with public or private coverage to use a tribal clinic as their usual source of care (36.0% vs. 8.8% and 6.8%).

Table 2-7. Distribution of Clinic Types for Those with a Usual Source of Care, 2004

Source	Type of Insurance			
	Uninsured % (Standard Error)	Public % (Standard Error)	Private % (Standard Error)	
Public Clinic	32.3% (4.24%)	29.4% (3.43%)	17.0% (2.18%)	**
Hospital Outpatient	11.5% (2.52%)	23.4% (3.01%)	15.8% (1.97%)	**
Private Clinic	19.8% (3.70%)	37.9% (3.54%)	59.8% (2.76%)	***
Tribal	36.0% (4.15%)	8.8% (1.87%)	6.8% (1.55%)	***
Other	0.4% (0.27%)	0.5% (0.46%)	0.6% (0.42%)	
Total	100.0%	100.0%	100.0%	

\* p<.05 \*\* p<.01 \*\*\* p<.001

## How Should Underinsured Be Defined? How Many Individuals Defined as “Insured” Are Underinsured?

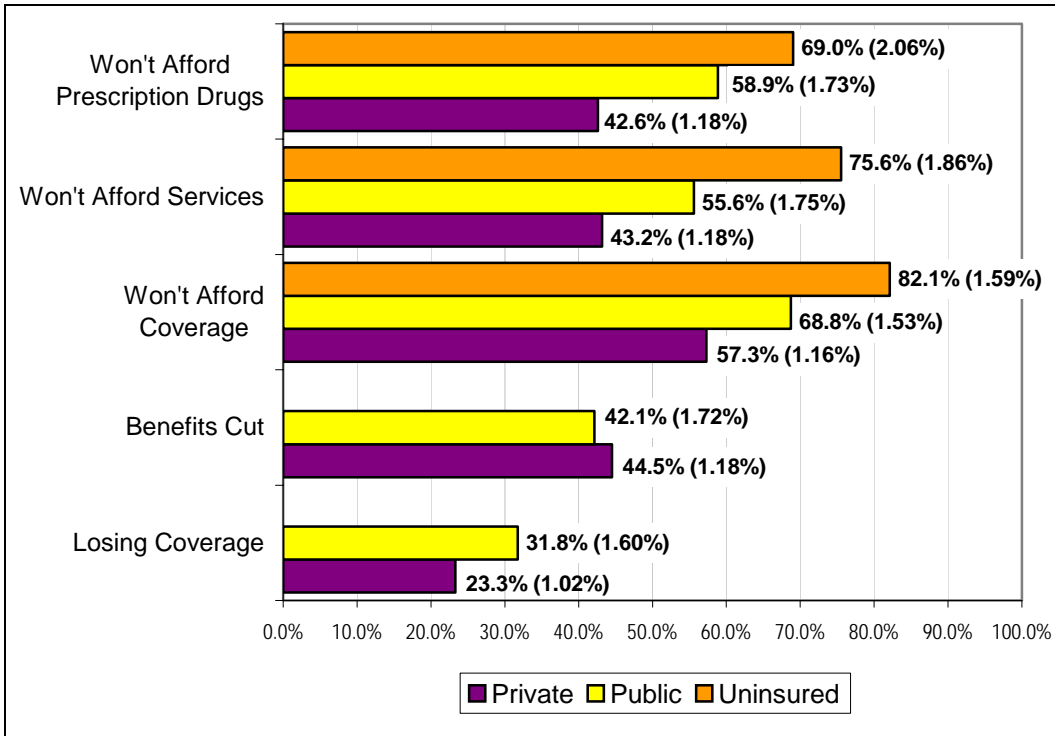
In response to escalating health care costs and insurance premiums, many employers have increased employees' cost sharing for health insurance and/or have reduced the comprehensiveness of their health benefits. There is concern that these changes have led to growing numbers of underinsured individuals with inadequate health coverage for their medical needs.

Researchers have taken a number of different approaches to defining underinsurance or inadequate coverage. Attitudinal approaches identify underinsurance in terms of the perceptions of the individual covered. Structural approaches identify underinsurance in terms of whether the benefits provided by a health insurance plan are commensurate with some benchmark of benefits.<sup>7</sup>

Taking an attitudinal approach to studying underinsurance in Oklahoma, we examined the number of individuals who indicated some level of worry about their access to health coverage and health care in the upcoming year. Figure 2-7 shows the degree of worry expressed by respondents, grouped by current coverage status. These findings suggest that, according to the attitudinal approach, the publicly insured experienced slightly greater levels of underinsurance, particularly in regard to losing or affording coverage and affording prescription drugs, than their privately insured counterparts. Not surprisingly, the uninsured showed the most concern over issues of access to services and coverage.

<sup>7</sup> Ward, A., Beebe, T.J., Blewett, L.A., and Smalda, S. Issues in Defining and Measuring Adequacy of Coverage. *State Health Access Data Assistance Center Working Paper*, 1992, p.3.

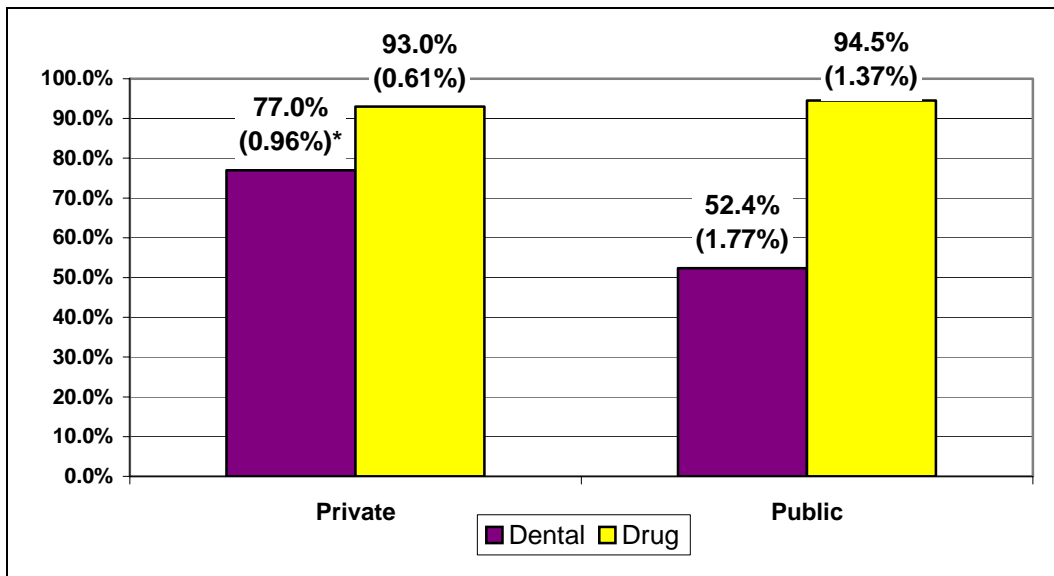
Figure 2-7: Percentage of Oklahomans Somewhat or Very Worried by Insurance Status, 2004



Using a structural approach to identifying underinsurance in Oklahoma, we examined the comprehensiveness of residents' health care coverage. Figure 2-8 displays the percentage of privately and publicly insured individuals who had dental insurance and/or prescription drug coverage. People with private coverage appeared to have more comprehensive benefits packages than those with public coverage. A greater percentage of Oklahoma's privately insured reported having dental insurance (77.0%) in comparison to Oklahoma's publicly insured population (52.4%). Oklahoma's Medicaid program does cover dental benefits for children, however dental benefits for adults are very limited and only cover tooth extractions.

Likelihood of reporting prescription drug coverage, on the other hand, was comparable between publicly and privately insured individuals (94.5% vs. 93.0%, respectively). From a structural perspective, the publicly insured were more likely to be underinsured in the context of dental benefits than those with private coverage.

Figure 2-8: Percentage of Insured Oklahomans with Dental or Drug Coverage, 2004



\* (Standard Error)

# Chapter 3

## Employer-Based Coverage

This chapter examines characteristics of Oklahoma employees who were offered employer-sponsored coverage. The chapter also explores the characteristics of the health plans offered by employers in Oklahoma.

### **What Are the Characteristics of Firms That Do Not Offer Coverage, As Compared to Firms That Do?**

Table 3-1 provides information on health insurance offer rates by employer characteristics. The likelihood that an employee was offered coverage is related to firm size. Only 28.7% of employees working for firms with fewer than 11 employees and 67.3% of employees working for firms with 11-50 employees were offered employer-sponsored coverage. Conversely, in larger companies (101+ employees) 86.3% of employees were offered employer-sponsored coverage. There were sizeable differences in access to coverage depending on the size of one's employer.

The likelihood of employer-sponsored health insurance was also related to employee income. Approximately 35.1% of working families earning incomes below the poverty level were offered health insurance coverage. Families earning more than 300% of the federal poverty level were over twice as likely (71.4%) to be working for firms that offered health insurance.

With offer rates of less than 50%, people working for firms in the personal service, agriculture, entertainment, and construction industries were the least likely to be offered health insurance by their employers. In addition temporary and seasonal employees were less likely to be offered coverage than their permanent counterparts. Part-time employees who work 30 hours per week or less were less likely to be offered employer-sponsored coverage than those working over 40 hours per week.

Table 3-1. Health Insurance Offer Rates by Selected Employer Characteristics, 2004

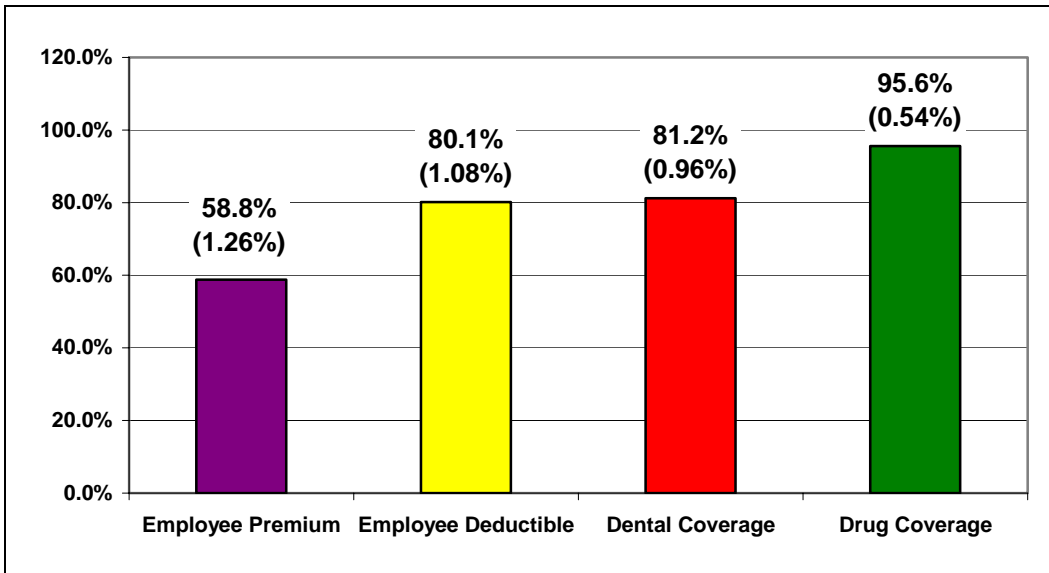
	<b>Offer Rate</b>	
	% (Standard Error)	
<b>Overall Offer Rate among Employed Oklahomans</b>	62.2% (1.13%)	
<b>Employer Size</b>		
< 11 employees	24.8% (2.04%)	***
11-50 employees	56.8% (3.01%)	***
51-100 employees	71.8% (5.07%)	
101+ employees (reference group)	78.0% (1.42%)	
<b>Family Income (as % of FPL)</b>		
<100%	35.1% (3.65%)	***
100-133%	48.3% (5.53%)	***
134-150%	49.5% (6.61%)	**
151-200%	54.4% (3.67%)	***
201-250%	66.8% (3.42%)	
251-300%	73.2% (3.16%)	
>300% (reference group)	71.4% (1.36%)	
<b>Industry Sector</b>		
Manufacturing	80.2% (2.91%)	*
Transportation	77.3% (3.29%)	
Education	71.6% (3.13%)	
Government (reference group)	70.7% (2.98%)	
Professional	67.0% (4.88%)	
Social	65.4% (7.61%)	
Health	64.8% (3.67%)	
Finance	64.2% (4.57%)	
Business	56.2% (5.26%)	*
Retail	51.7% (3.25%)	***
Construction	45.9% (4.45%)	***
Entertainment	44.1% (7.87%)	**
Agriculture	41.0% (5.01%)	***
Other	33.8% (8.61%)	***
Personal service	19.3% (4.33%)	***
<b>Type of Employment</b>		
Permanent (reference group)	63.8% (1.17%)	
Temporary	39.6% (4.86%)	***
Seasonal	38.5% (7.99%)	**
<b>Hours Worked</b>		
<20 hours	25.4% (3.88%)	***
21-30 hours	36.7% (4.77%)	***
31-40 hours	67.2% (1.60%)	
40+ (reference group)	65.5% (1.76%)	

\* p<.05 \*\* p<.01 \*\*\* p<.001

Employees covered by employer-sponsored insurance were asked about the extent of their benefits and the presence of cost sharing (Figure 3-1). Employer-sponsored insurance in Oklahoma appeared to be quite comprehensive with 95.6% of respondents indicating prescription drug coverage and 81.2% reporting dental coverage.

Cost sharing through employee premiums and deductibles was prevalent. Of employer-sponsored health insurance enrollees, 58.8% contributed to monthly premiums while 80.1% reported having deductibles as part of their insurance coverage.

Figure 3-1. Percentage of Employer-Sponsored Health Insurance Enrollees Whose Benefits Include Employee Premiums and/or Deductibles, and Dental and/or Drug Coverage, 2004



# Chapter 4

## Summary and Conclusions

The Oklahoma Health Care Insurance and Access Survey was the most comprehensive survey on health insurance coverage ever fielded in the state of Oklahoma. Survey results estimate that 17.3% of Oklahoma residents were uninsured.

There is ample reason to believe that the findings from the 2004 Oklahoma Health Care Insurance and Access Survey are likely a better estimation of the actual rate of uninsurance in Oklahoma than national surveys like the CPS because the survey sample was larger and the scope of the survey was focused solely on health insurance. Although variations in the actual uninsurance estimates are observed, the personal characteristics of the uninsured and the factors associated with being uninsured are consistent between the Oklahoma Health Care Insurance and Access Survey and national survey results. This provides further evidence of the validity of the survey findings.

This section highlights notable results that should be considered as Oklahoma policy makers move forward in their efforts to make affordable, high quality health insurance coverage available to all of its residents.

### Subpopulations with High Rates of Uninsurance

The results of the 2004 Oklahoma Health Care Insurance and Access Survey indicate there are population groups within Oklahoma that experience significantly higher rates of uninsurance than the state average.

Some potentially important groupings when targeting coverage expansion options and/or crafting outreach strategies include:

- Adults (19-24 year olds in particular)
- Families with income below 250% FPL
- Unemployed individuals
- Self-employed workers
- Temporary and seasonal workers
- Employees of small firms (50 or fewer employees)

It is likely that no single strategy will be effective in expanding coverage for all groups that experience higher rates of uninsurance. Consequently, policy makers should consider taking a multi-faceted approach to meet the needs of a diverse group of uninsured individuals.

## **Uninsured Likely to Be Without a Usual Source of Care**

The uninsured were less likely to have a usual source of care when compared to their publicly and privately insured counterparts. This is important because having a usual source of health care is associated with fewer delays in receiving care, better access to care, and better health outcomes. Providing insurance coverage does not guarantee a usual source of care – research has shown that many people do not see the need for a usual source of care because they seldom or never get sick.<sup>8</sup> However, it is recognized that providing coverage will foster the attainment of a usual source of care and the concomitant benefits of having one.

An additional concern stimulated by this analysis was that many uninsured people reported using the emergency room as a usual source of care, which leads to high costs and poor continuity of care. This method for attaining medical attention is much less efficient and effective than other alternatives, such as seeing a physician in a clinic setting. Decreasing the uninsured population's utilization of emergency room services and increasing use of clinics could potentially decrease hospitals' uncompensated care expenditures and improve the quality of care.

## **Evidence of Underinsurance**

Researchers and policy makers' attention has increasingly turned to the population who may be "underinsured." The underinsured, "...have health insurance but face significant cost sharing or limits on benefits that may affect its usefulness in accessing or paying for needed health services."<sup>9</sup>

The results of the Oklahoma Health Care Insurance and Access Survey provide insight into the extent of underinsurance among Oklahoma's insured population. In examining underinsurance from an attitudinal perspective, the publicly insured individuals expressed a greater degree of worry about health care access and maintaining insurance coverage than privately insured individuals. Furthermore, uninsured individuals reported more anxiety about accessing health care than both the privately and publicly insured respondents.

Using a structural approach to identifying underinsurance in Oklahoma, we examined the comprehensiveness of residents' health care coverage. People with private coverage had a more comprehensive benefits package than those with public coverage. A greater percentage of Oklahoma's privately insured reported having dental insurance (77.0%) in comparison to Oklahoma's publicly insured population (52.4%). Oklahoma's Medicaid program does cover dental benefits for children, however dental benefits for adults are very limited and only cover tooth extractions.

## **Employer-Sponsored Coverage**

Health insurance offer rates among firms vary according to the type of business: individuals working for firms characterized by small size (<50 employees), lower wage, part-time, and temporary or seasonal jobs were least likely to be offered health insurance benefits. In addition, insurance offer rates of firms operating in the personal service, agriculture, entertainment, construction and retail industries were among the lowest.

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<sup>8</sup> RWJF Synthesis Project, September 2001. Accessed at <http://www.rwjf.org/> September 14, 2004.

<sup>9</sup> Kaiser Commission on Medicaid and the Uninsured. *Underinsured in America: Is Health Coverage Adequate?* The Henry J. Kaiser Family Foundation, July, 2002.

The challenge of covering the uninsured has recently been exacerbated by the combination of falling revenues and expenditure growth in health care at the state and local levels. As a result, many states are focusing on minor incremental strategies for increasing coverage, at least in the short term. Moreover, the current economic recession and rising unemployment will negatively impact employers' willingness to offer coverage over time. Further research and monitoring will be needed in Oklahoma to determine the impacts of these social forces as well as the possible effects of any coverage expansion policies.

## Appendix A: Sampling, Weighting and Imputation

The Oklahoma project team was interested in obtaining health insurance coverage estimates for a representative sample of people living in Oklahoma as well as 5 subpopulations within the state: Whites, Blacks, Native Americans/American Indians, low income households, and 3 geographic regions. The regions were the “northwest” (Cimarron, Texas, and Beaver counties) and the “southeast” – (Choctaw, McCurtain and Pushmataha counties) and the balance of the state.

In order to determine how much sample to allocate to each of the subgroups within Oklahoma we had to take into consideration the design effect. The design effect is equal to the ratio of the variance taking the survey design features (stratification and clustering) under consideration, to the variance calculated under the assumption that all cases were sampled through a simple random sample procedure (Kish 1965). Because telephone surveys often involve three main adjustments to determine the probability of selection of each respondent, they are not simple random samples. The first adjustment is to account for the fact that some households have more than one telephone line (and thus an increased probability of selection), the second adjustment is to account for the fact that some households have more people living in them than others (assuming one random person is selected from each household as the respondent), and the third adjustment is for the fact that some phone numbers are more likely to be selected due to disproportionate sampling; for example, sample a higher percentage of people from the 3 counties in Region 2 (northwest – Cimarron, Texas, and Beaver) and the 3 counties in Region 3 (southeast – Choctaw, McCurtain and Pushmataha) compared with Region 1 (the balance of the state).<sup>10</sup>

For RDD surveys using a fair amount of disproportionate sampling (for example like the Oklahoma Health Insurance Survey), that randomly chooses one person in each household to be the target, generally have a design effect (above 2). Therefore we wanted to obtain completed surveys from at least 650 people in each geographic region. Table 1 shows the general demographic breakdown for the state of Oklahoma.

Table 1: Basic Demographics of Oklahoma Sampling Regions

Region	Total Population	Percent White	Percent Black	Percent American Indian	Percent Hispanic	Percent Under 200 Percent of Poverty
Balance of State	3,360,131	74.2%	7.5%	7.5%	5.0%	36.6%
Northwest	29,112	72.1%	0.6%	1.2%	24.5%	37.9%
Southwest	61,411	70.5%	7.7%	13.6%	2.6%	53.3%
Total	3,450,654	2,556,373	255,893	259,969	177,768	1,230,608

Source: Census 2000

The best sample design was determined by the group to allocate 650 completes to the two smallest regions and 4,200 completes to the rest of the state. The principal benefit of such a design is that it keeps the overall design effect to a minimum while reaching most of the goals of the survey team. Table 2 contains several columns: (1) total sample

<sup>10</sup> Disproportionate sampling (or stratified random sampling) can actually lead to a decrease in the design effect to the extent that the dependent variable is related to the strata (e.g., the 3 regions). However, many times the relationship is weak and the heterogeneity in the weights causes a higher design effect than would have been achieved without the disproportionate sampling. Furthermore, in telephone sampling our strata are often highly correlated with the actual strata (region of residence) but not everyone sampled in a particular telephone area code plus exchange combination actually lives in a region that the area code plus exchange was assigned to. Thus, in an analytical application we often have a higher design effect when using stratified sampling in a RDD survey than we would have had without the disproportionate sampling.

size; (2) total white (3) total Black (4) total American Indian, and (4) total Hispanic. The expected total sample size in each cell is the total number of expected respondents based on sampling and the demographic distribution of people presented in Table 1.

Table 2: Stratified Random Sample With a 650 Completed Surveys Allocated to the Northwest and Southeast and 4,200 Allocated to the Balance of the State

Region	Total Population	Percent White	Percent Black	Percent American Indian	Percent Hispanic	Percent Under 200 Percent of Poverty
Balance of State	4200	3115	314	314	211	1536
Northwest	650	469	4	8	159	246
Southwest	650	458	50	88	17	347
Total	5500	4042	368	410	387	2129

Although there will not be over 600 sampled cases in the three ethnic and racial minority categories, there will be over 350 cases from each. This is enough sampled cases to produce confidence intervals of plus or minus 5 percent.

## Weighting

The aim of weighting survey data is to make the respondents selected to take part in the Oklahoma survey representative of Oklahoma's entire population. This was accomplished by weighting respondents relative to their probability of selection into the sample. This process is made more difficult by the fact that not all the respondents have the same probability of inclusion into the sample. The probability of selection varied by: (1) the stratum (i.e., geographic region) the respondent was in, (2) how many phone lines were connected to a household, and (3) the number of people living in a household (each of these is discussed in more detail below). Weighting the respondents relative to their probability of selection into the sample accomplishes two key goals: (1) having the sampled respondents represent the entire population of Oklahoma, and (2) controlling for the fact that the respondents did not all have the same probability of selection into the sample.

The Oklahoma sample design did not draw actual people, but rather it drew phone numbers randomly. Phone numbers consist of three pieces: XXX-YYY-ZZZZ. The XXX is called an "area code," the YYY is called an "exchange," and the ZZZZ is called a "stem." The RDD samples were drawn from phone numbers that are in active area codes plus exchange groupings within the state of Oklahoma. The stems within an active area code plus exchange group are divided into 100 groups of 100 consecutive telephone numbers (called 100 banks) and telephone numbers are randomly drawn from 100 banks with at least one listed telephone number in the interval.

## Basic Probability

An important assumption in our weighting scheme is that within each stratum each phone number has an equal probability of selection. Then the basic probability is equal to:

$$\text{Probability of selecting a phone number (PSPN)} = \frac{\text{Total number of phone numbers selected into the sample}}{\text{Total number of phone numbers from which the sampled numbers were drawn}}$$

The total number of phone numbers from which the RDD sampled numbers were drawn was determined by how many "100 banks" were used by the vendor (Genesys). All

possible numbers from an (area code + exchange) combination were broken down into intervals of 100 (for example, 651-625-0000 to 651-625-0099). If there was a listed telephone number within the block of 100 numbers, then all the numbers within the 100 bank was eligible to be sampled. The denominator was, therefore, the number of banks used for sampling within the state multiplied by 100. The total number of phone numbers selected into the sample was determined by counting the number of numbers actually called as part of the survey.<sup>11</sup>

### Response Rate Adjustment

The probability of selecting a phone number is further adjusted by the response rate. For the purpose of weighting, the response rate is defined as the total number of completed surveys, divided by the total number of phone numbers in the sample.

$$\text{Response rate adjusted probability of selecting a phone number} = (\text{Response rate}) * (\text{Probability of selecting a phone number})$$

Table 3 contains the targeted number of completes, the actual number of completes and the response rate adjusted probability of selecting a phone number.

Table 3: The Targeted Number of Completed Surveys, the Actual Number of Completed Surveys, The Universe of Telephone Numbers, and the Response Rate Adjusted Probability of Selection

Stratum	Sample Targeted Number of Completed Surveys	Actual Number of Completed Surveys	Universe of Telephone Numbers	Response Rate Adjusted Probability of Selection
Southeast	650	928	49250	0.01884
Northwest	650	584	43250	0.01350
Balance of Oklahoma	4200	4335	3174025	0.00137
Total	5500	5847	3266525	0.00179

### Phone Line Adjustment

The response rate adjustment is not equal to the probability of selecting any one household because households have an unequal number of phone lines leading to them. We can use the number of phone lines connected to a household to adjust a household's probability of selection into the sample.<sup>12</sup> Information regarding the number of residential phone lines in each respondent's home is collected as part of the interview and it is used to make the following adjustment to the response rate adjusted probability of selecting a phone number:

$$\text{Probability of selecting a household} = (\text{number of phone lines within a selected household}) * (\text{Response rate adjusted probability of selecting a phone number})$$

<sup>11</sup> Genesys' screening process screens out business numbers through cross listing the numbers with listed businesses, and Genesys dials the remaining numbers to screen out disconnected numbers as well.

<sup>12</sup> This number was not be allowed to exceed three, even though some households have more than 3 phone lines.

## Basic Person Probability

The purpose of the weighting scheme was to develop person weights. Within each household only one person was selected for an in-depth interview. In general, people in larger households have a smaller probability of being included than people in smaller households. The ultimate probability of selecting a person is equal to:

$$\text{Probability of selecting a person} = (\text{Screen adjusted probability of selecting a household}) * (1 / \text{The number of adults living in the household})$$

## Basic Person Weight

The basic person weight is equal to the inverse probability of selecting a person, or:

$$\text{Basic person weight} = 1 / \text{Probability of selecting a person}$$

## Post-stratification

The goal of post-stratification is to adjust the person weights to match known population distributions of a given group.

$$\text{Post-stratified weight} = (\text{Basic person weight of the person in a group}) * ((\text{Known population distribution for group}) / (\text{Sum of the basic person weights in a post-stratified grouping}))$$

Post-stratifying the basic person weights ensures that the sum of person weights will equal known population distributions. For the Oklahoma survey, we post-stratified by race (black, American Indian, and all else) and gender (male versus female). The post-stratification adjustments were made using the 2002 American Community Survey estimates for the state of Oklahoma's non-institutionalized population (total population=3,379,515).

We used the 2003 Current Population Survey's Annual Demographic Supplement (CPS-ADS) estimate of the number of people without phones in Oklahoma to perform the non-telephone coverage adjustment on the data. The basic assumption is that those people who lacked phone service for a week or longer during the past year are very similar to those who do not have service. People who did not lack phone service differ with respect to health insurance coverage from those who did or those who did not have phones at all. Thus, the 6.5 percent of people in Oklahoma who live in households without phone service, are added to the weight total of those who lacked phone service for a week or longer (see Davern, et al. forthcoming Fall 2004 for a detailed description of this technique as applied to a state survey of health insurance coverage).

## Income Imputation

In survey research there is a substantial amount of missing data for certain types of items (e.g., income) because survey respondents refuse to answer the questions for some reason. If the organization collecting the data decides to not impute missing values, they have made an assumption that the respondents with missing data are no different from the people with reported data. This assumption does not hold up under examination. For example, in 2001 Colorado Household Survey the respondents with missing data on income had higher levels of education than those without missing income data. Higher levels of education are related to higher levels of income. Thus, the assumption that the

respondents with missing data are no different than the respondents with reported data is incorrect and estimates derived from this assumption will be biased.

For the Oklahoma survey data, we used “hot deck” imputation. Hot deck is a process by which a respondent’s valid value for a specific variable is assigned to another respondent who does not have a valid value for this variable. The respondent with the valid value is called a “donor” and a person with a missing value is called a “recipient.” For example, if the donor is 35 years old, then the recipient (respondent with missing age) is given a value of 35 and the donor maintains the age of 35.

The process of selecting a donor is the most important component of the “hot deck” procedure. Potential donors are sectioned into homogeneous groups called “cells” defined by many parameters. For example, all white, unemployed, college educated, males over the age of 65 with a valid value for the specific variable can be placed into one cell, while all non-white, unemployed, college educated, males over 65 can be placed into another cell. Recipients are matched to these homogenous cells of donors based on their characteristics. A random donor selected from the matching group supplies his/her value to the recipient.

The characteristics used to group the respondents should be highly correlated with the variable being imputed. For example, when imputing income, donors are matched with recipients based on highest educational level because education is highly correlated with income. The variables chosen to match the donors and the recipients form the basis of a “model” for predicting the imputed variable. A good imputation procedure should provide unbiased estimates of the mean and variance of the variable by correcting for potential distributional differences between people with and without reported data. The basic underlying assumption is that the value of the variable being estimated (such as state rates of health insurance coverage) is not conditional on (i.e., moderated by) the missing data mechanism.<sup>13</sup> For example, all those respondents with missing health insurance data do not have a different relationship between health insurance coverage and covariates than all the respondents with reported data.

Although properly specified imputation can alter basic distributional summary statistics (means and variances) from the statistics calculated using complete cases only, it should not transform the relationships among variables. If there was a relationship between two variables in the reported data it should be the same in the imputed data, and no new relationships should appear after the imputation. The basic idea of model-based (and particularly, “hot deck”) imputation is to use the existing relationships within the reported data to adjust for distributional differences among those who are likely to report data and those who are less likely.

The hot deck is limited in the number of “variable levels” it can have. For example, the variable “highest degree attained” can be broken down into three variable levels (or cells) for the hot deck; less than high school, high school diploma and college degree. The number of hot deck cells is equal to the product of the number of variable levels (e.g., covered, not covered) used to match donors with recipients. If there are too many variable levels used in the hot deck, then many of the cells will not be populated with donors. The more variable levels that are used (i.e., the more hot deck cells), the more donors are needed for the hot deck to work.

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<sup>13</sup> Little, R. and Rubin, D. (1987). *Statistical Analysis With Missing Data*. New York: Wiley.

## Implementation of the Hot Deck

We implemented the hot deck using STATA version 8's hot deck imputation procedure (available for download from the STATA web site<sup>14</sup>). The survey has both a categorical income question and a continuous income question. If the continuous income question is refused (roughly 33 percent), the respondent is asked to put their income into a category. If they refuse to put their income into a category then the data are completely missing (roughly 24 percent). Using the categorical income question to help impute continuous income is called the "unfolding bracket" methodology.

The first step of the imputation implementation is to classify all the people who reported continuous income into the appropriate category and impute the missing 24 percent of categorical income. Then the fully imputed categorical income question is used to impute a continuous income for each respondent. The imputation is done iteratively with variables removed from the procedure one at a time until each person receives an imputed value. The variables used are described below:

The categorical income question used the following the total income and size of the family living off the income. To impute the categorical income poverty level the following hierarchy for each imputation iteration (variables 1-2 were always in the hot deck and the procedure went through 4 iterations). The region variable was the first removed, and so on down the list until the number of people variable was removed.

1. Age (1. Less Than 18, 2. 17-30, 3. 31-64, 4. 65 and Over)
2. Education (1. Less Than High School, 2. High School, 3. At Least Some College)
3. Race (1. Black, 2. Other)
4. Insurance Coverage (1. Any Public Coverage, 2. Private Coverage Only, 3. Uninsured)
5. Number of people living off the income (1. One Person, 2. Two People, 3. Three or More People)
6. Stratum

The same hierarchy was used for the continuous income imputation except that the categorical income variable became the variable one in the hierarchy, the total number of people living in the house was variable two and everything else slid down two spots. The categorical income question was never removed during the iterations for the imputation of continuous income but each of the others was (for a total of 5 iterations) until everyone had an imputed continuous income amount.

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<sup>14</sup> www.stata.com