

Health Insurance Coverage and Access to Care Among Rural and Urban Minnesotans

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Introduction and background

Having health insurance is among the greatest predictors of access to health care services in the United States. Although the relationship between health insurance and access to medical care is not perfect, there is ample evidence that those without insurance experience restricted access to care (Brown, Bindman, and Lurie, 1998; Committee on the Consequences of Uninsurance 2002; Olson, Tang, and Newacheck 2005), and when they do finally seek services, they are in worse health than those with health insurance (Berk and Schur 1998; Stoddard, St.Peter, and Newacheck, 1994). This is of grave concern given that the rate of uninsurance in the U.S. has been on the increase for some time (DeNavas-Walt and Proctor, 2006), and that after years of stable and low rates of uninsurance, in 2004 Minnesota experienced a significant increase in the rate of uninsurance as well. Between 2001 and 2004 the rate of uninsurance in Minnesota increased from 5.7% to 7.4% (Minnesota Department of Health and University of Minnesota, 2006).

Residents of rural counties experience more restricted access to health insurance than those living in urban settings (Coburn, McBride, and Ziller 2002; Eberhardt and Pamuk 2004; Hartley, Quam, and Lurie 1994; Hueston 2000; Kaiser Commission on Medicaid and the Uninsured 2003). Hu and colleagues (2006) demonstrated that rates of uninsurance among working-age adults were significantly higher in rural than urban counties even after controlling for known correlates of health insurance coverage.

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These disparities in coverage are associated with differences in employment patterns and structures, with more rural residents being self-employed or employed by small firms that are less likely to provide insurance to employees (Frenzen 1993; Larson and Hill 2005).

Some research indicates that restricted access to employer-sponsored coverage leads more rural than urban residents to purchase their own insurance (Frenzen 1993) or to enroll in Medicaid (Hurley, Crawford, and Praeger 2002; Long, King, and Coughlin 2006). Other research indicates that regional differences in income are associated with rural residents being less able to purchase insurance in the private market, while at the same time poor rural residents are somewhat less likely to be eligible for and covered by public insurance than poor urban residents (Eberhardt and Pamuk 2004; Frenzen 1993). Income differences also impact the likelihood of accepting employer sponsored coverage. A recent study by Larson and Hill (2005) shows that in general, rural and urban workers are equally likely to take up an employer's offer of coverage, with the exception of low-wage workers in rural settings: they are more likely to decline the offer than their low-wage urban counterparts. A recent Kaiser Commission report (Kaiser Commission on Medicaid and the Uninsured, 2003) on health insurance coverage in rural counties showed greater coverage disadvantages among those living in more remote rural counties than rural counties adjacent to urban counties.

The implications of these coverage differences for access to services may vary by place of residence. Generally speaking, the uninsured are less likely to report a usual source of care — a common measure of access to medical care (Brown, Bindman and Lurie, 1998; Committee on the Consequences of Uninsurance 2002; Olson, Tang, and Newacheck 2005). Interestingly, several studies (Hartley, Quam, and Lurie, 1994; Larson and Hill, 2005; Reschovsky and Staiti 2005) show that the uninsured in rural counties are more likely to have a usual source of care than urban uninsured, perhaps speaking to the strength of the safety net and community (and physician) support for the less fortunate in some rural counties. By contrast, when looking at reported *confidence* in one's ability to get needed care, a measure of perceived access to care, individuals in rural adjacent counties (counties adjacent to urban counties) and rural non-adjacent counties are less likely to report this confidence than are their urban counterparts (Ormond, Zuckerman, and Lhila 2000).

Here we focus on health insurance as the key determinant of access to services, but we acknowledge that rural residents confront

additional access barriers such as transportation difficulties and a more restricted supply of medical services than residents of urban settings (Eberhardt, Ingram, and Makuc 2001; Edelman and Menz 1996).

We use data from the 2001 and 2004 Minnesota Health Care Access (MNHA) surveys to examine differences in health insurance coverage and access to coverage among non-elderly¹ Minnesotans living in three geographic regions: rural counties, rural counties adjacent to urban counties, and urban counties (see Appendix A for county breakdown). Specifically, we set out to answer five interrelated questions:

1. Are there differences in the distribution of health insurance coverage among residents of rural, rural adjacent and urban counties, and has the coverage distribution changed over time?
2. Are there geographic differences in the extent to which workers are able to gain access to insurance through their employers?
3. What demographic, health status and employment characteristics are associated with differences in health insurance coverage by residency?
4. Among those lacking insurance, does potential access to coverage through employers or public insurance programs vary by residency? And,
5. What is the relationship between health insurance coverage, having a usual source of care, and confidence in getting needed care among rural, rural adjacent and urban residents?

Data and Methods

Study Design and Sample

Data are from two statewide surveys of health insurance coverage, the 2001 and 2004 MNHA surveys. Both surveys were administered by telephone using a stratified sampling design that over-sampled in low-income, minority and rural counties of the state. Although only about 1% of Minnesota households do not own telephones (U.S. Census Bureau 2004) statistical adjustments were made to account for non-telephone households (Keeter 1995). Data were weighted to be representative of Minnesota's population.

In 2001, a total of 27,315 surveys were completed, yielding a response rate of 65%, and in 2004 a total of 13,802 interviews were completed for an overall response rate of 59%.²

Measures

For the primary variable of interest, insurance status and type, all respondents completed questions about current health insurance status and coverage over the past year.³ The responses to these questions are used to classify respondents as uninsured, covered by public insurance, employer-sponsored insurance or private self-purchased insurance at the time of the survey.

County name and zip code information were collected in the interview, which were in turn used to classify respondent's county of residence as rural or urban. This is done using Urban Influence Codes developed by the U.S. Department of Agriculture, Economic Research Service.⁴ In this paper, comparisons are made between urban, rural adjacent and rural non-adjacent groups of counties regardless of the size of the urban area and/or if the rural county is a micropolitan area or non-core area, assuming adjacency to an urban area may impact access to larger employers and therefore access to employer subsidized insurance or higher wages (see Appendix A for the geographic designation by county).

The survey includes questions about key demographic variables (i.e., age, race/ethnicity, marital status, income, and education), self-reported health status, and employment information (see Appendix B for operational definitions of all variables). The survey also includes measures of whether individuals have an offer of insurance from their own or a family members' employer, whether they are eligible for this offer, and if eligible, whether they took up this offer of coverage. We use this information to determine if the uninsured are eligible for employer sponsored insurance. Income, family size, and age are used to estimate if an uninsured individual is potentially eligible for public insurance. Finally, we examine the relationship between health insurance coverage and access to health care using two common indicators of access: reports of a usual source of care and whether an individual is confident in their ability to obtain needed health care.

Analysis

Using weighted data to match actual population breakdowns, we will:

- Analyze rates of insurance coverage by the three geographic regions (i.e., urban, rural adjacent & rural non-adjacent).
- Examine access to employer-sponsored health

insurance (i.e., employer offers of insurance, employees' eligibility for insurance and percent who take eligible coverage) by geographic region.

- Present weighted population characteristics such as demographic, socio-economic and work-related variables associated with coverage across the geographic regions.
- Examine the estimated eligibility rates for potential sources of health insurance coverage (both public and private) across the three regions.
- Across the three geographic regions analyze respondents' reported access to a usual source of care, as well as their reported confidence in getting needed care.
- Finally, present three multivariate logistic regression analyses that calculate the odds of lacking insurance coverage, having no usual source of care and no confidence in ability to access needed care across all of the geographic, demographic, and socio-economic variables.

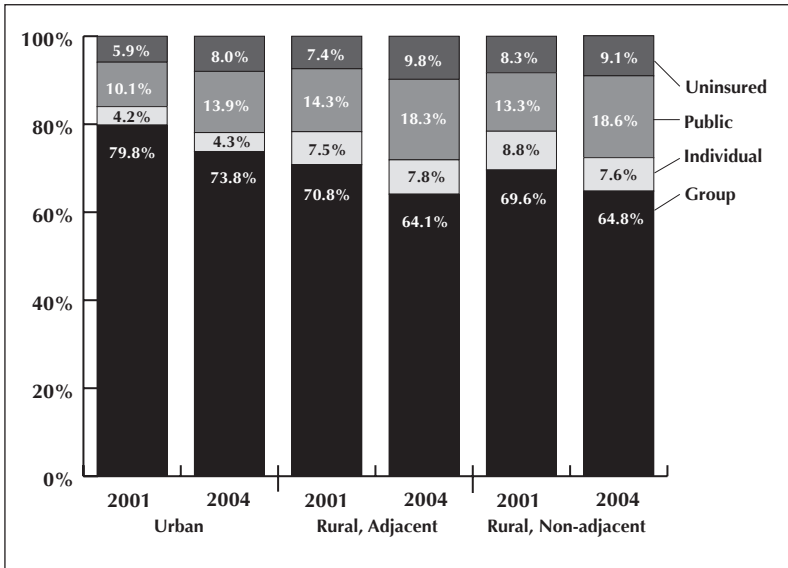
Results

The next five subsections answer each of the research questions concerning the patterns of coverage, access to coverage and access to care across rural and urban counties that were introduced at the beginning of the article.

Distribution of health insurance coverage

The majority of Minnesota's population lives in urban counties as they are defined for this study. Approximately 74% of the non-elderly population, or approximately 3.3 million, live in an urban county. This compares to 14% (610,000) living in adjacent rural counties and 12% (560,000) in non-adjacent rural counties. The distribution of the uninsured within the state follows a similar pattern. While the majority (68% in 2001 and 70.4% in 2004) of individuals without health insurance live in urban counties (data not shown), the distribution of uninsurance within the three geographic areas does not differ significantly. In 2004, 8% of individuals in urban counties were uninsured, compared to the approximately 10% in rural adjacent counties and 9% in rural non-adjacent counties

Figure 1: Health insurance coverage by geographic region in Minnesota, 2001 and 2004.



Source: 2001 and 2004 Minnesota Health Access Survey

* Indicates statistically significant difference between urban and rural (adjacent and non-adjacent) counties at $p < 0.05$

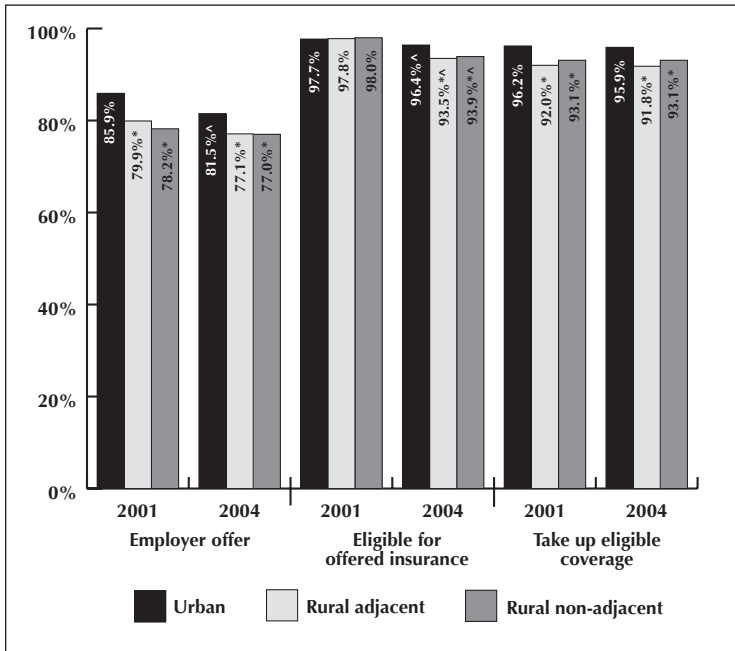
^ Indicates statistically significant difference between years at $p < 0.05$

(see Figure 1). It is important to note that those living in rural areas (unless otherwise specified, “rural” includes both adjacent and non-adjacent counties) are no more likely to be uninsured than are those in urban areas even when we control for known correlates of coverage that do differ by geography, such as income, education, and employment (see Tables 1 and 2 for list of variables; see Appendix D for results of the multivariate analysis).

Although the rates of uninsurance are similar across regions of Minnesota, there are important differences with respect to the type of health insurance coverage across regions. Individuals in rural counties are more likely than urban residents to be insured by public programs or have individual insurance. These other types of coverage make up for the relatively low rates of employer-sponsored insurance in rural counties compared to urban counties (approximately 64% coverage in rural adjacent, 65% in rural non-adjacent, and 74% in urban counties) and thus result in the observed equality of uninsurance rates.

Between 2001 and 2004, there was a 35% increase in uninsurance in urban Minnesota (from 6% to 8%) but no parallel increase in rural

Figure 2: Employer-sponsored health insurance: offer, eligibility, and take up by geographic region in Minnesota, 2001 and 2004.



Source: 2001 and 2004 Minnesota Health Access Survey

* Indicates statistically significant difference between urban and rural (adjacent and non-adjacent) counties at $p < 0.05$

[^] Indicates statistically significant difference between years at $p < 0.05$

counties, resulting in uninsurance rates that are now similar across regions. Over this same time period, all three regions experienced a decrease in employer-sponsored insurance (ranging from a 7% decrease in rural non-adjacent counties to a 10% decrease in rural adjacent counties) and an increase in public insurance coverage (ranging from a 40% increase in rural non-adjacent counties to a 28% increase in rural adjacent counties).

Employer sponsored insurance: Offer, Eligibility, and Take-up

Looking at Figure 2, we see an important difference with respect to access to employer-sponsored insurance within the state of Minnesota. More Minnesotans in urban counties are offered insurance through their own or a family member’s employer than are Minnesotans in rural counties. This remained true in both 2001 and 2004, despite a significant drop in the portion of urban Minnesotans who had an employer offer of health insurance. Further,

Table 1: Demographic characteristics of the uninsured and total population by geographic region in Minnesota, 2004.

	Urban		Rural, Adjacent		Rural, Non-Adjacent	
	Uninsured n=694	All in Urban n=7,648	Uninsured n=161	All in Adjacent n=1,487	Uninsured n=193	All in Non- Adjacent n=1,916
Gender						
Male	58.2% [^]	48.6%	44.8%*	48.3%	55.5%	50.3%
Female	41.8% [^]	51.4%	55.2%*	51.7%	44.5%	49.7%
Age						
0 to 5	6.5%	8.9%	9.4%	7.2%	8.1%	10.3%
6 to 17	10.4% [^]	19.0%	12.0% [^]	21.5%	12.6%	19.1%
18 to 34	50.5% [^]	28.1%	47.4% [^]	22.6%*	46.1% [^]	22.9%*
35 to 64	32.6% [^]	44.0%	31.3% [^]	48.8%*	33.2% [^]	47.6%
Race/Ethnicity						
White	64.5% [^]	85.2%	86.7%* [^]	95.1%*	78.9%* [^]	93.2%*
Black	10.8% [^]	6.4%	~	0.5%*	~	0.3%*
American Indian	5.1% [^]	1.8%	5.5%	3.1%*	8.1% [^]	3.3%*
Asian	6.2%	5.0%	~	0.7%*	&	1.5%*
Hispanic	17.5% [^]	4.0%	8.3%*	2.4%*	10.9%	2.9%
Born in the United States (for individuals 3 and older)						
No	21.5% [^]	9.0%	6.0%*	2.6%*	13.9%	3.9%*
Yes	78.5% [^]	91.0%	94.0%*	97.4%*	86.1%	96.1%*

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Marital Status (for individuals 18 and older)						
Not Married	59.4% [^]	33.6%	52.9% [^]	27.3%*	56.3% [^]	27.7%*
Married	40.7% [^]	66.4%	47.1% [^]	72.7%*	43.8% [^]	72.4%*
Income (percent of Federal Poverty Level)						
0 to 100	27.3% [^]	8.9%	23.2% [^]	9.6%	23.0% [^]	10.3%
101 to 200	29.6% [^]	12.8%	31.7% [^]	20.6%*	41.8%* [^]	19.3%*
201 to 300	20.3%	16.1%	23.6%	21.2%*	18.7%	19.6%*
301 to 400	12.6% [^]	18.1%	9.8% [^]	20.1%	11.1% [^]	24.0%*
> 400	10.2% [^]	44.1%	11.7% [^]	28.6%*	5.4% [^]	26.9%*
Education (parental educational attainment is used for children under 18)						
Less than High School	21.9% [^]	5.6%	8.6%*	4.7%	16.0% [^]	5.6%
High School	34.8% [^]	20.9%	47.0% [^]	29.7%*	29.6%	26.6%*
Some College	29.9%	33.0%	35.6%	42.3%*	40.6%	40.4%*
College Graduate or More	13.4% [^]	40.4%	8.8% [^]	23.3%*	13.9% [^]	27.5%*
Health Status						
Excellent/Very Good/Good	13.9%	7.4%	15.6%	8.9%	15.2%	7.9%
Fair/Poor	86.1%	92.6%	84.4%	91.1%	84.9%	92.1%

Source: 2004 Minnesota Health Access Survey

~ indicates no cases, & indicates <5 cases

* Indicates statistically significant difference between urban and rural (adjacent and non-adjacent) counties at p<0.05

^ Indicates statistically significant difference between uninsured and total population within geographic area at p<0.05

in 2004, of those who are offered insurance through an employer, more Minnesotans in urban counties are eligible for that insurance than are Minnesotans in rural counties. This is a significant change from 2001, when there was no difference across regions with respect to eligibility among those offered health insurance. Over this time period, all regions of Minnesota had a significant drop in the portion of those with offers who were eligible for that coverage in 2004. And finally, of those eligible in each time period, more Minnesotans in urban counties take up employer-sponsored insurance than do Minnesotans in rural counties of the state. In summary, Figure 2 tells us that in rural counties, a smaller portion of the population can rely on employer-sponsored health insurance. Fewer have offers of insurance, are eligible for that coverage, and have the resources or desire to take up the coverage if they are eligible.

Characteristics associated with health insurance coverage

Table 1 (previous pages) presents demographic characteristics of the uninsured population and total population in each geographic area in 2004. As the characteristics of the uninsured did not change drastically in any of the regions between 2001 and 2004, from this point forward our analysis will be restricted to MNHA 2004 data. First looking at the overall population in each geographic area, we see that individuals in urban counties differ significantly from those in rural counties. These populations differ with respect to age (urban counties have more 18 to 34 year olds and fewer 35 to 64 year olds), race and ethnicity (urban counties have a smaller proportion of white individuals and larger proportions of all other measured race and ethnic subpopulations), nativity (rural residents are more likely to be U.S. born), marital status (the urban counties have a smaller proportion of married individuals), income (urban counties have a larger proportion of the population with higher household incomes), and educational attainment (urban counties have a larger proportion of the population with higher educational attainment).

Interestingly, however, when we compare the uninsured populations across geographic regions, many of the differences are no longer significant, meaning that the uninsured look more similar from one region to another than the whole population. There are no significant differences between the uninsured across regions with respect to age and marital status. Further, no significant differences between the uninsured in urban and rural adjacent counties are seen for income and for educational attainment, with the exception that there are fewer in rural adjacent counties with less than a high school education. No significant differences between the uninsured in urban

Table 2: Employment characteristics of the uninsured and total population by geographic region in Minnesota, 2004.

	Urban		Rural, Adjacent		Rural, Non-Adjacent	
	Uninsured n=694	All in Urban n=7,648	Uninsured n=161	All in Adjacent n=1,487	Uninsured n=193	All in Non- Adjacent n=1,916
Employment Status						
Employed	68.0% [^]	80.1%	75.9%	81.0%	73.8%	81.0%
Not Employed	32.0% [^]	19.9%	24.1%	19.0%	26.2%	19.0%
Of those who are employed	n=476	n=6,037	n=116	n=1,161	n=137	n=1,496
Employment Type						
Self-employed	17.1% [^]	9.2%	14.5%	14.4%*	15.5%	17.4%*
Employed by Someone Else	82.9% [^]	90.8%	85.5%	85.6%*	84.5%	82.6%*
Number of Jobs						
One Job	88.0%	89.7%	86.2%	85.8%*	88.5%	84.4%*
Multiple Jobs	12.0%	10.3%	13.8%	14.2%*	11.5%	15.6%*
Hours Worked Per Week						
Part time: <35 hours/week	27.6% [^]	14.9%	25.4%	15.4%	32.5% [^]	14.4%
Full time: 35 or more hours/week	72.4% [^]	85.1%	74.7%	84.6%	67.5% [^]	85.6%
Type of Job						
Seasonal/Temporary	23.2% [^]	7.2%	16.3%	11.1%*	27.6% [^]	8.9%
Permanent	76.8% [^]	92.8%	83.7%	88.9%*	72.5% [^]	91.1%
Employer Size						
10 or Fewer Employees	37.2% [^]	15.6%	34.2%	23.8%*	33.0%	25.8%*
11 to 50 Employees	19.1% [^]	13.3%	21.2%	13.7%	19.4%	13.9%
More than 50 Employees	43.7% [^]	71.1%	44.7% [^]	62.5%*	47.6%	60.4%*

Source: 2004 Minnesota Health Access Survey

* Indicates statistically significant difference between urban and rural (adjacent and non-adjacent) counties at $p < 0.05$

[^] Indicates statistically significant difference between uninsured and total population within geographic area at $p < 0.05$

and rural non-adjacent counties are seen for educational attainment and the only difference between family incomes is that there are more uninsured in rural non-adjacent counties with incomes from 101% to 200% of the federal poverty level (FPL).

Table 1 also allows us to compare the uninsured to the total population within geographic region. There are many differences between these two groups in urban counties. For example, the uninsured are less likely to be female, 6 to 17, white, married, with incomes between 101% and 200% or above 300% FPL, and have a high school education. At the same time, they are more likely to be male, 18 to 34, 35 to 64, Black, American Indian, Hispanic, not married, below 100% FPL, and at the extremes of educational attainment (less than high school or college graduate or more). With the exception of lack of differences between the uninsured and

the total population with respect to gender, the uninsured in rural counties exhibit similar differences from the total population in these counties.

Table 2 contains the employment rate and employment characteristics of the uninsured and the total population across geographic types. There are no differences between the uninsured in rural counties and urban counties with respect to employment characteristics. It is important to note, however, that despite not being significant, the uninsured are more likely to be employed in rural counties than they are in urban counties.

With respect to employment characteristics, there are many differences between the uninsured and the total population within each region. For example, within urban counties the uninsured are more likely not to be employed, to be self-employed, to work part-time, to be a seasonal or temporary worker, and to work for a small or mid-sized employer. Unlike demographic characteristics, we do not see many differences between the uninsured and total populations in the rural counties. In rural adjacent counties, the only significant difference is that fewer of the uninsured work for large employers than do the total population of these counties. In rural non-adjacent counties, the uninsured are more likely part-time workers and seasonal or temporary workers.

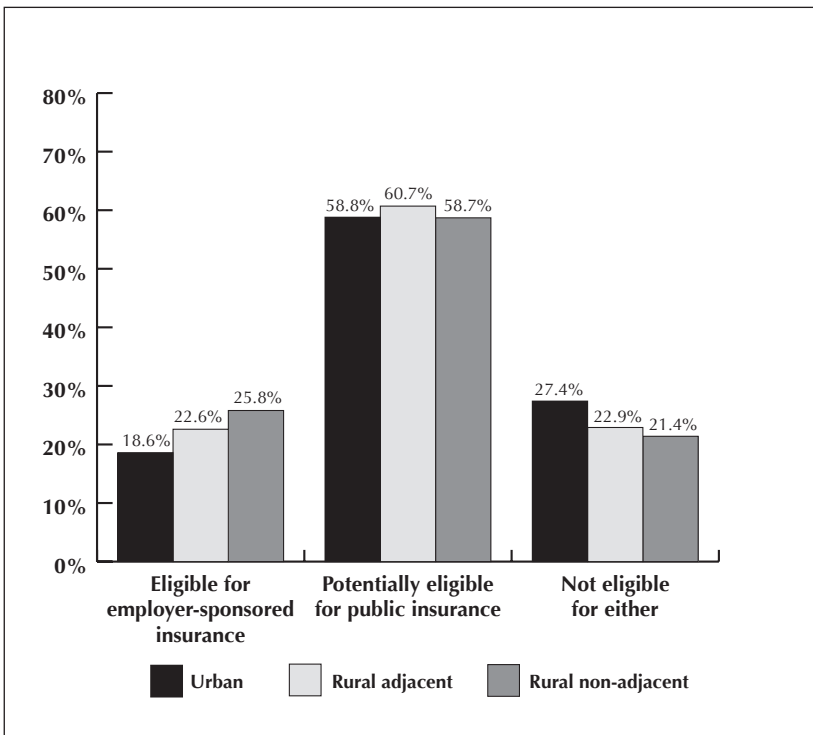
It is apparent, then, that by examining demographic and employment characteristics of the uninsured and the population as a whole in the three different regions, there are many distinct differences among the regions and within each region. However, when we control for all these factors (age, income, educational attainment, race, etc.) we find that a person is no more or less likely to be uninsured simply because he or she lives in a rural county. Instead, it is the interrelated characteristics of individuals living in rural counties and employers in rural counties (compared to urban counties) that result in the observed differences in the distribution of health insurance coverage in Minnesota. There are many characteristics that result in an individual being more likely uninsured in urban and rural counties alike. For example, males, adults age 18 to 34, American Indians, Hispanics, those with lower income and less education, and those working for small employees are more likely to be uninsured regardless of where they live (see Appendix D for results of the multivariate analysis).

Access to coverage among the uninsured

Many uninsured individuals are eligible for insurance programs but do not enroll. Figure 3 presents estimates of potential sources (to the extent the survey allows us to assess eligibility) of insurance

coverage for the uninsured by region. There are no significant differences with respect to potential eligibility across region. Slightly more of the uninsured in rural non-adjacent counties are eligible for employer-sponsored insurance, while slightly more of the uninsured in rural adjacent counties are eligible for public insurance programs. The observed difference with respect to employer eligibility may be related to the lower rates of eligibility and take-up seen in rural as opposed to urban counties shown in Figure 2. Across the regions about six of every ten uninsured individuals are potentially eligible for public insurance programs. Only between 21% and 27% of the uninsured are not eligible for any type of health insurance coverage, indicating that the uninsurance rate could be dramatically reduced if all those who were potentially eligible enrolled.

Figure 3: Potential sources of health insurance coverage among the uninsured, Minnesota, 2004.



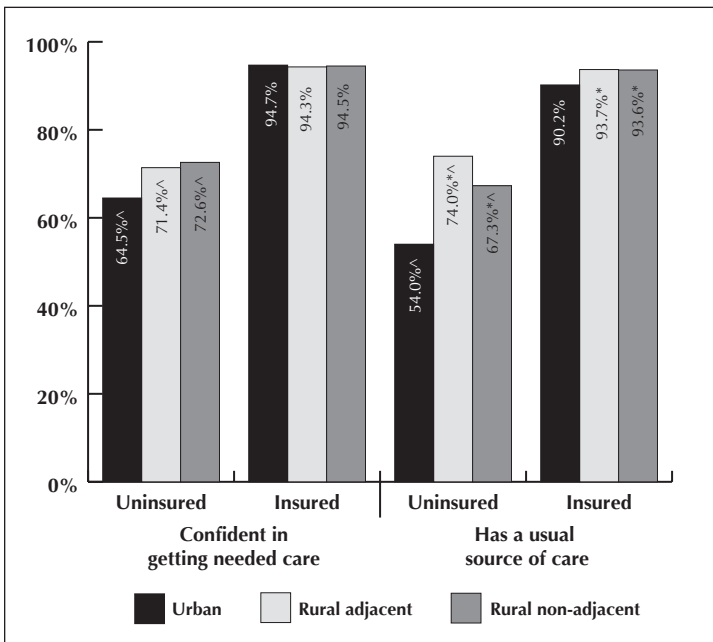
Source: 2004 Minnesota Health Access Survey

Note: None of the differences between geographic areas are significant at $p < 0.05$

Relationship between coverage, usual source of care, and confidence in getting needed care

Health insurance coverage and access to care are related, but coverage does not guarantee access to health care, nor do all uninsured face barriers in obtaining needed care. For this reason, it is important to consider other measures of access across geographic counties. Figure 4 includes two measures of access: one's confidence in their ability to get future needed medical care and if an individual has a usual source of care. Across geographic regions in Minnesota, the uninsured are less likely to have a usual source of care and are less likely to be confident in their ability to get needed care. Greater than nine out of ten of insured Minnesotans across the state are confident and greater than nine out of ten report a usual source of care. This compares to closer to seven of ten of the uninsured who report the same. Although there are no urban-rural differences in

Figure 4: Confidence in getting needed care and usual source of care by insurance coverage and geography, Minnesota, 2004.



Source: 2004 Minnesota Health Access Survey

* Indicates statistically significant difference between urban and rural (adjacent and non-adjacent) counties at $p < 0.05$

[^] Indicates statistically significant difference between uninsured and insured within geographic area at $p < 0.05$

perceived confidence in getting needed care, rural residents, both insured and uninsured, are more likely to report a usual source of care. These relationships hold even when we control for other correlates of access. That is, rural residents are significantly more likely to report having a usual source of care even after factors associated with the likelihood of having a usual source of care are held constant (e.g., gender, age, race/ethnicity, income, health status, etc; see Appendix D for results of the multivariate analysis).

Summary and Conclusions

In comparing rates of uninsurance among non-elderly Minnesotans, we find that only in 2001 were residents of rural non-adjacent counties more likely to be uninsured than urban residents. Although the rate of uninsurance increased across all three geographic regions between 2001 and 2004, this increase over time was only significant in urban Minnesota, and the urban-rural difference was no longer significant in 2004. Other demographic factors and employment structures are more strongly associated with the likelihood of being uninsured than place of residence. This is in contrast to prior literature showing fairly consistent regional disparities in uninsurance (Coburn, McBride, and Ziller 2002; Eberhardt and Pamuk 2004; Hartley, Quam, and Lurie 1994; Hu, Duncan, Radcliff, Porter, and Hall 2006; Hueston 2000; Kaiser Commission on Medicaid and the Uninsured 2003). Interestingly, a recent Kaiser report indicates greater similarity in coverage between urban and rural adjacent counties, with the majority of significant differences being between urban and rural non-adjacent counties. Our data, on the other hand, indicate that adjacent and non-adjacent counties in Minnesota are more similar than different, with the primary contrasts being urban-rural differences.

Consistent with the literature, among those who are insured, rural residents are more likely to have self-purchased insurance and are less likely to have employer-sponsored insurance (Frenzen 1993; Hurley, Crawford, Praeger 2002; Larson and Hill 2005; Long, King, Coughlin 2006). Although the total rate of employment is the same across geographic regions, those employed in rural counties are more likely to be self-employed or work for small employers. The self-employed and those working for small employers are less likely to have an offer of employer-sponsored insurance. Thus, it makes sense that when we look at offers of employer-sponsored insurance, those in rural counties are less likely to have an offer, and when offered, they are less likely to be eligible. Low take-up rates in rural areas could be related to the higher concentration of people with low

incomes in rural counties. It follows from this that rural Minnesotans are also more likely to be covered by public insurance, with the increase in public coverage between 2001 and 2004 likely helping to hold the rise in uninsurance at bay within rural counties.

Across Minnesota, the uninsured are less likely to have a usual source of care and are less likely to be confident in their ability to get needed care, even when we control for other correlates of access such as income. This suggests that the uninsured are not “protected” by any type of community. However, as found in prior research (Hartley, Quam, and Lurie, 1994; Larson and Hill, 2005; Reschovsky and Staiti 2005), even when we control for health insurance coverage, those living in rural counties are more likely to have a usual source of care, suggesting that in rural communities the uninsured know where to go when they need care even if they may be less than confident about getting needed care.

In closing, the results of this study indicate that the issue of uninsurance is a statewide problem in Minnesota rather than solely a rural problem. Although those in rural areas are less likely to have access to insurance through an employer, rural residents appear to be able to obtain access to public insurance rather than join the ranks of the uninsured, and rural residents are more likely to have a regular provider despite lacking insurance than is true for urban residents. Thus, the good news is that policy interventions aimed at improving access to health insurance generally will help all Minnesotans rather than those living in specific regions of the state. However, policy solutions that focus on increasing offers, eligibility and affordability of employer sponsored insurance may be needed more in rural than urban counties across the state.

Endnotes

¹ Most persons age 65 and over are eligible for and enrolled in Medicare, with less than one half of one percent of elderly Minnesotans lacking health insurance coverage (Minnesota Department of Health, School of Public Health, 2006). Therefore, we limit our analysis to the non-elderly under 65 years of age.

² Based on Response Rate 4 of the American Association for Public Opinion Research 2004.

³ Insurance status is based on self-reports or proxy responses to a series of questions listing different types of insurance. Like many other insurance surveys, the question series begins, “I am going to read you a list of different types of insurance...” the interviewer then read an exhaustive list of different types of insurance (i.e., Medicare, Medicaid, MinnesotaCare, employer sponsored insurance, self-

purchased private insurance, etc.). The respondent answered “yes,” “no,” or “don’t know / not sure” to each type of insurance (with more than one type allowed). Following this complete list, if no coverage is reported, an uninsurance verification item was asked. Those still reporting no form of coverage are considered uninsured.

⁴ This UIC categorizes rural counties based on the size of the largest city, its proximity (adjacency) to an urban area, and if adjacent, whether that urban area is large or small (based on population size).

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Appendix A: Designation of Urban, Rural Adjacent, and Rural Non-Adjacent by County in Minnesota

Urban Counties	Rural, Adjacent Counties	Rural, Not Adjacent Counties
Anoka	Aitkin	Beltrami
Benton	Becker	Big Stone
Carlton	Clearwater	Blue Earth
Carver	Fillmore	Brown
Chisago	Goodhue	Cass
Clay	Itasca	Chippewa
Dakota	Kanabec	Cook
Dodge	Kandiyohi	Cottonwood
Hennepin	Lake	Crow Wing
Houston	Le Sueur	Douglas
Isanti	Mahnomen	Faribault
Olmsted	Marshall	Freeborn
Polk	McLeod	Grant
Ramsey	Meeker	Hubbard
Scott	Mille Lacs	Jackson
Sherburne	Morrison	Kittson
St. Louis	Mower	Koochiching
Stearns	Norman	Lac qui Parle
Wabasha	Otter Tail	Lake of the Woods
Washington	Pennington	Lincoln
Wright	Pine	Lyon
	Pipestone	Martin
	Pope	Murray
	Red Lake	Nicollet
	Rice	Nobles
	Rock	Redwood
	Sibley	Renville
	Todd	Roseau
	Wilkin	Steele
	Winona	Stevens
		Swift
		Traverse
		Wadena
		Waseca
		Watonwan
		Yellow Medicine

Source: USDA, Economic Research Service

Appendix B: Operational Definitions of Variables

The survey includes questions about key demographic variables (i.e., age, race/ethnicity, marital status, income, education), self-reported health status, and employment information (i.e., employment status, hours worked, size of employer). In the analysis, age is divided into four categories: under 6 years of age, 6-17, 18-34 and 35-64 year olds.

To measure race and ethnicity, respondents were first asked to identify their ethnicity, and then asked to identify their race; multiple-responses to the race question are permitted. Both measures are used to identify a respondent's race and ethnicity. For the most part, race and ethnic groups are defined using the Census Bureau's "any race" construction (US Census Bureau, 2003). An individual is categorized as belonging to a specific racial or ethnic group if they report their race or ethnicity either alone or in combination with another race or ethnicity. Individuals reporting more than one race or ethnic identity are counted as belonging to all reported groups.¹ Therefore, counts obtained from the "any race" construction will total more than the population total for the state of Minnesota and percentages will sum to more than 100%. Due to the small number of individuals providing a race or ethnic identity response other than the Census Bureau categories (i.e., Black, American Indian, Asian, White, or Hispanic), the "other" race category is omitted from this report.² We include an indicator of nativity in the analysis telling whether the respondent is US born or born outside the US.

Marital status is coded as "married" or "not married" if the respondent reported living with a partner, or being single, divorced, separated, or widowed. Marital status was not collected for children under 18 years old. However, when a child was randomly selected as the target of the survey, the interviewer did ask for the educational attainment of the "primary wage earner." If the respondent could not name the primary wage earner, this question was asked about the person responsible for the care of the selected child. The education status variable is divided into four categories: high school graduate or less, high school graduate, some college, college graduate or more (i.e., post graduate degree).

Data collected on family income is recoded into measures of poverty status and divided into five categories: at or below 100% of the federal poverty level (FPL); 101- 200% of FPL; 201-300; 301-400; and, over 400% of the FPL. Self-reported health status is recoded from five categories to two representing respondents reporting they are in excellent, very good, or good health as compared to those reporting fair or poor health.

We include several employment-related variables in the analysis. As with educational attainment, when the randomly selected individual in the household was a child, this information was gathered for the primary wage earner or responsible adult. The first variable is employment status representing respondents who are either employed or not (including full-time students, unpaid workers, retirees and unemployed individuals). The second variable denotes whether the respondent is self-employed or employed by someone else. In addition, we include a variable indicating if the respondent has one or more than one job and a variable indicating full-time employment based on a response of 35 hours or more to the question of how many hours are worked per week at the job worked at the most hours. We also include a variable specifying whether the job is permanent as opposed to temporary or seasonal. Due to the relationship between offers of insurance and firm size, responses to questions of the size of the respondent's employer are classified into three categories oriented toward small employers: 10 or less employees, 11-50 employees, or more than 50 employees at all locations.

¹ In 2004, 1.4% of respondents to the MNHA survey reported more than one race. This is consistent with the number of Minnesotans who report multiple races according to the U.S. Census Bureau. In 2000, according to this source, 1.7% Minnesotans report multiple races. Source: U.S. Census Bureau, 2000. *Census 2000 Demographic Profile Highlights: Minnesota*. Available at: http://factfinder.census.gov/home/saff/main.HTML?_lang=en

² In 2001, 110 individuals (0.4%) reported a race/ethnicity other than White, Black, American Indian, Asian, or Hispanic. In 2004, there were 37 individuals (0.1%) who reported another race/ethnicity.

Appendix C: Analysis Strategy

The MNHA data are weighted to match population control totals to account for the fact that not all of the survey respondents were selected with the same probability. We first present weighted estimates of the rates of health insurance coverage and offer, eligibility and take-up of employer sponsored insurance across rural non-adjacent, rural adjacent and urban counties. We present weighted population characteristics of the residents in each of these regions as well as rates of uninsurance associated with important demographic and economic covariates within each region. In addition, we provide weighted estimates of the proportion of uninsured who appear to be eligible for some form of private or

public insurance coverage. Finally, we present the results from a multivariate analysis predicting insurance coverage by geographic region, controlling for known demographic and employment covariates of health insurance. As we are also interested in the relationships between health insurance, access to care, and geographic region, we perform analysis predicting each of the two access variables, controlling for health insurance coverage along with the same set of covariates. For this analysis we use logistic regressions as the outcomes of interest are dichotomous. All analyses are performed using STATA statistical software (StataCorp, 2003) which adjusts standard errors to account for the complex survey design. Significant differences are reported across years, when available, and between urban and rural counties on all exhibits. Unless stated otherwise, all differences discussed in the text are significant at $p < 0.05$.

Appendix D: Results of Multivariate Analysis
Uninsurance, No Usual Source of Care, and Not Confident in Ability to Access Needed Care: Results from Three Logistic Regressions, Minnesota, 2004.

	Uninsured		No Usual Source of Care		Not Confident	
	Odds Ratio	Std. Err.	Odds Ratio	Std. Err.	Odds Ratio	Std. Err.
Uninsured	-	-	5.091	0.665	5.868	0.809
Rural, Adjacent	1.000	0.154	0.625	0.097	0.845	0.128
Rural, Non-Adjacent	0.895	0.133	0.650	0.095	0.813	0.117
Male	1.321	0.140	2.515	0.244	1.190	0.128
6 to 17	0.739	0.184	2.977	1.149	1.568	0.501
18 to 34	2.906	0.661	17.790	6.394	2.651	0.790
35 to 64	1.398	0.320	8.269	2.967	3.063	0.881
Black	1.124	0.256	1.353	0.287	1.023	0.247
American Indian	2.422	0.585	0.837	0.316	1.514	0.443
Asian	0.918	0.287	1.279	0.351	0.735	0.267
Hispanic	2.577	0.534	1.588	0.362	0.661	0.183
Other Race	1.190	1.056	3.856	2.812	2.995	2.127
Not US Born	1.001	0.207	1.175	0.231	2.275	0.550
<100% FPL	7.244	1.552	1.666	0.280	2.224	0.420
101-200%	6.936	1.342	1.332	0.205	2.987	0.496
201-300%	4.019	0.749	1.443	0.194	1.698	0.268
301-400%	2.339	0.462	1.151	0.146	1.591	0.252

Continued next page

<High School	3.706	0.815	***	1.190	0.254	1.262	0.311
High School Graduate	2.684	0.435	***	0.661	0.085	1.311	0.193
Some College	1.656	0.258	***	0.693	0.077	1.182	0.160
Fair or Poor Health	0.997	0.166		0.813	0.137	4.155	0.593
Self-Employed	0.924	0.205		0.994	0.208	1.147	0.249
Part-time Worker (<35 hrs/week)	1.262	0.175		0.708	0.097	0.868	0.135
10 or fewer employees	1.775	0.321	**	1.210	0.203	1.164	0.216
11-50 Employees	1.346	0.216		1.177	0.166	1.153	0.181

Note: The odds of not having a usual source of care for adults 18-34 and 35-64 year old relative to children 0-5 years old are unusually high. The validity of these estimates were checked in bivariate relationships and using a stepwise series of linear regression models. We found that these estimates reflect the true nature of the data rather than a problem of correlation within this logistic regression model.

Source: 2004 Minnesota Health Access Survey

** Significant at p<0.05*

*** Significant at p<0.01*

****Significant at p<0.001*