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UNDERINSURANCE: THE HIDDEN DIMENSION TO THE HEALTH CARE CRISIS

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Abstract. *The paper examines the issue of underinsurance. It discusses how the concept can be measured and employs the measure in assessing the number of underinsured in the State of Nebraska. The paper examines the social and economic characteristics of the uninsured, both an at-risk group defined by low income and a group with higher income, and compares each to a corresponding set who are not underinsured. The paper reports a multivariate analysis of factors related to underinsurance and compares the above categories with respect to health status and access to health care.*

Debate on health care reform has focused primarily on providing health care coverage to the estimated 40 million Americans without health insurance. There is, however, another health care concern. It is the number of Americans, estimated at 25 to 30 million (Wilensky 1989; Farley 1985), who are underinsured and what, if anything, to do about them. The underinsured have health insurance but coverage is inadequate to cover most or a significant portion of their health care costs. This phenomenon becomes a health care concern when the underinsured require care and the cost of care not covered by insurance demands a significant portion of household income, or the cost is shifted to those who have insurance. It becomes a health care problem when it limits access to health care. Public policies designed to increase the proportion of the population with health insurance by making premiums more affordable may overlook this concern. State government policies designed to make insurance more widely accessible by allowing for "bare bones" policies to be sold, and/or for pools of small businesses to form cooperatives to purchase insurance may not solve the financial access problem if they result in policies with high co-payments and deductibles.

This analysis begins with a discussion of underinsurance, what it means and how it can be measured. Based on a survey of over 6,000 adults in Nebraska, it identifies the percentage who are insured, a subset of the

insured who are underinsured, and those who are uninsured. It outlines the social and economic profiles of those who are underinsured, subsets of the underinsured defined by low and high income, and those with health insurance. It also examines the factors correlated with underinsurance and the extent to which underinsurance is related to health status and access to health care.

Relevant Literature

Underinsurance has not commanded the scholarly attention of uninsured. Most studies treat it in passing when focusing on the uninsured. The lack of attention reflects what is considered a more serious problem—those without health insurance—and the difficult problems in defining as well as measuring underinsurance. The uninsured are simply those without health insurance. Defining and measuring underinsurance is more difficult.

Underinsurance: Meaning and Measurement

What constitutes underinsurance? Bashshur, Smith, and Stiles (1993) argue that underinsurance is one value of the insurance coverage concept that ranges from excessive and full coverage to uninsured. Excessive coverage refers to multiple coverage for the same set of services. Full coverage refers to total protection against out-of-pocket expenses other than the cost of premiums. Adequate coverage is less than total protection where in addition to premiums the insured is responsible for deductibles, copayments, exclusions, and other limits on coverage.

Underinsurance occurs, they maintain, when limits in coverage hinder obtaining care or when out-of-pocket expenses constitute a serious financial burden. They suggest that instances of underinsurance are reflected in deficient benefit packages, high out-of-pocket costs, and perception that coverage is inadequate. The first and second require a normative declaration regarding what constitutes a deficient package and high costs. The later can involve a uniform standard or one that varies with income. Given these approaches, the level of underinsurance rests in a value determination that is difficult to resolve. For example, setting a level of income as the measure of underinsurance, say spending 10% of net income for health care, assigns a normative value to health care services versus other uses of personal income.

Relying on individual perceptions to measure underinsurance shifts the value determination from the values and assessments of the researcher to the

health care consumer. It seems that the individual consumer's assessment has to come into play at some point in measuring underinsurance, but it is not clear that self-perception is the answer. Using this approach, the level of underinsurance is likely to be found to be high, since consumers are apt to deem undesirable any policy that calls on them to pay beyond health insurance premiums.

An aspect of underinsurance of some importance is the level of out-of-pocket costs that consumers must cover to secure health care. It has the advantage that it is an objective rather than subjective condition. It focuses on individual consumers and does not require a value standard imposed from afar. Moreover, it bears directly on the issue of access. The prospect of high out-of-pocket costs can discourage individuals from seeking care when they need it, especially if out-of-pocket costs are high in relation to income. However, setting that level at a fixed amount is problematic and again calls upon the researcher to establish a threshold value.

The measure of underinsurance employed here focuses on out-of-pocket costs by asking those who have insurance whether or not health care costs are usually paid by health insurance or regular household income. Those who respond regular household income may be considered underinsured. If insurance is not used as the primary source of payment one of two scenarios is likely. In one, insurance is available for the services obtained, but utilization is so low as to never exceed the level of deductibles in policies. The other possibility is that insurance is not covering the most typical uses of health services for members of the household. For those with incomes below a certain threshold, for example below 150% of poverty, one can assume that out-of-pocket costs are high in relation to income. One can argue that this group is at risk in terms of access to health care, and most problematical in terms of developing a national or state health care policy. To be sure, this group is underinsured, but so are those for whom out-of-pocket expenses for health care represent a much smaller portion of disposable income.

In this study the underinsured are those who have insurance but usually pay their health care costs from regular household income. In combination with income below 150% of poverty, we isolate a subset of the underinsured for whom out-of-pocket costs for health care are likely to be high in relation to income and for whom access to health care is most likely to be affected.

The measure provides a conservative reading of the number of underinsured. It counts as underinsured only those who actually sought care and were billed for it. It excludes those who did not need care or did not seek

care when they needed it. The measure also fails to distinguish those with very large from those with small health care expenses. Ideally, we would like to know exactly what a person's or household's medical expenses are so we could compare them with individual or household income and get an exact reading of costs in relation to income. Accurate and reliable information on this, however, is difficult to secure. The measure may also lump some with quite adequate insurance coverage in comparison to need, but whose health care expenses fall into the deductible or uncovered category, such as office calls which are not covered but generally modest compared to hospitalizations or outpatient services. The inclusion of some individuals and households that might not be considered underinsured is balanced by the exclusion of those for whom underinsurance kept them from seeking any health care at all during the year preceding the survey.

While the measure is not perfect, it enables us to address an under-analyzed but important aspect of the insurance situation in the United States and one with important implications for any proposals directed at reforming the health care system.

The Underinsured: Who They Are and How Many

Much of the research on the underinsured has focused on estimating numbers. Depending on the definition, Farley (1985) estimates that from 8 to 26% of the privately insured population under 65 in the U.S. is underinsured. The estimated range was inferred from a probability distribution based on assumptions regarding the probability of incurring medical expenses, the size of expenses, the relationship between expenses and income, and whether health care coverage has an out-of-pocket limit on hospital and medical expenses.

Bashshur, Webb, and Homan (1989) found 19% of Michigan's population to be underinsured. Underinsurance was defined as:

- (a) no coverage for doctor's fees incurred outside of a hospital,
- (b) insurance coverage for only a part of the previous year,
- (c) the perception on the part of a respondent that his/her insurance coverage was inadequate, or
- (d) some combination.

The corresponding percentages falling into each category were: 11, 5, 1, and 3% respectively.

While there is consensus on the growing number of underinsured (Renner and Navarro 1989; Rice 1991), there is relatively little information available on who the underinsured are, why they are underinsured, and how it affects access to health care. Focusing on the privately insured under 65 who pay their medical bills with household income, Comer and Mueller (1992) found that women were more likely to be underinsured than men, rural residents more likely than urban residents, those with low income more likely than those with high income, those unemployed or employed part-time more likely than those employed full-time, and those self-employed more likely than those not self-employed. Employment status (full-time, part-time, and unemployed) and self-employed (in business, in farming and not self-employed) were the most important factors in accounting for underinsurance. Marital status and age had no effect.

Farley (1985) notes that persons with nongroup coverage are more likely to be underinsured than those with a group plan. She also observes that women and their dependents are more likely to be underinsured than men and their dependents, at least in terms of expenses in relation to income. Full-time employees are less likely to be underinsured than part-time employees, who in turn are less likely to be underinsured than the self-employed and those not working. People of low income are more likely to be underinsured than middle and upper income people. Those 55 to 64 years are more likely to be underinsured than those younger, and those 19 to 24 years more likely to be underinsured than those 25 to 54. People in rural areas and those in poor health are more likely to be underinsured than those living in SMSAs and those in good health.

Another study reports inner-city patients more likely to be underinsured or uninsured, and less likely to seek care when they need it than non inner-city patients (Francis 1991). A study of Minnesota farm families reports that most have nongroup health coverage, and while coverage costs less than employer-provided plans in urban areas, they have less coverage and higher copayments and deductibles. Thus, farm families are more likely to be underinsured than non-farm families

The analysis below builds on these studies and goes a step further by examining the relationship of underinsurance and access to health care.

Sample Design and Measurement

Data were generated from a spatially clustered random sample of households in Nebraska using a random-digit-dialing procedure. Nearly universal

telephone service across the state (estimated at 97% of all households) insures a reasonably representative sample employing this technique. Interviews with 6,893 respondents 18 years and older were completed in the Fall of 1991. Initially, 1,869 interviews were completed as a part of the Nebraska Annual Social Indicators Survey (NASIS). Subsequently, additional interviews were completed in thirteen counties in the state. The additional surveys were merged with NASIS and weighted on the basis of the population in each county. This yielded a weighted random sample of 6893 households.

The additional interviews were obtained by first dividing the state's counties into four strata:

- 1) the state's two metropolitan counties;
- 2) the ten counties (excluding the first stratum) with the highest number of households with incomes below federal poverty standards;
- 3) the next ten counties with the highest percentage of households with incomes below federal poverty standards; and
- 4) the remaining counties in the state.

Both counties in the first stratum were selected, four from the second, four from the third, and five from the fourth. The goal in each of the counties was a sample of approximately 300. As sufficient numbers of households were obtained from stratum one in the initial survey, additional interviews were obtained only from the thirteen remaining counties. This design was employed to maximize the number of uninsured falling into the sample based on the expected relationship between income and insurance status.

Two additional weights were applied to the data. First, data from each stratum were weighted to adjust for slight variation compared to Census information on sex and age. Second, data were weighted to adjust for the differential probability of selection of adults in households where more than one adult was present. The weighted data can be treated as either a representative sample of individuals or households in the state. The response rate for all interviews, with three callbacks, was 65%, comparable to national samples obtained by similar methods.

Along with a standard set of demographic items, the survey probed whether or not respondents were covered by health insurance, and whether they paid most of their health care expenses with insurance, regular family income or some other source. Given the high penetration of telephone ownership, the sample does not omit uninsured respondents because they have no phone.

Respondents were also asked questions related to health status: self-assessment, number of days ill during the past year, and whether the respondent had a health problem during the past year and consulted a physician. Related to access, they were asked if they had a personal physician that they usually see and whether they failed to see a doctor during the past year when they needed to because of expense. Complete question texts are included in an Appendix.

Findings

How many underinsured?

Table 1 identifies the percentage of insured, a subset of the insured who are underinsured by our measure, and uninsured in the state in 1991. A little under eight percent were without health insurance (estimated number 125,268); 94% had health insurance. Of those with insurance, 13.3% were underinsured, that is, they had insurance but reported that they usually cover most of their medical (physician and hospital) bills with regular household income. Of these, 11.9% had income above 150% of the federal poverty standard (estimated number 213,598), 1.4% had income below (estimated number 22,484). While the 150% standard is somewhat of an arbitrary cutoff, using it suggests that between one and two percent of the population is at-risk, that is, their underinsured status may impact on their access to health care.

While 11.9% with incomes above 150% of poverty are underinsured by our definition, their higher income makes them less at-risk, that is, less likely to forego needed health care because of limited resources. Any proposal to reform the health care system should, of course, address the needs of the uninsured, but it should also consider the at-risk pool of underinsured, and the potential of any reform to increase or decrease their number (Bashshur, Smith, and Stiles 1993). The figures in Table 1 do not change appreciably when the sample is limited to those under 65 years.

Who are the underinsured?

Table 2 provides social and economic profiles of the high income and at-risk sets of the underinsured, and for comparison, corresponding sets of the insured. The numbers represent the percentage that possesses the particular characteristic.

TABLE 1
HEALTH INSURANCE STATUS, 1991

	Percent of survey respondents	Estimated number in population
<u>Underinsured</u>		
Has health insurance, most health care bills paid by regular family income:		
Income < 150% poverty	1.4	22,484
Income > 150% poverty	<u>11.9</u>	<u>191,114</u>
Underinsured subtotal	13.3	213,598
<u>Uninsured</u>	7.8	125,268
<u>Insured</u>		
Has health insurance, most health care bills paid by health insurance:	<u>78.9</u>	<u>1,267,134</u>
<u>Overall total</u>	100.0	1,606,000

With respect to the high income set, the underinsured are more likely to be men, single, and reside in rural Nebraska, that is, in other than one of the five counties defined by the Census Bureau as metropolitan. The high income underinsured have an average of 13.7 years of education and average 42 years of age. Two-thirds of the high income underinsured are employed full-time. Over two-thirds are employed in skilled occupations. Principle differences with the high income insured reveal that the low income underinsured are more likely to be female, single, younger, employed full-time and working rather than retired. They are also less likely to earn income of \$40,000 or more.

TABLE 2
SOCIAL AND ECONOMIC PROFILES: INSURED AND UNDERINSURED

	Income under 150% of Poverty Level		Income over 150% of Poverty Level	
	% Under- insured	% Insured	% Under- insured	% Insured
Female	68	62	44	49
Single	48	55	43	34
Rural	73	64	59	55
Education				
Mean years	13.8	12.8*	13.7	13.6
Standard deviation	2.7	2.1	2.6	2.7
Age				
Mean years	36	42*	42	47*
Standard deviation	13	21	16	18
Family Income				
Under 5,000	7	23	0	1
5,000-10,000	38	38	4	4
10,000-15,000	33	27	13	8
15,000-20,000	21	11	10	12
20,000-25,000	2	1	17	14
25,000-30,000	0	0	14	14
30,000-40,000	0	0	19	17
40,000 plus	0	0	23	29
Employment Status of Head				
Full-time	42	44	67	59
Part-time	8	18	10	11
Unemployed	10	1	1	0
Retired	1	16	12	17
In school	13	7	2	3
Keeping house	21	11	7	8
Other	5	3	1	1
Occupation				
Profession, technical & kindred workers	10	11	18	22
Managers, officials & proprietors	6	11	18	17
Clerical and kindred workers	17	14	15	17
Sales workers	8	11	6	5
Craftsman and foreman	9	8	11	9
Operatives	8	8	7	9
Non-farm laborers	1	5	1	1
Private Household	3	0	0	0
Service workers	29	17	11	11
Farm laborers or foreman	0	3	0	1
Military	1	2	0	1
Farming & ranching	8	10	13	7

* significant at .05 level.

With respect to the at-risk pool, the underinsured are predominantly female and rural. They average 13.8 years of education and 36 years of age. Forty-two percent are employed full-time, another 21% keep house. In terms of occupation, 29% report employment in service industries, 17% in clerical occupations. The at-risk pool is more likely to be married and rural than a low income set of insured. They, on average, have more formal schooling and are younger. There are fewer of the at-risk pool earning less than \$5,000 than of the low income insured. There are also fewer employed part-time and retired, but more who are unemployed, in school and keeping house. Occupation difference is limited to the higher percentage of underinsured employed in service industries.

Why are they underinsured?

With respect to factors related to underinsurance, Table 3 contains the results of a logistic regression where the dependent variable is a dichotomy: underinsured/insured. Each coefficient represents the amount of change produced in the odds of being underinsured compared to being insured. Coefficients greater than one signify that the odds of being underinsured are greater than the odds of being insured, given that particular characteristic and controlling for all others included in the analysis. Coefficients less than one mean the odds are lower. Statistical significance is reported at the standard .05 level.

The analysis suggests that underinsurance is driven by income and occupation. Compared to those with incomes of \$5,000 or less, those with incomes between \$5,000 and \$10,000 and those between \$10,000 and \$15,000 are more likely to be underinsured. Beyond the \$15,000 cutoff, the relationship between income and underinsurance is not statistically significant. Why would those with higher incomes be more likely to be underinsured than those of lower incomes? Some of the very poor, those with incomes below \$5,000, are covered by Medicaid which is likely to cover most health care costs. Furthermore, what is not covered by public insurance for the very poor is unlikely to be paid for out-of-pocket. They simply lack the funds to pay non-covered expenses.

In terms of occupation, compared to professional and technical occupations, managers, sales workers, craftspeople, service workers, and those in farming and ranching are more likely to be underinsured. Only farm laborers and foreman are less likely to be underinsured than those in professional and technical occupations.

TABLE 3
 LOGISTIC REGRESSION OF LIKELIHOOD OF BEING
 UNDERINSURED ON SELECTED INDEPENDENT VARIABLE

	Logistic Coefficient	Odds Ratio
Female	-.14	.86
Single	.22*	1.24
Urban	-.19*	.82
Age	-.01*	.98
Education	.05*	1.05
Income (000s)**		
5 - 10	.73*	2.07
10 - 15	.73*	2.09
15 - 20	.16	1.18
20 - 25	.36	1.44
25 - 30	.16	1.17
30 - 40	.03	1.03
40 and higher	-.10	.89
Employment Status**		
Part-time employment	-.25	.77
Retired	-.25	.77
In school	-.23	.79
Keeping House	.22	1.25
Occupation**		
Managers, officials, proprietors	.36*	1.43
Clerical and kindred workers	.27	1.31
Sales workers	.40*	1.50
Craftspeople and foreman	.43*	1.54
Operatives	.01	1.01
Nonfarm laborers	-.47	.61
Private house-hold workers	.39	1.49
Service workers	.43*	1.54
Farm laborers and foreman	-1.75*	.17
Military	-.88	.41
Farming and ranching	.87*	2.38

* significant at .05 level.

**Income, employment status, and occupation entered as sets of dummy variables. Suppressed model category for income "0 - \$5,000," for employment status "full-time," for occupations "professional and managerial."

Singles and residents in rural counties are more likely to be underinsured than those who are married and those living in urban counties. Underinsurance declines with age and increases with education. Employment status, once these other variables are controlled, is unrelated to being underinsured.

What difference does it make?

Finally, Table 4 examines the issue of health status and access to health care. Statistical tests compare the underinsured with the insured among those with incomes less than 150% of poverty and underinsured with the insured among those with incomes greater than 150% of poverty.

For the at-risk pool, those with incomes below 150% of poverty, there are two statistically significant differences between the underinsured and insured. However, only one is in the expected direction. The at-risk underinsured report fewer days during the past year when they were ill and could not do what they normally do than the insured, but are more likely to indicate that they failed to see a doctor when they needed to during the past year because of expense. While there is no difference in seeing a doctor among those who had a health problem and no difference in having a regular physician, access to the health care system is blocked, to be sure by self-selection on the part of those in need, to the at-risk underinsured. The data suggest that the at-risk underinsured eventually get care, but not necessarily when they first require it or as often as they need it. On the one hand, the finding is consistent with those who argue that underinsurance leads to delayed care, but it is less clear that this necessarily leads to more severe and costly health problems as some critics maintain.

Differences in health status and access among those with incomes above 150% are more likely to be statistically significant, but again not necessarily in the expected direction. The underinsured report fewer sick-days during the past year and greater likelihood of seeing a physician about a health problem. They are less likely to have a family doctor and more likely to have passed up seeing a doctor when they needed one, but these differences are quite small.

Differences in income and adequacy of health insurance do not impact on health status or access in a direct way, but appear to influence when individuals seek needed access to health care system and perhaps how often.

TABLE 4
CHI-SQUARE TESTS OF HEALTH CARE STATUS AND ACCESS TO
HEALTH CARE BY UNDERINSURED-INSURED AND INCOME LEVEL

	Income under 150% of Poverty Level		Income over 150% of Poverty Level	
	% Under- insured	% Insured	% Under- insured	% Insured
Health status				
self assessment (fair or poor)	16 (p=.36)	23	13 (p=.45)	12
Mean days ill past year	9 (p=.00)	29	42 (p=.01)	46
Percent with health problem and visited a doctor about it	100 (p=.45)	99	97 (p=.01)	91
Has regular family doctor	75 (p=.99)	75	77 (p=.04)	81
Not see a doctor when needed to because of expense	44 (p=.00)	26	13 (p=.00)	10

Significance level in parenthesis.

Conclusion

Most attention in the health care reform debate has focused on the problem of uninsurance. Relatively few studies have focused on another health care concern: underinsurance and what to do about it. As with uninsurance, it is important to know how many are underinsured, who they

are in terms of demographic characteristics, what factors account for their situation, and what, if any, health care consequences result from underinsurance.

Based on a statewide survey, a little over 13% of the population of the State of Nebraska, about 200,000 in a state of 1.6 million persons, are underinsured. About one and one-half percent, or 22,000, are at-risk of going without health care because of low income. This at-risk pool is somewhat more female and rural than a comparable income group with insurance. It is somewhat better educated and younger, and often with family income in the upper range of low income. It is more likely to be unemployed and less likely to be retired. More are found keeping house and employed in service industries.

Factors related to underinsurance include income and occupation. Underinsurance is also associated with being single, younger, and residing in a rural county. Oddly, greater education is positively correlated with underinsurance, perhaps because rural women tend to have higher educational attainment levels than rural men.

In terms of health care status, the principle difference between the underinsured and insured is in delaying care or frequency of care. The underinsured are more likely than the insured to report not seeing a doctor when they needed to because of the cost. The difference is particularly large for the at-risk underinsured. However, while access is restricted, it is unclear that this necessarily impacts negatively on health status. Differences between the underinsured and insured on several measures of health status were not statistically significant or were contrary to what was expected.

What does the analysis suggest for public policy? An emphasis on expanding financial access by eliminating barriers to health insurance may not eliminate all barriers. If the insurance plans that are marketed to presently uninsured resemble the plans purchased by those presently underinsured, access may not improve. Two insurance reforms may be especially prone to enlarged pools of underinsured: eliminating pre-existing conditions and requiring open enrollment could encourage greater use of co-insurance and deductibles. Both reforms would have the effect of insuring groups of potentially higher risk; some of the cost of which can be expected to be passed along to the insured. Policies designed to encourage competition for insurees by creating alliances, as is being done in some states, may provide a false sense of accomplishment. Insurance premiums may be reduced through that effort, but if the trade-off for cost containment is ever-higher deductibles and copayments, access to health care services may be improved only marginally.

While requiring deductibles and/or co-payments do not inherently restrict access, this research has demonstrated potential problems for low income households similar to the findings from the Health Insurance Experiment (Newhouse et al. 1981). Public policies that expand access to insurance should consider either public subsidies for low income households or regulatory limits on insurance liability.

The findings in this study are especially applicable to the problems confronting states in Nebraska's region of the country—the plains states or upper midwest (West North Central census region). States in this region, with large tracts of land and higher than average percentages of population in rural areas, are more likely to struggle with how to make health insurance accessible to smaller groups of persons. In doing so there is a natural tendency to develop insurance plans with high deductibles and co-payments, because premiums can be kept in an affordable range. Unfortunately, the evidence presented here demonstrates a trade-off between lower insurance premiums combined with more cost sharing, and lower utilization of needed medical services. Policy makers will want to monitor the effects of policy initiatives with that trade-off in mind.

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APPENDIX: Telephone Survey Questionnaire

1. Are you covered by private health insurance or public health insurance such as Medicare, Medicaid, or veterans benefits that pays all or part of your doctor and hospital bills or don't you have health insurance?
2. Which of the following sources do you usually use to pay your doctor, hospital, and other medical bills? Do you use health insurance, regular family income, or Medicaid? What about Medicare—that is, insurance for those over 65 or disabled, Medicare with supplemental insurance, Veterans or VA hospital benefits, or country medical assistance?
3. Would you say your health, in general, is excellent, good, fair or poor?
4. Is there a particular doctor that you usually see when you are ill or have a health problem?

5. Within the past twelve months, has there been a time when for financial reasons you or someone else in the household did not see a doctor even though you thought you (or they) should?
6. IF YES TO 5: Did you (or they) later see a doctor about the problem?

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