

# Vulnerable Populations and Health Insurance

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*This study provided a national profile of health insurance of certain vulnerable populations including children, racial/ethnic minorities, low-income families, non-metropolitan statistical area (MSA) residents, and those with poor health status. The study shows an increase in the proportion of uninsured nonelderly population. While public insurance helped reduce the employment- and health-related disparities in private coverage, it has not overcome other disparities related to vulnerable characteristics including race/ethnicity, wages, education, and area of residence. Comparison between health maintenance organization (HMO) and fee-for-service insurance indicates that younger although not much healthier people, racial/ethnic minorities, MSA residents, and those residing in the West and Northeast regions were more likely to have HMO coverage. To reduce significant disparities in health insurance coverage, policy makers will have to consider expanding public insurance coverage, targeting vulnerable groups, particularly those with multiple vulnerable characteristics rather than merely the economically distressed. Expecting managed care to achieve cost containment for services provided to vulnerable populations may be unrealistic.*

Vulnerability refers to the likelihood of contracting illness. Vulnerable populations are diverse groups of individuals who are at greater risk of poor

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physical, psychological, and/or social health (Aday 1994). They typically face greater barriers to accessing timely and needed care (Lurie 1997; Shortell et al. 1996). Various terms have been used to describe these populations, including *underserved populations* (Blumenthal, Mort, and Edwards 1995), *medically underserved* (Sundwell and Tavani 1991; Wrigley, Andres, and Davidson 1996), *medically disadvantaged* (Sundwell and Tavani 1991), *underprivileged* (Traugott 1996), *poverty-stricken populations*, *distressed populations*, and *American underclasses* (Demko and Jackson 1995). Vulnerable groups have included high-risk mothers and children, people of color, the poor, non-English-speaking patients, the chronically ill and disabled, the mentally ill, persons with AIDS, alcohol or substance abusers, the suicide- or homicide-prone, abusing families, homeless individuals, and recent immigrants and refugees. They usually exhibit worse health outcomes than others do, although with fewer resources to improve their conditions. The growth in their number and the magnitude of their multifaceted needs are placing greater demands on the medical care, public health, and related social and human services delivery sectors (Aday 1994).

Since the well-being of vulnerable populations is intertwined with the nation's health and resources, policy makers have long been concerned about the problems vulnerable populations face, which include access to health insurance. Health insurance contributes to the amount and kind of health care people are able to obtain. The Institute of Medicine (1988), in its landmark report on "The Future of Public Health," asserted that "[t]he ultimate responsibility for assuring equitable access to health care for all, through a combination of public and private sector action, rests with the Federal Government" (p. 8). Healthy People 2010, in a bold step forward from Healthy People 2000, called for the elimination of health disparities (U.S. Department of Health and Human Services 1998). Extending insurance coverage to vulnerable populations is also consistent with the principle of social justice, that people should not be penalized for circumstances such as their sociodemographic backgrounds and current health status over which they may have little control (Rice 1998).

Given the well-established role of health insurance in ensuring access to, and continuity of, health care (Newacheck et al. 1998; Anonymous 1997; Kogan et al. 1995; Muller, Patil, and Boilesen 1998; U.S. Congress. Office of Technology Assessment 1992; Angel and Angel 1996; Schoen et al. 1997; Sox et al. 1998), timely and accurate knowledge of the insurance status of diverse vulnerable populations is of critical importance to the development and assessment of targeted policy interventions. In addition to identifying which vulnerable groups are more likely to be disproportionately uninsured, policy makers are interested in the type of health insurance among those who are

covered. Are vulnerable groups more likely to be covered by public than private insurance? To what extent has public insurance overcome the disparity in private insurance coverage for vulnerable populations? Among those covered by private insurance, does managed care (e.g., health maintenance organizations or HMOs) tend to be associated with healthier rather than vulnerable groups? Answers to these questions will assist policy makers in determining the appropriate mix of public and private sector financing of health care and in assessing whether the cost savings associated with HMOs reflect biased or adverse selection. To the extent that if the privately insured are healthier than the publicly insured, and if HMO members are no healthier than those with private fee-for-service (FFS) coverage, then policy makers can lower their expectation that managed care serves as a cost-containment solution for publicly covered vulnerable groups, who typically have greater health needs. Knowledge of the insurance status of vulnerable populations can also assist in evaluating the equity in insurance coverage. To the extent that uninsurance can be predicted by characteristics of vulnerable populations, an inequitable insurance system would exist.

The purpose of this article was to provide a profile of the health insurance status of the nation's vulnerable population groups including children, racial/ethnic minorities, low-income families, those residing in non-metropolitan statistical areas or MSAs, and those with poor health status. Aday and Andersen's access to care framework (Aday 1993b) as well as Aday's (1993a) framework for studying vulnerable populations provided the guidance in the identification of these vulnerable populations. Specifically, vulnerable populations may be determined by predisposing, enabling, and need factors. Predisposing factors are those that describe the propensity of individuals to use more services, including basic demographic characteristics (e.g., children v. adults), and social structural variables (e.g., racial/ethnic minorities v. whites). Enabling factors describe the means individuals have available to them for the use of services, including resources (e.g., high-income v. low-income families) (Aday 1994) and place of residence (e.g., MSA v. non-MSA) (Aday 1993b). They represent social and human capital predictors of populations at risk (Aday 1993a). Need factors refer to measures of both physical and mental health status or illness, which is the most immediate cause of health services use (Aday 1993b). The federal government has also targeted these groups in its efforts to reduce the disparity in health care and improve overall health status (e.g., the State Children's Health Insurance Program or SCHIP for children, the Community and Migrant Health Center Program, the National Health Service Corps for racial/ethnic minorities and those residing in medically underserved areas such as non-MSAs, and Medicaid for low-income families).

As these populations typically have greater need for health care, their health status would be adversely affected by lack of access. To the extent that health insurance facilitates access, from a policy perspective, it is critical to understand the insurance status independently associated with these population groups. Four research questions were posed: (1) What is the health insurance status of these vulnerable population groups? (2) Which vulnerable population groups are more likely to be uninsured? (3) Among those insured, which vulnerable groups are more likely to be covered by public rather than private insurance? (4) Among those privately insured, are vulnerable groups more likely to be covered by FFS plans than HMOs? A nationally representative longitudinal database was analyzed to provide reliable answers to these questions.

#### **NEW CONTRIBUTION**

Using a recent and nationally representative probability survey, the study examined population characteristics associated with type of insurance coverage (i.e., public v. private, HMO v. FFS), in addition to providing an update on the health insurance status of the nation's under-65 nonelderly population. The analyses were based on a framework to study population vulnerability, rather than merely individual sociodemographic characteristics. Results of the study can be used to assess policies and programs that target insurance coverage for certain vulnerable populations.

#### **METHOD**

##### **DATA**

Data for this study came from the first two rounds of the Household Component (HC) of the 1996 Medical Expenditure Panel Survey (MEPS), a nationally representative survey of the U.S. civilian noninstitutionalized population cosponsored by the Agency for Health Care Policy and Research (AHCPR) and the National Center for Health Statistics (NCHS). MEPS uses an overlapping panel design in which data are collected through a preliminary contact followed by a series of six rounds of interviews during a 2½-year period. A sample of 10,500 households was drawn from the National Health Interview Survey (NHIS) sampling frame for the initial 1996 MEPS HC panel. The sample size will be increased every 5 years. As an overlapping panel survey, this series of data collection is launched each subsequent year on a new sample of households drawn from the NHIS sampling frame to provide overlapping panels of survey data, which when combined with ongoing panels will

provide continuous and current estimates at both the person and household level. Using computer-assisted personal interviewing (CAPI), data are collected for each household on demographic characteristics, health conditions, health status, use of medical care services, charges and payments, access to care, satisfaction with care, health insurance coverage, income, and employment. A more detailed discussion of the complex design of MEPS has been published elsewhere (Cohen 1997a, 1997b).

The current analysis used all those younger than 65 years who completed the first two rounds of the survey ( $n = 20,469$ ). The elderly population, those 65 and older ( $n = 2,508$ ), were excluded because of the near universal coverage by Medicare. We recognize that since Medicare does not cover prescription drugs or long-term care, supplemental insurance (i.e., Medigap) has to be purchased for their coverage. A large portion of the elderly population cannot afford Medigap. Thus, while Medicare is universal, access and affordability are not.

Since several of the policy-relevant vulnerable population subgroups were oversampled including Hispanics and blacks, those with functional problems, and individuals with a family income less than 200 percent of the poverty line, this data set affords an excellent opportunity to examine the insurance status of vulnerable populations. The 1997 panel (data not available for public release at the time this article was written) was expected to oversample more policy-relevant vulnerable subgroups including adults with functional impairments, children with functional limitations in their activities, individuals aged 18-64 who are predicted to have high levels of medical expenditures, and individuals with a family income less than 200 percent of the federal poverty level.

## MEASURES

For the purpose of this study, we used questions within MEPS that denote insurance status and vulnerability.

**Insurance Status.** We used the questions on health insurance to determine individual's insurance status. The final coding of insurance status consisted of four categories: those with private HMO insurance, those with other private FFS insurance, those with public insurance (predominantly Medicaid, a means tested entitlement program financed by federal and state government), and those without insurance. Individuals with public insurance may also have private coverage. Individuals with Medicare or CHAMPUS insurance were excluded from the analysis because the former is an entitlement pro-

gram and the latter is associated with military status. Both programs are unrelated to vulnerability. The final analytic sample included 20,052 participants younger than 65 who were followed during two rounds.

**Vulnerability.** Using the definition of characteristics of vulnerability as described in the introduction of this article, Aday and Anderson's access to care framework (Aday 1993b), and Aday's (1993a) framework for studying vulnerable populations, we identified measures within MEPS related to the vulnerable groups, as characterized by an individual's predisposing, enabling, and need factors. Specifically, measures of predisposing factors used in the analysis included age and race/ethnicity. The categories of race/ethnicity included white, black, Hispanic, Asian/Pacific Islander, American Indian, and other. Although blacks could be of Hispanic, African, and Asian descent, the data set did not distinguish among these categories. Measures of enabling factors consisted of income (hourly wage) and whether respondents resided in an MSA. Measures of self-perceived need identified from MEPS were (1) physical health status; (2) mental health status; whether the respondent (3) needed instrumental activity of daily living (IADL) help/supervision (such as managing money and shopping for personal items), (4) needed activity of daily living (ADL) help/supervision (such as dressing and eating); (5) used aids or special equipment; (6) experienced difficulty in walking, bending, or stooping; (7) experienced social limitations; (8) experienced cognitive limitation; and (9) had limitation in work, housework, or school.

Since many of the health status measures were collected for both rounds of the interview, we computed composite measures to capture a more stable state of health status by assigning the lower self-reported health status in the two rounds. For example, for self-perceived health and mental health status measures, we considered *excellent* as those reporting "excellent" for both rounds of interview, *very good* as those reporting "very good" for both rounds of interview plus those reporting "excellent" for one round of interview, *good* as those reporting "good" for both rounds of interview plus those reporting "very good" for one round of interview, *fair* as those reporting "fair" for both rounds of interview plus those reporting "good" for one round of interview, and *poor* as those reporting "poor" for both rounds of interview plus those reporting "fair" for one round of interview. The IADL and ADL measures were coded as "yes" (if respondent indicated IADL or ADL limitations in both rounds of interview), "sometimes" (if respondent indicated IADL or ADL limitations in one round of interview), and "no" (if respondent indicated no IADL or ADL limitations in both rounds of interview). The other health status

measures were based on one round of interview since they were not asked in the other round.

It should be pointed out that the limitation of the MEPS data precluded the consideration of community risk factors or many other vulnerable groups in the analysis. Many vulnerable populations are not captured by the MEPS or other national surveys due to a series of logistic challenges including language barriers, limited literacy, limited telephone accessibility of the potential respondents, lack of stable addresses, and higher rates of nonresponse and loss to follow-up (Lieu and Newman 1998). Due to these barriers, standard techniques for collecting data on vulnerable populations may be inadequate.

**Individual Covariates.** Aday and Andersen's access to care framework (Aday 1993b) is also used in the selection of individual covariates that are potentially related to insurance. These include predisposing factors such as respondent's gender, education, employment status, and occupation; and enabling factors such as marital status and place of residence. Since most private insurance is provided through the workplace, employment status is an important predictor of private coverage. We used three variables to represent the occupational environment of the respondents: the type of organization, whether current job had paid sick leave, and whether current job had paid sick leave to visit a doctor. Place of residence may indicate geographic accessibility to insurance plans as well as local attitudes about health insurance.

## STATISTICAL ANALYSIS

Data analysis was performed with SUDAAN because of the multistage, stratified cluster sampling of the MEPS. All analyses accounted for both the design effect and the sampling weights. Simple bivariate comparisons were made between individuals' insurance status and personal characteristics associated with vulnerable populations. Since many of the individual measures were significantly correlated, logistic regressions were used to examine the independent effects of these individual characteristics on insurance status. Several models were constructed with outcomes of insured versus not insured, public versus private insurance, Medicaid versus no insurance, and HMO versus FFS.

To enhance the predictive power of the models, we did not include variables with too many missing values (i.e., organization type, paid sick leave, paid sick leave to visit a doctor) or that were too highly correlated with other measures included in the model (i.e., IADL limitations that were highly correlated with ADL limitations, other measures of limitations including social limitation, cognitive limitation, work/housework/school limitation,

difficulty in walking, bending, or stooping, need for aids/equipment, which were significantly correlated with other health measures included in the model). Including these measures in the analyses would reduce the sample size significantly (to a few hundred) or bias the results (due to multicollinearity). We recognize the exclusion of these measures would affect the completeness of the model. For example, type of employment and workforce characteristics are important determinants of insurance coverage, particularly private versus public insurance coverage. The absence of more complete information on this variable would affect the findings in the determinants of insurance status.

We did include variables with modest missing values (e.g., employment status with 6,006 missing observations, marital status with 5,953 missing observations, and hourly wage with 11,490 missing observations). Rather than deleting the observations with missing values, we created dummy categories for the missing values so that analyses could be performed with a larger sample size. None of the dummy categories affected the final outcome of the models.

Estimates presented in the text and tables were weighted to reflect national population totals. Unless otherwise stated, only differences that were significant at the level of 0.05 or higher (in a two-tailed test) are discussed here.

## RESULTS

In 1996, an average of 81 percent of Americans younger than 65 in the civilian noninstitutionalized population had insurance coverage (see Table 1). About 69 percent of Americans younger than 65 had private insurance coverage, including 38 percent covered by HMO and 31 percent by FFS plans. More than 11 percent of Americans under 65 were covered by public insurance, primarily Medicaid. More than 19 percent were uninsured.

### HEALTH INSURANCE STATUS OF VULNERABLE POPULATION GROUPS

Although a sizable portion of children remained uninsured (13 percent for those younger than 5 years and 16.5 percent for those between 5 and 17 years), children were more likely to have insurance coverage than young adults (age 18-24). However, children were more likely to be covered by public insurance (27 percent for those younger than 5 years and 18.8 percent for those between 5 and 17 years).

*(text continues on p. 121)*



TABLE 1 Personal Characteristics and Health Insurance Coverage—1996  
U.S. Civilian Noninstitutionalized Population under Age 65 (in percentages)

<i>Population Characteristic</i>	<i>Insurance Coverage</i>				
	<i>Total Population</i>	<i>Private HMO</i>	<i>Fee-for- Service</i>	<i>Public</i>	<i>Uninsured</i>
Predisposing factors					
Age in years	227,135,470	38.2	31.0	11.4	19.4
Under 5	19,724,832	36.3	23.7	27.0	13.0
5-17	50,795,160	35.5	29.2	18.8	16.5
18-24	24,577,588	29.4	24.2	10.3	36.2
25-44	81,635,182	42.1	30.3	7.2	20.5
45-64	50,402,708	39.8	40.2	5.2	14.8
Race/ethnicity	227,135,470	38.2	31.0	11.4	19.4
American Indian	2,260,590	32.5	17.0	23.3	27.3
Asian	7,860,310	45.2	21.3	12.3	21.2
Black	29,771,748	32.5	17.6	24.4	25.6
Hispanics	26,524,735	30.5	13.5	20.7	35.4
Other	516,709	26.2	29.1	9.9	34.8
White	160,201,378	40.4	37.1	7.3	15.3
Gender	227,135,470	38.2	31.0	11.4	19.4
Male	112,730,759	37.6	31.2	10.3	20.9
Female	114,404,711	38.9	30.7	12.5	17.8
Highest degree	226,731,515	38.3	31.0	11.4	19.3
No degree	28,896,140	23.7	23.4	17.0	35.9
GED	7,580,170	29.1	24.0	14.7	32.2
High school diploma	77,887,307	39.6	33.6	6.1	20.6
Bachelor's degree	26,304,455	48.2	38.5	1.7	11.7
Master's degree	9,044,346	50.3	39.7	2.9	7.1
Doctorate degree	2,277,734	56.5	37.7	1.2	4.6
Other degree	11,758,171	48.7	33.8	3.9	13.6
Under 16 (not applicable)	62,983,191	36.0	27.0	22.0	15.0
Employment status	163,534,462	39.2	32.6	7.4	20.8
Employed	124,058,204	43.7	34.5	3.3	18.6
Not employed	39,476,258	25.2	26.7	20.3	27.8
Organization type	124,008,734	43.8	34.5	3.3	18.4
Private	87,675,674	44.4	33.0	3.3	19.3
Public	20,763,027	52.2	38.1	3.4	6.3
Self-employed (sole proprietorship)	9,467,602	26.7	34.2	4.5	34.7

TABLE 1 Continued

<i>Population Characteristic</i>	<i>Insurance Coverage</i>				
	<i>Total Population</i>	<i>Private HMO</i>	<i>Fee-for- Service</i>	<i>Public</i>	<i>Uninsured</i>
Self-employed (partnership/ incorporated)	6,102,431	32.4	43.4	2.3	22.0
Paid sick leave	106,188,563	46.4	34.1	3.3	16.3
Yes	64,780,349	56.2	36.4	1.4	6.0
No	41,408,214	31.0	30.3	6.2	32.4
Paid sick leave to visit a doctor	104,963,675	46.4	34.0	3.3	16.3
Yes	55,683,839	56.7	36.5	1.3	5.4
No	49,279,836	34.7	31.1	5.5	28.7
Enabling factors					
Hourly wage	102,772,165	46.4	33.8	3.3	16.6
Under \$5	6,876,043	23.8	25.5	12.0	38.7
\$5-\$9.99	37,629,514	36.2	30.3	5.3	28.2
\$10-\$14.99	29,282,846	52.7	35.7	1.5	10.2
\$15-\$19.99	13,292,700	60.9	35.6	0.8	2.8
\$20+	15,691,062	56.7	40.5	0.1	2.7
MSA	227,135,470	38.2	31.0	11.4	19.4
Yes	181,816,292	42.7	28.1	10.9	18.3
No	45,319,177	20.3	42.7	13.3	23.7
Census region	227,135,470	38.2	31.0	11.4	19.4
Northeast	44,471,340	41.9	30.1	12.7	15.4
Midwest	53,205,684	33.9	40.8	9.7	15.6
South	78,104,854	35.3	31.2	10.3	23.2
West	51,353,592	44.1	21.2	13.9	20.8
Marital status	164,044,165	39.1	32.5	7.3	21.0
Married	90,379,495	44.3	37.5	4.0	14.2
Nonmarried	73,664,670	32.8	26.4	11.4	29.4
Need factors					
Perceived health status	226,641,387	38.3	31.0	11.4	19.3
Excellent	59,268,957	41.8	34.7	7.6	15.9
Very good	89,029,802	40.1	32.7	9.3	17.9
Good	57,110,540	36.0	27.5	14.0	22.6
Fair	16,490,926	28.2	24.4	21.3	26.1
Poor	4,741,163	22.6	20.4	33.6	23.4

(continued)

TABLE 1 Continued

Population Characteristic	Insurance Coverage				
	Total Population	Private HMO	Fee-for- Service	Public	Uninsured
Perceived mental health status	226,539,072	38.3	31.1	11.4	19.3
Excellent	79,918,611	43.1	33.7	7.4	15.9
Very good	90,897,951	38.8	31.9	10.3	19.0
Good	44,494,204	31.6	27.9	16.5	24.1
Fair	9,298,666	27.9	19.7	26.5	25.9
Poor	1,929,640	16.8	10.2	41.3	31.7
IADL help	226,710,396	38.3	31.0	11.4	19.3
Yes	1,416,568	17.0	20.7	45.3	17.1
Sometimes	2,692,391	23.9	28.6	29.3	18.2
No	222,601,438	38.6	31.1	11.0	19.4
ADL help	226,696,367	38.3	31.0	11.4	19.3
Yes	656,710	18.0	21.3	48.4	12.2
Sometimes	1,632,248	27.7	30.3	29.2	12.8
No	224,407,409	38.4	31.1	11.2	19.4
Use aids/equipment	227,095,778	38.2	31.0	11.4	19.4
Yes	2,655,178	23.8	29.8	32.1	14.3
No	224,440,600	38.4	31.0	11.2	19.4
Walk/bend/stoop difficulties	227,095,778	38.2	31.0	11.4	19.4
Yes	12,691,362	33.9	29.0	18.2	18.9
No	214,404,417	38.5	31.1	11.0	19.4
Social limitations	227,033,640	38.2	31.0	11.4	19.4
Yes	5,794,791	30.8	26.1	24.6	18.4
No	221,238,850	38.4	31.1	11.1	19.4
Cognitive limitation	225,538,307	38.1	31.1	11.4	19.4
Yes	3,541,868	23.9	23.0	31.5	21.6
No	221,996,439	38.4	31.2	11.1	19.4
Work/housework/ school Limitation	207,368,591	38.4	31.7	9.9	20.0
Yes	9,718,712	25.6	25.7	27.9	20.7
No	197,649,879	39.1	32.0	9.0	19.9

Note: GED = general equivalency diploma. MSA = metropolitan statistical area. IADL = instrumental activity of daily living. ADL = activity of daily living. HMO = health maintenance organization.

Racial and ethnic minorities were more likely than whites to be uninsured and, when they had insurance, to be covered by public rather than private insurance. Hispanic nonwhites were most likely to be uninsured (35.4 percent), followed by American Indians (27.3 percent), blacks (25.6 percent), and Asians (21.2 percent). Blacks were most likely to have public insurance (24.4 percent), followed by American Indians (23.3 percent) and Hispanics (20.7 percent), whereas Asians were most likely to have private HMO coverage (45.2 percent).

Low income was related to lack of insurance. Those making less than \$5 per hour were most likely to be uninsured (38.7%), followed by those making \$5 to \$9.99 per hour (28.2 percent). Those making \$15+ per hour were most likely to be privately insured (96.5 percent to 97.2 percent).

Insurance coverage also varied by geographic residence. Those residing within MSAs were more likely to be covered by HMO plans (42.7 percent) than those residing outside MSAs, who were more likely to be covered by FFS plans (42.7 percent). Non-MSA residents were also more likely to be uninsured than MSA residents (23.7 percent v. 18.3 percent). Individuals residing in the South and West were less likely than those of other regions to have private insurance (66.5 percent and 65.3 percent in the South and West, respectively, compared with 74.7 percent in the Midwest and 72 percent in the Northeast).

The health status of individuals was related to their insurance status. Those with excellent health were most likely to be privately insured (76.5 percent), whereas those with fair and poor health were least likely (52.6 percent and 43 percent, respectively). Public insurance helped reduce the health-related disparities in private insurance coverage, as persons in poor health were most likely to be covered by public insurance (41.3 percent). A similar pattern was observed with all other health measures including perceived mental health status; need for ADL help; need for IADL help; need for aids/equipment; difficulty in walking, bending, or stooping; social limitation; cognitive limitation; and limitation in work, housework, or school.

#### **CHARACTERISTICS ASSOCIATED WITH THE UNINSURED**

Table 2 presents results of the logistic regression models associating characteristics of vulnerable populations with insurance coverage. These results indicate the likelihood of whether an individual with certain characteristics will be insured and, if insured, whether they are covered by private or public insurance, HMO, or FFS plans. The odds ratios were presented along with a

TABLE 2 Logistic Regression Models Associating Vulnerable Populations' Characteristics with Insurance Status for 1996 U.S. Civilian Non-institutionalized Population Under Age 65

<i>Population Characteristic</i>	<i>Insurance Coverage</i>		
	<i>1 = Insured 0 = Uninsured Odds Ratio</i>	<i>1 = Privately Insured 0 = Publicly Insured Odds Ratio</i>	<i>1 = HMO 0 = Fee-for-Service Odds Ratio</i>
Intercept	32.93	4.32	0.53
Predisposing factors			
Age in years			
Under 5	4.44***	1.25	1.99***
5-17	3.33***	2.10***	1.71***
18-24	0.67***	0.62**	1.31**
25-44	0.67***	0.37***	1.29***
45-64 (reference group)			
Race/ethnicity			
American Indian	0.70	0.25***	1.52
Asian	0.64***	0.61**	1.32*
Black	0.70***	0.21***	1.60***
Hispanic nonwhite	0.39***	0.28***	1.53***
Other	0.34**	0.85	0.67
White (reference group)			
Gender			
Male	0.71***	1.11	0.93
Female (reference group)			
Highest degree			
No degree (reference group)			
GED	1.19	0.97	1.29
High school diploma	1.80***	2.43***	1.12
Bachelor's degree	2.25***	4.70***	1.07
Master's degree	3.31***	2.08*	1.17
Doctorate degree	6.73***	3.93	1.42
Other degree	2.22***	2.82***	1.33*
Employment status			
Employed	0.74***	4.28***	0.90
Not employed (reference group)			

TABLE 2 Continued

Population Characteristic	Insurance Coverage		
	1 = Insured 0 = Uninsured Odds Ratio	1 = Privately Insured 0 = Publicly Insured Odds Ratio	1 = HMO 0 = Fee-for-Service Odds Ratio
Enabling factors			
Hourly wage			
Under \$5	0.09***	0.01***	0.79
\$5-\$9.99	0.13***	0.04***	1.02
\$10-\$14.99	0.37***	0.15***	1.16
\$15-\$19.99	1.23	0.21**	1.33**
\$20+ (reference group)			
MSA			
Yes	1.42***	1.82***	2.86***
No (reference group)			
Census region			
Northeast	1.51***	0.56***	1.21***
Midwest	1.45***	0.80**	0.80***
West	1.24***	0.59***	1.73***
South (reference group)			
Marital status			
Married	2.22***	3.33***	1.10
Not married (reference group)			
Need factors			
Perceived health status			
Excellent	0.72	3.32***	0.80
Very good	0.73	2.91***	0.88
Good	0.67*	1.86***	1.00
Fair	0.72	1.39	0.88
Poor (reference group)			
Perceived mental health status			
Excellent	1.32	3.70***	0.61
Very good	1.23	2.49***	0.56
Good	1.16	1.52	0.54
Fair	1.30	1.07	0.64
Poor (reference group)			

(continued)

TABLE 2 Continued

Population Characteristic	Insurance Coverage		
	1 = Insured 0 = Uninsured Odds Ratio	1 = Privately Insured 0 = Publicly Insured Odds Ratio	1 = HMO 0 = Fee-for-Service Odds Ratio
ADL help			
Yes (reference group)			
Sometimes	0.49	1.95	0.93
No	0.80	2.84**	1.33
Number of observations	19,163	15,047	12,346
-2 log likelihood ratio	16,019.23***	3,958.64***	1,089.08***

Note: GED = general equivalency diploma. MSA = metropolitan statistical area. ADL = activity of daily living. HMO = health maintenance organization.

\* $p < 0.05$ . \*\* $p < 0.01$ . \*\*\* $p < 0.001$ .

test of significance of the coefficients. The 95 percent confidence intervals (CIs) of the odds ratios are available on request.

Among predisposing factors, significant predictors of insurance included age, race/ethnicity, gender, and education. While children younger than 18 were more likely to be insured, those between 18 and 44 were less likely so. Men were more likely to be uninsured than women. Among racial/ethnic groups, Hispanics were least likely to be insured, followed by blacks and Asians. The higher the educational achievement, the more likely one was to be insured. For example, compared with those without any educational degrees, those with a high school diploma were 1.80 times more likely to be covered by insurance, those with a bachelor's degree were 2.25 times more likely, those with a master's degree were 3.31 times more likely, and those with a doctorate degree were 6.73 times more likely.

Controlling for other characteristics, employment was associated with the uninsured. The type of organization among those employed was a significant predictor. In a separate analysis (results not shown), those employed either by private or public organizations were more likely to be insured than those self-employed through partnership or incorporation (odds ratios = 1.49, 3.42, CI = 1.03-2.17, 2.14-5.46, respectively).

All enabling factors entered into the model were significantly associated with insurance coverage. There was a gradient relationship between hourly wage and insurance. Those who made the least (less than \$5 per hour) were

least likely to be insured, followed by those making between \$5 and \$9.99 per hour, and \$10 to \$14.99 per hour. There was no difference in insurance coverage between those making between \$15 and \$19.99 per hour and those making \$20+ per hour. Area of residence was significantly related to insurance. Those residing in MSAs were 1.42 times more likely to have insurance than those residing in non-MSAs. Those living in the Midwest, Northeast, and West were more likely to be insured than those living in the South. Married individuals were 2.22 times more likely to be insured than nonmarried ones.

In terms of measures of health needs, both physical health status measures (i.e., perceived physical health status and need for ADL help) and mental health status measure were not significantly related to insurance.

#### **CHARACTERISTICS ASSOCIATED WITH THE PRIVATELY INSURED**

Comparing the population characteristics between the privately insured and publicly insured enables us to assess the target of public insurance in reducing the adverse impact on coverage based on private initiatives. Among predisposing factors, the association between age and insurance status was less than clear-cut. Compared with those aged 45-64, those aged 5-17 were more likely to be privately insured, but those between ages 18 and 44 were less likely. Race/ethnicity was a strong predictor of insurance status. Compared with whites, minorities such as blacks, American Indians, Hispanics, and Asians were significantly more likely to be covered by public than private insurance. Employment was a strong predictor of the type of insurance. Those employed were 4.28 times more likely to be covered by private than public insurance. Education was significantly associated with insurance status. Those with educational degrees were more likely than those without degrees to have private than public insurance coverage.

Measures of enabling factors were significantly associated with insurance status. There was a gradient relationship between hourly wage and insurance status. Those who made the least (less than \$5 per hour) were most likely to be publicly insured, followed by those making between \$5 and \$9.99 per hour, between \$10 and \$14.99 per hour, between \$15 and \$19.99 per hour, and \$20+ per hour, who were more likely to be privately insured. Area of residence was significantly related to insurance status. Those residing in MSAs were 1.82 times more likely to have private insurance than those residing in non-MSAs. Those living in the South were more likely to have private insurance than those living in other regions primarily due to relatively lower public insurance coverage despite a high uninsurance rate. Married people were more likely to have private than public insurance.



There was a significant association between population need and public insurance coverage. Whether measured by perceived physical or mental health status, or need for ADL help (or need for IADL help in a separate model), those with greater health problems were more likely to have public coverage than those with less health problems. For example, those whose perceived health status was excellent were 3.32 times more likely to have private coverage than those who rated their health as poor. Those who rated their mental health as excellent were 3.7 times more likely to have private coverage than those who rated their mental health as poor. Those without need for ADL help were 2.84 times more likely to have private coverage than those who needed ADL help.

The extent to which public insurance was used to reduce the disparity in coverage for vulnerable populations was also examined in a separate logistic regression model, which associates population characteristics with "Medicaid versus no insurance." The results (not shown) were largely consistent with the comparison between privately and publicly insured: those who are unemployed, poor, or in poor health are more likely to have public insurance. In addition, women and younger people were more likely to have Medicaid than remain uninsured. Race (other than black), education, and geographic residence were not significantly associated with Medicaid versus no insurance.

#### **CHARACTERISTICS ASSOCIATED WITH HMO COVERAGE**

Among those covered by private insurance, age, race/ethnicity, and place of residence were significant predictors of HMO rather than FFS coverage. Younger people, those younger than 45, were significantly more likely to have HMO coverage than those aged 45 to 64. Blacks (1.6 times), Hispanics (1.53 times), and Asians (1.32 times) were more likely to have HMO coverage than whites. MSA residents were 2.86 times more likely to have HMO coverage than non-MSA residents. Those residing in the West or Northeast regions were more likely to have HMO than those from the South or Midwest regions. None of the other characteristics were significantly associated with HMO membership.

#### **DISCUSSION**

In recent years, despite national rhetoric to address the problem of the uninsured, the number of uninsured continues to grow. This study shows that nearly one out of five or 19.4 percent of the population younger than 65

remained uninsured. This finding is consistent with the trend of a continuing increase in the number of uninsured. In 1987, Swartz (1989) estimated that there were 37 million Americans without health insurance—more than 17 percent of this population being below the age of 65 years. The number of uninsured grew by about 1 million per year between 1988 and 1993 (Fraser 1997; Employee Benefits Research Institute 1995b). By 1993, about 41 million and 18.1 percent of the nonelderly population lacked coverage. Recent projections, based on extending the current trend lines in employer-based coverage and Medicaid and Medicare enrollment, estimate that the number of uninsured will grow to 45.6 million or 16.2 percent of the population by the year 2002 (Sheils and Alecxih 1996). Analysts have attributed this growth in uninsurance to a marked shift in our political culture that replaces solving social problems with cutting public spending and balancing the federal budget (Altman, Reinhardt, and Shields 1998).

While vulnerable populations remained hardest hit by lack of insurance, 18.6 percent of the employed were uninsured, or nearly 15.9 million individuals. This finding is consistent with previous studies that demonstrate that more than half of the uninsured are poor or near-poor, that about one quarter are children, and that 85 percent live in families headed by a worker (Employee Benefits Research Institute 1995a, 1995b). A 1997 National Survey of Health Insurance showed that 75 percent of the uninsured nonelderly adults were in working families and one third of the people in fair or poor health were uninsured (The Henry J. Kaiser Family Foundation and the Commonwealth Fund 1997). Indeed, the link between employment and insurance has been steadily eroding for nongovernment employees in general and their dependents in particular (Fraser 1997). In the context of previous research, our study demonstrates the continual erosion of private insurance. Based on the comparable 1977 and 1987 National Medical Care Expenditure Surveys (NMCES), the percentage of nonelderly population with private health insurance declined from 79.4 percent in 1977 to 77.7 percent in 1987 (Taylor, Beauregard, and Vistnes 1995). Our study indicates that this number has further declined to 69.2 percent (see Table 1). The decline in the employment-based health insurance has affected vulnerable populations disproportionately. For example, persons in families with an income below 200 percent poverty experienced a much sharper decline in private health insurance coverage than their wealthier counterparts (Employee Benefits Research Institute 1997). The growing number of uninsured among the employed highlights the cracks in the foundation of the American employer-based system (Altman, Reinhardt, and Shields 1998). Having a job is no longer a guarantee for insurance coverage. Analysts project that the number of persons receiving insurance through

an employer will further drop to 52.2 percent in 2002 (Sheils and Alecxih 1996).

The finding that a greater proportion of children (compared with nonelderly adults) are covered by insurance can be attributed to the expansion of the Medicaid program through the *Omnibus Budget Reconciliation Acts of 1987-1990* and other legislation that eliminated categorical eligibility for Aid to Families with Dependent Children (AFDC) as a requirement for Medicaid enrollment and raised the age and income ceilings under which children could receive Medicaid (Cutler and Gruber 1996; Dubay and Kenny 1996). The recently enacted SCHIP could further help states cover more uninsured children with about \$24 billion in federal funds during the next 5 years (King 1997; Thorpe and Florence 1999). Whether the expansion of public programs is able to make up for the erosion in employer-sponsored insurance remains to be seen.

While there has been considerable interest in the health insurance status of children, more than 30 million Americans aged 18-64 remain uninsured. The main objective of this study is to identify the vulnerable population subgroups most susceptible to uninsurance. The findings of the study indicate these groups included racial/ethnic minorities (in particular Hispanics, American Indians, and blacks), those who worked in low-wage jobs or companies that did not offer sick leave benefits or who were self-employed in solo proprietorship, and those residing in non-MSAs (see Table 3 for summary of findings). Since these vulnerable characteristics are independently associated with uninsurance, individuals with multiple vulnerable characteristics are likely to face significantly greater risk. Indeed, individuals whose vulnerability cuts across predisposing, enabling, and need characteristics (e.g., those who are racial/ethnic minorities, poor, and in bad health) are likely to bear the greatest risk.

To the extent these vulnerable populations had insurance coverage, they were more likely covered by public than private insurance. Controlling for population characteristics, the observed insurance disparities in employment and health status were no longer significant predictors. These findings are largely due to public insurance (primarily Medicaid) that targets the unemployed poor and the unhealthy.

While public insurance helps reduce the employment- and health-related disparities in private coverage, it has not overcome other disparities related to vulnerable characteristics including race/ethnicity, wages, and area of residence. This is consistent with the focus of public insurance such as Medicaid, which typically targets those with very low income, their children (both often recipients of AFDC), and the medically needy, rather than specific racial/ethnic groups, despite national rhetoric to reduce racial disparities in health

TABLE 3 Insurance Status and Population Characteristics: Summary of Findings

<i>Population Characteristic</i>	<i>Insurance Status</i>		
	<i>Insured versus Uninsured</i>	<i>Privately Insured versus Publicly Insured</i>	<i>HMO versus Fee-for-Service</i>
<i>Vulnerable groups versus others</i>			
Children versus adults	+	+	+
Minorities versus whites	-	-	+
Low income versus high income	-	-	<i>ns</i>
Non-MSA versus MSA	-	-	-
Poor health versus good health	<i>ns</i>	-	<i>ns</i>
<i>Individual covariates</i>			
Male versus female	-	<i>ns</i>	<i>ns</i>
Uneducated versus educated	-	-	<i>ns</i>
Unemployed versus employed	+	-	<i>ns</i>
South versus non-South	-	+	-
	(excludes West)		(excludes Midwest)

Note: "+" indicates more likely to be insured, privately insured, or health maintenance organization (HMO) covered than uninsured, publicly insured, or fee-for-service covered, respectively. "-" indicates less likely to be insured, privately insured, or HMO covered than uninsured, publicly insured, or fee-for-service covered, respectively. "ns" means not significant. MSA = metropolitan statistical area.

outcomes (U.S. Department of Health and Human Services 1990, 1998, 1999). Those with low wages, called "the near poor," often do not qualify for Medicaid and are most likely to be uninsured (Rowland, Feder, and Keenan 1997). Although Medicaid plays an important role in providing insurance coverage for many low-income families, its eligibility levels are constrained and workers without children are usually precluded from coverage. Education was independently associated with insurance, suggesting that those without education were less likely to identify and seek insurance even if eligible. Nationally, more than one third, or 3.1 million, children are eligible for Medicaid but not enrolled (Reschovsky and Cunningham 1998). Nor is public insurance evenly distributed geographically. Area and regional differences reflect not only different marketplace conditions, managed care penetration, and demographic profiles but also variation in state funding of public insurance programs, such as Medicaid. Public coverage for vulnerable groups is often at the mercy of individual states where public insurance spending competes with

other social spending such as education or social services, which may have a greater impact on health than the Medicaid program (Fraser 1997). The fact that the number of uninsured has continued to grow indicates that the growth of public insurance has not been able to keep pace with declines in private coverage.

A comparison between HMO and FFS insurance indicates that younger although not much healthier people, racial/ethnic minorities, MSA residents, and those residing in the West and Northeast regions were more likely to have HMO coverage. These findings are largely consistent with previous studies on predictors of HMO enrollment (Taylor, Beauregard, and Vistnes 1995; Juba, Lave, and Shaddy 1980; Welch and Frank 1986; Gaus, Cooper, and Hirschman 1976; Berki and Ashcraft 1980). One explanation of the finding that the health status of HMO and FFS plans was comparable is that the cost savings achieved by HMOs over FFS may not be due to adverse selection. HMOs could achieve cost savings through a different style of medical care delivery than traditional FFS, including physician compensation methods and controlling the use of medical services, particularly high-cost hospital use (Taylor, Beauregard, and Vistnes 1995; Luft 1981; Miller and Luft 1993). Young people and racial/ethnic minorities are more attracted to HMOs, presumably because of lower overall out-of-pocket costs than FFS plans. Older people, who are more likely to have formed strong ties to their physicians under FFS insurance plans, might be less willing to switch plans (Taylor, Beauregard, and Vistnes 1995; Mechanic, Weiss, and Cleary 1983; Ellis 1986). Overall decline in the increase of health care spending seems to indicate that HMOs have contributed to cost containment. Alternatively, it could reasonably be argued that HMOs did enroll healthier people and that FFS insurance produced or maintained healthier people. The true answer can only be found through data collected longitudinally. Regardless, the cost savings achieved through HMOs over FFS cannot be automatically expected to happen when HMOs are expanded to vulnerable populations.

A comparison between privately and publicly insured indicates that, in addition to differences in other vulnerable characteristics, an overwhelming health disparity exists between the privately and publicly insured. The publicly insured were less healthy, less likely to be employed, had lower paying jobs if employed, and were more likely to be racial and ethnic minorities. Thus, states implementing or expanding programs that enroll Medicaid recipients in HMOs in an attempt to cut costs should lower their expectation regarding the extent of cost saving that HMOs can help achieve. Recent data indicate that Medicaid has not experienced significant savings from the expansion of managed care to low-income families (Holahan, Bruen, and Liska 1998).

Taken together, these findings have two policy implications. First, to ensure the equitable distribution of resources and reduce significant disparities in health insurance coverage for particular vulnerable groups, policy makers at both federal and state levels will have to consider expanding public insurance coverage targeting vulnerable groups, rather than merely the economically distressed. In particular, greater efforts are needed to reach those with multiple vulnerable characteristics because they are the ones with greater risk to be uninsured. Second, expecting managed care to achieve cost containment for services provided to vulnerable populations may be unrealistic. Before turning to HMOs for their Medicaid populations, states may need to conduct demonstration projects to test if managed care can indeed contain costs without reducing the quality of care. Otherwise, low capitation rates may lead to managed care organizations dropping their Medicaid members, causing disruption of care.

This study has several limitations. It should be pointed out that the study of vulnerable populations as presented in this article is still preliminary. Vulnerability is a multidimensional construct and can afflict individuals in clusters. Among populations at risk, those susceptible to multiple risks (e.g., being of racial/ethnic minority, children, and poor) are likely to be more vulnerable than those susceptible to single risk (e.g., high-income minority, children of high socioeconomic status). While the Aday framework provided a useful guidance in the selection of some vulnerable characteristics, it is by no means comprehensive or addresses the interaction of these characteristics. Future conceptualization and analysis of vulnerability should reflect some combined aspects of an individuals' predisposing, enabling, and need characteristics and explore how the interactions of these characteristics affect vulnerability.

All secondary analyses are limited to the variables available. As indicated before, the limitation of MEPS prevented us from studying a broad array of vulnerable characteristics and their environmental determinants (e.g., community factors associated with vulnerability). Excessive missing values prevented us from including all relevant measures in the analysis (e.g., workforce characteristics). The absence of health system measures precludes the study of the impact of health systems (e.g., competitive pressures, different levels of managed care penetration and practice in different regions of the country or within the same regions) on insurance status. Another important methodological issue in the use of MEPS data is the extent to which self-reports and proxy reports are similar; in the MEPS, one household member (typically mother) reports all of the information for her children as well. Despite these limitations, the large sample and longitudinal nature of MEPS make it one of the best sources available for examining the status of insurance in America.

In the near future, it appears that financing health care is likely to continue in the pluralist mode, with a combination of public and private approaches and the continued expansion of managed care in both private and public sectors. Too often, various health care reform initiatives are almost exclusively catering to the anxieties of the middle class. Vulnerable populations remain on the margins of the political process. Unless there are a strong political will and a commitment to social justice at both the federal and state levels, ensuring access to care and eliminating health disparities for all may continue to be national goals than reality.

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