Is Health Care Use Equivalent Across Social Groups? A Diagnosis-Based Study

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Abstract: Previous studies of medical care utilization have controlled for medical need by signs or symptoms or broad disease classifications. The present study uses both symptoms and discrete diagnoses to control for medical need in order to determine if the use of ambulatory and hospital care differs by race, income, education, insurance coverage, or region. Using data from the 1976 National Health Interview Survey, we found that there were no consistent differences in the number of physician visits made in a year by these characteristics, medical need held constant. Lack of insurance coverage was associated with fewer hospitalizations in a year for five of nine chronic diseases under review. Race was associated with fewer hospitalizations for two conditions prevalent among minorities. These effects were not evident when medical need was controlled solely by signs or symptoms. (*Am J Public Health* 1983; 73:563–571.)

Introduction

Improving access to medical services has been an avowed cornerstone of federal health policy over the last two decades. Its implementation includes supply side programs such as manpower training, hospital construction, neighborhood health centers, and the National Health Services Corps and demand side programs such as Medicaid and Medicare, as well as tax subsidies for the health insurance of the working population.

Most observers of the health care scene claim that these policies have improved access to medical care of previously underserved groups. Utilization of health services currently appears to be determined primarily by medical need rather than by the race, education, or income of individuals or the characteristics of their communities.[1] Despite these improvements, some gaps in utilization remain. In their comprehensive survey of access to health care among a national sample of families, Aday, Andersen, and Fleming reported that most Americans have adequate access to health services. However, they also found that about 12 per cent of the population is without a regular source of care and a similar percentage lack health insurance. Both those who lack a regular source of care or who have no health insurance utilize fewer health services than the rest of the population. Similarly, residents of rural areas, particularly rural Blacks and Hispanics, have lower utilization rates.[2] Dutton identified another gap in utilization. She found that the poor and members of racial minorities tend to receive care in public clinics or emergency rooms where utilization is impeded because of long travel and waiting times, the effect of which is independent of income, culture, and age, sex, and race.[3]

The conclusion that social differences in utilization have been reduced is also dependent on the definition of medical need used. Aday, Andersen, and Fleming defined need two ways: by a *use-disability ratio* which measures utilization as a function of restricted activity days among those with some restriction in activity, and by a *symptoms-response ratio* which compares the number of persons receiving treatment for a symptom to the number a panel of physicians believe should seek treatment for that symptom. They found few significant differences in either ratio by social class or race.[2] Chen defined need in terms of the proportion of persons with a symptom (e.g., joint pain) who made at least one visit to a physician and found significant differences in utilization as a function of several social factors.[4,5] Kleinman, Gold, and Makuc defined need by patient self-assessment of health status, finding that the poor and Blacks have lower utilization rates for ambulatory care than the rest of the population, when controlling medical need in this fashion.[6]

All of the foregoing definitions of medical need are based either on signs and symptoms of an illness or the broadest disease classifications. Some symptoms are consistent with diseases of widely varying consequences. Joint pain, for example, may be a symptom of mild bursitis or severe rheumatoid arthritis. Moreover, patients may not recognize symptoms of illnesses such as hypertension and diabetes for which medical care is beneficial. Thus, a definition of medical need based either on signs and symptoms or on broad disease classifications may mask a relationship between social characteristics of the individual and utilization of medical care. In the present study, medical need is

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defined both by discrete diagnoses using the four digit ICDA system (Eighth Revision),[7] and by patient-recognized symptoms. We ask whether utilization is equivalent across races, income groups, educational levels, insurance coverages, and regions, when controlling for medical need as well as sex, age, marital status, and family size.

Methods

We performed linear and logistic regression analysis on data collected from respondents to the 1976 National Health Interview Survey who have one of nine marker chronic conditions to determine if the social and demographic characteristics of these individuals, characteristics of their environment, or symptoms they report affect their utilization of health care. We performed the same analysis on a sample of respondents to this survey drawn to represent the whole population of the United States, and which we further divided into those without a serious chronic illness, and those with one or more serious illnesses, regardless of diagnosis.

The National Health Interview Survey (NHIS) is a stratified, random survey of the population of the continental US. The NHIS is administered annually by the National Center for Health Statistics to collect information from 120,000 individuals residing in 40,000 households. The NHIS elicits data on the social characteristics of each of the 120,000 individuals, on each of their medical conditions, their activity and work limitations, and their use of health services. Each medical condition reported by each individual respondent is given an ICDA disease or impairment code according to a strict protocol. The medical coders provide a discrete ICDA code for a condition such as "rheumatoid arthritis" only if a respondent reports that a physician previously gave a specific diagnosis or the symptoms that are reported yield an unambiguous diagnosis. They provide a catch-all ICDA code such as "arthritis unspecified" if the symptoms do not imply a discrete diagnosis or a physician has not provided one.

The NHIS can not be used to determine the true prevalence rate for discrete conditions, since respondents only report conditions of which they are aware and no medical examination is provided. However, it provides a good indication of the medical care utilization of patients with severe and unambiguous symptoms or with conditions previously diagnosed.

The methods of the NHIS, including the sampling procedures, the established validity of the medical and non-medical questionnaire items, the medical coding procedure, and its applicability to various research questions, are documented extensively elsewhere.[8-13]

The public use version of the 1976 NHIS includes data on 113,160 individuals. From among all these persons, we selected respondents with an ICDA code for nine discrete conditions: rheumatoid arthritis (n = 238), osteoarthritis (n = 152), tendonitis (n = 2,284), lower back pain (n = 1,452), angina pectoris (n = 270), chronic ischemic heart disease (n = 533), hypertension (n = 1,419), emphysema (n = 449), and diabetes (n = 815). The choice of conditions reflects their prevalence in the community at large and the range of their symptoms and impacts. We selected four musculoskeletal conditions because the 1976 NHIS included an arthritis supplement, and as a result more data on symptoms and utilization due to these conditions are available than for all other conditions. In addition to these nine disease specific samples, we created a random sample (n = 2,000) from among the 113,160 survey respondents to represent the population of the continental US, regardless of health status. This sample was also partitioned into those persons with no chronic conditions causing activity limitations (n = 1,697) and those with one or more such conditions (n = 303) to represent well and ill populations, respectively. The purpose is to compare the determinants of utilization in these groups with the determinants in persons with one of the specific diagnoses chosen for study.

The NHIS provides as many as 15 variables measuring patient-recognized symptoms and signs. Of these 15, at least nine are specific to the condition in question.* Another six variables measure gradations in overall health status.** We performed factor analysis using varimax rotation on the 15 symptom variables separately for each of the nine discrete conditions. For the non-disease-specific samples, the factor analysis included only the six variables measuring overall health status. The factor analysis yielded as many as five symptom factors for each sample, the first three based on symptoms reports of the discrete condition, and the last two based on overall health status. The symptom factors derived for each sample were used as independent variables in the subsequent multiple regression analyses.

The other principal independent variables included in the analysis are race, family income, education, insurance coverage, dummy variables which derive from the Census regions (with the category "West" left out), and dummy variables defined by whether the respondent lives in an SMSA-central city, SMSA-suburb, or non-SMSA (with the category "non-SMSA" left out). The independent variables included for statistical control only are age, sex, family size, and marital status.

We include two measures of utilization for each sample: 1) the total number of physician visits, and 2) hospitalizations over a one-year period due to all conditions the individual may have. Because of the arthritis supplement in the 1976 NHIS, three measures of utilization specifically due to each arthritic condition are also reported. They include the total number of physician visits due to the specific condition in question over a one-year period, and whether the individual had ever been hospitalized or had ever had a surgical procedure for this condition. The last two utilization

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*Duration since onset; extent and frequency of symptoms; whether the condition causes chronic activity limitation and if so, whether it is the main cause of activity limitation; the number of restricted activity, bed, and work loss days in the past two weeks; and the number of bed and work loss days in the past year.

**Overall assessment of health status; overall activity limitation and restricted activity days; and the total number of conditions, chronic conditions, and chronic conditions causing limitation in activity.

TABLE 1—Effect of Medical and Social Variables on Total Number of Physician Visits for All Conditions, 1 Year Period (Standardized regression coefficients)

Sample	N	Race	Family Income	Education	Insurance Coverage	Living in: Northeast	North-Central	South	Central City	Suburb
Well Persons	1520			−.10**					.08**	
All Persons	1788		−.08**	−.09**					.09**	
Ill Persons	268				−.11**				.15**	
Rheumatoid Arthritis	189			.11*		−.31**	−.36**	−.29**		.12*
Osteoarthritis	110						.19**		.15*	
Tendonitis	1685	.09**		.03*	−.06**		.04*			
Lower Back Pain	1046			.07*						
Angina	245				−.16**		−.13**			
Emphysema	399	.18**	−.12**			.09*	.11**			
Hypertension	1259				−.04*			−.12**		
CHD	471									
Diabetes	718	−.07**			−.08**		−.12**	−.13**	.08**	

TABLE 1—Continued

Sample	Symptom Factor 1	Symptom Factor 2	Symptom Factor 3	Symptom Factor 4	Symptom Factor 5	Significance of Equation	Adjusted R^2	R^2
Well Persons	x	x	x	x		.01	.03	.04
All Persons	x	x	x	x	.10**	.01	.05	.06
Ill Persons	x	x	x	x	.20**	.01	.11	.17
Rheumatoid Arthritis				.13**		.05	.08	.18
Osteoarthritis		.49**	x	.32**		.01	.37	.48
Tendonitis			.09**	.29**	x	.01	.10	.11
Lower Back Pain		.13**	x	.09**		.01	.02	.04
Angina			x	x		.05	.05	.12
Emphysema	x	.13**		x		.01	.07	.11
Hypertension		.22**	x	x		.01	.06	.07
CHD		.10**	x	x		n.s.	.01	.05
Diabetes	.07**	.16**	x	x		.01	.07	.10

*Coefficient significant at $p < .05$
**Coefficient significant at $p < .01$
X-variable not included in equation
Race: 1 = White, 2 = Minority
Insurance coverage: 0 = no insurance, 1 = some insurance
Northeast, North Central, South: 0 = not living in this region, 1 = in region
Central city, suburb: 0 = not living in this area, 1 = living in area

measures are categorical variables and therefore logistic regression is used to estimate the effect of demographic, social, and regional variables and symptom factors on the probability that an individual received one or more hospitalizations or surgical procedures (Tables 4 and 5, below). A one-sided chi-square test ($p < .05$) establishes the significance of the coefficients for each variable in the equations and the overall relationship between the independent and dependent variables. The other utilization measures are continuous variables, and linear regression is used to estimate the effect of the independent on the dependent variables (Tables 1 through 3, below). A one-sided F-test ($p < .05$) establishes the significance of individual coefficients and the overall equation.

In each regression equation we test whether there are significant differences in utilization by race, income, education, insurance coverage, region, and urban-rural residence, when medical need as defined by symptom factors and age, sex, marital status, and family size are held constant. Since age, sex, marital status, and family size are included in the equations only for purposes of statistical control, to save space, regression coefficients for these variables will not be included in Tables 1 through 5, below.***

The purpose of the following analysis is not to provide exact estimates of regression coefficients for social and demographic variables. Given the complex sampling frame of the NHIS,[9] this would be prohibitively expensive to do.[14-16] Instead, the purpose is to detect consistent patterns in the coefficients for the variables of interest.

After estimating the equations for Tables 1 through 5,

***Full data available on request to authors.

TABLE 2—Effect of Medical and Social Variables on Total Number of Hospitalizations for All Conditions, 1 Year Period (Standardized regression coefficients)

						Living in													
Sample	N	Race	Family Income	Education	Insurance Coverage	Northeast	North-Central	South	Central City	Suburb	Symptom Factor 1	Symptom Factor 2	Symptom Factor 3	Symptom Factor 4	Symptom Factor 5	Significance of Equation	Adjusted R^2	R^2
Well Persons	1520			−.14**							x	x	x	x		.01	.03	.04
All Persons	1788		−.05**	−.10**				−.04*			x	x	x	x		.01	.04	.05
Ill Persons	268									.11**	x	x	x	x		n.s.	.00	.06
Rheumatoid Arthritis	189		−.31**		.18**	−.18**			−.13**			.20**			.22**	.01	.19	.28
Osteoarthritis	110											.23**	x	.32**	.37**	.01	.20	.34
Tendonitis	1685			−.04**	.04**		.05**	.07**	−.06**	−.09**	−.05**	.04**		.24**	x	.01	.07	.08
Lower Back Pain	1046		.06**		.06**		.11**	.11**			−.11**	.18**	x	.23**	.08**	.01	.12	.14
Angina	245		−.12**						−.15**			.19**	x	x	−.10**	.01	.09	.16
Emphysema	399					.12**	.16**				x	.26**	.10**	x		.01	.07	.11
Hypertension	1259	−.05**			.05**					.06**	.05**	.21**	x	x		.01	.05	.06
CHD	471				.08**							.29**	x	x		.01	.07	.10
Diabetes	718	−.07**							−.08**		.11**	.23**	x	x		.01	.08	.11

*Coefficient significant at $p < .05$
**Coefficient significant at $p < .01$
X-Variable not included in equation
Race: 1 = White, 2 = Minority
Insurance coverage: 0 = no insurance, 1 = some insurance
Northeast, North Central, South: 0 = not living in this region, 1 = in region
Central city, suburb: 0 = not living in this area, 1 = living in area

we sought to determine if the results were sensitive to the inclusion of interaction terms, for example between education and insurance and income, and race, sex, age, and severity, or to the functional form of the independent and dependent variables. Since the results were not sensitive to the inclusion of interaction terms or the functional form of variables, we report here only the results from the initial specification of each model equation.***

Appendix Table 1 summarizes the demographic characteristics and medical care utilization of each sample in the study. Again, because of the difficulty in estimating variances from complex sampling frames and because there may be social differences in obtaining discrete diagnoses, the characteristics of the persons in these samples may differ from the characteristics of persons in true random samples.

Results

Table 1 presents data on the factors affecting the number of physician visits for all conditions over a one-year period. In this and all subsequent Tables, each sample is analyzed separately. The Table reports regression coefficients only for variables which significantly affect utilization. The first three rows are samples representing: persons with no chronic conditions causing limitation in activity (well persons), the entire population of the continental US (all persons), and those with one or more chronic conditions causing limitation in activity (ill persons).

Among all persons (row 2), those with lower family incomes, poor educations, and those living in central city areas had more physician visits when controlling for symptoms. No differences according to race or insurance cover-

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***Full data available on request to authors.

TABLE 3—Effect of Medical and Social Variables on Total Number of Physician Visits for This Condition, 1 Year Period (Standardized regression coefficients)

						Living in				
Sample	N	Race	Family Income	Education	Insurance Coverage	Northeast	North-Central	South	Central City	Suburb
Rheumatoid Arthritis	189					−.16**	−.19**	−.13**		
Osteoarthritis	110	.19**			−.17**	.23**			−.16**	
Tendonitis	1685									
Lower Back Pain	1046		−.09**	.06**		.06**				

TABLE 3–Continued

Symptom Factor 1	Symptom Factor 2	Symptom Factor 3	Symptom Factor 4	Symptom Factor 5	Significance of Equation	Adjusted R^2	R^2
.29**	.10**				.01	.12	.22
.25**	.31**	x	.12**		.01	.24	.38
.14**	.05**	.41**	.14**	x	.01	.23	.24
.14**	.30**	x	.07**	−.05**	.01	.16	.17

*Coefficient significant at $p < .05$
**Coefficient significant at $p < .01$
X-Variable not included in equation
Race: 1 = White, 2 = Minority
Insurance coverage: 0 = no insurance, 1 = some insurance
Northeast, North Central, South: 0 = not living in this region, 1 = in region
Central city, suburb: 0 = not living in this area, 1 = living in area

age were found, and all other significant differences were due to demographic characteristics or symptoms.

Among ill persons (row 3), no differences in the number of physician visits according to race, income, or education were detected, residents of central city areas actually had more physician visits, and, surprisingly, so did those who reported having no health insurance. Even among well persons (row 1), no differences in the number of physician visits among races, income groups, or by insurance coverage were detected, and the poorly educated and those living in central city areas actually had significantly more such visits. In the samples of persons with specific chronic conditions, only among those with diabetes did members of a racial minority group have significantly fewer physician visits than Whites and in the tendonitis and emphysema samples, such persons actually had more physician visits. For none of the nine conditions under study did lower income persons or those reporting no insurance experience fewer visits to the doctor. The well educated did make more physician visits for three of the four musculoskeletal conditions, although there was no educational gradient for any of the five non-arthritic conditions and for osteoarthritis. More severe symptoms resulted in significantly more physician visits for all but angina and the symptoms effect was the most consistent among all factors included in the analysis.

Table 2 presents results on the effect of the independent variables on the total number of hospitalizations for all conditions over a one-year period. Membership in a racial minority group, lack of insurance coverage, low family income, and poor education did not result in fewer hospitalizations among well persons, all persons, and ill persons, respectively. In fact, among well and all persons, the poorly educated had more hospitalizations and, among all persons, the low income group did as well. In the disease specific samples, those who reported having some health insurance coverage had a significantly greater number of hospitalizations in five of the nine conditions and in no condition did those without insurance experience more hospitalization. Since those without insurance did not have fewer physician visits, this suggests that lack of insurance may only be critical in impeding the utilization of expensive health services. Members of racial minority groups with either diabetes or hypertension reported fewer hospitalizations than Whites. These were the only conditions among the nine in which minority group members constituted more than 10 per cent of the total (Appendix Table 1). The absence of a racial effect on hospitalization in the other illnesses may therefore reflect the small numbers of minorities in each of these samples rather than true equivalency in hospitalization rates. Low income was only associated with fewer hospitalizations among persons with one condition, lower back pain, and poor education was not associated with fewer hospitalizations among those with any of the nine conditions under study. As with physician visits, severe symptoms had the most consistent effect on the number of hospitalizations in a year, with at least one symptom factor significantly affecting hospitalization in each of the nine condition samples.

Tables 3 through 5 present data on utilization specifical-

TABLE 4—Effect of Medical and Social Variables on the Probability of Ever Having Had One or More Hospitalizations for This Condition (Logistic regression coefficients)

						Living in											
Sample	N	Race	Family Income	Educa-tion	Insurance Coverage	North-east	North-Central	South	Central City	Suburb	Symptom Factor 1	Symptom Factor 2	Symptom Factor 3	Symptom Factor 4	Symptom Factor 5	Significance of Equation	D
Rheumatoid Arthritis	187	x									1.26**					.01	.21
Osteoarthritis	110	x											x			.02	.26
Tendonitis	1543	x											.25**	.39**	x	0	.04
Lower Back Pain	1015	x			.48**							.42**	x	.63**		0	.13

*Coefficient significant at p < .05
**Coefficient significant at p < .01
X-Variable not included in equation
Race: 1 = White, 2 = Minority
Insurance coverage: 0 = no insurance, 1 = some insurance
Northeast, North Central, South: 0 = not living in this region, 1 = in region
Central City, suburb: 0 = not living in this area, 1 = living in area

TABLE 5—Effect of Medical and Social Variables on the Probability of Ever Having Had One or More Surgical Procedures for This Condition (Logistic regression coefficients)

						Living in											
Sample	N	Race	Family Income	Educa-tion	Insurance Coverage	North-east	North-Central	South	Central City	Suburb	Symptom Factor 1	Symptom Factor 2	Symptom Factor 3	Symptom Factor 4	Symptom Factor 5	Significance of Equation	D
Rheumatoid Arthritis	187	x		.52**												.01	.18
Osteoarthritis	110	x											x	.58*		.05	.24
Tendonitis	1543	x									−.55*		.20**	.31*	x	.01	.02
Lower Back Pain	1015	x	.10*		.48*							.24**	x	.73**	−.21*	0	.09

*Coefficient significant at p < .05
**Coefficient significant at p < .01
X-Variable not included in equation
Race: 1 = White, 2 = Minority
Insurance coverage: 0 = no insurance, 1 = some insurance
Northeast, North Central, South: 0 = not living in this region, 1 = in region
Central city, suburb: 0 = not living in this area, 1 = living in area

ly due to each of four musculoskeletal conditions. Table 3 portrays the effect of the independent variables on the number of physician visits due to the condition in question over a one-year period. For each of the four conditions, severe symptoms result in an increase in the number of visits to the physician for the condition. The effect of symptoms on the number of physician visits becomes even clearer when utilization is regressed on the independent variables without the symptom factors. For rheumatoid arthritis, the per cent of variance explained (unadjusted) decreases from .22 to .08; for osteoarthritis from .38 to .21; for tendonitis from .24 to .02; for lower back pain from .17 to .04 (regressions without symptom factors not shown in Table). Not only is the effect of symptoms on ambulatory care utilization the most consistent of all sets of variables analyzed, but membership in a racial minority group, low family income, and lack of insurance coverage did not result in fewer physician visits for any of the four conditions. Persons with poor education had fewer visits for only one condition, lower back pain, and residents of central city areas had fewer physician visits only for osteoarthritis. The quantity of ambulatory care used over a one-year period among persons with these conditions seems to be determined primarily by medical need and demographic factors.

Table 4 presents the results of a logistic regression analysis of the effect of the independent variables on the *probability* that an individual with one of these four musculoskeletal conditions had ever received a hospitalization for it. The D-statistic is analogous to an r-square. Unfortunately, race was excluded from this analysis because too few individuals in each sample were members of minority groups to permit estimation of a racial effect. As can be seen from the Table, income, education, and central city residence had no effect on the probability that an individual had ever been hospitalized for any of the four conditions. While lack of insurance had no effect on the probability of hospitalization for three of the four conditions, persons with lower back pain who reported no insurance were less likely to have had at least one hospitalization for this condition. Severe symptoms increased the chance of hospitalization for persons with all conditions but osteoarthritis, indicating again that the most consistent determinant of hospitalization is medical need.

The utilization measures used in Tables 2 and 4 differ in two respects. First, the measure used in Table 2 includes hospitalizations for any condition, not just the one in question. Second, it is the count of hospitalizations over a one-year period, whereas the measure in Table 4 asks if the individual had ever been hospitalized for the specific condition. When comparing the results across these utilization measures, we find that lack of insurance coverage results in fewer hospitalizations in the past year for persons with rheumatoid arthritis, tendonitis, and lower back pain. However, it only affects the probability of ever having had a hospitalization for the condition in question for persons with lower back pain. Thus, lack of insurance may impede only the non-arthritic hospitalizations of those with rheumatoid arthritis and tendonitis or persons with these two conditions who lack insurance may receive one hospitalization for the condition but fewer total hospitalizations and they may wait longer to receive the one.

Table 5 presents the results of a logistic regression analysis of the effect of the independent variables on the *probability* that an individual with one of these four musculoskeletal conditions had ever had surgery for it. Again, there were too few individuals who were members of a minority group in each sample to estimate an effect of race on surgery. Low income was associated with a lower chance of surgery only for lower back pain among the four samples; poor education was associated with a lower chance of surgery only among persons with rheumatoid arthritis; and lack of insurance coverage impeded surgical utilization only among those with lower back pain. Severe symptoms increased the chance of ever having had surgery for osteoarthritis, tendonitis, and lower back pain, but not for rheumatoid arthritis.

Discussion

Is health care use equivalent across social groups? This question can not be answered with one study. Aday, Andersen, and Fleming concluded that social differences in utilization have been reduced, although persons without insurance or a regular source of care have lower rates of utilization. Their conclusions can not be generalized to persons with specific chronic conditions, however, since the survey on which they base their conclusions included too few cases with any one discrete diagnosis. Likewise, the conclusions one may draw from the present study are also limited. Household surveys such as the NHIS generally do not reach individuals who may have a reason to avoid interview. Undocumented workers, for example, would be unlikely to participate in the NHIS and they probably lack adequate access to care.[17,18] The NHIS does not include as much information on the nature of the usual source of care as the surveys on which Dutton, and Aday, Andersen, and Fleming based their conclusions, and so it can not be used to detect an effect of the system of care or source of care on utilization rates. The conclusion that utilization is or is not equivalent across social groups may also depend on the year of the study. Since the data on which the present study is based were collected, the number of physicians per capita has increased which might have improved utilization by the poor or racial minorities, while Medicaid reimbursement has been reduced and public hospitals closed which might have impeded it. The cautious strategy would be to generalize the results of this study only to the mid-1970s, to those likely to respond to surveys, and to those likely to know they have a discrete diagnosis or to have symptoms so severe that the diagnosis is unambiguous.

This paper presents the results of two separate tests of equivalence in utilization of ambulatory care: the number of visits for all conditions in a year, and the number of visits specifically due to the musculoskeletal condition in question. When controlling for diagnosis as well as symptoms, medical need is the most consistent determinant of ambulatory care utilization. There were no consistent effects of race, income, education, or insurance coverage on the number of physician visits in a year for all conditions or the one in question.

The situation for hospitalizations seems less clear. As with ambulatory care, symptoms consistently affect both the number of hospitalizations in a year for all conditions among persons with one of the nine chronic diseases studied and the probability of ever having had a hospitalization specifically due to one of the four musculoskeletal conditions under study. However, for five of the nine specific chronic disease samples, a reported lack of insurance coverage resulted in fewer hospitalizations in a year, symptoms and demographic characteristics held constant. The five included rheumatoid arthritis, tendonitis, lower back pain, chronic ischemic heart disease, and hypertension. These are not conditions for which hospitalizations are rare. For example, 36 per cent of the respondents with rheumatoid arthritis had had at least one hospitalization for their condition (Appendix Table 1). For two conditions which are common among Blacks, hypertension and diabetes, members of racial minority groups reported significantly fewer hospitalizations in a year, symptoms, insurance coverage, and all other demographic characteristics held constant. While we found that persons without insurance coverage had fewer hospitalizations in a year for five conditions, we also found that insurance did not affect the probability of ever having had a hospitalization for the condition in question among three of the four musculoskeletal conditions for which the data are available. One possible explanation for this discrepancy may be that hospitalizations are available to those without insurance if they queue for them. Another is that some individuals who formerly had insurance for hospitalizations do not have any now.

Perhaps the most important finding of this study is that differences in the number of hospitalizations in a year that appear when both the condition and symptoms are held constant were not evident in the non-disease-specific samples. No significant effects for race or insurance on hospitalization (Table 2) were found among well persons, all persons, and even those with one or more unspecified chronic conditions causing limitation in activity. This suggests that when medical need is more strictly controlled through both diagnosis and symptoms, conclusions about equivalence of utilization may prove erroneous.

The results of this study differ somewhat from those of Chen and Buck[5] and Kleinman, Gold, and Makuc.[6] These differences may be a function of the definitions of medical need used and of the populations under study. Chen and Buck defined need in terms of the proportion of persons with a *symptom* who made at least one visit to a physician. Their study population included adults, regardless of discrete diagnosis. Kleinman, Gold, and Makuc defined need by *patient self-assessment of health status*. They, too, did not stratify their study population by condition. Both symptoms and patient assessment of health status were subsumed in the symptom factors through which we controlled for medical need. The present study probably had a stricter definition of medical need. On the other hand, there may be differences among incomes and races in obtaining discrete diagnoses from physicians which would confound our results. However, when we controlled for symptoms and self-assessment of health status, but not discrete diagnosis (the non-disease-specific samples), we still found that the poor and poorly educated as well as minorities had as many physician visits in a year as others. There may be differences in rates of diagnosis, but this apparently does not bias the overall results for ambulatory care.

The present study defined medical need by both diagnosis and symptoms. We found few consistent differences in ambulatory care utilization by race, education, income, region, or insurance coverage within the nine disease specific samples. Medical need was consistently related to the use of ambulatory care. However, persons without insurance coverage had fewer hospitalizations in five of the nine disease specific samples, and minority group members with two diseases, diabetes and hypertension, reported fewer hospitalizations, although medical need also had a strong effect on hospitalization rates. The effects of insurance and race were not evident in the non-disease-specific samples. By using more strict control for medical need, we reaffirmed the findings of other studies that ambulatory care utilization of previously underserved groups has improved. While federal health policy goals to improve access to medical services have been largely successful for ambulatory care, we found that this is not so clearly the case for utilization of hospital services.

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APPENDIX TABLE 1—Characteristics of Each Sample in Study: Major Independent and Dependent Variables

Sample	N	% Male	% White	% Married	% With Insurance	Age (Mean ± Std Err.)	No. of 1 Yr Physician Visits, All Conditions (Mean ± Std Err.)	No. of 1 Yr Hospitalizations, All Conditions (Mean ± Std Err.)	No. of 1 Yr Physicians Visits, This Condition (Mean ± St Err.)	% Who Have Ever Had Surgery For This Condition	% Who Have Ever Been in Hospital For This Condition
Well Persons	1697	47	88	43	80	29 ± 1	3 ± 0	.10 ± .01	–	–	–
All Persons	2000	48	88	45	80	32 ± 1	4 ± 0	.14 ± .01	–	–	–
Ill Persons	303	45	86	55	79	53 ± 1	9 ± 1	.37 ± .04	–	–	–
Rheumatoid Arthritis	238	35	93	69	80	55 ± 1	12 ± 1	.33 ± .05	7 ± 1	13	36
Osteoarthritis	152	32	97	62	89	57 ± 1	10 ± 1	.26 ± .05	5 ± 1	20	35
Tendonitis	2284	41	95	74	86	49 ± 0	7 ± 0	.24 ± .01	2 ± 0	5	7
Lower Back Pain	1452	56	93	71	80	48 ± 0	9 ± 1	.37 ± .02	3 ± 0	22	51
Angina	270	47	98	72	84	63 ± 1	9 ± 1	.57 ± .07	–	–	–
Chronic Ischemic Heart Disease	533	64	95	75	87	62 ± 0	10 ± 1	.61 ± .04	–	–	–
Hypertension	1419	33	77	58	73	61 ± 0	10 ± 0	.29 ± .02	–	–	–
Emphysema	449	75	98	68	79	64 ± 1	9 ± 1	.54 ± .05	–	–	–
Diabetes	815	46	85	63	76	59 ± 1	10 ± 0	.50 ± .04	–	–	–