A Longitudinal Study of Use of Health Care Services Among Older Women

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This research tested the hypothesis that the percent of variance explained in use of health care services by the health care services utilization model could be significantly increased by including measures of past use of health care services and of past health status. Data from older women who participated in the Social Security Administration's Longitudinal Retirement History Survey (N = 1894) were analyzed by means of regression analysis. The results revealed that measures of previous use of health care services were more strongly related to current use of health care services in 1979 than were measures of previous health status. Inclusion of previous use and previous health status variables almost doubled the amount of variance explained by current predictors in number of physician visits, and more than doubled the explained variance in having to put off health care while the amount of variance explained in number of hospital episodes and in number of hospitalized nights was increased by approximately one-third.

R ESEARCH accumulating from cross-sectional studies indicates that use of health care services among older adults is affected primarily by need for health care services (1-6). However, a major problem with studies of the utilization of health care services is that typically only a small percentage of the variance in the use of services is explained. After examining the issue of the limited ability of large-scale multivariate surveys to explain variance in the use of physicians' services among the general population in the United States, Mechanic (7) concluded that one of the major reasons for the problem was that cross-sectional data cannot measure the dynamic processes involved in the decision to seek care. Based on Mechanic's conclusion, the purpose of this research is to try to increase the amount of variance explained by the health care services utilization model by including longitudinal measures of two predictors of the use of health care services, i.e., past health status and previous use of health care services. Since the primary predictor of the use of health care services is health, an association among measures of illness across time is expected to contribute to correlations between past use of needed services and current use. Furthermore, use of health care services in the past is expected to predict current use because of increased knowledge of the availability of these services and how to gain access to them.

METHODS

Data. — This research used secondary analysis of the Social Security Administration's Longitudinal Retirement History Survey (8). The major purpose of the LRHS was to study retirement among a nationally represented sample of 11,153 noninstitutionalized older adults, 3,013 of whom were older women who were not living with a spouse when they were first interviewed in 1968. Only older women without a spouse were included in the LRHS because older women with a spouse generally did not have retirement plans that were independent of those of their spouse. Older women

were chosen as the focus of this research because they are a special need group that is especially likely to be at risk economically in the U.S. and who, therefore, may have greater difficulty accessing the health care system than do other groups. The sample was first interviewed in 1969 and reinterviewed every other year until 1979. In 1969 the respondents were between the ages of 58 and 63 and generally not retired. In 1979, when the study ended, the respondents ranged in age from 68 to 73 and most were retired.

The dropout rate in the LRHS was high. Of the 3013 older women originally interviewed in 1969, 1119 dropped out of the survey before 1979. The Social Security Administration has indicated that the major reasons for the loss of original respondents from the study include refusal of respondents to be interviewed, temporary absence, inability to locate respondents, institutionalization, and death. Only the data on the 1894 women who were interviewed in all six waves of the LRHS were included in this analysis. As has been discussed elsewhere (9), the exclusion of the dropouts is a source of bias in this research. Separate analysis of the data for the dropouts and survivors has shown that the two groups are significantly different in their use of health care services, with the less healthy dropouts using more health care services than the survivors.

Research Framework. — The health care services utilization framework developed by Andersen and his colleagues (10,11) has frequently been used by researchers investigating the use of health care services in the general population (10,12-14) and in the older adult population specifically (1-6,15). The framework of individual characteristics which predict health care services utilization contains three major components: predisposing variables, enabling variables, and need variables. Predisposing variables exist prior to the onset of illness and include those variables that describe the propensity of individuals to use health care services. These variables may include demographic characteristics, social structural characteristics, and values, attitudes, and knowl-

edge regarding health, illness, and health care services. Enabling variables provide the means for individuals to use health care services. They include resources specific to the individual and his family, such as income and health insurance, as well as resources available in the community such as ratios of health personnel and facilities to the population and the price of health care services. Since community variables are rarely available in survey research, Aday and Andersen (11) and Aday et al. (12) have suggested that variables such as urban/rural residence and region of residence be used as proxy measures of these variables. Need variables are the most immediate cause of the use of health care services and may include need as perceived by the individual in terms of level of disability, symptoms experienced, diagnosis or evaluation of the general state of health, and need as evaluated by the health care delivery system, including symptoms and diagnosis. The dependent variables in the model are the use of health care services, which may include the use of specific kinds of health care providers, such as physicians and dentists as well as specific types of facilities such as hospitals.

Hypotheses and Literature Review. — Aday et al. (12) have summarized the criticisms of empirical efforts to operationalize the health care services utilization framework, including those of Mechanic (7) and Wolinsky (13). Both critics conclude that the need variables have the greatest impact on the use of health care services and that after these effects are taken into account, the effects of the predisposing and enabling variables are small. Aday et al. (12) argue that the fact that the need measures account for the greatest amount of the variance is neither unexpected nor denigrates the predictive potential of the model.

The hypothesis of this research is that information on past health status and past use of health care services will increase the percent of variance explained by the health care services utilization framework over the amount that can be explained by current predictors alone. As has been found in research on general adult populations, health status is the best predictor of the use of health care services among older adults (1–6,15). Andersen and Newman (16) hypothesized that past illness, used as a predisposing demographic variable, was a predictor of future use of health care services. In a cross-sectional study of older Canadians, Snider (17,18) found that prior use of ancillary health and health-related services was most predictive of the level of knowledge of those services in a given community. Furthermore, knowledge of available services influenced the use of these services more than any of the other predisposing, enabling, or need variables in the analysis, including three measures of current health status and two measures of income. Having a regular source of medical care was used by Aday and Andersen (11) and Aday et al. (12) as a proxy measure of access to care. They found that those with a regular source of medical care were more likely to have seen a physician in the previous year, to have had a higher average number of physician visits, and to have been hospitalized in the previous year than were those with no regular source of care.

In a prospective longitudinal study of use of health care services among older adults, Evashwick and colleagues (15)

found that health status in 1974 was the most predictive of use of physicians and hospitals in 1976 among older adults in the Massachusetts Health Care Panel Study. Furthermore, having seen a physician regularly rather than on a problem basis in 1974 was also a significant predictor of use of both physician and hospital services in 1976. Finally, having had a regular physician in 1974 was a significant predictor of use of physicians in 1976. Thus, this longitudinal study demonstrated that previous health status and previous patterns of use of physicians can predict the use of physicians and hospitals two years later.

In the LRHS, measures of health status and measures of the use of physicians and hospital services are available for each of the six interview years covering a 10-year period. Therefore, it was possible to test the hypothesis suggested by previous research that the inclusion of previous illness and previous use variables in the health care services utilization framework will improve the estimates of current utilization over the estimates that can be obtained from just current information. If it is correct, this hypothesis is especially interesting because of the changes, particularly in such enabling variables as income, private insurance and public insurance, and the need variables that were occurring in this particular population as they moved from their preretirement years to their postretirement years (3).

Measurement. — The variables used in this analysis, their means, standard deviations, and categories are reported in Table 1. The four utilization measures will be discussed in detail here because of the transformations in their values that were used. The four utilization measures that were available included the number of physician visits in the past year, the total number of times the respondent was hospitalized in the past year, the total number of nights hospitalized in the past year, and whether or not the respondent had to put off needed health care in the previous year. Following Wolinsky and Coe's recommendation (6) that truncated variables be used to minimize the distortion caused by the few respondents with extremely high use of health care services, the number of physicians' visits was truncated from a maximum of 365 to 21 or more; the number of hospital episodes was truncated from a maximum of 15 to a high of 4 or more; and the number of nights hospitalized was truncated from a maximum of 365 to 14 or more. As in Wolinsky and Coe's study, the truncations were set where the tails of the distributions became flat, generally with only 5% of the sample of respondents exceeding the criterion level. In their research, Wolinsky and Coe found that using truncated variables and natural logarithms of the use variables to adjust the measures of the dependent variables for nonnormality substantially increased the predictive utility of Andersen's model as measured by the percent of variance explained in the dependent variables. The analyses reported in this paper were performed using both truncated measures of the dependent variables and their natural logarithms. Using these two different methods of adjustment for nonnormality in the dependent variables produced essentially the same results, as Wolinsky and Coe had also found. However, when log transformations of variables are used in regression analysis, the regression coefficients are not as easy to interpret, as

Table 1. Means, Standard Deviations, and Response Categories for the Predisposing, Enabling, Need, and Utilization Variables for Surviving Respondents in 1979 (*N* = 1894)

Variable	*M*	*SD*	Values
Predisposing Characteristics			
Demographic			
Age	70.413	1.717	68–73 years
Widowed	0.666	0.473	0 = not widowed
			1 = widowed
Divorced	0.124	0.329	0 = not divorced
			1 = divorced
Never married	0.149	0.357	0 = previously married
			1 = previously married
Social Structure			
Education	9.886	3.537	0–18+ years
Race	0.858	0.349	0 = other
			1 = white
Head of household	0.880	0.325	0 = nonhead
			1 = head
Living children	0.709	0.460	0 = no living children
			1 = had living children
Completely retired	0.808	0.394	0 = partially, not retired
			1 = completely retired
Not retired	0.072	0.259	0 = partially, completely retired
			1 = not at all retired
Previous Health Status			
Health same/better than others in previous years	4.161	1.340	0–5 years
Handicapped or disabled in previous years	1.285	1.603	0–5 years
Enabling Characteristics			
Family			
Annual family income	8.233	4.227	0 = under $1000
			:
			23 = $30,000 and over
Satisfied with way of living	2.692	0.702	1 = very unsatisfied
			2 = unsatisfied
			3 = satisfied
			4 = very satisfied
Able to get along on income	2.346	0.923	1 = can't make ends meet
			2 = just enough
			3 = enough with a little left over
			4 = always have money left over
Private hospital insurance	0.640	0.365	0 = no coverage
			1 = has coverage
Private-home/office insurance	0.285	0.451	0 = no coverage
			1 = has coverage
Medicare-hospital coverage	0.882	0.323	0 = no coverage
			1 = has coverage
Medicare-physician coverage	0.906	0.292	0 = no coverage
			1 = has coverage
Medicaid coverage	0.188	0.391	0 = no coverage
			1 = has coverage
Previous Use			
Number of previous years physician visits exceeded the median	2.204	1.682	0–5 years
Number of previous years hospital episodes exceeded the median	0.604	0.890	0–5 years
Number of previous years hospitalized nights exceeded the median	0.461	0.741	0–5 years
Number of previous years respondent reported having put off necessary health care	1.515	1.469	0–5 years
Community			
SMSA-Central City	0.584	0.493	0 = not SMSA-CC resident
			1 = SMSA-CC or suburb resident

Table 1. Means, Standard Deviations, and Response Categories for the Predisposing, Enabling, Need, and Utilization Variables for Surviving Respondents in 1979 (N = 1894) (continued)

Variable	M	SD	Values
Need Characteristics			
Objective			
Handicapped or disabled	0.425	0.494	0 = not handicapped or disabled 1 = handicapped or disabled
Subjective			
Health compared to others same age	2.206	0.700	1 = worse 2 = same 3 = better
Use			
Physician visits in past year	6.059	6.289	0–21 +
Hospital episodes in past year	0.224	0.631	0–4 +
Hospitalized nights in past year	1.046	3.265	0–14 +
Put off care in past year	0.290	0.454	0 = did not put off care 1 = did put off care

Stolzenberg (19) has discussed. The unstandardized coefficients are interpreted as the rate of change in the logarithm of the dependent variable per unit change in a predictor variable, while the standardized coefficient can be interpreted as the number of standard deviations of change in the logarithm of the dependent variable for every standard deviation change in the predictor variable. A major problem of interpretation is that logarithmic scales are so rarely used that they are not intuitively meaningful. Therefore, only the analysis using the truncated variables will be presented, although the results using logarithmic transformations will be supplied on request.

The predisposing variables that were available in the study included age in years, years of education, marital status, race, whether the respondent was head of household, whether or not the respondent had living children, and retirement status. Dummy variables were created for marital status with dichotomous categories included for widowed, divorced, and never married women and married women serving as the reference category. Other dichotomized dummy variables included race, with categories for whites and others, head of household with categories head and not head, and having living children. Finally, retirement status was converted to dummy variables with the variables including completely retired and not retired, with partially retired serving as the reference category. Finally, two aggregate measures of previous health status were created. The first was a measure of the number of previous years (1969, 1971, 1973, 1975, 1977) in which the respondents reported that their health was the same as or better than the health of others their own age. The second was the number of previous years in which the respondents reported having a handicap or disability.

Among the enabling family level variables, an aggregate measure of annual family income with 23 categories ranging from a low of under $1000 per year to a high of $30,000 per year or more was included as an objective measure of income in 1979. Other financial variables measured involved subjective estimates of the adequacy of income and included the respondent's reported satisfaction with her way of living and her ability to get along on her income. Dichotomous measures of private insurance coverage of hospitalization and of home and/or office visits were included, as were measures of Medicare coverage for hospitalization and physician visits and Medicaid coverage.

Aggregate measures of the previous use of health care services were included as enabling variables in the use of health care services in 1979 as suggested by Aday and Andersen (11), Aday et al. (12), and Snider (17,18). For physician visits, hospital episodes, and number of hospitalized nights in previous years the aggregate measure is the number of previous years (1969, 1971, 1973, 1975, 1977) in which the respondents' score on that health care services utilization measure exceeded the median value for the sample. For putting off health care, the aggregate measure is the sum of the number of previous years in which the respondent reported that she had had to put off getting necessary care.

The final enabling variables were community level variables and were dichotomous dummy variables, including residence in a Standard Metropolitan Statistical Area (SMSA) central city area and residence outside an SMSA, with residence in an SMSA outside the central city area as the reference category.

The two contemporaneous need variables that were available included an objective measure of the respondent's health, i.e., whether she was handicapped or disabled, and a measure of her subjective assessment of her health.

The intercorrelations among the predictor variables presented in Table 1 were examined for problems of collinearity. Following the suggestion of Farrar and Glauber (20), variables with correlations of .70 or higher with other predictor variables were eliminated. Private hospital insurance coverage was dropped from the analysis because of its excessively high correlation with private insurance coverage of home and office visits.

Data Analysis. — The data analysis techniques included Pearson's correlation coefficients and multiple regression analysis. Multiple regression was used to examine the relationships of the current and prior predictor variables to each

of the four dependent variables. The standardized regression coefficients, or Betas, indicate the number of standardized units that a dependent variable changes given one standardized unit change in a predictor variable, controlling for the other predictor variables in the model. The magnitude of the coefficients indicates the relative strength of an independent variable as a predictor of a given dependent variable. Heise (21) has suggested that only standardized regression coefficients that are ≥.10 should be interpreted as being substantively important in policy research as predictor variables with smaller coefficients explain less than 1% of the variance in the dependent variable. Therefore, the discussion which follows will emphasize those variables whose coefficients meet this minimum criterion.

RESULTS

The results of the analyses are shown in Table 2. Zero-order correlation coefficients showing the effects of each of the predictor variables on the measure of use of health care services are presented in the first column, labeled "Corrs." The results of the multiple regression analysis *excluding* the previous health status and previous use measures are presented in the second column, labeled "Betas-I." The results of the multiple regression analysis *including* the previous health status and previous use variables are presented in the third column, labeled "Betas-II."

Use of Physicians. — Inspection of the zero-order correlations between the predictor variables and number of physician visits in the past year reveals that the strongest statistically significant zero-order predictors are use of physicians in previous years, the two measures of current health status, and the two measures of previous health status. Other enabling variables that are correlated with number of physician visits include Medicaid coverage, satisfaction with way of living, annual family income, able to get along on income, private insurance coverage of home and office visits, and residence in a central city. Several of the predisposing variables were also weakly related to use of physicians. These included being widowed, education, race, being completely retired, and not being retired.

In the first regression equation using only current predictor variables to predict the number of physician visits in 1979, the strongest predictors are the need variables, health compared to others the same age (β = − .22) and being handicapped or disabled (β = .15); these are followed by the enabling variables, Medicaid coverage (β = .14), annual family income (β = .08), private insurance coverage for home and/or office visits (β = .07), and SMSA central city residence (β = .08).

In the second regression analysis, the measures of health compared to others in previous years, being handicapped or disabled in previous years and use of physicians in previous years were added to the equation. When the prior health and use variables were added to the equation, two effects were observed. First, the effects of the current predictors as indicated by the Beta coefficients decreased, and the effects of three of the weakest current predictors (i.e., central city residence, annual family income, and private insurance coverage of home and office visits) became insignificant.

Second, the strongest predictor that emerges is previous use of physicians (β = .33), which alone accounts for almost 11% of the variance in the dependent variable. The addition of the previous use variable significantly increased the variance explained in current use of physicians by 11%.

Use of Hospitals. — The strongest zero-order predictors of number of hospital episodes in the past year include the two measures of current health status, previous hospital episodes, and the two measures of previous health status. Other, weaker enabling variables include Medicaid coverage, able to get along on income, satisfaction with way of living, annual family income, residence in a central city, and residence outside an SMSA. Significant predisposing predictors include age, never married, having living children, being completely retired, not being retired, and race.

In the first regression analysis using only current predictor variables, the strongest predictors of number of hospital episodes in 1979 are health compared to others (β = − .19), and being handicapped or disabled (β = .09), Medicaid coverage (β = .11), having living children (β = − .09), and age (β = .05). When prior health and use variables are added to the equation, previous hospital episodes emerge as the strongest significant predictor (β = .20), explaining 4% of the variance in current hospital episodes. The effects of the current predictors that were statistically significant in the first equation generally remain the same or decrease slightly in the second equation. Thus, the addition of the previous use variable increased the amount of variance explained in hospital episodes in 1979 by only 3%.

Examination of the zero-order predictors of numbers of hospitalized nights in 1979 reveals that the correlations are fewer and weaker than those of the other measure of hospital use, the number of hospital episodes. As with number of hospital episodes, the strongest zero-order predictors are the two measures of current health status, previous nights hospitalized, and the two measures of previous health status. Other weak relationships are observed with having living children, ability to get along on income, satisfaction with way of living, being completely retired, Medicare hospital coverage, Medicaid coverage, education, and residence outside an SMSA.

In the analysis of the number of nights hospitalized using only current predictors, the strongest predictor is health compared to others the same age (β = − .16), currently being handicapped or disabled (β = .08), and having living children (β = − .06).

When the previous health and previous use measures are added to the equation, the nights hospitalized in previous years emerge as one of the strongest predictors (β = .10) along with health compared to others (β = − .15). The effects of being handicapped or disabled (β = .08) remain unchanged. Thus, the addition of the previous use variable increases the amount of variance explained in nights hospitalized in 1979, but by only 2%.

Put Off Needed Health Care. — Twenty-nine percent of the older women in the sample reported having to put off needed health care in 1979. The strongest zero-order predictors of having put off health care in 1979 include having

Table 2. Zero-Order Correlations and Standardized Regression Coefficients Showing the Effects of the Predisposing, Enabling and Need Characteristics on Utilization Variables in 1979

Variables	Physician Visits in 1979			Hospital Episodes in 1979			Hospitalized Nights in 1979			Put Off Care in 1979		
	Corrs†	Betas-I‡	Betas-II§	Corrs†	Betas-I‡	Betas-II§	Corrs†	Betas-I‡	Betas-II§	Corrs†	Betas-I‡	Betas-II§
R^2		.13	.24		.08	.11		.04	.06		.09	.21
Predisposing Characteristics												
Demographic												
Age	.04	.03	−.01	−.05*	−.05*	−.06*	−.03	−.04	−.05	.01	.02	.01
Widowed	.06*	.07	.03	.02	.01	−.01	.04	.06	.04	.08**	.03	.05
Divorced	.00	.03	.01	.01	.00	−.01	.02	.03	−.01	−.02	−.01	−.01
Never married	−.05	.05	.04	−.04*	−.02	−.02	−.02	.01	−.02	−.08**	−.02	−.04
Social Structure												
Education	.08*	.04	.07	−.03	−.01	−.03	.05*	.06	.05	−.06**	−.04	−.04
Race	−.06*	−.04	.01	−.06**	−.05	−.03	−.04	−.04	.00	−.03	.01	.00
Head of household	.00	.01	.02	−.01	−.02	−.03	.01	.01	.03	.02	.03	.02
Living children	.02	.00	−.01	−.07*	−.09**	−.13**	−.08*	−.06*	−.12***	.13***	.12***	.09**
Completely retired	.08***	−.01	.00	.07***	.05	.04	.07*	.00	.05	.06**	.01	.01
Not retired	−.07**	−.04	−.02	−.05*	.07	.01	−.04	.00	.03	−.06**	−.02	−.02
Enabling Characteristics												
Family Level												
Annual family income	.10*	.08**	.03	−.05*	.01	−.01	−.05	.01	−.02	−.16***	−.05	.02
Satisfied with way of living	−.12***	−.05	−.05	−.05**	.03	.03	−.05**	.00	−.03	−.22***	−.14***	−.08*
Able to get along on income	−.10***	−.03	.00	−.07***	.02	−.01	−.07*	.01	−.02	−.21***	−.11***	−.11***
Private home/office insurance	.05*	.07**	.03	.03	.04	.01	.00	.01	−.01	−.07**	−.04	−.02
Medicare physician coverage	.04	.04	.04	−.04	−.03	.02	.02	.00	.02	.02	.00	.00
Medicare hospital coverage	−.02	−.01	−.02	.05	.05	.03	.05*	.04	.04	.01	.00	.01
Medicaid coverage	.15***	.14***	.11***	.12***	.11***	.11*	.06*	.06	.01	.06*	−.07*	−.06*
Community Level												
SMSA-Central City	.07**	.08*	.07	.05**	.04	.01	−.01	−.02	−.02	.01	.04	.05
Not SMSA	−.03	.02	.03	−.05**	.05	.00	−.05*	−.06	−.02	.05	.03	.04
Need Characteristics												
Objective												
Handicapped or disabled	.27***	.15***	.13***	.19***	.09***	.10**	.14***	.08**	.08*	.16***	.10***	.04
Subjective												
Health compared to others	−.29***	−.22***	−.17***	−.24***	−.19***	−.15***	−.17***	−.16***	−.15***	−.12***	−.02	−.02
Previous Health and Use Characteristics												
Aggregate measure of health compared to others in previous years	−.27***		−.01	−.20***		−.02	−.14***		−.01	−.20***		−.04
Aggregate measure of handicapped or disabled in previous years	.23***		−.05	.17***		−.02	.12***		−.02	.21***		.02
Aggregate measure of use of health service in previous years	.43***		.33***	.26***		.20***	.15***		.10**	.42***		.35***

*p ≤ .05; **p ≤ .01; ***p ≤ .001.
† = Zero order correlation coefficients.
‡ = Betas in regression model without prior health status and prior use variables.
§ = Betas in regression model with prior health status and prior use variables.

previously put off health care and the two measures of previous health status; the enabling income variables including annual family income, satisfaction with way of living, and able to get along on income; and the two measures of current health status. Other weaker predictors include the predisposing variables of widowed, never married, education, having living children, completely retired, and not retired. Other weak enabling variables include private insurance coverage of home and/or office visits and Medicaid.

The most important current predictors of having put off necessary health care in 1979 are subjective assessment of income ($\beta = -.14$ for satisfaction with way of living and $-.11$ for able to get along on income), followed by being handicapped or disabled ($\beta = .10$), having living children ($\beta = .12$) and, finally, having Medicaid coverage which decreases the probability of having to put off care ($\beta = -.07$).

With the addition of the previous health and previous use variables in the second regression equation, previous use emerges as the strongest predictor ($\beta = .35$). The effects of the other variables including the current health and income variables are reduced. Thus, the addition of the previous use variables significantly increased the amount of variance explained in putting off health care in 1979 by 12%.

CONCLUSIONS

In summary, inspection of the zero-order correlation coefficients has shown that previous use of health care services and previous health status are significantly related to all four of the measures of current use of health care services used in this research — number of physician visits in 1979, number of hospital episodes in 1979, number of hospitalized nights in 1979, and having put off needed health care in 1979. When the previous use and previous health status variables were added to the current predictors in the second regression analysis, in all cases the previous use predictors had significant associations with the health care service utilization measures in 1979. Introduction of the previous use variables increased the percent of variance explained in all four variables, doubling it in two cases — use of physicians and putting off care — and increasing it by one-third for the two hospital use measures.

Furthermore, the previous use measure emerged as the strongest predictor of current use of physicians, of hospital episodes, and of putting off needed health care. That the measures of previous use were so predictive is interesting, considering the changes that had occurred in the population in the interim from 1969 to 1979. In 1969 the women in the sample ranged in age from 58–63, most were still working, and they were not yet eligible for Medicare. By 1979, their ages ranged from 69 to 73, most were retired, almost all had at least Medicare hospital coverage, and most had Medicare physician coverage. Considering the change in the mix of private and public insurance that occurred in this population as they aged and retired, the continued effects of previous use of health care services are noteworthy.

Although it is not possible to determine from this research the precise reasons for the continued effects of the previous use variables, it is possible to offer some speculations that can be explored in future research. The previous use vari-

ables are measuring at least four related phenomena, including previous access to health care services, previous health status, propensity to use health care services, and knowledge of services. One possible explanation for the correlation in use across time is that previous use is related to current use of health care services because of continued health problems. However, when measures of previous health status were introduced into the regression analysis, with the previous use variables, they were not significant predictors of the dependent variables. Thus, it is possible to speculate that it is not the continued existence of health problems that is the most important predictor of the use of health care services, but the ability to access health care services when the need arises. On the other hand, the greater predictive power of the measures of previous use may also be due to the fact that the previous use variables are measured more accurately than the previous health status variables. If health status had been measured more accurately, it might have also been more predictive over time.

Other variables that need to be included in future research in this area are the propensity to use health care services and knowledge of services and how and when to use them. In a cross-sectional study of the use of ancillary health care services in a sample of older Canadians, Snider (17,18) found that reported previous use of those services was predictive of knowledge of the services and knowledge was predictive of reported current use. In addition to knowledge of services available, previous use may also increase knowledge of how to access health care resources when needed and knowledge of how to evaluate health conditions when they occur. If these patterns are lifelong and habitual, then knowledge of the factors that produce them may suggest ways to alter inappropriate patterns. Changing inappropriate patterns would be important in the case of those older people who chronically overuse services, thereby increasing costs. It would also be important for the more typical older adult who has a tendency to underutilize health care services and, therefore, may not receive timely treatment for health conditions in early stages when they are easier and less expensive to treat (22). The current public health emphasis on education for self-care is an example of how the medical community is responding to the need to instruct older adults as well as the general population on the most appropriate, effective ways to use existing health care resources (23).

The continued effects of income and private insurance on use of health care services, especially on use of physicians and having to put off needed health care, suggest that these factors need closer examination in studies of the accessibility of health care services among the older population. Wolinsky et al. (5) and Wolinsky and Coe (6) have suggested that the fact that current health status is generally the strongest predictor of current use of health care services in cross-sectional research indicates that health care services are equitably distributed among older adults in the United States. This research also shows, however, that older women in the greatest financial need and in the poorest health are the most likely to report that they have had to put off needed health care. Furthermore, use of physicians continues to be influenced by income, private insurance coverage, and Medicaid; even hospital use is somewhat

affected by these variables, although less so than physician utilization. Older women who lack those enabling resources have less than equitable access to needed services. Thus, one must question whether equity of access to health care services has been achieved for all older people. Certainly, poor health is the major predictor of use of hospitals and physicians, but socioeconomic variables also continue to influence use. Furthermore, this longitudinal research suggests that inequities in access to health care services may be related across time. Thus, those who use health care services at earlier points in time are more likely to use health care services later. From a health policy perspective, these findings suggest that, if equity in the health care services is desired as a national goal, then policies and programs that produce greater access to the mutable enabling resources, including private insurance, public insurance and income, could increase equity (24,25) and that the earlier these changes are introduced, the better. As observed (12), the effects of the enabling variables are smaller than the effects of the need variables, but they do exist.

Finally, we return to the issue with which this research began, the low percent of variance explained in the use of health care services, in the general population as well as among older adults specifically. While the inclusion of the previous use variables increased the percent of variance explained in the four utilization variables used in this research, the R-squares are still relatively low, especially for the measures of hospital utilization. One factor that may have limited the ability of this data to explain the use of hospitals, especially, is that the time period involved may have been too long to detect the longitudinal dynamics involved in use of hospitals; hospitalization is more episodic than use of physicians and occurs in response to more dramatic health care problems. If hospital use were tested using a longitudinal dataset with shorter time intervals between interviews, such as the National Medical Care Expenditures Survey (26) the predictiveness of the model for hospital use might be increased. Second, since this research used secondary analysis of existing data, it was not possible to gather data about some of the dynamic variables that may influence the decision to seek medical care, e.g., the influence of the lay referral network (7). Prospective longitudinal research designed to specifically measure these dynamic processes would be more appropriate. Finally, approximately one-third of the older women in the LRHS dropped out of the study between 1969 and 1979 for reasons discussed above. Analysis of the LRHS data reported elsewhere (9) suggests that the dropouts were less healthy than the survivors who were analyzed in this research, and that they used more physicians and especially more hospital services than the survivors. Furthermore, the health care services utilization framework was more predictive of the use of both physicians and hospitals among the dropouts than among the survivors. Thus, while longitudinal data have some inherent advantages over cross-sectional data, they also have a serious disadvantage which results from bias produced by the inevitability of dropouts in a study of any size and length. Further research using longitudinal designs should include an analysis of the effects of this source of bias as the information gained from those who do not complete the research may be at least as important, if not more so, than the information from those who do.

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