Use of Care and Subsequent Mortality: The Importance of Gender

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Objective. In light of recent discussions on access that have emphasized the need to relate access measures to outcomes, we examined the relationship between three self-reported utilization and access to care measures and the risk of subsequent mortality.
Data Sources and Design. A nationally representative sample from the first National Health and Nutrition Examination Survey that included adults 25–64 years of age without publicly funded health insurance was followed prospectively from initial interview in 1971 through 1975.
Data Collection. Complete baseline and follow-up information was obtained on 4,491 persons (90 percent). Baseline access and use was assessed with answers to three questions: having a usual source of care, obtaining a general checkup, and not obtaining needed care (or forgone care). The relationships between the access and use measures and mortality by 1987 in men and women were examined using survival analyses. The analyses adjusted for race, and for baseline age, education, income, residence, insurance status, employment status, the presence of morbidity on examination, self-rated health, smoking status, leisure exercise, alcohol consumption, and obesity.
Principal Findings. After adjusting for all other baseline variables, not obtaining a general checkup was associated with higher mortality in women (hazard ratio = 1.64 [95% confidence interval = 1.16, 2.32]), but not in men (hazard ratio = 1.07 [95% confidence interval = 0.80, 1.42]). Reporting a usual source of care and forgone care were not related to subsequent mortality in either women or men.
Conclusions. Reporting a general checkup is an outcome-related utilization measure in women only. Further development of access and use indicators should address gender differences in health care use.

Key Words. Access, mortality, gender

Current policy discussions about access have focused on affordable methods to eliminate financial barriers to medical care. Most previous studies of access typically have used the availability of a usual source of care or simply the availability of health care resources in a given area as the measure of access to care. Neither having health insurance nor the availability of health care

resources, however, will ensure access to needed services. Attitudes toward health and health care, and socio-cultural and environmental factors, all affect the receipt of effective health care.

Early analyses of access emphasized the distinction between availability of health care resources and utilization, but did not link either to health outcomes. The work of Andersen and colleagues has been critical in explicating the many elements that potentially affect access, which they define as actual use of services (Andersen and Aday 1978). Concerns about the growth in health care costs, however, have led to increasing interest in health outcomes to assess health care services.

A recent Institute of Medicine report defines access as "the timely use of personal health services to achieve the best possible health outcomes" (Institute of Medicine 1993). This definition has been controversial in its emphasis on both utilization and outcomes in evaluating access. The definition, however, does encourage identifying those areas of medical care that are linked with outcomes. The Institute of Medicine report uses a condition-specific approach, identifying conditions for which there are access indicators that can be linked to improved outcomes; the approach is limited, however, because of a paucity of conditions for which these criteria can be met. Currently the need is for more general measures of access or utilization that can be linked to outcomes.

We examined the relationship between three self-reported measures of access or utilization and one health outcome, mortality, using data from the National Health and Nutrition Examination Survey Epidemiologic Follow-Up Study (NHEFS). NHEFS followed a representative cohort of the U.S. population for up to 16 years. A previous study of this cohort showed that the availability of health insurance was associated with lower mortality (Franks, Clancy, and Gold 1993). Analyses in that study supported the hypothesis that health insurance increases access to effective health care resulting in

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lower mortality. The current analysis sought to characterize the extent to which self-reported characteristics of access and use are related to mortality, beyond socio-demographic factors, health insurance, health status, and health behaviors.

We examined two traditional measures of reported access, availability of a usual source of care, and care not received for perceived medical problems (forgone care), supplemented by a third measure of actual use, receipt of a general checkup, that is, a physician visit other than for illness.

There is limited evidence that access or utilization as gauged by the three measures is associated with improved outcomes. Having a usual source of care is associated with greater utilization (Berki and Ashcraft 1979; Wilensky and Rossiter 1983). While several studies suggest advantages to continuity of care (Starfield 1992), reporting a usual source of care implies continuity only indirectly. Evidence that the availability of a usual source of care may be beneficial primarily addresses poor persons with chronic illness (Lurie, Ward, Shapiro, et al. 1986; Fihn and Wicher 1988; Shea, Misra, Ehrlich, et al. 1992). The utility of having a usual source of care as a population-based measure of access has not been demonstrated, and surveys have found that most people without a regular source of care do not want one (Hayward et al. 1991), casting doubt on the validity of this measure of access.

Persons with forgone or delayed care have prolonged morbidity, increased severity of illness, and consequent mortality (Weissman et al. 1991). There are, however, no longitudinal community-based studies showing that delayed care results in increased mortality. In addition, it is unclear whether patients can reliably distinguish needs for which effective health care is available (Lohr, Brook, Kamberg, et al. 1986). People may forgo care for both effective and ineffective services, and they may forgo care for some conditions but not others.

Use of care for general checkups measures, in part, patient-initiated care unrelated to medical problems. A trial of multiphasic health checkups in patients enrolled in a health maintenance organization found that mortality was inversely related to the number of checkups received, an effect that was independent of specific preventive maneuvers (Friedman, Collen, and Fireman 1986). Getting a general checkup may be a useful measure of the extent to which patients use the health care system in a timely and effective manner unconfounded by the presence of medical problems (Andersen, Lion, and Anderson 1976).

The rationale and analysis used in the present study was informed by the conceptual framework developed in the Institute of Medicine report on

access and a U.S. Congress Office of Technology Assessment (OTA) report on the impact of health insurance (U.S. Congress, OTA 1992). It is hypothesized that timely and effective use of health services can save lives. Our analysis adjusted for factors identified in the OTA report as influencing the use of care and health outcomes (U.S. Congress, OTA 1992). These factors are categorized as predisposing (age, gender, education, employment, and race), need (perceived health and objective evidence of morbidity), enabling factors (income, health insurance, and residence), and individual behaviors (smoking status, alcohol consumption, leisure exercise, and obesity status). We focused on working-age adults, who have been shown to have less access to medical care than the elderly (Hayward et al. 1988). Data on men and women were analyzed separately because of significant differences in the way they use health care (Wingard 1984; Graves 1993; Adams and Benson 1992).

METHODS

The first National Health and Nutrition Examination Survey (NHANES I), conducted beween 1971 and 1975, collected socio-demographic, utilization, medical history, and clinical and laboratory information from a representative sample of the civilian, noninstitutionalized population (National Center for Health Statistics and Miller 1977; National Center for Health Statistics and Engel et al. 1978). Detailed information that included questions relating to access was collected on 6,913 adults aged 25–74 years. Interviewees were also examined by physicians, who identified morbidity based on history, physical examination, and the results of laboratory investigations. The NHANES I Epidemiologic Follow-Up Study (NHEFS) was designed to trace and reinterview respondents aged 25 to 74 years (National Center for Health Statistics and Cohen, Barbano, Cox, et al. 1987; Cox, Rothwell, Madans, et al. 1992). The most recent follow-up in the NHEFS occurred in 1987. The age, race, and sex-specific mortality of the NHEFS cohort is similar to that experienced by the U.S. population (Madans, Cox, Kleinman, et al. 1986a).

The 5,687 working age adults in the detailed NHANES I 1971–1975 baseline sample aged 25–64 were considered for analysis. We excluded 74 persons whose race (mostly Asian American and Native American) was neither white nor African American, and 614 adults with publicly funded insurance (Medicaid, Medicare, Veterans' insurance, or public assistance). Reliable analyses of these subgroups were precluded by their small sample sizes. We thus analyzed data on 4,999 adults aged 25–64. Vital status from follow-up

in NHEFS was not available on 186 persons (3.7 percent). Compared with persons with vital status follow-up information, those lost to follow-up were younger, and were more likely to be African American men and white women (Madans, Kleinman, Cox, et al. 1986). There were 322 persons (6.4 percent) with vital status information at follow-up who had incomplete baseline data, mostly missing family income data, so that the reported analyses are based on 4,491 persons (89.8 percent of eligible respondents). Compared with persons with complete baseline data, those with incomplete baseline data were older (mean age 46.6 years compared with 43.9 years), more likely to have fewer than 12 years of school (44.6 percent compared with 32.9 percent), and more likely to have six or more drinks per week (33.3 percent compared with 25.9 percent).

ANALYSES

The NHANES I survey employed multistage stratified probability sampling of clusters of persons. In addition, persons living in poverty areas, women of childbearing age, and elderly persons were oversampled. To accommodate the complex survey design, the statistical package SUDAAN (Research Triangle Institute 1993) was used in the analyses subsequently reported in this article. SUDAAN uses a Taylor series approximation method to compute variances that allow adjustment for the multistage probability sampling strategy. The weights provided on the 1987 NHEFS public use tapes were used to adjust for survey oversampling and nonresponse to yield population estimates of reported baseline descriptors, but were not used in the survival analyses. The large variability and skewness of the weights for NHEFS results in excessive increases in the variance estimates, so that several known risk factors are found to be nonsignificant (Ingram and Makuc 1994). We followed the recommendations of Korn and Graubard (1991) to use unweighted survival analyses (weighting each observation equally) that adjusted for the cluster sampling but controlled for the variables affected by oversampling (age, gender, and income) by including them as covariates.

The baseline access questions used were: "When did you last have a general checkup or examination, not counting exams made during a visit for an illness?" (dichotomized as never/ever); "Is there a particular doctor you see regularly or whom you would go to if something were bothering you?" (dichotomized yes/no); and "During the past 12 months have you had a health problem which you would have liked to see a doctor about but did

not for some reason?" (dichotomized yes/no). Other potentially confounding baseline variables examined included: age (years), race (dichotomized as white or African American), education (dichotomized as at least 12 years of school or less), family income (treated as three dummy variables, income less than $7,000 per year, $7,000–$9,999 per year, and $10,000–$14,999 per year, using income over $15,000 per year as a reference), health insurance status (dichotomized as reporting having no health insurance or having private health insurance), employment status (dichotomized as working most of the previous three months or not), rural residence (dichotomized as Standard Metropolitan Statistical Area [SMSA] or not [rural]), morbidity (dichotomized as the presence or absence of evidence of morbidity found on medical examination and laboratory testing), self-rated health (treated as three dummy variables, reporting health in general to be very good, good, or fair/poor, with excellent as the reference value), smoking status (smoker or not), obesity status (dichotomized as body mass index greater than 17 Kg/m^2 or not), leisure exercise (dichotomized as reporting little or no exercise compared with moderate or much exercise), and alcohol consumption (categorized as two dummy variables: consuming alcohol at least two or three times a week, and usually at least three drinks each time (that is, at least six drinks per week); and consuming fewer than six drinks per week, but at least some alcohol (with not drinking as the reference group). We also included household size as an interval-level variable.

RESULTS

By the end of the follow-up period, 300 (12.3 percent) men and 196 (7.5 percent) women had died (Table 1). Slightly more women than men, 18.4 percent compared with 13.7 percent, reported not having obtained a general checkup. Reporting not having a usual source of care was twice as common in men as women (17.25 percent compared with 8.5 percent), and reporting forgone care was slightly more common in women (16.4 percent compared with 13.2 percent). In both men and women, not getting a checkup was associated with an increased risk of subsequent mortality (Table 2), but the other two access measures did not show any statistically significant association with subsequent mortality.

After adjusting for all other baseline characteristics, the proportional hazards survival analyses revealed (Table 3) in women that reporting not getting a general checkup at baseline was associated with increased mortality

Table 1: Distribution of Vital Status and Selected Baseline Characteristics by Sex

	Women	*Men*
	N* *(percent)*	N* *(percent)*
Vital status		
Died	196 (7.5)	300 (12.3)
Alive	2322 (92.5)	1673 (87.7)
Checkup		
No	474 (18.4)	281 (13.7)
Yes	2044 (81.6)	1692 (86.3)
Regular MD		
No	228 (8.5)	351 (17.2)
Yes	2290 (91.5)	1622 (82.8)
Forgone care		
Yes	423 (16.4)	253 (13.2)
No	2095 (83.6)	1720 (86.8)
Age group		
Over 55 years	537 (21.0)	455 (19.6)
45–54	728 (26.0)	552 (24.2)
35–44	559 (24.7)	424 (24.9)
25–34	694 (28.3)	542 (31.3)
Race		
African American	262 (9.6)	200 (8.3)
White	2256 (90.4)	1773 (91.7)
Education		
< 12 years school	798 (29.7)	679 (30.9)
≥ 12	1720 (70.3)	1294 (69.1)
Income		
Under $7000	728 (27.2)	626 (32.4)
$7000–$9999	657 (26.2)	592 (30.2)
$10,000–$14,999	470 (21.7)	361 (19.9)
Over $15,000	663 (25.0)	395 (17.5)
Insurance status		
Uninsured	363 (13.2)	246 (11.1)
Private	2153 (86.7)	1727 (88.9)
Employment status		
Unemployed	1389 (53.1)	210 (9.8)
Employed	1129 (46.9)	1763 (90.2)
Residence		
SMSA	1510 (63.8)	1229 (66.4)
Non-SMSA	1008 (36.2)	744 (33.6)

Continued

Table 1: Continued

	Women N* (percent)	Men N* (percent)
Self-Rated health		
Fair, poor	431 (16.2)	305 (13.4)
Good	787 (33.0)	601 (30.7)
Very good	765 (26.8)	528 (27.6)
Excellent	625 (24.0)	539 (28.3)
Morbidity		
Present	1052 (44.8)	769 (41.9)
Absent	1466 (55.2)	1204 (58.1)
Leisure exercise		
Little, or none	1061 (43.8)	649 (33.9)
More	1457 (56.2)	1324 (66.1)
Smoking status		
Smoker	907 (37.1)	928 (47.7)
Non-smoker	1611 (62.9)	1045 (52.3)
Alcohol consumption		
$\geq$ 7 drinks per week	389 (15.4)	775 (39.3)
1–6 drinks per week	1453 (57.7)	898 (45.5)
Non-drinker	676 (26.8)	300 (15.2)
Obesity status		
BMI† > 27 Kg/M^2	215 (7.9)	213 (11.2)
BMI $\leq$ 27	2303 (92.1)	1760 (88.8)

*Number of persons in sample with characteristic. Percentages are weighted to provide population (white and black persons with private or no insurance) estimates.

†Body Mass Index in kilograms/meter^2.

(hazard ratio = 1.64 [95% confidence interval = 1.16, 2.32]). In addition, for women, being younger, having at least 12 years of school, and having no morbidity at baseline examination were associated with lower mortality. Neither of the other two access measures, nor race, income, insurance, employment, rural residence, self-rated health, body mass index, or exercise showed any adjusted statistically significant association with subsequent mortality.

In men (Table 3), younger age, being white, being in the highest income category compared with being in the lowest income category, better self-rated health, no morbidity, not smoking, not being overweight, and not drinking more than six drinks per week were associated with lower mortality. Neither any of the three access measures, nor education, insurance, employment, rural residence, or exercise showed any statistically significant association

Table 2: Association of Baseline Access Measures with Subsequent Mortality

	Women	*Men*
	N* *(percent) Dying*	N* *(percent) Dying*
Checkup		
No	60 (11.4)	59 (19.5)
Yes	136 (6.7)	241 (11.1)
Regular MD		
No	22 (9.0)	48 (11.0)
Yes	174 (7.4)	252 (12.6)
Forgone care		
No	167 (7.9)	256 (12.2)
Yes	29 (5.9)	44 (12.7)

*Number with characteristic who died. Percentages are weighted to provide population (white and black persons with private or no insurance) estimates.

with subsequent mortality. A stepwise survival analysis, in which the checkup variable was entered first, followed by each of the other independent variables in turn, revealed that checkup became not significant when income was entered into the equation. Thus, for men, getting a checkup was simply a marker for higher income, and had no adjusted independent relationship with subsequent survival.

Finally, two analyses by gender were conducted excluding the two measures of baseline health status, and self-rated health and morbidity, to examine possible overadjustment by the inclusion of these variables as covariates. Excluding the health status measures from the survival analyses produced no significant changes in the hazard ratios for the access measures; in women, the effect of not reporting a checkup was increased slightly (hazard ratio = 1.70 [95% confidence interval = 1.21, 2.37]).

DISCUSSION

This analysis of a nationally representative cohort of the working-age adult U.S. population suggests that the mortality experience of American women who report getting general checkups is lower than that for those who do not. Use of care for general checkups, and not just the availability of a usual source of care or forgone care, is important in women for our understanding of the relationship between access and mortality. Reporting getting a checkup in

Table 3: Adjusted Hazard Ratios for Survival Time by Gender

	Hazard Ratios (95 percent Confidence Intervals)	
Baseline Risk Factor	*Women*	*Men*
No checkup	1.64 (1.16, 2.32)	1.07 (0.80, 1.42)
No regular MD	1.28 (0.82, 1.98)	1.10 (0.80, 1.51)
No forgone care	1.29 (0.83, 1.98)	0.91 (0.64, 1.28)
Age (years)	1.07 (1.05, 1.09)	1.08 (1.06, 1.10)
White	1.04 (0.64, 1.69)	0.63 (0.47, 0.83)
≥ 12 Years School	0.63 (0.45, 0.88)	0.83 (0.64, 1.07)
Income < $7,000	1.08 (0.69, 1.67)	1.59 (1.07, 2.38)
Income $7,000–$9,999	0.96 (0.62, 1.48)	1.37 (0.93, 2.04)
Income $10,000–$14,999	0.82 (0.50, 1.32)	1.00 (0.71, 1.40)
Private insurance	0.76 (0.53, 1.07)	0.96 (0.71, 1.32)
Employed	1.00 (0.71, 1.39)	0.73 (0.52, 1.04)
Rural	0.77 (0.56, 1.05)	0.96 (0.72, 1.26)
No morbidity	0.70 (0.51, 0.97)	0.70 (0.50, 0.97)
Very good self-rated health	1.00 (0.60, 1.67)	1.36 (0.93, 1.99)
Good self-rated health	0.91 (0.58, 1.45)	1.73 (1.24, 2.41)
Fair/Poor self-rated health	1.40 (0.86, 2.30)	1.80 (1.21, 2.68)
Present smoker	1.84 (1.39, 2.44)	1.83 (1.48, 2.28)
BMI > 27 Kg/M^2	1.28 (0.84, 1.94)	1.53 (1.08, 2.15)
≥ 7 drinks/week	1.36 (0.78, 2.36)	1.39 (0.99, 1.96)
1–6 drinks/week	1.04 (0.75, 1.42)	0.76 (0.54, 1.06)
Little/No exercise	1.00 (0.71, 1.40)	1.14 (0.92, 1.42)

Notes. Analysis also adjusted for household size. Baseline risk factors indicate the value of the baseline characteristic with associated hazard ratio. Except where noted, the hazard ratio shows the adjusted hazard with the risk factor present compared with the risk factor absent; for age the risk factor is a one-year increment in age; each income group is compared with income ≥ $15,000 reference group; each self-rated health group is compared with excellent self-rated health as reference group; each alcohol consumption group is compared with not drinking.

women thus meets the Institute of Medicine's report criteria for an access measure, namely, use of care that improves outcomes (Institute of Medicine 1993), but it is a general and not a condition-specific measure. In men, however, none of the access or use measures demonstrated an unconfounded relationship with survival.

In this cohort, the observed benefit for women of getting a general checkup cannot be explained by the effects of screening, such as the receipt of Papanicolaou smears and mammograms; the study sample is too small for us to discern the impact of known efficacious screening maneuvers. A survival benefit associated with more frequent checkups, but independent of specific preventive maneuvers, has been observed previously (Friedman, Collen, and Fireman 1986). Instead, the response to this use of care question must be that it is a marker in women for either some unmeasured factor protective of health, or that getting regular checkups reflects more effective use of health care. This analysis controlled for a theory-based array of factors known to affect health, including health behaviors, so it is unlikely that some unmeasured factor operating in women accounts both for getting general checkups and improved survival.

Any explanation of why getting a general checkup is associated with improved survival needs to account for the observed gender difference. Several strands of evidence bear on this inconsistency. Women have a more positive attitude to health and medical care (Meininger 1986). In the current study men are twice as likely to report not having a usual source of care. Andersen et al. found that the most common reason for getting a checkup was different in men and women; women were most likely to obtain a checkup for preventive reasons whereas men were most likely to obtain a checkup for purposes of work or insurance (Andersen, Lion, and Anderson 1976). Women are more likely to perceive symptoms than men, although they are not more likely to adopt the sick role when ill (Hibbard and Pope 1983; Wingard 1984; Meininger 1986). Consistent with these observations, women report more morbidity and use ambulatory services more than men for both preventive and illness-related care (Wingard 1984; Adams and Benson 1992). These gender differences have been hypothesized to be due, in part, to childhood socialization; women's greater responsibility for family health increasing the salience of health matters and the perception of symptoms; increased familiarity with the health care system because of obstetric and gynecologic needs; and the greater social acceptability for women to acknowledge symptoms (Hibbard and Pope 1983; Wingard 1984; Verbrugge 1985). It is possible that their greater sensitivity to symptoms may cue women to seek care earlier than men, including visits labeled as checkups. Men, in contrast, are more likely to be hospitalized than women (excluding sex-specific conditions) and are more likely to receive invasive procedures, of which a greater proportion are likely to be inappropriate (Khan, Nessim, Gray, et al. 1990; Ayanian and Epstein 1991; Bickell, Pieper, Lee, et al. 1992; Verbrugge 1989; Graves 1993; Orencia

et al. 1993). Taken together, these gender differences suggest that women are likely to seek care earlier and are less likely to receive more technical, higher-risk invasive medical procedures (Franks, Clancy, and Naumburg 1995). We hypothesize that obtaining a general checkup identifies women as adopting a health-protective role. For men, in contrast, simply obtaining a checkup may not identify persons having effective access to health care. Of note, while men were more likely than women to have obtained a checkup, they were less likely to report a usual source of care. It is possible that getting a checkup would be more predictive of health outcomes in men if the question was linked to whether the checkup was for preventive reasons.

Other gender differences in factors affecting mortality are also of interest. Although women report lower levels of self-rated health than men, self-rated health predicted mortality in men only. This result confirms that observed in a previous analysis of the impact of self-rated health on subsequent mortality using the same data (Idler and Angel 1990). Other studies have found that self-rated health predicts mortality in women as well as men (Mossey and Shapiro 1982; Kaplan and Camacho 1983; Idler, Kasl, and Lemke 1990; McCallum, Shadbolt, and Wang 1994); none of these latter studies, however, adjusted for physician-measured baseline biomedical morbidity as was done in our analysis and in the study by Idler and Angel (1990). These findings suggest that women include in their health self-appraisal factors that lower their health perceptions but are not related to mortality. This discrepancy complicates interpretation of the meaning of self-rated health, a measure increasingly used in outcomes research. Whether women's lower reported self-rated health is related to their propensity to seek medical care earlier compared with men merits further study. The remaining gender-discrepant factors associated with improved survival in women (education) and men (race, income, obesity status, and alcohol consumption) did not yield statistically significant interaction effects, suggesting that the differences observed are likely to be sampling effects.

These results are likely to underestimate the relationship between access or use and survival, and illustrate the difficulty of finding measures of access or use associated with improved outcomes. Neither of the traditional access questions of "usual source of care" and "forgone care" measures actual use of medical care, and both questions presume perceived medical need. They do not distinguish persons who perceive no need for a usual source of care (the majority of those without a usual source of care [Hayward et al. 1991]) or those who do not forgo care because they have no acute medical problems. Availability of a usual source of care does not directly assess continuity of care,

which has been shown to improve health outcomes (Starfield 1992; Franks, Nutting, and Clancy 1993). The question on forgone care conflates many different reasons for not getting care, only some of which may affect subsequent mortality. In the instance of "usual source of care," despite adjustment for health status and morbidity, persons with an identified doctor may have been sicker at baseline, offsetting any measurable benefits from having a usual source of care. In the instance of "forgone care," people may have correctly perceived that their symptoms/illness were not remediable by medical care.

Limitations of the study and results should be noted. The access and use questions were asked only at baseline; people might later have obtained a usual source of care or obtained needed care thereby avoiding any adverse health effects. Misclassification bias, which has been shown to result from misunderstanding questions about usual source of care (Perloff and Morris 1992), would tend to mask the benefit, if any, of having a usual source of care. These analyses do not directly address the relationship between access and morbidity; it remains possible that having a usual source of care and not forgoing care reduce morbidity without improving survival. Including the measures of health status (self-rated health and morbidity) as covariates in the multivariate analyses may have resulted in some overadjustment. Excluding these variables from the analyses, however, caused relatively small increase in the observed hazard ratios for the checkup measure. Finally, the results apply only to those with complete data and not to the 10 percent of persons with missing baseline or outcome information.

The ability of general checkups to capture access to medical care, as defined by the Institute of Medicine and as demonstrated by women in this study, is posited to arise in two ways. First, a volitional decision to use the medical care system, not occasioned by symptoms or external requirements (e.g., job, insurance, or school physical) suggests a non-passive health care consumer who might more reasonably be expected to successfully negotiate the medical care system. Second, opportunities for provider-patient communication and education that could enhance future effective use of the system with respect to utilization, appropriateness, and continuity would be greater through contact with the system during a time of health.

In summary, we found that of the three access or use measures examined, the sole predictor of improved survival is the receipt of checkups for women. While the data do not provide a direct explanation for the gender difference captured by this measure, and these exploratory findings should be replicated, the results have implications for two important lines of future inquiry. First is the issue of gender bias in health services utilization. To

date, studies on gender disparities in the use of health care have highlighted differences in the receipt of technical services. In most studies women have received fewer invasive and technology-intensive services than men (Tobin, Wassertheil-Smoller, Wexler, et al. 1987; Khan, Nessim, Gray, et al. 1990; Steingart, Packer, Hamm, et al. 1991; Ayanian and Epstein 1991; Krumholz et al. 1992; Bickell, Pieper, Lee, et al. 1992) and have received a higher proportion of procedures considered appropriate (Bickell, Pieper, Lee, et al. 1992). Exploration of a possible relationship between women's more frequent and effective use of ambulatory services and subsequent lower receipt of technology-intensive services may lead to improved outcomes for both men and women. The results also suggest that failure to obtain a checkup may identify a particularly vulnerable group of women for whom specific outreach efforts are warranted.

The second issue raised by this analysis is the need to reconsider more general measures of outcome-validated access to medical services. The condition-specific access indicators described in the Institute of Medicine (1993) report represent an important conceptual approach to measuring access despite the relatively short list of conditions for which process measures are clearly related to health outcomes; more general measures of effective access to care also need to be developed. Health care reform proposals have focused increased attention on quality improvement. As we move toward universal coverage, accurate measurement of effective access will be essential to assessing the impact of changes in medical care delivery systems. Developing and refining indicators that incorporate the many elements that are implied by outcome-validated access will be an important challenge for the health services research community. Critical to the effort to develop useful measures of access is greater understanding of the factors underlying gender differences in utilization and perceived health, and in their relationship with health outcomes.

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