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## **The Relationship Between Continuity of Care and the Health Behaviors of Patients: Does Having a Usual Physician Make a Difference?**

[Original Articles]

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### **Abstract**

**Background.** Implicit in "any willing provider" and "freedom of choice" legislation is the assumption that ongoing provider relationships lead to better patient outcomes on average. Although previous studies have identified associations of usual source of care with medical utilization, its relationship to patient lifestyle has not been examined.

**Objective.** To determine the effect of having a usual physician on health behaviors.

**Methods.** Data on 3,140 adults from the 1995 Mid-Life in the US study were used to estimate logistic regressions of the effect of having a usual physician on exercise, obesity, vitamin-taking, smoking quits, substance abuse behaviors, preventive medical visits, and respondent assessments of the ability to affect one's own health and risk of heart attacks and cancer.

**Results.** Respondents with a usual physician were 3 times as likely to have had a preventive medical visit during the past year. Among lower-income respondents, those with usual physicians were one-half as likely to report substance abuse behaviors. Instrumenting reduced the magnitude of the former but not latter effect. No other significant differences were found.

**Conclusions.** Strategies designed to foster regular patient-provider relationships may affect certain health behaviors, such as preventive care visits and substance abuse. Yet in the absence of interventions to improve the effectiveness of these relationships, they are unlikely to be a powerful policy instrument for achieving widespread improvements in patient lifestyle choices.

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The US health care system has undergone enormous changes during the past decade, including increases in the number of uninsured, selective contracting, and the rise in managed care. Some observers argue that these changes are detrimental to the quality of care because they disrupt the patient-provider relationship. For example, patients might not be able to see their family doctors because they are not part of the physician network developed by the insurance plan. For this reason, "any willing provider" and "freedom of choice" legislation prohibiting plans from restricting

provider networks and limiting the patient's choice of provider has been proposed (and in many states, adopted, albeit in relatively weak forms).<sup>1</sup> Implicit in this debate is the assumption that regular provider relationships are key to the provision of high-quality care because of the physician's role in monitoring patient health and follow-up treatment.

Studies have shown that after controlling for confounding factors, having a usual source of care is associated with greater service use<sup>2-8</sup> and can lead to the earlier receipt of cancer screening examinations among women,<sup>9-14</sup> even taking simultaneity into account.<sup>15</sup> This study expands the scope of earlier research to examine other outcomes that are potentially affected by continuity, focusing on health behaviors. Patients are more likely to attempt and achieve health behavior modification in response to discussions with physicians,<sup>16-20</sup> yet many physicians fail to counsel patients about behavioral health risks.<sup>19-25</sup> A physician with an ongoing, long-term patient relationship might have a greater impact because of heightened awareness of the patient's health behaviors and problems and more frequent opportunities to discuss these behaviors, disseminate information, or treat problems. In turn, patients who have an ongoing physician relationship may be more trusting,<sup>26</sup> less reluctant to listen to the physician, or more willing to be treated. Thus, patients with a usual physician are hypothesized to exhibit healthier behaviors.

## Methods

### Data

Analyses were based on the 1995 midlife in the United States (MIDUS) study of noninstitutionalized US residents (age range, 25-74) with telephones, conducted by the John D. and Catherine T. MacArthur Foundation Network on Successful Mid-Life Development. Respondents participated in a random-digit dialing telephone interview (response rate, 70%) and were asked to mail back written questionnaires (response rate, 86.8%). The response rate for both parts of the survey was 60.8%. The sample analyzed here was respondents who completed both parts and had complete data for the explanatory variables (except income, assets and insurance, which were imputed when missing).

Estimation sample sizes varied by outcome, caused by line-item nonresponse, but were approximately 3,100. In power calculations, this was large enough to detect health behavior differences of reasonable magnitudes. The following assumptions yielded an odds ratio of 1.13 associated with the effect of having a usual physician on a health behavior: (1)  $pr(\text{patient is given physician advice on the health behavior}/\text{has usual physician}) = .3$ ; (2)  $pr(\text{patient is given physician advice on the health behavior}/\text{has no usual physician}) = .15$ ; (3)  $pr(\text{patient exhibits health behavior}/\text{given physician advice on the behavior}) = .5$ ; and (4)  $pr(\text{patient exhibits health behavior}/\text{given no physician advice on the behavior}) = .25$ . Based on a 5% cutoff for type I error and the assumptions that 70% of adults have a usual physician and the multiple correlation coefficient equals .3, 80% power can be achieved.

### Dependent Variables

Outcomes were whether the respondent: (1) exercised vigorously several times a week or more; (2) met the criterion for obesity (body mass index  $\geq 30$ ); (3) regularly took vitamin or mineral supplements (excluding high-dosage megavitamins); (4) had quit smoking (ever-smokers only); (5) reported behavior related to drug or alcohol abuse (list available upon request); and (6)

had seen a physician for a preventive medical visit during the earlier year. Analyses of attempted smoking quits yielded similar results. Because of the large number of outcomes examined, a relatively strict cutoff for statistical significance ( $P \leq 0.01$ ) was used.

### Usual Source of Care and the Patient-Provider Relationship

The regressor of primary interest was the response to the question, "Do you have one particular doctor who you usually see?" This measure provides information on whether policies to encourage the formation of regular patient-provider relationships are likely to affect health behaviors. Ideally, one would also have information on various aspects of the relationship between the physician and the patient to identify whether certain types of regular providers are more effective than others. In the event that regular provider relationships do not have the hoped-for impact on patient behavior, more detailed information on the nature of these relationships would allow the design of intervention studies to try to improve the weak link in patient-provider relationships (eg, the physicians if they are not supplying adequate information to patients or the patients if they are not behaving in accordance with the advice given by physicians).

Unfortunately, no information was available regarding what goes on in the doctor's office, so the policy conclusions are based on the estimated effects of having an "average" usual source of care. However, additional analyses were undertaken to try to glean some information regarding characteristics of the usual source of care. The survey obtained information on the respondent's agreement with statements such as, "When I am sick, getting better is in the doctor's hands," or "It is difficult for me to get good medical care." Analyses alternately examined the impact of having a regular physician in conjunction with the following: (1) agreement with the first statement, as a rough proxy for having a regular physician who is trusted by the patient; and (2) disagreement with the second statement, as a proxy for a regular physician with whom the patient is contented.

An alternative way to explore the nature of the patient-provider relationship is to examine outcomes that may be more closely linked to whether the physician discussed lifestyle issues with the respondent. Although the questionnaire did not directly measure the information given to patients, it did ask about the extent to which respondents agreed with the following statements: (1) "Keeping healthy depends on things I can do"; (2) "There are certain things I can do for myself to reduce the risk of a heart attack"; and (3) "There are certain things I can do for myself to reduce the risk of getting cancer." Analyses examined whether the respondent agreed strongly with each statement. Disagreement does not necessarily mean that the physician did not discuss preventive care and lifestyle issues with the respondent. However, after controlling for education and other confounding factors, respondents were probably more likely to respond affirmatively if their physicians had such discussions with them.

The estimated effect of having a usual physician will be biased if it is correlated with the error term of the outcome equations. For example, respondents with a high propensity to look after their health may be simultaneously more likely to form a regular provider relationship and to engage in healthy behaviors. Respondents who recently saw a physician for preventive services may have been more likely to describe their physicians as usual providers. In either case, "endogeneity" bias results. To address the first possibility, the regressions explicitly controlled for the thought and effort the respondent reported currently putting into his or her health, on a 0 to 10 scale ("no

thought or effort" to "very much thought and effort"). Unless bias results solely from people's concern about maintaining their health and the effort scale perfectly measures this construct, controlling for effort will not completely eliminate endogeneity bias; thus, instrumental variables estimation (described below) was also used.

### Other Control Variables

The regressions also controlled for the following: age; sex; race; Hispanic ethnicity; urban residence; education (less than high school, high school or college without a degree, and college degree); marital status (married/cohabiting, separated/divorced, widowed, and never married); number of children; work hours; income from all sources; assets (net of debts); health insurance (private, public, and none); self-assessed physical health on a 1 to 5 scale (poor to excellent); and primary care physicians per 1,000 residents in the respondent's county. For couples, income and assets are per adult averages.

Marital status, children, and hours were hypothesized to influence health behaviors through opportunity costs: respondents with other time commitments have less time to engage in either negative or positive health behaviors. Income and assets affect the affordability of medical services, exercise equipment, etc. Insurance directly affects medical use and might affect other health behaviors if uninsured persons have greater financial incentives to remain healthy. Physician supply may impact preventive care use through geographic access to care.

Sicker persons may be more likely to get preventive care and quit smoking, but may be less likely to exercise. Sensitivity analyses to determine reverse causality bias, by using self-assessed health status 10 years ago instead of current health and by restricting control variables to education and demographics only, had a negligible impact on the estimated effects of having a usual physician. Similarly, use of more comprehensive health controls (including medical conditions, functional limitations, mental health, and overall health on a 1-10 scale) did not change the results.

### Statistical Analysis

Summary statistics were calculated using sample weights to correct for differential probabilities of selection and nonresponse in order to match the age, sex, race, and educational composition of the US population. Chi squared tests were used on unadjusted differences in health behaviors between respondents with and without a usual physician. Logistic regression was used to estimate the probability of each outcome. Odds ratios and 99% confidence intervals associated with having a usual physician are presented. Regressions did not use sample weights because if correctly specified, all relevant factors biasing the individual associations between the outcomes and regressors should be accounted for. (Specifications controlling for sample weight showed that it was generally insignificant and did not change the estimated effect of having a usual physician.)

Regressions were re-estimated using two-stage instrumental variables (2SIV) methods.<sup>27</sup> The correlation between the existence of a usual physician and the residual term in the outcome equations can be attenuated by using a predicted value. Following the approach of Dubin and McFadden <sup>28</sup> for 2SIV analysis when the endogenous regressor is discrete, a logit regression was used to construct the predicted probability of having a usual physician; this nonlinear prediction

was then used as an additional instrument in a linear regression of the probability of having a usual physician. The linear predicted probabilities replaced the actual value of the endogenous regressor in the outcome equations and the standard errors were adjusted for the use of a predicted value.<sup>29</sup>

IV can be thought of as a quasi-randomization procedure applied to nonexperimental data. The procedure relies on the existence of a variable, known as the "identifying instrument" that effectively "randomizes" patients to treatment and control groups. Here, potential instruments should directly affect whether the respondent has a usual physician, but only indirectly affect health behaviors, through the usual physician. Under certain assumptions,<sup>30</sup> the observation that respondents living in the same place for a longer time have better health behaviors provides evidence that having a regular physician improves health behaviors.

These assumptions are as follows: (1) nonzero average causal effect (respondents who live in the same area for longer are more likely to establish ties to health professionals); (2) monotonicity (respondents who would have a usual physician if they lived in an area for a short time would also have one if they lived there a long time); (3) exclusion restriction (length of residence does not explain health behaviors after controlling for usual physician and the other covariates); (4) stable unit treatment value assumption (the health behaviors of one respondent are not affected by whether other respondents have a usual physician and there are only minor differences in effectiveness among usual physicians); and (5) random assignment (knowing what each respondent's health behaviors would be for each length of residence yields no information about the respondent's actual length of residence).

The first assumption is testable; a chi-squared test of length of residence in the regression of usual physician yielded a *P* value of 0.0001. The second assumption seems reasonable. Examples can be constructed in which the other assumptions fail, particularly #4. Nonetheless, IV estimation should be more consistent than single-equation estimation, especially given the strong association between the instrument and the endogenous regressor.<sup>31,32</sup> Thus IV estimation is useful for purposes of sensitivity analysis.

## Results

### Population Characteristics

Table 1 gives weighted descriptive statistics for the explanatory variables. Almost three-quarters of the sample had a usual physician. On average, respondents rated their physical health as 3.39 on the 1 to 5 scale. In response to being asked how much thought and effort they put into their health these days, respondents reported an average of 7.26 on the 0 to 10 scale. After weighting, the sample looked fairly representative of the US population except that respondents were quite wealthy: respondents had average income and (per adult) assets of \$28,110 and \$41,667.

Variable	Percent or Mean (SD)
Has usual physician	70%
Female	54%
Race	
White	79%
Black	12%
Other non-White	9%
Hispanic	4%
Age group	
25-34	27%
35-44	30%
45-54	20%
55-64	13%
65-74	11%
Resides in urban area	71%
Education	
Less than high school	15%
High school or some college but no degree	64%
Bachelor's degree or higher	21%
Marital status	
Married or cohabiting	76%
Separated or divorced	12%
Widowed	4%
Never married	8%
Number of children	2.40 (1.92)
Self-assessed physical health (1, poor; 5, excellent)	3.39 (0.99)
Self-reported thought and effort put into health (10, very much; 0, none)	7.26 (2.06)
Has private insurance	82%
Has Medicaid or other public insurance	21%
Household income per adult	\$28,110 (\$26,606)
Household assets per adult	\$41,667 (\$97,203)
Work hours	34 (22)

Physicians per 1,000 residents in county	30 (18)
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Table 1. Weighted Descriptive Statistics for Regressors

### Unadjusted Differences in Outcomes

Table 2 gives the frequency for each outcome by whether the respondent had a usual physician, along with the *P* value for the difference. About one quarter of all MIDUS respondents engaged in vigorous physical activity several times a week or more and one quarter met the criteria for obesity. About 40% of respondents took vitamin or mineral supplements regularly. About one-half of regular smokers had quit. Less than one tenth reported any behaviors associated with drug or alcohol abuse. Over two thirds saw a physician for a preventive medical visit during the earlier year.

Outcome	n	Has No Usual Physician	Has Usual Physician	P-Value for Difference
Engages in vigorous physical activity several times a week or more	3130	26%	25%	.344
Body mass index meets criteria for obesity	3013	24%	24%	.726
Regularly takes vitamin or mineral supplements*	2987	36%	42%	.001
Has quit smoking (respondents who ever smoked)	1694	47%	53%	.025
Reports behavior associated with drug or alcohol abuse*	3087	13%	5%	.001
Saw a physician for a preventive medical visit during past year*	3073	47%	78%	.001

\*Significant at  $P \leq 0.01$ .

Table 2. Weighted Differences in Unadjusted Outcomes, by Whether the Respondent Has a Usual Physician

Several unadjusted differences between the groups were statistically significant, all in the hypothesized directions: respondents who had a usual physician were more likely to take vitamins or mineral supplements (5-percentage point difference); less likely to report drug and alcohol abuse behaviors (8-percentage point difference); and more likely to report preventive medical visits during the previous year (31-percentage point difference). Rates of smoking quits were also substantially higher among respondents with a usual physician, although the difference missed statistical significance at the 1% level. Differences in the other outcomes were small and insignificant.

### Effect of Having a Usual Physician on Health Behaviors

Table 3 presents the estimated effect of usual physician from the logit regressions. The first column gives the single-equation estimates and the second column gives the 2SIV estimates. After adjusting for potentially confounding factors, strong relationships remained between having a usual physician and two outcomes: drug and alcohol abuse behaviors and preventive medical visits. Having a usual physician almost halved the likelihood of engaging in behaviors related to substance abuse and almost quadrupled the probability of having had a preventive medical visit in the past year. None of the other estimates were significantly different from zero.

Outcome	Single-Equation Estimates	Instrumental Variables Estimates
Engages in vigorous physical activity several times a week or more	OR = 0.98 (0.75, 1.27)	OR = 1.15 (0.19, 6.91)
Body mass index meets criteria for obesity	OR = 1.04 (0.79, 1.38)	OR = 1.23 (0.21, 7.07)
Regularly takes vitamin or mineral supplements	OR = 0.98 (0.78, 1.24)	OR = 0.35 (0.07, 1.72)
Has quit smoking (respondents who ever smoked)	OR = 0.88 (0.63, 1.22)	OR = 0.65 (0.11, 4.05)
Reports behavior associated with drug or alcohol abuse	OR = 0.59 (0.40, 0.87)*	OR = 0.03 (0.001, 1.06)
Saw a physician for a preventive medical visit during past year	OR = 3.41 (2.68, 4.33)*	OR = 1.56 (0.29, 8.35)

Note: 99% confidence intervals in parentheses. All specifications control for a constant term and the regressors in Table 1.

\*Significance at  $P \leq 0.01$ .

OR, odds ratio.

Table 3. Odds Ratios and Confidence Intervals From Multiple Logistic Regressions of the Effect of Having a Usual Physician on Health Behaviors and Opinions About Medical Care

Instrumenting reduced the magnitude of the effect of having a usual physician on preventive visits and increased the standard errors, precluding the establishment of a significant relationship. However, the effect of having a usual physician on drug and alcohol abuse behaviors actually increased in magnitude after instrumenting and narrowly missed statistical significance at the 1% cutoff ( $P = 0.011$ ).

To determine whether the high average MIDUS income affected the generalizability of the results, the single-equation models were re-estimated separately for respondents with incomes above and below the median. Having a usual physician significantly affected substance abuse-related behaviors among lower-income respondents only ( $OR = 0.37$ ,  $P < 0.001$ ). In contrast, its impact on preventive medical visits was larger among higher-income respondents ( $OR = 4.27$ ,  $P < 0.001$ ), although it was also large and significant among lower-income respondents ( $OR = 3.17$ ,  $P < 0.001$ ).

### Nature of the Physician-Patient Relationship

Results (not shown here) were similar when examining proxies for whether the respondent had a regular physician he or she trusted or with whom he or she was contented. In both cases, the probability of substance abuse-related behaviors was reduced and the probability of preventive medical visits was increased. However, no significant relationships were found between having a usual physician and the information measures (whether the respondent agreed strongly that keeping healthy depended on things he or she could do and that there were things he or she could do to reduce the risk of a heart attack or cancer).

## Discussion

Based on a national sample of adults, strong and consistent evidence was found that respondents with a usual physician are only about one-half as likely to report drug and alcohol abuse behaviors as those without a usual physician; this effect is confined to respondents at income levels below the median. Somewhat weaker evidence supported the conclusion that respondents with a usual physician are about 3 times as likely to have a preventive medical visit during the past year. Part of this effect was caused by endogeneity, perhaps resulting from reporting bias (eg, people who have recently been to the doctor might be more likely to report having a usual physician). After adjusting for confounding factors, no evidence was found that

having a usual physician is significantly associated with any of the other health behaviors, including exercise, obesity, vitamin/mineral use, or smoking quits.

Additional analyses also failed to support the hypothesis that patients with usual physicians are better-informed about the relationship between lifestyle choices and health. No significant associations were found between the existence of a usual physician and the respondent's tendency to agree that she could affect his or her own health or the risk of getting heart attacks or cancer. These results are at least suggestive that physicians may not be substantially better at counseling patients about lifestyle choices when it is within the context of an ongoing relationship. However, the proxies used were too crude to conclude that respondents with a usual physician received no more counseling on average than those without one. The insignificant associations between health behaviors and regular provider relationships are probably partly caused by the unwillingness or inability of patients to follow the physician's advice, even when it is given.

The finding that adults with a usual physician were more likely to have had preventive medical visits is consistent with earlier findings on the association between regular providers and preventive medical services among adults.<sup>2-15</sup> The phenomenon that instrumenting reduces the estimated impact of usual physician on routine visits has previously been noted among children.<sup>15</sup> To the knowledge of the author, no previous studies explored the impact of having a usual source of care on the health behaviors of patients beyond their use of medical services. The most closely related study is by Weiss and Blustein,<sup>33</sup> who studied the impact of duration of patient-provider relationships among elderly Americans with a usual source of care. They showed that patients with provider relationships of 10 years or more had lower Medicare expenditures than those with relationships under 1 year. However, little difference was seen in other outcomes, such as the receipt of flu vaccines or mammograms, or the prevalence of smoking and obesity.

Their findings are consistent with the conclusion of this study that strategies to foster regular patient-provider relationships are unlikely to result in widespread improvements in health behaviors. Although having a usual physician appeared to increase the rate of annual checkups, public health factors, including lifestyle, tend to be more important determinants of the overall health of general populations than medical care per se. Substantial evidence was found that regular provider relationships reduced self-reported drug and alcohol abuse behaviors among lower-income MIDUS respondents, suggesting that usual physicians play an important role in identifying substance abuse problems and referring patients to treatment. However, none of the other health behaviors studied were affected by the continuity of patient-provider relationships.

These conclusions should be interpreted in light of several limitations. Analyses were based on a single telephone survey and mail-back questionnaires. Internal validity of survey responses cannot be ascertained with cross-sectional data. MIDUS respondents had to have phones to complete the first part of the survey and be literate in English to complete the second part, so the sample probably disproportionately excluded non-English speakers and persons who were homeless, of low-income class, and poorly educated. Exclusions caused by missing data may further limit the generalizability of the results. Data on a more comprehensive set of health behaviors, including nutritional habits and seatbelt use, might have provided stronger evidence that regular provider relationships can effect changes in patient behavior.

All of the measures in the study were self-reported, including health status, health services utilization, and the existence of a usual source of care. They were, therefore, measured with error, and, thus, systematic biases may have ensued. Preventive visits and negative health behaviors are likely to have been underreported, whereas positive health behaviors are likely to have been overreported. Reporting biases should affect study conclusions primarily if differential bias exists between respondents with and without a usual source of care. In this case, the 2SIV estimation becomes more critical, as it should attenuate any biases caused by correlation between the error term and usual source of care. However, the 2SIV estimates should themselves be viewed with caution; although they should be more consistent than the single-equation estimates, IV assumptions are unlikely to hold fully.

Because respondents self-reported whether they have a usual source of care, heterogeneity exists in its definition. Conclusions about the usefulness of regular patient-provider relationships as a policy instrument for effecting patient behavioral change are based on the average effect of these relationships. Usual physicians are probably most effective when they are skilled at communicating with patients. The impact of having a usual physician is also likely to be larger among patients who are more receptive to suggestions for behavior modification, because even if physicians inform their patients about health behaviors, the patient may not remember the information or heed the physician's advice. Thus, additional information on the patient-provider interaction would be useful for shedding light on the study findings and for identifying types of patient-provider relationships that are most effective at changing patient behaviors.

Yet even if certain individual relationships are found to be more effective than the "average" relationship studied here, in the absence of interventions to improve communication and/or compliance, simply fostering such relationships is unlikely to produce large health behavior benefits at the aggregate population level. This conclusion does not depend on the reason for the inability of physicians to change the behavior of their patients. Whether the result of the physician's failure to provide information to patients or the patient's failure to modify behavior, continuity per se is unlikely to result in patients who generally practice better health habits, although it may affect selected behaviors. The modest average effects of usual physicians on the health behaviors of their patients should be considered in forecasting the impact of policies such as "any willing provider" laws or "freedom of choice" legislation.

Although this study suggests that regular provider relationships may result in at least some beneficial health behaviors by the patient, the results cannot speak to the best means of fostering such relationships. In particular, it would be useful to know whether managed care encourages or discourages the formation of regular provider relationships. Although critics have asserted that HMOs interfere with the ability of patients to see their usual physicians by contracting with a limited set of providers, it is also possible that managed care fosters ongoing patient-provider relationships through the gatekeeper system and the requirement that patients choose a single primary care physician. Managed care is a potential mechanism for ensuring continuity and better access to private providers, especially among Medicaid patients, who often receive primary care in public hospital emergency rooms.<sup>34</sup>

Future research should also investigate the system constraints within which physicians operate. If plans limit the length of visits (either explicitly or through increased case loads), opportunities for

physicians to discuss health habits with patients could be reduced. Physicians often find it difficult to provide all of the necessary services within the allocated time, so it is unsurprising that preventive care and health education often get short shrift during office visits. Thus, it would be useful to know how financial and organizational factors in the health care system affect the physician's effectiveness in disseminating health information and encouraging patients to engage in healthy behaviors.

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