Is Family Care Associated with Reduced Health Care Expenditures?

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BACKGROUND. Specific components of family medicine associated with reduced health care costs are not well understood. We examined whether people who received "family care," the sharing of a personal physician across familial generations, had lower health care expenditures than those who received "individual care" that lacked generational continuity.

METHODS. We studied 1728 children and 2543 adults using a data subset of the 1987 National Medical Expenditure Survey, a representative sample of the civilian noninstitutionalized US population, to examine the relationship between care category and total health care expenditures, adjusting for potential confounders and effect modifiers. Survey respondents from households with either a married or a single woman aged 18 to 55 years as head of household and at least 1 child younger than 18 years were included. Only individuals reporting a family physican (FP) or general practitioner (GP) as their personal doctor were examined, since intergenerational family care is provided almost exclusively by FPs and GPs.

RESULTS. Family care provided by an FP or GP was associated with 14% lower expenditures for adults ($51), after adjustment for covariates (*P* = .04), compared with individual care provided by a family or general practitioner. Although not statistically significant, for children family care was associated with 9% lower expenditures ($19).

CONCLUSIONS. These findings suggest that family care provided by FPs or GPs is associated with lower health care costs. Policies promoting family care may reduce health care costs.

KEY WORDS. Physician's practice patterns; physicians, family; health care costs. *(J Fam Pract 1999; 48:608-614)*

T he need to contain costs is dramatically reshaping the health care landscape in the United States. As managed care has increasingly emphasized primary care tension has been growing between approaches to health care delivery led by specialists and those led by primary care physicians. Primary care is associated with lower costs,[1,2] and for many conditions equivalent or better outcomes in comparison with specialist care.[1-4] However, the mechanisms of such cost savings remain largely unexplored. We examined whether people who received intergenerational family care, the sharing of a personal physician across familial generations, had lower health care expenditures than those who did not.

Within primary care, family physicians have been shown to use relatively fewer resources, while providing equal quality care for several conditions.[3,5] Could the emphasis on the family within family medicine explain some of these cost savings? The idea that patients should be treated in the context of their family and community has long been a core tenet of family medicine[6-9] and was reiterated in the 1996 Institute of Medicine report on primary care.[10] Since the family has been shown to influence both health status[11] and health care utilization,[12,13] proponents of family care believe it improves primary care quality,[6,14-18] although supporting evidence for this belief is limited.[19-23] Recently reported findings from the Direct Observation of Primary Care Study provide insight into some of the reasons why emphasizing the family may reduce costs.[24,25] Medalie and colleagues[24] found that study physicians devoted a significant proportion of time addressing issues related to family members, and Flocke and coworkers[25] reported that the provision of care to a second family member occurred in 18% of outpatient visits, with the secondary patient present during only half the visits.

Using data from the National Medical Expenditure Survey (NMES), we previously reported that intergenerational family care, defined as the provision of primary care within a family by a shared personal physician for at least 1 adult and 1 child, was widespread, occurring in 35% of US families. Compared with other patterns of personal physicians within families, family care occurred more often in families residing in nonmetropolitan regions and outside of the Northeast, and in families with a woman as the head of household who was less educated, older, more likely to have Medicaid

health insurance, and had higher unhealthy behavior scores.[26]

Because no previous studies have looked into the relationship between intergenerational family care and health care expenditures, we examined this issue using the 1987 NMES. This survey was conducted at a time when relatively unrestricted access to physicians in the health care system was the predominant mode of delivery in the United States. A significant relationship between family care and cost savings during this time would provide support for current policies promoting family care within managed health care on a fiscal, as well as ideologic, basis. We hypothesized that total health care expenditures for individuals would be lower when family care occurred, after adjusting for a number of potential confounders.

METHODS

SAMPLE
We analyzed data from the Household Survey component of the NMES.[27] This component was a 1-year cross-sectional survey of nearly 35,000 individuals from approximately 14,000 households representing the US civilian noninstitutionalized population in 1987. The survey used a stratified, multistage area probability design with oversampling of minorities, the poor, the disabled, and the elderly. Four interviews were completed in 1987 to collect information regarding medical care, health expenditures, and health insurance coverage. Subjects completed a self-administered questionnaire that included a request for the name of their usual personal physician and selection from a checklist of that physician's specialty type. We included in our study individuals who identified family physicians (FPs) or general practitioners (GPs) and who met our definitions of family care and individual care families. Approximately 50 families with a single man as the head of household were excluded because there were too few of them for meaningful analysis. Another 50 families with missing expenditure information were also excluded from the analyses. The final sample included 1714 children and 2516 adult men and women from families with either a married or a single woman aged 18 to 55 years as a head of household and at least 1 child younger than age 18.

MEASURES
Family Care. As reported previously,[26] family care was assessed by measuring intergenerational personal physician congruence. Data from the Rand Health Insurance Experiment[28] showed that personal physicians represented generalists who provided 87% to 93% of visits for selected primary care problems. A national study[29] showed that 79% of Americans could identify a "regular" personal physician by name, and 76% of those physicians were believed to be FPs, GPs, internists, or pediatricians.

Presence of intergenerational personal physician

congruence was defined as at least 1 parent and 1 child sharing the same personal physician. Other patterns of congruence were considered and rejected. Spousal personal physician congruence would have limited the study to married families. Moreover, in the preponderance of families with spousal congruence by a shared FP or GP, intergenerational family care also occurred. Physician congruence across all family members would have excluded families where some members did not identify a personal physician. For example, in several families personal physician congruence occurred, but the male head of household did not identify a personal physician.

The following 2 intergenerational personal physician congruence categories were compared: (1) family care, which included all families in which there was personal physician congruence between at least 1 parent and at least 1 child, and (2) individual care, which included all families in which there was a personal physician for at least 1 parent and at least 1 child, but there was no intergenerational congruence. Two previously reported categories,[26] in which no personal physician was reported for either the parents, the children, or both generations, were not included in this study.

Sociodemographic Factors. Several variables available in the NMES were examined to adjust for potential confounding. Categorical variables included health insurance during the survey period (any private insurance, any Medicaid but no private insurance, or no insurance), level of education for adults (less than high school, high school, or greater than high school), household income as percent of poverty level (poor = < 100%; near poor = 100% to < 125%; low income = 125% to < 200%; middle-income = 200% to 400%; and high income = > 400%), race/ethnicity (white or nonwhite), residence location (metropolitan or nonmetropolitan), census division (Northeast, Midwest, South, or West), and marital status for adults (married or unmarried but living with a partner, or single). Continuous variables included age and for family-level analyses, family size. Age was also examined categorically and age-sex interactions were evaluated, but these did not materially affect the findings.

Case Mix/Disease Severity. Subjective health status was measured using items that comprise subscales of the Medical Outcomes Study (MOS) General Short-Form Health Survey (SF-20), a reliable and valid measure.[30] The MOS general health survey is a useful measure of the health effects of chronic disease; the subscales exhibit distinct profiles for several diseases.[31] For example, hypertension was associated with a decrement of 3.5 in the health perceptions scale (scored from 0 to 100), compared with a decrement of 13 for persons with chronic lung disease.[31] The subscales exhibited excellent internal reliability in the NMES and included 5 questions each on health perceptions (Cronbach's α = .90), mental health (α = .88), and physical functioning (α = .85). Although the NMES did not record the MOS survey items

for children, an item assessing overall health status (excellent, good, fair, or poor) was included. Because "poor" was recorded for very few children, we collapsed overall health status into 3 levels: excellent, good, and fair or poor. Each subject's baseline smoking status was classified as current smoker, former smoker, or never smoker. Body mass index (BMI) was calculated for each subject from self-reported weight and height, and categorized to reflect extremes that have been associated with excess mortality in other studies[32,33] (ie, BMI ≤ 19 kg/m^2 or ≥ 30 kg/m^2). An index of unhealthy behaviors was developed by summing the responses to the following categories: (1) getting less than 7 hours of sleep per night; (2) eating breakfast only rarely or sometimes; (3) using a seatbelt sometimes, at most; and (4) not getting regular physical exercise. Summary indexes have been shown to be predictive of health status, morbidity, and mortality, thus suggesting predictive validity.[34-37] This index was used as a measure of orientation toward health behaviors among adult subjects. Ten health attitude questions, derived from a 1970 Center for Health Administration Studies/National Opinion Research Center study,[38] were included in the NMES. For this report, 5 questions that contributed to reliability (Cronbach's $\alpha = .62$) were selected to form a unidimensional scale to measure the adult respondents' "medical skepticism" about health insurance and health care. Increasing medical skepticism has been shown to be associated with increasing mortality in the NMES.[39]

Total Health Care Expenditures. The NMES includes detailed, corroborated data on 1987 health care expenditures. Total annual medical care expenditures for individuals were examined.

STATISTICAL ANALYSES

Because of the complex survey design of the NMES, analyses were conducted with the statistical package SUDAAN.[40] SUDAAN uses the method of Taylor series linearization to produce appropriate standard errors in surveys involving cluster sampling. Weights provided on the public-use tapes were used to adjust for survey oversampling and nonresponse. The results reported provide national estimates of frequency distributions and means. The relationship between family care and total health care expenditures was examined by a 2-step approach. First, for each subject the presence of any expenditures during the survey period was determined, thus allowing comparison of the proportion of spenders with nonspenders. Second, among spenders, we assessed total health care expenditures by family care and individual care category. Univariate analyses provided national estimates of the proportions of spenders and nonspenders and, among spenders, total annual medical expenditures. Analyses that adjusted for other characteristics included multiple logistic regression to assess the relationship between family care status and spending or nonspending, and multiple linear regression to assess the relationship between family care and total annual medical expenditures. Log transformation of the outcome (total medical expenditures) was performed to normalize the skewed distribution of expenditures. The method of Duan and colleagues[41] was used to retransform the logarithm-based parameter estimates into dollars. Because each covariate chosen for these analyses could potentially contribute to confounding, fully saturated multivariate models are presented.

RESULTS

Baseline characteristics of the sample stratified by family care category are shown in Table 1. This table also provides national population estimates for each covariate.

The mean age was slightly older for family care adults (35 years) than individual care adults (34 years). Similarly, the mean age was slightly, but not significantly, older for family care children (10 years) than individual care children (9 years). Education was lower for family care adults (20% with less than high school education) than individual care adults (11%), although income levels were similar across groups. Family care adults were more likely to be uninsured (17%) than individual care adults (11%). Similarly, more family care children were uninsured (17%) than individual care children (14%), although this finding was not statistically significant. Family care adults were more likely to be women (56%) than individual care adults (51%), and family care adults were more likely to be single parents (23%) than individual care adults (14%). Race/ethnicity was similar across groups. Rural residence occurred more frequently in family care (39%) than individual care (24%) families. Fewer family care families lived in the northeastern United States (12%) than individual care families (23%). Self-reported health status was similar across groups for adults, although fair or poor health status occurred less often in family care (5%) than individual care (8%) children. The mean number of unhealthy behaviors was slightly greater for family care (2.1) than individual care (1.9) adults, and current smoking occurred more frequently in family care (32%) than individual care (25%) adults. Mean medical skepticism scores were similar across groups.

NONSPENDERS

After adjustment for covariates, the association between family care (as opposed to individual care) and likelihood of having any expenditures did not differ significantly for children (adjusted odds ratio [AOR] for having no expenditures = 1.2; 95% confidence interval [CI], .8 - 2.2) or adults (AOR for having no expenditures = 1.3; 95% CI, .9 -1.9). Family-level analyses showed that less than 1% of families had no health care expenditures, and the proportion of families without expenditures did not significantly differ between family care and individual care families.

Relationships Between Family Care Category and Selected Characteristics

Characteristic	Family Care Adults (n = 1712) Children (n = 1472)	Individual Care Adults (n = 804) Children (n = 242)
Mean age, years, adults, (SE)*	35 (.2)	34 (.3)
Mean age, years, children, (SE)	10 (.2)	9 (.4)
Education level, adults, %†		
<High school graduate	20	11
High school graduate	43	37
>High school graduate	37	52
Household income % of poverty level, %		
<200	24	22
200 to 400	43	47
>400	33	31
Health insurance, adults, %*		
None	17	11
Medicaid	7	8
Private	76	82
Health insurance, children, %		
None	17	14
Medicaid	11	19
Private	72	68
Women, adults, %†	56	51
Married, adults, %†	77	86
White race/ethnicity, adults, %	84	84
Rural residence, family, %†	39	24
Geographic region, family, %†		
Northeast	12	23
Midwest	35	26
South	36	32
West	18	19
Mean MOS Scales, ‡ adults, (SE)		
Health perceptions	77 (.71)	78 (.87)
Mental health	74 (.54)	75 (.63)
Physical functioning	91 (.54)	94 (.85)
Self-reported health status, children, %*		
Excellent	56	53
Good	39	39
Fair or poor	5	8
Number of unhealthy behaviors, adults, (SE)*	2.1 (.04)	1.9 (.05)
Smoking status, adults, %*		
Never	48	51
Former	20	25
Current	32	25
Mean body mass index, adults (SE)	25 (.15)	25 (.20)
Mean medical skepticism score, ‡ adults (SE)	2.3 (.02)	2.3 (.03)

*P <.05 (analysis of variance of means or chi-square analysis for differences among groups).

†P <.001 (analysis of variance of means or chi-square analysis for differences among groups).

‡Higher scores indicate higher perception of functioning for health status, mental health, role functioning, and physical functioning. Higher scores for medical skepticism scale (range = 1 to 5) indicate more negative attitudes.

SE denotes standard error; MOS, Medical Outcomes Study.

expenditures for subjects with family care ($192) and individual care ($195). However, for adults, unadjusted annual median expenditures were lower for people with family care ($343) than for those with individual care ($383).

Tables 2 and 3 present the relationship between family care and total health care expenditures after simultaneous adjustment for each covariate. For children, the association between family care, in contrast to individual care, was not statistically significant (β = -.10; 95% CI, -.45 to .07). After multivariate adjustment, measures significantly associated with lower expenditures for children included low income and the lack of health insurance, while good and fair or poor health status were associated with greater expenditures (Table 2). Retransforming the results for children provided a point estimate that family care was associated with 9% ($19) lower expenditures. Retransforming other significant covariates revealed reductions of 43% ($84) for lacking insurance, 40% ($77) for income less than 200% of the poverty level, and 23% ($44) for income between 200% and 400% of the poverty level. There were increases in expenditures of 3% ($7) per additional year of age and an increase of 52% ($103) for good and 236% ($458) for fair or poor health compared with excellent health status.

Compared with their individual care counterparts, family care adults had significantly lower total health care expenditures (β = -.15; 95% CI, -.30 to -.01). After adjustment, additional measures significantly associated with reduced expenditures included being married, living in the southern United States, having better perceived health status and role functioning on the MOS scales and greater medical skepticism scores, while measures associated with increased expenditures included Medicaid, female sex, and current smoking (Table 3). Retransforming these

HEALTH CARE EXPENDITURES

For children, after the exclusion of nonspenders, there were similar unadjusted annual median total health care

results indicated that family care was associated with 14% ($51) lower expenditures in adults. Retransforming the other significant covariates revealed associations with reductions of 21% ($75) for being married and 27% ($99) for living in the South, and increases of 42% ($153) for Medicaid, 67% ($242) for female sex, and 25% ($92) for current smoking. For each 1-point increase on the perceived health status score and for each 1-point increase on the role functioning score, expenditures decreased by 1% ($3). Each increase on the medical skepticism score was associated with a reduction of 4% ($16).

DISCUSSION

Our findings, using data from a large representative sample of US households, show that intergenerational family care, when compared with individual care, was significantly associated with modestly lower adjusted total health care expenditures for adults, with similar, although not significant, findings for children. These findings suggest that emphasizing family care might be an effective means of reducing health care costs.

STRENGTHS
The validity of these analyses is supported by a number of strengths. First, because having health care expenditures and the amount of expenditures were modeled separately, the lower costs associated with family care for adults do not reflect simply a lower likelihood of using care. In fact, the odds of having any expenditures did not differ significantly between the 2 groups. Second, because total health care expenditures were examined, cost shifting between outpatient, inpatient, or other settings does not explain the relationship between family care and lower expenditures. Third, we adjusted for a wide array of potential patient confounders, including sociodemographics and health status. Finally, we examined a nationally representative survey with an excellent response rate, rigorous data collection methods, and validation of expenditure data.

LIMITATIONS
Our findings are subject to some limitations. It is possible that control for health status was not adequate. Evidence, however, supports the validity of self-reports of morbidity.[42] The MOS health perceptions scale (adults) and the self-reported health status measure (children) were used to adjust for disease severity. Studies have validated this subjective approach, compared with more objective measures.[43,44] Because these

TABLE 2

Linear Regression Predicting Log-Transformed Total Health Care Expenditures: Children with any Health Care Expenditures During 1987

Characteristic	Adjusted β	(95% CI)
Personal physician category		
Family care	-.10	(-.45 to .07)
Individual care	Baseline	
Insurance status		
Private	Baseline	
None*	-.57	(-.91 to -.23)
Medicaid	.09	(-.23 to .41)
Age, years*	.040 per year	(.038 to .042)
Sex, women	.02	(-.12 to .16)
Household income % of poverty level		
<200*	-.50	(-.80 to -.20)
200 to 400†	-.25	(-.45 to -.05)
>400	Baseline	
Race/ethnicity, nonwhite	-.18	(-.42 to .06)
Residence, nonrural	-.15	(-.39 to .09)
Geographic region		
Northeast	Baseline	
Midwest	.06	(-.18 to .30)
South	-.14	(-.14 to .10)
West	-.09	(-.35 to .17)
Health status		
Excellent	Baseline	
Good*	.44	(.22 to .66)
Fair or poor*	1.22	(.80 to 1.64)

CI denotes confidence interval.
Note: Beta coefficients simultaneously adjusted for each listed factor.
*P <.001.
†P <.05.

measures were predictors of mortality in the NMES,[1] their validity as health status measures is supported.

Because the NMES is a cross-sectional survey, causality cannot be proved, and unmeasured confounding may explain the observed relationships. Factors associated with the choice of a personal physician may also be related to expenditures. Most important, people choosing family care may exhibit lower need or demand for care. Although we adjusted for measures of both need and demand according to the Andersen-Newman behavioral health model,[45] the possibility of confounding remains. For example, attitudes toward health care affect both the choice of a personal physician and health care utilization,[46] although in the present study no significant difference in medical skepticism scores between groups was found.

Our findings are also limited by the use of 1987 data. However, the relative cost savings of family care compared with individual care likely remain relevant, suggesting that policies promoting family care within the current managed health care environment merit consideration. If, for example, emphasizing the family results in lower resource utilization as supported by findings from the Direct Observation of Primary Care[24,25] studies, then

TABLE 3

Linear Regression Predicting Log-Transformed Total Health Care Expenditures: Adults with any Health Care Expenditures During 1987

Characteristic	Adjusted β	(95% CI)
Personal physician category		
Family care*	-.15	(-.30 to -.01)
Individual care	Baseline	
Insurance status		
Private	Baseline	
None	-.15	(-.33 to .04)
Medicaid*	.35	(.19 to .70)
Age, years	.001 per year	(-.001 to .011)
Marital status, married*	-.23	(-.45 to -.01)
Gender, women†	.51	(.37 to .65)
Education		
<High school graduate	-.10	(-.19 to .09)
High school graduate	-.11	(-.25 to .03)
>High school graduate	Baseline	
Household income % of poverty level		
<200	-.15	(-.37 to .10)
200 to 400	-.06	(-.22 to .10)
>400	Baseline	
Race/ethnicity, nonwhite	-.05	(-.23 to .14)
Residence, nonrural	.08	(-.09 to .26)
Geographic region		
Northeast	Baseline	
Midwest	.02	(-.22 to .25)
South*	-.32	(-.54 to -.09)
West	.17	(-.44 to .11)
MOS scale‡		
Health status†	-.009	(-.014 to -.005)
Mental health	-.002	(-.007 to .003)
Physical functioning	-.002	(-.007 to -.003)
Role functioning†	-.008	(-.057 to -.003)
Number of unhealthy behaviors	-.04	(-.11 to .02)
Smoking status		
Never	Baseline	
Former	.06	(-.12 to .24)
Current*	.23	(.04 to .41)
Body mass index		
<20	.03	(-.26 to .33)
≥30	.05	(-.13 to .23)
Medical skepticism†‡	-.19	(-.29 to -.10)

CI denotes confidence interval; MOS, Medical Outcomes Study.
Note: Beta coefficients simultaneously adjusted for each listed factor.
*P<.05.
†P <.001.
‡Higher scores indicate higher perception of functioning for health status, mental health, role functioning, and physical functioning. Higher scores for medical skepticism scale indicate more negative attitudes.

There are a number of mechanisms by which family care may save money. Savings may occur when unbilled care is provided during visits by other family members, as suggested by findings from the Direct Observation of Primary Care study.[24,25] Such unbilled visits could reduce the need for in-person visits and thus reduce costs. Also, some conditions may be treated more cost-effectively with knowledge of family issues, whether through tailoring interventions on the basis of this knowledge or by enlisting family members in treatment plans.

CONCLUSION

The Institute of Medicine issued a report in 1996 that defined primary care as "the provision of integrated, accessible health care services by clinicians who are accountable for addressing a large majority of personal health care needs, developing a sustained partnership with patients, and practicing in the context of family and community."[10] Although this definition lends theoretical support for family care, our analyses provide empirical evidence of an association between family care and cost saving. We believe that policies promoting family care may result in appropriately lower health care expenditures. Assessments of relationships between family care and expenditure subcomponents, such as ambulatory visits and diagnostic tests, are needed to identify where expenditure differences are greatest. Further, studies that disentangle aspects of longitudinal continuity from intergenerational family care are warranted. Although we conclude that policies promoting family care may help contain health care costs, research is also needed to explore relationships between family care and health outcomes.

promoting family care should result in cost savings in current managed care settings. However, the extent to which the family can truly be emphasized, given increasing time demands faced by physicians, is not known. Evaluation of relationships between specific aspects of family care and cost and health outcomes needs to be performed using more recent data sources than the NMES.

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