The Medicare Alzheimer's Disease Demonstration Program

Effects of the Medicare Alzheimer's Disease Demonstration on the Use of Community-based Services

Robert Newcomer, Mark Spitalny, Patrick Fox, and Cathleen Yordi

Study Question. Did the Medicare Alzheimer's Disease Demonstration with its case management and community service waivers affect the use of community-based long-term care services among people with dementia and their primary caregivers?

Data Sources. Baseline and periodic caregiver interviews. Measures include client and caregiver attributes and self-reported service use.

Study Design. The demonstration randomly assigned voluntary applicants into treatment and control groups. Treatment group cases were eligible for case management and for up to $699 per month in community care benefits. The actual monthly entitlement varied among the eight demonstration communities due to regional cost and inflation adjustments over time. Analyses are for the year after enrollment.

Data Collection. Analyses are of cases surviving six months or more in the community after enrollment ($n = 5,209$). Cases received baseline and semi-annual assessments.

Principal Findings. The intervention of case management and community service reimbursement had a strong, consistent, and positive effect on the likelihood of using home care (including homemaker/chore services, personal care services, companion services) and adult day care. Treatment group clients were at least twice as likely as control group clients to be using any of the four community-based services. A similar, but less pervasive effect was achieved with caregiver training and support group participation. Reimbursement provided by the demonstration's Medicare waiver was generally not sufficient to exceed the level of control group service acquired through private payment.

Conclusions. Reimbursement levels within the demonstration may have enabled more individuals to purchase some services, but they were not sufficient to increase the average level of use over those in the control group. No consistent differences between demonstration models were found in service use likelihood or average use among users.

Key Words. Dementia, case management, home care, adult day care service use

Prior studies of people with dementia have found that they "underutilize" formal care (cf. Bass, Looman, and Ehrlich 1992; Biegel et al. 1993; Caserta et al. 1987; Webber, Fox, and Burnette 1994). Among the explanations for this is a general unwillingness of caregivers to seek formal assistance. This reticence is said to arise, in part, because of the presumed stigma associated with dementia, the "hassle factors" experienced when bringing providers into the home, and the unavailability of providers who are willing and able to accommodate people with dementia (Ory, Williams, Emr, et al. 1985). Physical activity, meals programs, and other services provided in group settings have a tendency to segregate people with dementia from other participants. Another service supply problem is that homemaker/chore and companion services are limited in quantity and in the availability of staff experienced in working with a demented population (Hooyman, Gonyea, and Montgomery 1985).

Contributing to these service supply issues is limited insurance coverage for community-based services. Even in public programs such as Medicaid, degenerative cognitive function does not trigger financial assistance unless it is conjoint with physical disability; even then, disability levels may have to qualify for nursing home placement.

In 1989, the Health Care Financing Administration implemented the Medicare Alzheimer's Disease Demonstration and Evaluation (MADDE) program. This was designed to address some of the presumed barriers to community care services: identifying a network of "dementia-friendly" community-based services, working with them to develop staff trained in the care of people with dementia, counseling caregivers in the selection of services, providing financial assistance for community care, and monitoring care quality.

This article reports on whether MADDE was able to increase community-based service use among its participants. Other analyses have examined whether the demonstration affected informal caregiver time and the levels of unmet need (Yordi, DuNah, Wilkinson, et al. 1997). Other articles in this

section of the August 1999 *HSR* examine persons taking part in the demon-
stration in terms of caregiver burden and depression and the placement of
clients in nursing homes.

THE MEDICARE ALZHEIMER'S DISEASE
DEMONSTRATION

Enrollment into MADDE was voluntary. Eligible applicants had to have a
physician-certified diagnosis of an irreversible dementia, be enrolled in (or
eligible for) both Parts A and B of Medicare, and reside in the demonstration
site's catchment area. Two case management models were implemented.
These differed by case manager–to-client ratios and service expenditure
ceilings per month for each client. Model A sites operated with a target
case manager–to-client ratio of 1:100 and had a monthly community service
reimbursement limit or cap of from \$290 through \$489 per month per client.
Model B sites had a target case manager–to-client ratio of 1:30 and a slightly
higher reimbursement limit of from \$430 through \$699 per month per client.
Per month reimbursement caps in each model varied by site over time due
to regional cost variations and inflation adjustments. Care usually covered
under Medicare continued to be reimbursed as part of the regular Medicare
benefit.

Case management and caregiver support services were covered by the
program's administrative budget and were not included under the client's
monthly expenditure caps. The support services included caregiver education
and training, caregiver support groups, mental health and counseling services,
and transportation to education and support groups.

Services reimbursed by the demonstration included adult day care;
homemaker, housekeeping; general chore (i.e., heavy cleaning); personal
care; minor home repairs; companion services; non-emergency transporta-
tion; adaptive and assistive equipment; consumable care goods (such as those
used for incontinence); and safety modifications to the home.[1] Clients and/or
caregivers paid a 20 percent copayment for any demonstration services they
used (for Medicaid participants the copayment was waived).

Model A (low reimbursement–high caseload) sites were located in
Champaign/Urbana, Illinois; Memphis, Tennessee; Portland, Oregon; and
Rochester, New York. Model B (high reimbursement–low caseload) sites
were located in Cincinnati, Ohio; Miami, Florida; Minneapolis, Minnesota;
and Parkersburg, West Virginia. The demonstration became operational in

December of 1989, and served clients and their families until November 31, 1994. Intake assessments were completed at the time of application to these programs. Applicants who completed assessments were randomly assigned by the evaluators into the demonstration treatment group (where they were eligible for case management and service coverage), or into a control group (where they continued to receive their usual care). Persons receiving case management services at the time of application (e.g., through Medicaid Home and Community-based Care programs) were generally not accepted into the demonstration. These individuals were excluded because their case management and benefits were equal to or greater than that available through MADDE. Such exclusions occurred prior to randomization. Persons becoming eligible for such programs after enrollment remained in the demonstration.[2]

METHODOLOGY

Four community services are included in these analyses: chore, personal care, companion, and adult day care. These were selected because they accounted for more than 80 per cent of the services used by demonstration participants (with consumable supplies being the other most commonly used benefit). The hypotheses underlying the demonstration are (1) that treatment participants would have a higher likelihood of use of all these services relative to those in the control group; (2) that the intensity of service use among all users would be higher among those in the demonstration treatment group relative to controls; and (3) that participants in the Model B (i.e., higher-resource) program would have both a higher likelihood and intensity of service use than participants in the Model A (i.e., lower-resource) program. See Table 1, which shows the variables used to represent predisposing, enabling, and need characteristics of an individual. These generally follow the conventional application of the Anderson-Newman framework (1973); client measures were expanded to include cognitive impairment, behavior problems, and type of housing. Caregiver attributes were added to the model and were grouped into parallel predisposing, enabling, and need dimensions.

     The predisposing characteristics of the caregiver (i.e., age, gender, and relationship) were selected from those in other studies that were found to influence the likelihood of service use. The enabling characteristics include measures that complement client attributes with regard to income, primary caregiving resources (i.e., time spent in this role, the availability of additional

or secondary caregivers, and whether the caregiver lived with the client), whether the individual was a member of the demonstration's treatment group, and caregiver participation in both education and training about Alzheimer's disease and caregiver support groups. Caregiver need includes health status and functional limitations, as well as other situational dimensions of need like employment limitations (due to the caregiving role), perceptions of the client's functional needs for which the caregiver reports the need for additional assistance (i.e., unmet service needs) in providing ADL or IADL support, depression, and the stress/burden arising from caregiving itself.

The analysis controlled for the client's community of residence and service use in the months preceding the period of analysis. Community of residence adjusts for differences in the availability and cost of services among communities, and any practice pattern differences that may favor the use of particular services. Prior studies suggest that the use of a service predicts the subsequent use of the same service and that the resources used for one service (i.e., personal care) may compete against the use of other, related services (i.e., adult day care). Controls were also used to adjust for differing lengths of exposure. The underlying logic was that a longer time in the community after application for inclusion in the demonstration could increase the likelihood of service use. Variables representing death or nursing home placement during the observation period were used to adjust for any unmeasured changes in health status or for differential attrition associated with these events.

The Study Sample

The analysis was conducted using data from the cohort of initial enrollees into the MADDE program. This cohort ($n = 5,831$ cases) entered the demonstration between December 1, 1989 and May 1, 1991, and included clients assigned to either treatment or control groups. Assessment data were collected at baseline and semi-annually on each of these cases if they continued to reside in the community.[3] The period for the analysis is the first 12 months after randomization. This period was selected because of the expectation that the case management intervention would likely have its greatest effect on clients during this initial exposure. In this sense the analysis is biased toward finding a case management–service reimbursement effect on community service use patterns.[4]

Three additional criteria were used for inclusion in this analysis. First, the client had to have a primary caregiver, because caregiver predictors are a central dimension of the analytical question: 136 clients did not have primary caregivers. Second, clients had to have been reinterviewed at the

Table 1:   Characteristics of the Study Sample

1A, Client Characteristics*	Treatment (n = 2682)			Control (n = 2527)		
	%	Mean	s.d.	%	Mean	s.d.
Predisposing						
Age		78.5	7.8		78.7	8.0
Gender (female)	39.4			42.5*		
Minority (yes)	12.2			12.2		
Lives alone	13.1			13.7		
Type of residence						
Home/Condominium	85.4			83.8		
Apartment/Senior housing	14.6			16.2		
Enabling						
Income						
$9,999 or less	34.0			33.4		
$10,000–$24,999	38.6			38.9		
$25,000 and higher	27.4			27.7		
Need						
ADL scale[†]		3.8	3.2		3.7	3.2
IADL scale[‡]		13.0	3.5		12.8	3.6
MMSE[§]		14.2	8.7		14.6	8.6
Behavior problems[¶]		8.4	3.9		8.4	3.9
Service Use [††]						
Prior hospitalization[‡‡]	20.9			21.0		
Day care days at baseline	16.4	19.5	35.2	15.0	29.7	40.4**
Day care days during year	37.1	78.1	67.9	21.1**	73.0	73.8
Chore care use/Hours at baseline	17.8	40.9	125.6	20.0*	67.5	166.8**
Chore care use/Hours during year	38.9	135.7	202.5	27.9*	139.4	260.3
Companion care use/Hours at baseline	16.6	64.4	188.5	13.8*	83.0	199.1*
Companion care use/Hours during year	37.8	174.6	294.0	21.4**	185.4	319.9
Personal care use/Hours at baseline	19.7	90.2	232.3	18.9	104.1	242.6
Personal care use/Hours during year	44.4	294.3	398.1	34.0*	295.6	426.1
Any home care use/Hours at baseline[§§]	42.8	114.0	259.1	42.3	134.7	263.2*
Any home care use/Hours during year	74.8	353.3	497.4	56.6**	332.8	523.0
Assisted living housing use/Days during year	5.5	161.8	107.9	7.7	161.2	107.2

*$p < .05$; **$p < .01$. t-Tests and chi-square analyses, as appropriate, were used to determine significant differences between groups.

[†]ADL score is based on clients needing none, some, or maximum assistance. Scores can range from 0 to 10. Higher scores are indicative of greater impairment.

[‡]IADL score is based on clients needing none, some, or maximum assistance. Scores can range from 0 to 16. Higher scores are indicative of greater impairment.

[§]Mini-Mental Status Examination values can range from 1 to 30. Lower scores are indicative of greater impairment. A score of 17 or under indicates moderate to severe impairment. Scores 18 to 23 indicate moderate to mild impairment.

¶The Behavioral Problems Index ranges from 0 to 19. Higher score equals more behavior problems.

††Mean use of service is based on participants who used the named service at any time during the year.

‡‡Hospitalized in the six-month period prior to entering the demonstration.

§§Any home care is created by combining chore, companion, and personal care into a single measure.

1B, Caregiver Characteristics*	Treatment			Control		
	%	Mean	s.d.	%	Mean	s.d.
Predisposing						
Relationship						
Spouse	51.2			51.3		
Married child	25.8			25.9		
Unmarried child	14.4			13.2		
Other relationship	8.7			9.6		
Age		63.8	14.3		63.6	14.5
Gender (male)	28.3			27.1		
Enabling						
Income						
Less than $14,999	28.8			29.2		
$15,000–$29,999	39.8			37.3		
$30,000 and higher	31.4			32.4		
Lives with client	77.3			75.6		
Lives with spouse	48.3			48.4		
Hours per week caregiving		91.6	57.2		88.4	58.2*
Secondary caregiver assistance‡‡‡		3.3	4.5		3.6	4.7*
Had used caregiver training services at baseline‡‡‡‡	49.4			27.5**		
Needs (Caregiver)						
Health status (fair/poor)	22.9			23.9		
Functional limitations¶¶		1.1	2.1		1.1	2.0
Employment limitations†††	18.8			18.0		
Unmet service needs§§§		1.8	2.6		1.8	2.6
Stress and burden scale††††		14.6	7.2		14.7	7.2
Depression scale¶¶¶		4.4	3.4		4.4	3.3
Control Variables						
Exposure days in period		308.0	93.9		304.3	97.3
Died during first six months of period	2.6			2.9		
Died during second six months of period	5.8			5.8		

Nursing home placement first six months of period	10.9	12.0
Nursing home placement second six months of period	10.1	9.1

*$p < .05$; **$p < .01$. t-Tests and chi-square analyses, as appropriate, were used to determine significant differences between groups.

¶¶The mean number of ADL/IADL tasks the caregiver has some difficulty performing. Scores can range from 0–13. The higher the score the greater the impairment.

†††The primary caregiver gave up employment-related opportunities due to the caregiver role.

‡‡‡The mean number of ADL/IADL tasks with which secondary caregivers provided help. Scores range from 0–13. The higher the score the greater the number of tasks secondary caregivers helped perform.

§§§The mean number of ADL/IADL tasks for which the caregiver reported needing help. Scores range from 0–13. The higher the score the greater the unmet service needs.

¶¶¶Scores range from 0–15. Scores greater than 5 reflect probable depression (Yesavage et al. 1983).

††††Scores range from 0–36. 0–8 scores represent low stress and burden; scores 9–16 represent moderate stress and burden; 17 or more represents severe stress and burden (Zarit, Reever, and Bach-Peterson 1980).

‡‡‡‡Caregivers had used either caregiver education and training classes and/or a caregiver support group in the six-month period prior to entering the demonstration.

first semi-annual reassessment. This excluded 323 persons who died or were institutionalized within the first six months after enrollment. Third, clients could not be residing in supportive housing at baseline, because two of the four services examined were often provided in such facilities. This excluded 163 additional cases. Persons relocating into supportive housing after baseline were retained. A total of 5,209 cases met all of the sample criteria, 5,181 with no missing values.

Measurement

Service Utilization. To measure service use, primary caregivers were asked during each assessment interview to identify (from a fixed list of options) the services they had used in the prior six months, and to indicate how often they had used them. If a person had used the service in either the initial six-month period or during the first 12 months of the study, the case was classified as a service user (1 = use, 0 = nonuse). Caregivers were sometimes confused about how to distinguish personal care, chore, and homemaker services from each other. This was especially true in the circumstance where a provider may have delivered more than one service (e.g., homemaker

and companion) during a single visit. Respondents typically could identify total units and provide a percentage distribution of these units into the applicable categories. If a distinction could not be made, the respondent was asked to indicate the total units regardless of the type of service received during the period. Respondents were also requested to provide the names of service providers during the interview. During data coding, service type and agency were cross-checked to distinguish care providers. When this procedure could not distinguish between types of services, the reported units were distributed equally among the applicable services. Care was taken to assure that service units were not double-counted. Analyses were conducted that treated each service separately, and that combined companion, personal care, and homemaker/chore into a single measure of "any home care."[5]

Client and Caregiver Characteristics. Client and caregiver data were obtained from baseline and semi-annual assessment interviews conducted with the client's primary caregiver. Baseline and reassessment data provide client and caregiver attributes at a point in time; reassessments provide self-reported service use during the prior six months. Assessments were collected independently from the case managers by the demonstration evaluation contractors. Included among these data was client functional status as measured by a version of the Katz activities of daily living (ADL) scale (Katz, Ford, Moskowitz, et al. 1963); Lawton and Brody's instrumental activities of daily living (IADL) scale (Lawton and Brody 1969); mental functioning was assessed using the 30-item Mini-Mental Status Examination (MMSE) (Folstein, Folstein, and McHugh 1975); caregiver functional status measured as per client's above; caregiver burden measured by a revised version of Zarit's caregiver burden scale (Zarit, Reever, and Bach-Peterson 1980); caregiver depression measured by the brief version of the Geriatric Depression Scale (Yesavage et al. 1983); and service utilization. Additional client and caregiver data included in the initial analyses were discussed earlier and are shown in Table 1. Among client predisposing, enabling, and need measures, the only difference between groups was that somewhat more women were in the control group. Among caregiver attributes, the only significant differences were in caregiver hours per week (more among the treatment group), the task assistance from secondary caregivers (more among the controls), and receipt of caregiver training prior to enrollment (more among the treatment group).

Site Variables. Dummy variables representing each of the eight states participating in the demonstration project were used, with each of the included sites being coded relative to a reference site. The reference site chosen for each service (i.e., homemaker/chore, personal care, companion, and day

care) was the one whose use rates were closest to the median percentage of service users among all sites. This enabled a comparison of any one site to the median performance of all sites in the demonstration.[6]

Alternative Service Use Control Variables. Separate analyses were conducted for the prediction of each selected community service (i.e., homemaker/chore, personal care, companion, and adult day care). If a study participant used the target service in the six-month period prior to enrollment into the demonstration, the case was classified as a baseline service user (1 = yes, 0 = no). All of the three other remaining community-based services were included in the model as control variables because the use of another community service could affect the use of the target service. Study participants were classified as a service user (1 = use, 0 = nonuse) for each of the alternative services if they used them in either the initial six months or during the first 12 months after demonstration enrollment. For the regression analyses, units of service used in these periods replace the dichotomous variable. Minor differences in the likelihood of using chore service and companion services existed between the treatment and control groups at baseline. These differences became nonsignificant when all types of home care were combined. Additional minor differences in the average service use among users at baseline persisted even when the home care services were combined into a single measure.

Analysis

A two-stage model was used to test the hypotheses relative to the likelihood and amount of service use. The first-stage used logistic regression to identify the likelihood of any home care (and each of the component services, i.e., homemaker/chore, personal care, companion) and adult day care use. The second-stage model used bootstrap regression to identify affects on the amount of use among service users (Efron and Tibshirani 1993). This resampling process was used instead of ordinary least squares regression because it makes no distributional assumptions about the residuals. Analyses had shown these models to have non-normally distributed residuals.[7]

Both the logit and the regression analyses were initiated using all the covariates shown in Table 1. Variables of substantive interest to the hypothesis testing were fixed in all models: experimental group assignment, site, site × treatment, three measures of client need (i.e., ADL, IADL, MMSE), and a measure of prior utilization for the service use outcome being predicted (e.g., prior chore service use as a predictor of chore service use during the first 12 months of the demonstration). Interaction terms between the client need variables and the treatment and site effects were also tested but not found

to be significant. The final equation used in each model included all of the fixed variables listed earlier and those measures that had met a .05 criterion in at least one of the earlier models. Only the treatment main effect, site, site by treatment interactions, and participation in caregiver training and support groups (if significant in the model) are shown.

FINDINGS

Service Use Likelihood

Home Care. At the time of application to the demonstration, about one-fifth of the clients in both the treatment and control groups were using homemaker/chore services. During the first 12 months after demonstration enrollment, the proportion of clients who used homemaker/chore services increased substantially for both groups (see Table 1). The proportion of users more than doubled among those in treatment, while those in the control group increased by 50 percent. A similar pattern was apparent in personal care services. This includes assistance provided in the home for activities such as dressing, bathing, toileting, transferring, and eating. A third home care service, here termed companion services, included friendly visitors, telephone reassurance, and adult "sitter services." Personal care workers or homemakers who provided shopping or errands might also have these tasks billed as companion service units. Companion services were designed to provide respite for caregivers, allowing them to leave the home and conduct personal business or social recreation activities. Prior to the demonstration, 17 percent of the treatment group and 14 percent of the control group had used companion services in the preceding six-month period. As with the other home care services, the proportion of use doubled among those in treatment and increased by half among the control group.

In recognition that problems may be associated with a client's ability to distinguish the definitional subtlety among these services, and that billing practices among providers or across sites may also cross over among the component activities, a variable "any home care" was created that combined the units among the three types of services. This measure showed essentially identical use among the treatment and control groups at baseline. The rates of change over time approximated those of the component services.

Table 2 shows the result of a logit regression that controlled for site and treatment by treatment interaction effects on these results. As the results are similar among the component services and their combination, only results

Table 2:   Treatment and Community Effects on Service Use

Variable	Odds Ratio†	Wald 95% Confidence Limits		Parameter Estimate‡	Standard Error
		Lower	Upper		
Any Home Care Service (users _n_ = 3783)					
Treatment group	2.77	2.40	3.20	46.42	13.91***
Used caregiver training/support	1.40	1.20	1.61	−22.37	14.70
Low-Resource Sites					
New York (_n_ = 590)	0.78	0.48	1.29	7.56	62.13
Oregon (_n_ = 673)	0.32	0.19	0.53	−209.20	56.16****
Tennessee (_n_ = 622)	2.67	1.64	4.36	173.50	90.09
High-Resource Sites					
Florida (_n_ = 797)	2.42	1.53	3.84	83.56	47.91
Minnesota (_n_ = 891)	0.74	0.48	1.13	−51.73	42.84
Ohio (_n_ = 673)	1.11	0.69	1.78	78.76	59.40
West Virginia (_n_ = 400)	0.56	0.31	1.00	−101.67	66.34
Site × Treatment Interactions					
New York × treatment	1.06	0.52	2.16	−134.49	73.00
Oregon × treatment	1.74	0.85	3.55	1.18	58.61
Tennessee × treatment	1.93	0.88	4.27	−39.33	104.50
Florida × treatment	0.54	0.28	1.06	177.67	66.74
Minnesota × treatment	1.13	0.62	2.06	2.81	56.86
Ohio × treatment	0.38	0.19	0.73	−103.52	70.28
West Virginia × treatment	1.90	0.76	4.71	111.29	87.76
Adult Day Care Service (users _n_ = 1697)					
Treatment group	2.61	2.20	3.10	7.12	3.45*
Used caregiver training/support	2.23	1.92	2.60	5.71	2.90*
Low-Resource Sites					
Illinois	1.10	0.58	2.08	28.55	14.83
Oregon	0.52	0.26	1.03	−48.66	10.98****
Tennessee	0.39	0.18	0.86	−14.16	19.93
High-Resource Sites					
Florida	2.73	1.55	4.80	38.40	12.24**
Minnesota	4.58	2.79	7.51	7.49	9.24
Ohio	1.80	0.96	3.37	10.14	13.22
West Virginia	0.16	0.05	0.49	−12.35	27.85
Site × Treatment Interactions					
Illinois × treatment	0.85	0.38	1.92	−12.38	18.07
Oregon × treatment	0.43	0.18	1.04	7.49	14.06
Tennessee × treatment	1.33	0.50	3.59	−21.60	25.64
Florida × treatment	0.94	0.46	1.93	−4.67	14.08
Minnesota × treatment	1.21	0.63	2.30	30.47	11.57***
Ohio × treatment	1.50	0.69	3.26	1.98	15.55
West Virginia × treatment	2.07	0.56	7.63	9.84	30.84

*$p < .05$; **$p < .01$; ***$p < .001$; ****$p < .0001$.

†Odds Ratio refers to the logit analysis.

from the composite measure of any home care are shown. Membership in the treatment group, compared to membership in the control group, more than doubled the likelihood of initiating home care service. Community of residence had a marked effect on the likelihood of using this service in three of the eight communities during the first 12 months in the demonstration. Illinois was the site with the median percentage of use.

The interaction between site and treatment group was generally non-significant when home services were combined, suggesting that the difference between communities was usually a local practice phenomenon rather than a treatment effect differential.[8]

Participation in caregiver training programs was associated with increased service use when all home care services were considered both together and separately. This effect was about half that of demonstration treatment group participation.

Adult Day Care. Adult day care offered from four to six hours of care at a center where supervised activities, health status monitoring, and a noonday meal were provided. Transportation to and from the center was usually included as part of the service. Prior to the demonstration, similar proportions (about 15 percent) of the treatment and control groups were users of day care services. Within 12 months this proportion doubled in the treatment group, and it increased by about 50 percent among the control group.

These differences are reflected in Table 2 where treatment group members were significantly more likely to use day care service than control group members. The likelihood of use relative to the median site (i.e., New York) was highest in Florida and Minnesota, and lowest in West Virginia and Tennessee. Site by treatment interactions showed no significant differences.[9] Experience with caregiver training had an effect on the likelihood of day care services approaching that of demonstration participation.

Amount of Service Use

The amount of home and community service use among those using a service either at baseline or at some time during the observation period does not appear to be particularly sensitive to treatment group participation as reflected

in a simple comparison of mean expenditures in Table 1. The bootstrap regression results in Table 2, which control for site and site by treatment interactions, however, do show a significant affect for both home care and adult day care. (Treatment effects on the individual home care services were not found.) On average, a treatment group member who used home care used about 45 hours more than users in the comparison group. Similarly, treatment group members used on average about seven more days of adult day care.

The amount of use of home care (among users) was significantly associated with only one of the eight sites, Oregon, where the use was substantially below that of the median site (Illinois). There were no significant site by treatment interactions. With respect to adult day care, Florida had higher use than the median value site (New York), while Oregon was lower. Site by treatment interactions show that Minnesota, alone among the sites, produced an increment of effect over the average main effect.

The general absence of statistically significant comparisons on both types of services is a function of the small effect sizes, .04 and .07 (the means divided by the standard deviation) for home care and day care, respectively. Individual site level comparisons have a power level well under .20. For the total group of users, power is .30 and .40, respectively, among the two types of services. Reductions in the standard deviation by three-fourths in home care and by one-half in day care would have increased the effect size to about .16, but even at this level a power level of .80 is achieved only with 1,000 cases. For individual sites power would be no higher than .50.

Testing Demonstration Model Differences

Participation in the demonstration treatment group had a marked affect on the likelihood of service use. The third study hypothesis addressed whether participation in the Model B program (i.e., the higher monthly capitation) produced a higher likelihood of service use (and the use of more units of care) than participation in the Model A program. This question was addressed in a series of models that differed from those in the prior analysis by the inclusion of a dummy variable, where Model B cases were given a value of one and the Model A cases were assigned the value zero. Step one of the analysis used the full set of covariates in Table 1 (including the treatment main effect), inserting the model dummy variable. Site and site by treatment interaction terms were omitted because model is correlated with site. Model was significant in this model. The second step reestimated these equations, retaining those items that met a criterion of .05, also adding site main effects and a model by

treatment interaction term. This variable has a value of 1 when the model is B treated and 0 otherwise. The "model" dummy variable main effect was omitted due to its correlation with site. Logit and bootstrap regression results from this series of analyses are shown in Table 3. Of specific interest are the odds ratios for the model, by treatment interaction, and the parameter estimates on the same variable. None of these results is significant within conventional criterion levels of $p < .05$. However, there was a tendency ($p < .10$) for Model B programs to have a lower likelihood of home care and an increased likelihood of adult day care. Units of service received also showed a tendency for more units among those in Model B, but again at nonsignificant levels ($p < .10$).

DISCUSSION

A compelling pattern supports the finding that the Medicare Alzheimer's Disease Demonstration treatment group participants had a higher likelihood of community service use than control group participants. This is consistent with the functions of the demonstration: working with families to identify service needs and counseling them into appropriate services. Treatment group members were 1.7 to 2.3 times more likely than individuals in the control group to use home care services, each considered separately, or 2.8 times more likely to use at least one of these services. The likelihood of adult day care use was 2.6 times higher among the treatment group.

Participation in caregiver training and/or support groups emerged as a naturally occurring, competing treatment in the experiment. Exposure to this support significantly increased the likelihood of community service use, approaching that of the demonstration program for adult day care (i.e., odds ratios of 2.2 versus 2.6). It was substantially lower for any home care use (i.e., odds ratio 1.4 versus 2.8). This finding suggests the importance of training and counseling in affecting the willingness of caregivers to try a service.

The likelihood of using a particular home care service varied noticeably by community. This was expected given variations in the supply of providers and in the regulatory rules affecting eligibility. When the in-home services were grouped together—essentially treating these services as alternatives to each other—the variability across sites was greatly reduced but not eliminated. Clients in both Tennessee and Florida showed higher propensities to use in-home care than clients in the median site. Persistent site differences were even more apparent in comparing the likelihood of adult day care use.

Table 3:   Testing Model A versus Model B Effects on Service Use

Variable	Odds Ratio[†]	Wald 95% Confidence Limits		Parameter Estimate[‡]	Standard Error
		Lower	Upper		
Any Home Care					
Treatment group	3.05	2.50	3.72	23.71	21.53
Used caregiver training/support	1.38	1.19	1.59	−23.60	16.32
Low-Resource Sites					
New York	0.72	0.49	1.06	−42.85	45.49
Oregon	0.38	0.26	0.56	−178.18	33.45****
Tennessee	3.16	2.12	4.71	179.93	60.16**
High-Resource Sites					
Florida	2.04	1.42	2.93	153.03	38.93***
Minnesota	0.90	0.64	1.25	−77.04	30.35**
Ohio	0.77	0.54	1.11	−7.12	44.14
West Virginia	0.82	0.52	1.29	−65.85	50.37
Model × Treatment Interactions					
Model B × Model A and controls	0.79	0.60	1.03	48.66	28.48
Adult Day Care					
Treatment group	2.19	1.73	2.76	2.60	4.60
Used caregiver training/support	2.23	1.91	2.59	5.33	2.92
Low-Resource Sites					
Illinois	1.14	0.74	1.77	27.82	9.41**
Oregon	0.38	0.23	0.61	−37.54	8.08****
Tennessee	0.54	0.33	0.91	−20.66	10.85
High-Resource Sites					
Florida	2.26	1.48	3.43	29.02	8.18***
Minnesota	4.30	2.98	6.20	19.69	7.09**
Ohio	1.91	1.26	2.91	4.11	7.93
West Virginia	0.22	0.12	0.41	−12.98	15.19
Site × Treatment Interactions					
Model B × Model A and controls	1.30	0.98	1.80	10.88	5.99

$*p < .05$; $**p < .01$; $***p < .001$; $****p < .0001$.

[†]Odds Ratio refers to the logit analysis.

[‡]Parameter estimate refers to the bootstrap analysis of service users. Model B (i.e., higher-resource) sites treated group ($n = 1423$), Model A treated group ($n = 1259$), controls ($n = 2527$). Any home care: logistic regression R^2 .22, w/ 25 d.f.**** Bootstrap regression R^2 .29, F-value 11.050.**** Adult day care: logistic regression R^2 .30, w/ 31 d.f.**** Bootstrap regression R^2 .36, F-value 27.607.****

Clients in Tennessee and West Virginia, with both states having a substantial proportion of rural participants, were much less likely to use day care than clients in the median site. Clients in the predominantly urban sites of Florida and Minneapolis were substantially more likely to use this service. The

general absence of significant site by treatment interactions suggests that the demonstration's main effect on home care and day care service use was relatively constant among all programs.

The higher rates of community service use among treatment group members, with the exception of adult day care, did not translate into a higher intensity of service use among those using the service. This finding, which addresses the project's second hypothesis, suggests that, although the demonstration's coverage for home care may have been helpful in getting more families to use a service, it was not sufficient to substantially alter the amount of service being used over that which was purchased through private out-of-pocket expenditures by control group members. In-home care services typically ranged in price from $12–$15 per hour, adult day care from $30–$55 per day. This translates into a monthly maximum of 24–40 hours of home care that could be purchased with the demonstration benefit for Model A and B clients, respectively. This is equal to about one to two hours per day, five days a week, or more likely three to four hours on one or two visits per week. Day care is typically purchased in four- to six-hour blocks for a bundled price of about $40 per day. Given the benefit caps under each model, between two and three days of care per week could be reimbursed under Model A and B, respectively. These levels of support may be sufficient for routine client management, and they appear to be affordable by a segment of the comparison group.[10]

The third hypothesis tested was whether participants in Model B (i.e., the higher-resource model) would have a higher likelihood of service use and a higher intensity of use than participants in Model A (the lower-resource model). This was tested in a series of analyses using a model by treatment interaction term. There was a tendency for Model B programs to produce a higher likelihood of adult day care use and an offsetting tendency toward lower likelihood of home care use, but these results were not statistically significant. These findings suggest that within the limitations of two sets of four site replications, few systematic differences existed between the two demonstration models. In other words, the combination of lower client-to-case manager ratios and up to $200 more per monthly reimbursement were not sufficient to produce demonstrably different utilization among the four replications of each demonstration model. Site differences within a model group offset most of the differences found in comparisons between models.

An examination of the site by treatment interactions is informative for understanding the comparisons within and between groups. Relative to the controls and the median site reference, treatment group clients in the low-

resource sites were as likely or were more likely to be using a home care service than the treatment group clients in high-resource sites. Part of this difference appears to be related to the prevailing practice in a community. Sites where prevailing use was low relative to the median site typically showed a tendency for increased use, as reflected in site by treatment interactions. The opposite occurred when the site was a relatively higher user of the service. These patterns appeared in both models. For adult day care, three of four Model B sites were above the median site in use compared to only one Model A site. All of the Model B site by treatment interactions (while not statistically significant) showed a tendency to emphasize day care use further, or to be neutral to it. Half of the Model A sites, in contrast, showed a tendency to reduce the use of this service.

SUMMARY AND CONCLUSIONS

Three hypotheses were tested in this analysis: (1) that treatment group participants in the Medicare Alzheimer's disease demonstration would be more likely, relative to those in the control group, to use home care services (including homemaker/chore, personal care, companion) and adult day care in the 12 months following voluntary enrollment into the demonstration; (2) that the intensity of community service use among all users would be higher among those in the demonstration treatment group than in the controls; and (3) that participants in Model B (higher-resource use) would have a higher likelihood of service and higher intensity of use than participants in Model A (lower-resource use). These hypotheses were tested using both logistic regressions of the likelihood of service use and bootstrap regressions predicting the level of use among service users. Applicants to MADDE were randomly assigned to treatment and control groups within each of eight demonstration sites. A common set of predisposing, enabling, and need characteristics of the dementia client cases and their caregivers were used for control variables.

The case management and community service reimbursement intervention had a strong, consistent, and positive effect on the likelihood of using each of the services examined. Treatment group clients were almost twice as likely to be using community-based services as were those in the control group. Caregiver training and support group participation increased service use likelihoods by at least 50 percent for two services.

Reimbursement for services provided through the demonstration's Medicare waiver facilitated the use of services but generally was not sufficient

to exceed the level of service acquired by control group members through private payments.[11] In other words, it appears that the relatively low reimbursement available was used primarily as a substitute for private payment rather than as a supplement permitting more units of care. Two qualifications need to be made with respect to this finding. First, Medicaid-eligible clients and caregivers were generally excluded from the demonstration at the time of their enrollment application. Thus, the demonstration's effect was tested among a range of clients from the near-poor through people of progressively higher income. In this truncated range, low income may have been a contributing factor in non-service use. The demonstration's limited coverage may have been important in helping the near-poor population reach utilization levels more comparable to those of the moderate-income population, but tests of treatment by income interaction terms were not statistically significant within the available sample size. This effect may have also been constrained by the 20 percent copayment on demonstration services. Second, a weekly visit for personal care or homemaker/chore assistance or twice-a-week day care attendance, which was the norm among users, is essentially respite care. The increment from this respite level to one necessary to supplement daily care or 24-hour care needs was not tested by the reimbursement caps available from the demonstration. The effects of significant increments in funding on caregiver willingness to accept higher levels of assistance, and whether such a funding benefit reduces nursing home placement, are questions remaining to be tested.

One can draw conclusions about the relative effectiveness of funding level differences between the demonstration's two models. Within the limits of the monthly payments and the case manager–to-client staffing ratios, it would appear that there is no systematic advantage for the high-resource model over the lower-resource model when they are examined across the four sites in each model, although there is a tendency for the higher-resource programs to emphasize adult day care. The finding of essentially equivalent effects is important from a cost perspective. The low-resource (Model A) sites have fewer service dollars to spend on each treatment client per month and substantially lower administrative costs due to the client-to–case manager ratio (1:100 compared to 1:30 for the high-resource sites).

Participation in caregiver training or support groups emerged as a naturally occurring, competing treatment in the experiment. Exposure to this training or support approached the effect of the demonstration program for adult day care selection. It was substantially lower for companion and chore care and nonsignificant for personal care. Such a finding suggests the

importance of training and counseling in care planning and in influencing the caregiver's willingness to try relatively unknown community services. An extension of volunteer support group resources could perhaps be an effective means of encouraging greater use of some community resources by caregivers. In this context it may be possible to reserve more extensive case manager involvement for reticent and complex cases. Such a triaging of caregiver needs was not an explicit component of this or similar case management demonstrations, which have had to follow rather routinized protocols.

NOTES

1. Additional, but seldom used, services included skilled nursing and rehabilitation nursing therapies (i.e., speech, occupational, physical therapy; home health aide), medical supplies in conjunction with skilled and unskilled home care, and home-delivered meals not otherwise reimbursed by Medicare.
2. Applicants during the first 24 months of operation constituted a closed panel of cases for the evaluation. The programs continued to enroll members for two years after that in order to maintain a steady-state client-to–case manager ratio. Evaluation data were not collected on these later enrollee cohorts. Miller et al. (1999) in this *HSR* issue examine attrition from the MADDE project, finding no differences between treatment and control cases in mortality or other attrition rates.
3. A supplemental sample ($n = 2,310$ cases) was drawn among applicants entering the demonstration between May 1 and November 1, 1991. This sample was selected to assure the evaluation of an adequate sample size for the full 36 months of exposure in the demonstration. For budgetary reasons, assessment data were collected only at baseline, 24, and 36 months for this group. The present analysis excludes this sample because community service utilization data during their first 18 months of enrollment were not collected.
4. Further justification for this focus is provided by a descriptive analysis of service use over the full 36 months. This revealed that differences in utilization patterns between the treatment and control groups were most pronounced during the first 12 months, but the groups did not converge over the remaining months.
5. A comparison of self-reported community service use (among the treatment group), with the demonstration-reimbursed claims found that 93 percent of the cases were able to identify correctly that they were receiving a service when they were getting it; an equal proportion were correctly able to identify that they were not receiving a service (Donatoni 1997). This finding was equally robust regardless of caregiver type (e.g., spouse, daughter, other family member), but reporting accuracy was higher among those living with the dementia client. Reporting of actual service units was much less reliable, but with no systematic bias. Any differential service unit reporting accuracy between the groups is

probably in the direction of having the treatment cases underreport units, because they had to pay for fewer of these services.

6. Site visits were conducted at program start-up and close-out as part of the evaluation. One function of these visits was to interview local informants and program staff about service supply and issues relative to changes in supply, the competitive advantage of the program to negotiate discounted rates, and problems in access to care for the dementia population. Except for placing Medicaid-eligible recipients in nursing homes of their choice, there were no particular service access problems at either baseline or close-out. The programs were not large enough to stimulate new services (e.g., day care), available exclusively to the treatment group members, or to negotiate discounted prices. Any unmeasured "history" effects that may have influenced the applicant pool or the services they were able to obtain have been controlled within the study's prospective cohort by randomization of the applicants. Market area differences in access and use are reflected in the site and site by treatment interaction terms used in the analysis.

7. This procedure used 200 repeated estimations of each model, each using a random resample of cases with replacement and then using the average of the parameter estimates and their standard errors as the model estimate.

8. Combining home care services masks some of the variation among the specific services. For example, treatment group members were over 2.5 times more likely to use homemaker/chore services than control group clients in Tennessee; and almost two-thirds less likely to use homemaker/chore services than control group clients in Florida. New York treatment group members were almost two-thirds (OR = 0.38) less likely, and Oregon 2.5 times more likely to use personal care services than those in the control group. Tennessee treatment cases were 2.2 times more likely, and Ohio treatment cases 0.23 times less likely than control cases to use companion services.

9. The effect size for home care is about .44 and for day care about .33. The former has a power of .9 with as few as 170 cases, a number achieved except in the West Virginia site; the latter has a power of .8 with as few as 190 cases.

10. The unit price for these various services was not systematically higher in the Model B sites, which could have offset the financial advantage of Model B over Model A had such differences been present.

11. Quality assurance and satisfaction with the demonstration program may influence service use rates. The programs largely purchased services from existing and preestablished providers. The main exception involved attendant aides or home care workers, where neighbors, family members, and non-agency–affiliated providers accounted for the bulk of the labor force. All sites worked with their major providers to influence staff training, often conducting training using the demonstration staff. They also tried to influence the assignment of staff to demonstration clients, such as by requesting the staff members who had gone through the training program or others found through experience to be of high quality. One site (West Virginia) set up its own home care program, recruiting, training, and supervising home care staff. Quality assurance efforts per

se, except in this latter example, continued to rest with the contracted provider and the appropriate licensing agency. Case managers did monitor whether the providers arrived when scheduled, and if the clients were reporting any problems or dissatisfaction with the providers.

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