
Case Management, Client Risk Factors, and Service Use

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Six "pure" types of case-manager activity are identified using chart data from 922 cases in the Medicare Alzheimer's Disease Demonstration. The association between case-manager actions and client characteristics, and between case-manager activities and service use outcomes is used to test predictive validity. Case-manager activity is generally more associated with caregiver than client characteristics. Monitoring and service management was protective against nursing home placement. A clinical nursing emphasis was protective against hospitalization. Understanding how case management is differentiated may improve staffing, treatment protocol, and client service outcomes.

INTRODUCTION

The term "case management" has come to describe a method of organizing a fragmented group of service providers (and sometimes funding sources) at the point of service delivery. One impetus for the initial growth in this approach was the expansion in community-based care options for persons needing some form of long-term care (Weil and Karls, 1985). Case managers in these programs may determine benefit eligibility and develop care plans for those electing to remain outside of nursing homes. On a more limited scale, case-management functions have begun to be

extended to the interface between acute care (and even primary health care) and a multitude of community care services. Community services include skilled care such as home health and nursing homes, as well as "non-skilled care" such as residential care, day care, meals programs, and homemaker/chore services. Case management in this context can range from simple referrals to serving as a point of information coordination between multiple providers. The incorporation of case management into health care delivery is being stimulated by (a) the recognition that large numbers of elderly persons with chronic conditions require treatment that is inappropriate for acute care settings; (b) funding for in-home and community-based care from Medicaid waiver programs; (c) advances in medical practices that have resulted in many types of medical and surgical care being practiced outside the hospital in community-based or home settings; and (d) recognition of communication problems between primary care providers and medical specialists and other providers (Applebaum and Austin, 1990; Mor, Piette, and Fleitmann, 1989; Rothman, 1992).

Case management is now considered a pivotal component of long-term care service delivery and as a likely adjunct to primary care in managed health care systems (Grower, 1997; Kane, 1985). Inpatient and nursing home case-management teams may also be gaining prominence. The utility of case management is based more on its face validity than on scientifically documented success. The two major evaluations of community-based case-manage-

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ment interventions, the Channeling demonstration (cf., Kemper, 1990) and the Medicare Alzheimer's Disease Demonstration (Newcomer et al., 1992), as well as a number of other demonstrations using case management as part of community-based long-term care services (cf., Berkeley Planning Associates 1986; Kemper, 1988; Kemper, 1990; Mathematica Policy Research, Inc., 1986; Weissert, 1985; Weissert, 1988) have generally failed to find a cost savings resulting from case-manager interventions. These programs, particularly those able to reimburse community services, have shown that they can improve access to and use rates of community care.

Several studies conducted in Great Britain have found a therapeutic benefit. As early as 1970, British researchers concluded that the provision of support services to families of elderly persons with dementia enabled them to cope longer and thus maintain elders at home (Sainsbury and Grad de Alarcon, 1970). More recently, community-wide studies in townships such as Gloucester, East Kent, and Edinburgh showed that, through early intensive case-management efforts, the number of geriatric hospital admissions was reduced by as much as 60 percent, hospital stays were shorter, and the probability of admission to residential care declined substantially (Barker, 1985; Davies, 1988). Anecdotal studies that measure caregiver burden and satisfaction with services have also produced positive findings (Gilhooly, 1984).

In focusing on variables predicting positive outcomes, British researchers (unlike the United States studies) were led to examine the "core tasks of case management" and concluded that "the importance of recognizing the core tasks is that their performance directly affects most aspects of efficiency" (Davies, 1988). The British literature reflects attempts to

go deeper into the multidimensional, managerial, coordinative, and clinical functions of case management. Factors identified that may affect case-management service outcomes include the professional background of case managers, the manner in which objectives are established and priorities set, the degree to which case managers have control over finances, the organization of their ongoing tasks and daily activities, and the implementation of a brokerage or consolidated model of case management (Davidson, Moscovice, and McCaffrey, 1989; Malone Beach, Zarit, and Spore, 1992).

Faced with the inconsistent findings about case-management effectiveness and the continuing expansion of this function throughout the health and long-term care delivery system in the United States, emergent studies of case management have begun to give more attention to specific case-manager practices. This has taken several forms. One approach is to delve into the professional background, managerial, coordinative, and clinical functions of case management, as has been done in Britain. Other approaches measure connections between client characteristics and case manager's actions, and the resultant outcomes of this interaction (cf., Cambridge, 1992; Davies, 1988; U.S. Congress Office of Technology Assessment, 1990).

This article follows this latter approach using case manager chart data to chronicle case-manager activity. The purpose is to first create a typology of case-manager activities, and then to explore the extent to which different types of case-manager actions are related to client characteristics, and to assess the extent to which these actions are related to client and caregiver service use outcomes. This work has both methodological and practical applications. Current practice, particularly as prescribed in the demonstration programs

cited above, constrain the discretionary behavior of case managers and require that certain segments of time be obligated to routine tasks. The emphasis given to a particular client by a case manager is usually unmeasured in most studies because case management is treated as an undifferentiated activity. Such bundling implicitly treats every contact as being equivalent. An unbundling of activity and contacts provides an opportunity to more specifically match activity and need, and to track some of the consequences arising from the encounters. Understanding when and how case management is differentiated, and the client and staffing consequences of this differentiation, should be helpful in designing case-management programs and treatment protocols, and in gaining more sensitive measurement of case-management program performance.

Case-Management Tasks and Functions

Whether in the fields of mental health, health care, rehabilitation, acquired immunodeficiency syndrome (AIDS), or aging, case managers typically perform a common set of sequential and often overlapping functions (Rothman, 1992). These generally comprise a subset of the following seven tasks (see Applebaum and Austin, 1990; Cambridge, 1992; Capitman, Haskins, and Bernstein, 1986; Geron and Chassler, 1995; Piette et al., 1992):

- Screening and case finding involves eligibility determination and may be based on cognitive and functional status, geography, financial eligibility, and less often, the lack of available informal support.
- Comprehensive assessment involves collecting in-depth information on client needs and resources using a systematic protocol. Baseline demographic information is obtained, and the protocol may

be used to determine a person's social situation, physical, mental, and psychological functioning, and financial resources. An early ideal was to have a multidisciplinary team involved in the assessment. More typically, one individual completes the assessment, and consultation is available from other professionals to help translate the assessment into a care plan.

- Care planning's core objective is to identify resources for each area of need uncovered during the assessment and define the process by which clients are linked with those resources. The care plan should be revised based on additional information that may be acquired during the course of the care, especially at reassessment.
- Service coordination is required for implementation of the care plan and involves identifying a complex set of activities to meet each of several need areas and coordinating providers to meet those needs. Activities range from making referrals, to assisting the client and or caregiver in acquiring services, to making arrangements with vendors concerning the type and amount of service and authorizing payment for the services.
- Monitoring is characterized by phone contacts and home visits to monitor the quality of care provided by vendors in the home on a routine basis.
- Reassessment should occur at regular intervals, although the length of the interval is dependent on client characteristics and needs. An interval of 6 months is considered the average for long-term care case management. Reassessment may also be triggered by events in clients' or caregivers' lives or changes in client status, such as the death of the caregiver or a major hospitalization.
- Planned discharge is rarely indicated for

community-based long-term care clients. However, discharge planning is often a necessary process when funding for case management is tied to a specific service (e.g., Medicare certified home health care), if it is connected to placement of the client in a nursing home or assisted living, or in relation to a hospital stay.

Although each of these functions is likely to be performed by case managers at some point with each client, there may be a wide degree of latitude about how these tasks are implemented, and even in whether a single case manager provides all these functions. Case managers may also have direct service roles, such as client and caregiver training in the use of assistive aids or equipment, or in how to access other community resources.

Another source of variation among programs and case managers is how they implement their roles. For instance, reassessment intervals may vary, as do the criteria that may trigger a reassessment, or the protocols that determine how data are collected. Care planning, such as a decision to institutionalize the client, is another source of variation—one that is further influenced by a negotiation between the case manager and the client's informal network. Recognizing the many sources of potential variation in case-management implementation, this analysis uses the operational experience of a single multi-site demonstration program to constrain the variation in practice. The program is known as the Medicare Alzheimer's Disease Demonstration Evaluation (MADDE). MADDE was in operation from December 1989 through November 1994. Two case-management models were implemented. These differed by case manager-to-client ratio and per-month service expenditure ceilings for each client. Model A sites operated with a target case manag-

er-to-client ratio of 1:100 and had a monthly community service reimbursement limit or cap of about \$300 per month per client. Model B sites operated with a target case manager-to-client ratio of 1:30 and had a slightly higher reimbursement limit of about \$500 per month per client. Acute care and other skilled care services usually covered under Medicare continued to be reimbursed, but were not under the control of the case managers in either model.¹ Case managers in both models used the same basic assessment instrument. Sites within each model followed similar protocols relative to the frequency of scheduled periodic contacts. Model B sites, by design, had more frequent scheduled visits. All sites conducted annual reassessments. Case managers were predominantly (if not exclusively) social workers in seven of the eight sites. The remaining site's staff were exclusively nurses.

Enrollment into MADDE was voluntary. 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. Program participants were eligible for case-management services from enrollment through the end of the demonstration, as long as they remained residents in the community. Case management was withdrawn within 60 days after a permanent nursing home placement.

Services reimbursed under the demonstration included adult day care; homemaker/personal care; housekeeping; general chore (i.e., heavy cleaning); home repairs and maintenance; companion services, such as friendly visiting or caretaking while the caregiver attended educa-

¹ Model A sites were located in Champaign/Urbana, Illinois; Memphis, Tennessee; Portland, Oregon; and Rochester, New York. Model B sites were located in Cincinnati, Ohio; Miami, Florida; Minneapolis, Minnesota; and Parkersburg, West Virginia.

tional and/or support groups; home-delivered meals; non-emergency transportation for client; adaptive and assistive equipment; medical supplies in conjunction with skilled and unskilled home care; consumable care goods; and safety modifications to the home.²

Clients and/or the caregiver paid a 20-percent co-payment for any demonstration services used (the co-payment was waived for Medicaid participants). Case-management time 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, caregiver/family mental health and counseling services, and caregiver transportation to education and support groups. These support services were usually provided by someone other than the client's case manager, although some sites did use case managers to conduct group training sessions.

METHODS

Sample

Annual assessment data were collected on program participants (and the control group) for a maximum of 3 years, even if their enrollment was longer. The total number of demonstration participants was 8,141, half of whom were randomly assigned into the demonstration treatment group and eligible for case management and community service coverage. A probability sample of 1,000 treatment group participants was selected for the chart reviews (approximately 125 cases per site).

² Skilled nursing and rehabilitation therapies (i.e., speech, occupational, physical) not otherwise reimbursed by Medicare could be reimbursed under the demonstration guidelines; however, few such service units were reimbursed by any of the demonstration program sites.

Relatively equal numbers of cases by site were used to assure that the experience of a single site did not dominate the patterns or effects observed. This sample was screened for eligibility based on these criteria: participation in the demonstration for at least 6 months (to assure at least this minimum exposure to case-manager activity); no change in informal caregiver (to assure continuity of client/caregiver relationships with the case manager), and one primary case manager for the majority of the time in the demonstration (again for purposes of assuring continuity of care). Of the 1,000 sample cases, 922 met these criteria, with 893 having complete data sets on most of the assessment variable items of interest in these analyses. The resulting sample is large enough (with a power of .8 and an alpha of .05 two-tailed) to detect an effect size of .2 standard deviations between the two demonstration models. The comparison among demonstration models was built into the design to enable a test of the typology's sensitivity to case-load variations.

Continuity of care was emphasized in selecting the cases as a safeguard against having to restart the assessment and care planning processes due to changes in either caregivers or case managers. Such recycling of case-manager actions was thought to potentially truncate the range of case-manager activities that might otherwise be observed in a steady-state client relationship.

Instruments and Data Sources

Chart information on each study client was summarized on a case-manager activities code list. This included a description of the clients' problem(s) and other needs, an assessment as to whether the encounter was a crisis or an ongoing situation, and a list of the activities that were implemented.

A listing of these activities is included in Table 1, along with the means and standard deviations of these measures. Items consist of a count of each activity. The chart data, to which these instruments was applied, covered the client's problems defined at demonstration enrollment and throughout the first year of participation (or the period of participation if less than 1 year).

Client and caregiver data were obtained from baseline assessment interviews conducted with the client's primary caregiver. These instruments include data on client health and functional status as measured by a version of the Katz activities of daily living (ADL) scale (Katz and Akpom, 1976); Lawton and Brody's instrumental activities of daily living (IADL) scale (Lawton and Brody, 1969); client cognitive status as measured by the mini-mental status examination (Folstein, Folstein, and McHugh, 1975); client behavioral problems assessed using an adaptation of the index developed by Zarit, Todd, and Zarit (1986); caregiver health status measured as per 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, Brink, Lum, et al., 1983); and service utilization. These scales and indices are widely recognized and used because of their reliability and predictive validity. The scale ranges, and clinically normed cut points, if any, are shown in Table 2.

Additional client and caregiver data included:

- Age.
- Educational level.
- Ethnicity.
- Sex.
- Income.
- Hours of paid work per week by caregiver.

- Paid work interruptions.
- Insurance.
- Living arrangement.
- Marital status.
- Relationship between client and caregiver.
- Size of support network.
- Unmet ADL/IADL task needs.

The client measures generally follow the framework of predisposing, enabling, and need characteristics of clients (Anderson and Newman, 1973). Recognizing that the study involves clients with dementia, the framework was extended to include caregiver characteristics.

Service use, an outcome variable in the analysis, includes both community services (e.g., adult day care, personal care, companion services, and homemaker chore services), and health care (e.g., hospital, nursing, nursing home). The service use data were obtained on all assessments as part of the interview with caregivers. For these analyses, service use was obtained from the 6-month assessment, to permit the tracking of service use patterns that may be related to the case-manager activity. The sample completing this instrument is smaller than the starting sample due to mortality and nursing home placement attrition during the 6-month period. The descriptive statistics on the client, caregiver, and service use values are shown in Table 2.

RESULTS

Typology Construction

The actions taken by each case manager to solve client or caregiver presenting problems were coded by a RN/MPH and MSW/MSG into an inclusive list of over 200 categories describing client problems and caregiver activities, 54 of which repre-

Table 1
Descriptive Statistics of Case Management Data Set

Variables	Sample Size	Mean Value ¹	Standard Deviation	Minimum Value	Maximum Value
RN Assessment	922	0.299	0.748	0	5
Crisis Assessment	922	0.037	0.253	0	5
Non-domain Assessment	922	0.025	0.188	0	3
Routine Assessment	922	1.917	2.066	0	19
Care Plan Development	922	1.333	1.558	0	15
Care Plan Revision	922	1.243	2.487	0	25
Care Plan Problem Solved	922	0.076	0.324	0	3
Service Provider Contact	922	1.923	2.158	0	16
Ongoing Service Adjustment	922	2.917	5.340	0	43
Routine Monitoring	922	4.287	7.121	0	56
Change Service Provider	922	0.310	0.837	0	8
Quality Problem Solved	922	1.107	3.395	0	49
Monitoring per Caregiver Request	922	0.975	2.948	0	33
Placement Discussed	922	0.677	1.280	0	11
Placement Assistance Offered	922	0.166	0.683	0	11
Discharge Planning	922	0.101	0.491	0	6
Referred Legal Services	922	0.156	0.547	0	5
Referral Non-demonstration Social Services	922	0.170	0.723	0	9
Entitlement Assistance	922	0.298	0.995	0	14
Health Service Assistance	922	0.288	1.086	0	11
Advocacy Assistance	922	0.133	0.636	0	7
Referral Non-demonstration Support Group	922	0.196	0.844	0	20
Referral Demonstration Support Group	922	0.552	1.325	0	10
Assist Caregiver in Getting to Support Group	933	0.253	1.463	0	28
General Caregiver Support	922	1.992	3.540	0	36
Non-demonstration Caregiver Counseling	922	0.081	0.538	0	12
Disease Information to Caregiver	922	0.776	1.423	0	20
Caregiver ADL Training	922	0.374	1.086	0	15
Behavior Management to Caregiver	922	0.409	1.140	0	12
Caregiver Change Activities	922	0.093	0.445	0	5
Client Social Skills Training	922	0.616	2.019	0	40
Client Depression Counseling	922	0.053	0.303	0	3
Client Mental Health Counseling	922	0.038	0.259	0	4
Therapy/Intervention	922	0.068	0.412	0	7
Case Manager/Client Therapy	922	0.068	0.474	0	7
Home Environment Modification	922	0.306	0.947	0	1
Client Medications Changed	922	0.154	0.571	0	7
Crisis Referral	922	0.036	0.401	0	11
Obtained Crisis Services	922	0.027	0.193	0	2
Contacted Public Guardian	922	0.020	0.218	0	5
Contacted Adult Protective Services	922	0.114	0.962	0	24
Case Manager Medical Consultation	922	0.744	2.558	0	60

¹ All variables are based on a count of the event or activity named in each row.

NOTES: RN is registered nurse. ADL is activities of daily living.

SOURCE: Medicare Alzheimer's Disease Demonstration Evaluation, unpublished data, 1994.

sented case-manager activities. The remaining categories described caregiver and client problems. The variables describing case-manager activities were then factor-analyzed to create a typology of case-management "pure" types. Several different methods of factor analysis were used (in both an exploratory and confirmatory fashion). In the end, principal factor analysis with a promax rotation produced a six-factor solution in which each factor represented a distinctive approach to the case. A

particular advantage of the promax approach in these analyses is that it produces factors that may be correlated with one another. This is consistent with a theoretical assumption that the case-management approaches are not independent in clinical practice. (Other approaches to factor analysis typically use orthogonal rotation, and produce factors which have uncorrelated components.) Promax rotations have been shown to provide better results in those situations where the underlying

Table 2
Descriptive Statistics of Client and Caregiver Assessment Data

Variable	Sample Size	Mean	Percent	Standard Deviation ¹
Client Variables (Baseline)				
Mild MMSE Score (Score = 25-30)	893	—	11.3	—
Moderate MMSE Score (Score = 17-24)	893	—	42.8	—
Behavior Problems (Count = 0-19)	890	7.881	—	3.99
Left Alone Safely (Yes/No)	883	—	47.1	—
ADL Impairments (10 Measures, each 1-3)	891	18.004	—	5.83
Unmet ADL Needs (Count of Yes on 1-10 Items)	893	8.656	—	2.25
Unmet IADL Needs (Count of Yes on 1-8 Items)	893	6.996	—	1.61
Caregiver Variables (Baseline)				
Paid Work Hours	883	10.392	—	17.65
Burden (Score = 0-36, 9-16=Moderate, 17+ =Severe)	882	16.184	—	8.13
Depression (Score = 0-15, 6+=Probable Depression)	880	6.591	—	1.880
IADL Impairments (8 Measures, Each 0-1)	882	0.881	—	1.564
ADL Impairments (5 Measures, each 0-1)	882	0.269	—	0.730
Hours of Informal Caregiving	882	112.578	—	118.065
Size of Social Network (Count of Persons)	893	2.267	—	1.110
Spouse (Yes/No)	892	—	50.4	—
Children (Yes/No)	893	—	38.5	—
1:30 model	893	—	45.9	—
Service Use Variables (Percent at 6 Months)				
Use Adult Day Care	573	—	28.3	—
Use Companion	573	—	30.8	—
Use Home Maker/Chore	573	—	36.0	—
Use Personal Care	573	—	40.7	—
Use Nursing	573	—	25.3	—
Nursing Home Placement	573	—	15.7	—
Hospital Discharge	573	—	26.9	—

¹No standard deviation shown when the variable's distribution is represented by a percentage.

NOTES: MMSE is mini-mental status examination. ADL is activities of daily living. IADL is instrumental activities of daily living.

SOURCE: Medicare Alzheimer's Disease Demonstration Evaluation, unpublished data, 1994.

ing factors are correlated (Hatcher, 1994). The correlation or loading of each variable with a factor are shown in Table 3. All factors were subjected to a scaling procedure in which the Chronbach's alpha statistics for each factor ranged from .67 to .78. A criterion value of 30 (or .3x100) or greater was required before a variable was included in a factor. A variable could be included on multiple factors if it achieved the 30 criterion level on each factor. Twenty of the 54 items failed to achieve this criterion level on any factor and were subsequently omitted from further analysis.

The factor solutions use the client as the unit of analysis and thus reflect the summation of all case-manager activities with each client during their first year of participation. Cases from both demonstration models were pooled together so that the design

effect of client to case-manager ratios would not preclude the range of activity types that might be observed. The derived factors are described as "pure" types of practice in Figure 1. Each client or case is potentially exposed to one or more of these pure types since their needs likely change over time, and the types of case management may be adjusted to this new level of need. This differential exposure is accommodated in the analysis, because the factor scores for any client represent their weighted exposure to each type of practice.

Client and Caregiver Attributes and Case Management

Underlying the development of the case-management activities typology is an assumption that there is some tailoring

Table 3
Factor Loadings of Case Management Variables

Variable	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
RN Assessment	—	—	—	61	—	—
Crisis Assessment	—	—	31	—	—	—
Routine Assessment	52	—	—	—	—	—
Care Plan Development	79	—	—	—	—	—
Care Plan Revision	61	—	—	—	—	—
Care Plan Problem Resolved	—	42	—	—	—	—
Service Provider Contact	69	—	—	—	—	—
Ongoing Service Adjustment	42	—	—	45	—	—
Routine Monitoring	76	—	—	—	—	—
Change Service Provider	49	—	—	—	—	—
Quality Problem Solved	58	—	—	—	—	—
Placement Discussed	—	34	—	—	—	50
Placement Assistance Offered	—	—	—	—	—	55
Discharge Planning	—	—	—	—	—	35
Referral Non-demo Social Service	—	—	—	34	36	—
Entitlement Assistance	—	—	—	30	—	—
Health Service Assistance	—	—	32	—	—	—
Referral Non-demo Support Group	—	—	—	—	75	—
Referral Demo Support Group	—	—	—	31	—	—
Asst Cg Getting to Support Group	—	—	—	35	—	—
General Cg Support	—	35	—	49	—	—
Non-demo Cg Counseling	—	—	—	—	72	—
Disease Info to Cg	—	56	—	—	37	—
Cg ADL Training	—	56	—	—	—	—
Behavior Management to Cg	—	77	—	—	—	—
Client Mental Health	—	37	—	—	—	—
Therapy Intervention	—	42	—	—	—	—
Home Env Modification	35	—	—	—	—	—
Client Meds Changed	—	30	—	—	—	—
Crisis Referral	—	—	87	—	—	—
Obtained Crisis Services	—	—	51	—	—	—
Contacted Public Guardian	—	—	—	—	41	—
Contacted APS	—	—	81	—	—	—
Cm Medical Consult	—	—	—	32	—	—

¹Variance explained in each variable by a factor x 100. Values of 30 or more were required to load on a factor. A few items loaded on more than one factor.

NOTES: RN is registered nurse. Cg is caregiver. Cm is case manager. APS is Adult Protective Services. ADL is activities of daily living. Env. is environment.

SOURCE: Medicare Alzheimer's Disease Demonstration Evaluation, unpublished data, 1994.

of activity to the needs of the client or caregiver. The analysis in Table 4 shows the extent to which these activities are associated with the client and caregiver characteristics obtained on the baseline assessment instruments discussed previously. These results are shown using standardized regression coefficients to represent the relative importance of each attribute in its association with a case-manager activity factor score. Separate regression models were run with each factor used as the dependent variable. The models shown in Table 4 used case-manager activity factors computed for the clients at baseline and after 6 months

in the demonstration.³ Measures such as functionality or cognitive status that could change from one assessment to the next (and which did change on average over time) do not have significant associations with case-manager activity for more than 6 months. Attributes like caregiver relationship, which were not allowed to change by the case selection rules, are more likely to reflect significant associations over multiple periods (if they have any association at all).

The interpretive issue in this analysis is

³ Nearly all the problems addressed by the case managers were identified at baseline and the care plans and other activities developed in response to these issues continued to be pursued across all the reassessment periods.

Figure 1
Typology of Case Manager Activities

1. Routine service monitoring. Variables that loaded heavily on this factor included conducting a routine assessment, care plan development and revisions, maintaining ongoing contact with service providers, and monitoring problems with service providers.
2. Caregiver training/mental health approach. This factor was characterized by activities such as provision of disease management information to the caregiver, caregiver training on behavioral management, training to meet ADL and IADL needs, mental health counseling and therapy
3. Crisis intervention model. Activities characterized by this factor included a crisis assessment, obtaining health services assistance, and referrals to adult protective services and other crisis interventions.
4. Clinical nursing/caregiver support. Variables that loaded heavily on this factor included having an RN assessment, need for ongoing service adjustment, providing general caregiver support, and assisting caregivers in getting to a support group.
5. Caregiver empowerment/advocacy approach. This factor was characterized by assistance in obtaining non-demonstration-funded social services, referrals to non-demonstration support groups, and use of public guardian services.
6. Client health and placement approach. Discharge planning and placement assistance were variables loading heavily on this factor.

SOURCE: Robert Newcomer, PH.D., 1997.

whether any client or caregiver attributes were uniquely or predominantly associated with a single or small number of the case-manager types. A measure that is either uniformly present on all or absent on all factors would suggest that the attribute is not a unique influence on the case manager's style or activities. Cognitive status illustrates this issue. Several indicators of cognitive status were used in these models, with the more severely impaired being the null status. Five of the six factors showed fairly substantial associations with clients who were more severely cognitively impaired as measured on one or more of these alternative indicators. Such a result may be helpful in a population that includes clients both with and without dementia, but in a situation in which all clients have dementia this provides little discrimination.

Client functional status and caregiver attributes provide dimensions with some apparent relationship to case-manager activities. Limitations in ADLs were positively associated with routine monitoring and negatively associated (although with a small coefficient) with most of the other approaches. Having unmet assistance needs for IADL tasks had a minor association with two of the factors. Caregiver attributes showed more risk factor varia-

tion. IADL limitation among caregivers was an important covariate for four of the factors, while ADL limitation (much less common in the caregiving group) was positively associated with only one. Depression, an assumed risk factor for caregivers, had a demonstrable relationship with factor 1 (negative) and factor 6 (positive). Issues related to the maintenance of employment status, affecting almost half the caregivers and a targeted risk of the program, were not a striking covariate for any factor. The size of the social support network and caregiver relationships are two dimensions that seemed to help trigger a case-manager response. Larger networks were associated with factors 1 and 6. Routine monitoring was less likely when the caregiver was not the spouse or the child of the client. The crisis intervention approach was more likely when other relatives or non-relatives were the caregivers. The client to case manager ratio features of the demonstration were systematically associated with two approaches: factors 4 and 6 were somewhat more likely among those in the 1:100 model, although much of this relationship is tied to the Illinois site which (as noted previously) used only nurse case managers.

Table 4
Baseline Caregiver and Client Characteristics Associated With Case Management Factors

Model	Factors at Baseline and 6 Months ¹					
	Factor 1 Base/6 Months	Factor 2 Base/6 Months	Factor 3 Base/6 Months	Factor 4 Base/6 Months	Factor 5 Base/6 Months	Factor 6 Base/6 Months
Client Variables						
Mild MMSE Score	—	-.41/	-.19/	-.70/	-.40/-.30	—
Moderate MMSE Score	—	—	-.14/-.18	-.54/-.45	-.40/-.30	-.40/
Behavioral Problems	-.08/	—	—	-.08/-.09	—	-.10/
Left Alone Safely	—	—	.10/	—	.37/	—
ADL Impairments	.11/	-.06/	-.02/	-.08/	-.10/-.05	—
Unmet ADL Needs	—	—	/.09	-.22/	—	—
Unmet IADL Needs	—	—	.13	.10/	—	—
Caregiver Variables						
Paid Work Hours	-.01/.03	—	—	—	—	-.01/-.09
Employment Affected	—	—	-.05/	—	—	—
Burden	—	.03/.02	—	.03/	.01/.02	—
Depression	-.19/	—	—	—	—	.11/.26
IADL Impairments	.54/	0.67/	—	.48/.28	—	.33/.50
ADL Impairments	.56/.70	-.016/	—	—	—	—
Hours Informal Caregiving	.01/	—	—	—	—	—
Size Social Network	.37/	—	—	—	—	.22/.20
Child	.30/	—	-.28/	—	-.03/	—
Spouse	—	—	-.27/	—	.01/-.04	—
Length of Time Caregiving from Baseline	—	—	.001/	—	—	-.30/
1:30 Model	—	—	—	-.30/-.30	-.10/	-.30/-.40

¹Significant ($p < .05$ or less) standardized correlation coefficients for 6 and 12 months, respectively; $n = 893$ at baseline and 871 at 6 months. Variables not significantly related to any factor are not shown in table.

NOTES: MMSE is mini-mental status examination. ADL is activities of daily living. IADL is instrumental activities of daily living.

SOURCE: Medicare Alzheimer's Disease Demonstration Evaluation, unpublished data, 1994.

Case Management Models and Service Use

Logistic regression models were estimated to test multivariate comparison of each factor with selected service use outcomes. The analyses used the baseline client and caregiver attributes (shown previously in Table 2) as control variables. These were included in equations where all case manager "pure" type factor scores were used as the independent or predictor variables. The dependent variable was the presence or absence of a service use during the 6-month period following baseline. Separate sets of equations were calculated for each of the seven services shown in Table 5. For parsimony in presentation, the odds ratios for each case-manager factor have been taken from each of these seven separate

equations and summarized into Table 5. The odds ratios (OR) show the likelihood of use during the client's first 6 months after enrollment, controlling for client and caregiver characteristics. Values for the covariates are not shown.

In interpreting the relationships between case-manager types and service outcomes, it is important not to infer cause and effect, since case-manager activities could take place in response to temporally specific changes in status which are not captured in the static measures of client and caregiver characteristics (collected only at 6-month intervals in this project) controlled in the analysis. Moreover, case-manager activities are not completely independent of the tasks needed to carry out certain services—most particularly the management of services in place. With these qualifications,

Table 5
Case Management Factors Associated With the Likelihood of Service Use (n=573)

Variable	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
Companion Care	OR=1.53 (p<.01)	OR=.70 (p<.001)	OR=.51 (p<.02)	—	—	—
Homemaker	OR=1.52 (p<.01)	—	OR=.65 (p<.05)	OR=.76 (p<.02)	—	OR=.81 (p<.09)
Personal Care	OR=1.34 (p<.01)	—	—	OR=1.24 (p<.01)	—	—
Nursing Services	OR=1.30 (p<.002)	—	—	—	—	—
Nursing Home	OR=.59 (p<.02)	—	—	—	—	—
Hospital	—	—	—	OR=.70 p<.001	—	OR=1.17 (p<.008)

NOTES: The first row in each cell is the odds ratio derived from a logistic analysis of the likelihood of service use over the client's exposure period in the demonstration. The models control for case manager-to-client ratio, client living arrangements, mental status, medical problems, level of supervision required, a measure of caregiver support, hours of caregiving, and client unmet ADL needs. These variables were retained from a larger list of covariates because they were found to be statistically significant in the full models; p value refers to the statistical significance. Results are shown only when p<.05 or smaller.

SOURCE: Medicare Alzheimer's Disease Demonstration Evaluation, unpublished data, 1994.

the service outcomes analyses suggest a pattern of relationships that is much more discriminating among the case-manager activity types than was true of the relationship between the measured client and caregiver attributes.

The activity of routine monitoring (factor 1), as might be expected, is statistically and positively associated with the demonstration's funded home care benefits: homemaker, companion, and personal care. It is also associated with persons receiving nursing services. Adult day care, alone among the demonstration-funded benefits, had no significant relationship to any case-manager pure type. Caregiver training (factor 2), while not significantly associated with "hands on" direct services, is less likely to occur when companion services are used. This relationship is consistent with an assumption that companion service clients tend to be less characterized by behavioral and other problems that may require caregiver training. Crisis intervention (factor 3) is a counter image of routine monitoring, with a reduced likelihood of companion and homemaker use. Factor 4, the clinical nursing and caregiver support activity, parallels factor 1 in having a positive relationship to personal care use, but it has a

reduced likelihood of homemaker services. Caregiver empowerment (factor 5) has a reduced likelihood of homemaker services and no relationship to the other services. Client health and placement activities (factor 6) is related to a reduced likelihood of one community service and has no significant relationship to the others.

Nursing home placement and hospital services, the remaining services in Table 3, reflect two different dimensions of the demonstration program's operations. An explicit purpose of the demonstration was to reduce nursing home placement. Hospitalizations, on the other hand, were seen as being outside of the case manager's control. Only three case-manager activity factors have statistically significant relationships with health care use. Routine service monitoring, the predominant mode of case management, was associated with a lower likelihood of nursing home placement. Clinical nursing was associated with a lower rate of hospital admission. Client health and placement activity was associated with higher likelihood of hospital use. In this case, the direction of effect is very likely to be that the case manager is responding to these situations rather than causing them.

DISCUSSION AND CONCLUSIONS

The unbundling of case-manager activity into component parts is intuitively appealing for program evaluation, since it may provide a more sensitive comparison of client outcomes relative to the assistance needed and given than a simple measure indicating participation in a program. It can be argued that, in practice, this tailoring of activity to need is routinely done. The analytical challenge addressed by this article is how to document and represent these multifaceted activities in evaluative studies. The approach taken was to create a profile of the types of case-management activity received by a sample of clients, where each client's exposure to case management was weighted or distributed among the varying types of activity that occurred during a 6-12 month enrollment period. Six pure types of case-manager activity were identified, with routine service monitoring being the most common function. Among the variables loaded on this factor were conducting baseline and semi-annual assessments, revising care plans, maintaining ongoing contact with service providers, and monitoring problems with service providers. These are the predominant activities around which MADDE (and most community-based case-management demonstrations) are designed. The case managers reviewed in these analyses were expected to follow a regular protocol of client contacts (e.g., quarterly or semi-annual home visits, monthly phone contacts, and other contacts as needed), and assist them in using the program's community care benefits. The frequency of contacts varied between two sets of demonstration models, but was similar among the four sites in each model. During the initial months after enrollment in a program, a large proportion of a case manager's time with a client, regardless of the model, was absorbed by these basic activities.

Under these circumstances, it is not surprising that client attributes (Table 4) have little association with "routine monitoring" activity—since most clients were getting some of this case manager attention. Equally understandable is this modality's association with clients under the program's community services benefit. In short, it is evident that a case manager's behavior is substantially affected by the program's protocol (e.g., frequency of client contacts, the benefits monitored). There is evidence, however, that case managers were able to exercise discretionary behavior, too. These activities are represented by various forms of caregiver education, training, and empowerment. These activities may be short-term and specific to the client or caregiver's particular situational needs. It appears that tangible effects of these activities, if any, are on dimensions of care or well-being not measured in these analyses of service use outcomes. For example, these activities are associated with the use of support groups and other voluntary programs that may be very valuable to the participants.

Another of the pure types was labeled crisis intervention. This approach represents a class of activities in which case managers triaged their relationship with a client to less than routine monitoring. Crisis intervention clients tend to be somewhat less cognitively impaired than those in routine monitoring and to be reported as more likely to be left alone safely (Table 4). Important, perhaps, is that the crisis intervention approach is more common among non-spousal and non-immediate-family caregivers, and has no association with either the demonstration's community or health care service use. The assignment of a client to this approach may reflect a limitation on access to case management and introduce the risk of reducing familiarity with the

client's status. However, within the 1-year tracking window used in these analyses, the demonstration data suggest that clients did not suffer such adverse effects as high hospital use or nursing home placement likelihood. How one moves from a crisis intervention mode to a routine monitoring mode remains to be determined. Whether there are long-term adverse effects on client health status or caregiver outcomes resulting from under-monitored conditions, or whether the non-family caregivers operate under voluntaristic norms that could be more easily broken should there be a sudden change in status, are other issues left for more extended tracking.

The final and least frequently occurring case-manager activity is that associated with health care placement, most particularly discharge planning and placement assistance. These activities appear to be situationally specific and reactive to a crisis rather than preventive.

Several practice and research lessons are learned from these analyses. First, client risk factors (e.g., cognitive and functional health status), within the client frailty range and time frame of this data set, are much less predictive of the type of case-manager activity exposure than are caregiver characteristics. Perhaps this should be expected when the protocol for who gets case management and the intensity of this management are substantially prescribed by operating protocols, and when there is relative homogeneity among clients on cognitive and functional ability. More flexibility in the protocol and more variation in the population would possibly produce more association between case-manager activity and client attributes. Second, a practical issue for health plans and others using case-management interventions is how to prioritize care. In other words, when and under what circum-

stances can the personnel resources committed to routine monitoring be reallocated so that greater number of clients can be assigned to a less intensive management caseload?. This issue has been addressed to some extent in the comparison of the 1:30 with 1:100 case manager to client ratios that distinguished the MADDE program design. No effect on case-manager activity modes was systematically associated with either caseload, although there is evidence from one site (compared with the other seven) that the use of nurses rather than social workers may result in more attention to clinical nursing-related activity. The long-term consequences of this added emphasis may warrant further examination. Another observation from the demonstration program comparisons is that the smaller caseload sites, as a group, were no more likely to engage in caregiver training or other forms of empowerment, than were the larger caseload sites. This may be a function of the demonstration's frequency of contact protocols or the limited steady-state period tracked among the sample.

There are some limitations to these findings that also deserve mention. First is the reminder that the data are specific to community care models of case management in a fee-for-service environment. The programs studied do not include case management in the context of a managed health care system. They are also specific to a population of caregivers for those having dementia. Another limitation is more subtle. The analysis employed service use as an measure of effectiveness. With the data used it was not possible to determine whether more caregiver support activity was desired than made available, or if the case manager's assistance achieved the client's desired outcome. Further analysis could perhaps use more refined measures of effectiveness. A fourth limitation is that the staffing of the demon-

stration program was too homogeneous to test whether the observed case-manager behaviors were affected by the experience and professional training of the case managers. In all but one site, the staff were predominantly social workers and mental health professionals. In one site staff were exclusively nurses. The clinical nursing factor does have a protective association with the likelihood of hospitalization, but this result could be an artifact of the program's location rather than directly attributable to the case managers. Nevertheless, this issue deserves further exploration.

Finally, in looking toward replications of this effort to unbundle case-management activity, there are three other limitations in the current design that could be addressed. One of these results from the simultaneity of what is done and why it may be needed. The second arises from the short-term nature of the problem and its resolution (which often may be self-resolving, although stressful). Both of these problems can be minimized by an episode-based analysis of problems and their resolution. Episodes could be defined as a period preceding or following a particular event (e.g., acute illness to the client or caregiver, hospitalization of client or caregiver, receipt of a temporarily debilitating outpatient procedure). Case-control or single-group evaluation designs could be helpful in understanding better what seems to be accomplished under various case-manager activities, and the relative cost of these approaches. Analyses like this may yield more understanding of the "real time" orientation to crisis intervention/resolution. Prevailing work has implicitly measured mostly steady-state or routine monitoring. The third issue is the important gap in knowledge about the relative role played by the case manager versus other providers (particularly the primary care physician) in managed care or coordi-

nated care systems. Anecdotal evidence from professional and trade association conferences and training programs suggests that an emerging direction of case management is toward coordination with the client's ongoing primary care provider, perhaps as a component in chronic disease management programs. Direct involvement of the case manager in home-care worker training and supervision also seems to be occurring in some plans and among private-practice case managers. Should such tasks be added to the case manager's role in caregiver's training about the disease process and caregiver skills development, it may become even more difficult to separate case manager effects from the broader effect of preventive care.

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