

Modeling the costs of case management in long-term care

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A conceptual approach to developing models for analyzing cost is applied to case management in long-term care. This conceptual approach uses four dimensions to classify case management programs. The application results in identifying five case management cost models. Empirical measures of case management

costs and a set of determinants of the within-model variation in these costs are suggested for each model. This article discusses several policy relevant hypotheses that could be addressed by the empirical implementation of these cost models.

Introduction

Case management has become a popular and prevalent way to organize and allocate health and social services in the United States and has particularly been emphasized in long-term care (Austin, 1988; Austin et al., 1985; Austin and O'Conner, 1989; Kane, 1988). It has been a feature of many demonstration projects in long-term care for the elderly and disabled. Legislative proposals at the Federal and State level almost invariably incorporate case management and it has been adopted by insurance carriers who have developed case managed long-term care insurance products. In practice, case management has proliferated and is characterized by enormous variability from program to program.

Given its prevalence, policymakers need information to help them estimate the costs of case management in long-term care: both its actual costs under various program designs, the proportion of the cost of delivering services attributable to case management, or the monetary or other benefits gained because of it. Variations in features and functions are likely to affect both the cost of case management and the costs of services being managed, but, to date, case management remains largely a hidden cost in long-term care.

The costs of case management merits close policy attention, even in the absence of full assessments of likely benefits. The substantial variations found among programs in their features and functions are likely to translate into significant differences in costs. Given this situation, policymakers need to identify the costs of case management as fully and carefully as possible across the many, diverse programs. Moreover, even at the operational level, better information on the relationship between costs and programmatic features and functions could provide useful information on economies of scale, and the cost implications of differing organizational arrangements.

In this article, we present a conceptual approach to classifying case management programs in long-term care

that will permit meaningful cost comparisons within models. We identify a set of case management program characteristics that define a set of case management models, and the likely determinants of the variation in costs within these models. The focus of our economic modeling is exclusively on costs of the case management function itself. That is, we conceptually identify individual models of case management by considering the likely reasons for differences in the structural relationship of costs to case management services, and thereby provide a useful approach for policymakers to analyze the costs of case management.

This article has five sections. In the first section, we specify the type of case management that we consider in this study. In the second section, we describe our conceptual approach to classifying case management programs in long-term care. In the third section, we present our proposed case management cost models, and in the fourth section we discuss our proposed within-model determinants of case management costs. We concluded this article with a discussion of the policy relevance of the modeling approach and issues for further research.

Definition and components

According to the Omnibus Budget Reconciliation Act (OBRA) of 1981, which introduced case management as a service under home and community-based Medicaid waivers, "case management is . . . management of a specified group of services for a specified group of people." In the language of the Consolidated Omnibus Budget Reconciliation Act (COBRA) of 1985, which permitted States to include case management to targeted populations as an optional service under their regular Medicaid programs, ". . . case management is commonly understood to be a system under which responsibility for locating, coordinating, and monitoring a group of services rests with a designated person or organization." The population focus in the definitions suggests, as Kemper (1990) points out, that case management is both an administrative function and a service.

One of the challenges for case managers is to balance client advocacy with resource allocation (Kane, 1988). The tension between them is inevitable when case managers can withhold benefits from the very persons they are trying to help. The more authority the case managers have, the greater this tension (Kane, 1988). If

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they merely make referrals, but do not authorize or purchase services, case managers may not conceptualize this ethical dilemma so clearly.

By common agreement, the functions of case management are:

Screening—This is a casefinding process to identify those in the targeted population who need case management. It involves asking a set of questions to those who contact the program to determine their likely eligibility; in a more aggressive mode, screening also includes vigorous outreach efforts in the population.

Assessment—At the best, case management is a comprehensive, multidimensional, functionally oriented evaluation of the applicants' present situation and needs, including the adequacy of formal services (that is, services from paid personnel or organizations) and informal services (that is, services from family and friends).

Care planning—Using the assessment, the case manager develops a plan for care which indicates the type and timing of proposed services and the roles of the community agencies and family members.

Implementation—In this function, the case manager assists the client in service acquisition according to the assessed needs and the plan. In some programs, the plan is implemented through "brokering"—a term used in the literature (Applebaum and Austin, 1990) when the case manager's function is to arrange the care plan by referring the client to the services generated from the assessment and delineated in the care plan. The case manager's authority to implement the plan comes from expertise and ease of access to service providers. The broker model is typically contrasted with other models wherein case managers have fiscal authority and can purchase services on behalf of the client.

Monitoring—The case manager monitors both the progress of the client and the performance adequacy of the service providers. Monitoring intensity ranges from proactive to a more passive responsiveness to issues raised by either client or service provider.

Reassessment—Reassessment is done at established intervals (for example, every 6 months), or upon the occurrence of events likely to be associated with change in functional status, such as a hospitalization.

Finally, we exclude case management that is exclusively for acute care, although case management programs in which both long-term care and acute care are managed are considered in this study.

Classifying case management

In economic theory, a cost function appropriate to an economic unit is deduced from a larger, complete model that specifies the various relationships that exist among all the factors over which an economic unit has some control as well as some important factors it does not control. The relationships within this larger economic model include a specific, quantitative expression of what the goal of the organization is, and the various restrictions or constraining influences the economic unit faces in trying to achieve that goal. Diversity across economic units in the nature of these goals and restrictions can give rise to quite different structures of incentives, with substantial implications for costs. This

way of defining cost models from economic theory assumes that what is being produced by the economic units categorized within a given cost model is reasonably homogeneous. Substantial departures from homogeneity in the product or service being produced constitutes an additional criterion for defining useful models of cost.

When there are significant differences across case management programs in either goals or constraining influences, there is good reason to doubt that an analysis of the costs of case management across these differences would be meaningful. The entire structure of the econometric cost model is likely to differ with such variation in goals and constraints, thereby contradicting the assumption needed to derive useful estimates of the parameters of a cost function. Hereafter, we use the term "case management cost model" to refer to those configurations of goals, constraints, and composition of services that a priori give rise to differences in case management programs over which comparisons of case management costs are unlikely to be useful.

From these theoretical underpinnings, as well as from our review of the literature, we have developed a conceptual approach to classifying case management programs that includes four dimensions:

- The nature of the case management services provided.
- The goal(s) of the case management decisionmaking unit.
- The reimbursement mechanism for the case management services.
- Specific constraints that are operating.

Each case management program's expression of these dimensions provides insights concerning how, or by what rule, case management services are allocated to that program's clients, and what factors enter into that rule. Differences in these rules and the factors that enter into them can have significant implications for the amounts and the costs of case management services provided to a client. Each of the major dimensions is described in more detail.

Case management services provided

This first major dimension encompasses two aspects of the case management service: The extent of integration of case management with service delivery; and the number of case management functions performed by the program.

In our analysis, we specify integration by distinguishing between case management programs providing only case management and no direct services, those that in addition provide some community-based long-term care services, and those that also provide institutional care. By itself, the extent of integration of long-term care services associated with a given case management program can be expected to have direct implications in reducing the amount of time case managers would need to spend planning care on behalf of their clients. Presumably, those case managers who have control over a wide array of residential and community-based services that are delivered through their own organization can work within ready channels of communication and established priorities for admission to the array of service programs under the agency auspices.

To enumerate case management functions, we adopted the list used in the evaluation of the Channeling demonstration: casefinding and outreach; screening;

baseline needs assessment; initial care planning; and, ongoing case management, i.e., implementation, monitoring, and reassessment (Thornton, Dunstan, and Kemper, 1988). Clearly, differences in the number and the completeness with which these core case management functions are provided will have major implications for costs. (Like the Channeling evaluators, we acknowledge the existence of costs associated with administrative, clerical, or provider relations functions and assume they are allocated appropriately across the core case management functions.)

Case management goals

The organizations that typically provide case management services can be expected to have multiple stated goals, including quantitatively vague ones such as contributing to the full independence of their clients. To define case management cost models, however, we sought to identify a specific, quantitative expression of what, by the nature of the organization, its primary goal is likely to be. In the terminology of economic modeling, we ascribed an objective function to the case management decisionmaking unit, or a quantitative expression of what it is trying to optimize. Ascribing a theoretical objective function that is parsimonious and specific enough to be useful is not always easy. And even when a specific theoretical objective function can be confidently proffered, it is not necessarily true that all case management programs in that cost model adhere to the same theoretical ideal in the same degree. Nevertheless, this is a critical element in any cost model and hence an important dimension of our conceptual approach to defining case management cost models.

Case management revenue and reimbursement

Like the goals, a given revenue or reimbursement mechanism can have different quantitative implications for case management cost. For example, the price-elasticity of demand and the other determinants of the demand for private case management services might be expected to differ from one locale to another. Or a budget specific to case management services can be fixed at various levels relative to some measure of the underlying need for case management for the caseload served. Also, a given type of reimbursement mechanism may take somewhat different expression and still may not be thought to define a separate cost model. For example, private case management services may be contracted for by the billable hour or by a total fee per episode of case management with some well-defined end point, and both may still be classified in the same case management cost model.

Other specific constraints

In an economic cost model, the major example of what we call a constraint is the technological one that expresses the quantitative relationship between inputs and the services or products produced, the technical term for which is a "production function." Although we do not provide a detailed mathematical expression of these case

management production functions in this article, we do provide a careful narrative description of them for each model. We do this in the belief that this will provide any future research project that empirically implements one of these models with important insights concerning the full set of factors that are likely to determine costs within each class of case management program.

In addition to a production function or technological process, there are other features of the environment within which case management programs operate that may constrain the manner in which they can either produce or offer their services and thus are important constraints in the sense of an economic cost model. An example of one such constraint is that, in conjunction with a fixed budget, the caseload must be maintained at some stipulated level. Or, an even more restricted constraint from the standpoint of costs would be one that stipulated that the number of clients per case manager must be fixed.

In the formal presentation of our case management cost models, we separately identify these and any other constraints that we believe would be important in explaining variation in the costs of case management among programs within each such model. That is, just as differences in the nature of the production function can be important in identifying the proper set of factors to take into account in a statistical cost model, so can the other constraints that we have identified for each of our case management cost models.

Proposed case management cost models

In a separate aspect of this study, we systematically sought information on a sample of 48 case management programs. Descriptive findings are contained elsewhere (Kane, et al., 1991). These case management programs and the information we collected on them were used to formulate our conceptual approach and identify our individual cost models. Together this yielded five a priori models of case management that we propose for analyzing case management costs. They are:

- Model 1: Broker.
- Model 2: Purchase authority (public dollars).
- Model 3: Capitated.
- Model 4: Insurance.
- Model 5: Fee for service.

Table 1 compares the highlights of the five models according to service features, goals, reimbursement mechanisms, and constraints.

Model 1: Broker

In this model, public or private non-profit organizations provide case management services to functionally impaired persons at risk of entering a nursing home, but they have no authority (or very limited authority) to purchase services for the clients. The case management agency serves a coordinating function and may also be a service provider. The full panoply of case management services is usually offered.

In broker programs currently operating, the goal of case management appears to be to minimize the use of

Table 1
Models of case management for analyzing costs

Dimensions	Broker	Purchase authority	Capitated	Insurance	Fee for service
Service features					
Extent of integration:					
Case management only				X	X
Case management and community-based long-term care	X	X			
Case management, community-based long-term care, and institutional care			X		
Case management functions:					
Assessment, care planning, and monitoring					1x
Full spectrum case management	X	X			
Full spectrum case management and utilization review			X	X	
Goals²					
Minimize nursing home use	X				
Minimize nursing home use and efficient community-based long-term care use		X			
Minimize cost of case management, community-based long-term care, and institutional care			X	X	
Maximize profits and revenues					X
Reimbursement mechanisms					
Fixed budget	X	X			
Annual capitation			X		
Administrative cost				2x	
Fee-for-service and billable hours					X
Constraints					
Process that relates case management time to cost of community-based long-term care	X	X	X	X	
Process that relates community based long-term care use to institutional care use	X	X	X	X	
Fixed budget for case management	X	X			
Per client cap on community-based long-term care costs		X			
Private demand for case management					X

¹Private case manager may not do monitoring if client does not want to pay for that service feature.

²All goals are qualified by implicit standards of care.

³If case management is contracted out by insurance company, it may be a fee-for-service or capitated arrangement.

SOURCE: Kane, R.A., Penrod, J.D., Davidson, G.B. Moscovice, I., and Rich, E.: *Case Management Costs: Conceptual Models and Program Descriptions*. Prepared for Health Care Financing Administration. Minneapolis Minnesota. University of Minnesota Health Policy Center, June 1989.

institutional care among clients at risk of nursing home admission through access to available community-based long-term care, and mitigation of the problems resulting from the lack of information, uncoordinated services, and distorted financial incentives in the long-term care system. The case management unit is typically reimbursed by a fixed budget based on historical caseload and cost experience.

Among the other constraints related to this model:

- There is a process¹ relating the provision of case management services to the costs of community-based long-term care in this particular environment.
- There is a process that relates the amount of community-based long-term care and the expected use of institutional care.
- Case managers can only arrange community-based long-term care that is already available through existing programs.
- The overall budget for case management is fixed.

¹In this model and in all subsequent models, by the term "process" we mean a technological relationship or "production function" as used in economic cost modeling.

In the broker model, we would expect case management to be allocated across clients in such a way that an additional hour spent on any client realizes the same additional time spent in the community, subject to all the constraints being satisfied.

The factors in the broker model likely to be related to case management costs can be summarized as follows:

- The very limited authority to arrange community-based long-term care can be expected to add to the work of case managers.
- The size of the budget available for case management is clearly an important constraint on case management costs.

Model 2: Purchase authority (Public dollars)

In this model, public or private, non-profit organizations provide case management services to functionally impaired individuals who are eligible to receive community-based long-term care under Medicaid, Medicaid waivers, or some other publicly funded program, such as a State program, an Older American's Act program, or one using pooled funds. Case management services are usually at arms-length from service provision, although some of the organizations

performing the case management function may also be vendors authorized to be reimbursed under service plans. Typically but not always, less than the full panoply of case management services are provided. Outreach may be minimal and screening or even assessment may be done by another group such as a preadmission screening program.

As the purchase authority model is usually applied, the clientele is typically nursing-home certifiable. Similar to the broker model, the goal for case managers is to maximize the time that nursing-home certifiable clients, who prefer to be in the community, spend outside of nursing homes. The case management unit is paid by a fixed budget based on historical caseload and cost experience.

The following constraints are operative for this model:

- There is a process that relates the amount of case management services provided and the expected cost of community-based long-term care (that is, time spent finding the most efficient mix of community-based long-term care, negotiating prices, encouraging service from informal caregivers, etc., and determining expected use of community-based long-term care).
- There is an implicit process operating that relates the amount and kind of community-based long-term care services provided to future expected use of institutional care.
- There may be a cap on what can be spent per month per client on community-based long-term care.
- The budget for case management is fixed, but generally programs can have a waiting list.
- The program may be constrained to a caseload of a fixed size. Even more restrictive, the caseload per case worker may be constrained to a fixed value.

In the purchase authority model, we would expect from the above model that case management would be allocated across clients in such a way that an additional dollar spent on case management for any client would yield the same number of additional days spent in the community, subject to all constraints being satisfied.

The features of this model important for case management costs are summarized as follows:

- The amount of any spending cap on community-based long-term care will generally affect overall case management costs.
- The amount of the fixed budget for case management clearly determines case management costs per client when caseload is also fixed.

Model 3: Capitated

Here case management is provided within a health services model that is capitated for acute, ambulatory, and all long-term care services for voluntarily enrolled functionally able and disabled Medicare eligibles. This model is at present represented by the four social health maintenance organizations (which are demonstration projects) and On Lok, which began as a demonstration project but is now in operation under special legislative authority.

In the capitated programs, the case management organization also may provide many community-based

long-term care services, as well as nursing home services. It is at risk for all long-term care services specified under the plan whether provided directly or not, and all acute care services that would be covered under Medicare. The case management unit is thoroughly integrated with service delivery and the full continuum of case management core functions is provided. Because the capitated organization's profitability depends on keeping the costs of acute care down, the incentive for appropriate casefinding and management is increased.

The goal of the case management unit is to minimize the total costs for which the capitated organization is responsible. The capitated organization is paid through an annually determined capitated amount from Medicare and for some enrollees from Medicaid, plus a monthly premium from enrollees. The case management unit, which is part of the overall structure, is allocated salary lines to accomplish its task.

The following constraints are present in the capitated model:

- There is a process that relates the amount of case management services provided and the expected costs of community-based long-term care.
- There are processes that relate the amount of community-based long-term care and the expected use of long-term institutional care and acute care.
- There are constraints on the standards of care for case management, community-based long-term care, acute care, and long-term institutional care.
- There is a constraint in the form of the demand for case management and the services controlled by the case manager.
- These demonstration programs generally recognize the capitation constraint by explicit monthly caps on expenditures for extended care per enrollee.

In this model, the case managers should be expected to allocate case management services to enrollees in such a way that an additional dollar spent on case management saves a dollar in expected community-based long-term care, acute care, or long-term institutional care costs for which the plan is responsible, subject to meeting minimal standards of care.

Features of the capitated model relevant to case management costs include:

- The provision of case management services per enrollee under this model should take careful account of the effects of case management on acute care, community-based long-term care, and institutional care costs.
- These demonstration programs are providers of many community-based long-term care services, thus reducing to some extent the time needed to arrange these services.
- Because of the different organizational arrangements that characterize these demonstrations, they vary in the degree of centralization of their case management function (utilization review and discharge planning in hospitals versus expanded long-term care); even when individual programs are compared on total case management functioning, this organizational difference may impact on costs.

Model 4: Insurance

In conjunction with long-term care insurance, case management services are either contracted out or done internally by the company to contain total costs of the long-term care benefits provided for under their plan. Typically only case management services are provided, and these usually include the full panoply of functions.

If done internally, the goal of the case management unit is to minimize the sum of case management costs, community-based long-term care costs, and institutional care costs (provided under the plan) subject to the constraints listed in the section. If contracted out, the goal should be the same, but in practice the contracted case management organization may adhere less strictly to the effort to minimize total long-term care costs.

If done internally, case management is simply an internalized cost. If contracted out, it could be paid for by capitated reimbursement or fee for service.

Constraints in the private insurance model are as follows:

- The process that relates the amount of case management services provided and the expected costs of community-based long-term care (i.e., finding the most efficient mix of community-based long-term care, negotiating prices, coordinating benefits, and assessing informal caregivers).
- The process that relates the amount of community-based long-term care and expected use of institutional care.
- A constraint in the form of standards of case management that either an external case management organization might recognize or that the insurance company stipulates be followed in recognition of its effects on the demand for their long-term care insurance.

We would expect case managers to allocate their services to a client (insuree) such that an additional dollar spent on case management saves a dollar in expected community-based long-term care costs and/or institutional care costs, subject to meeting minimal standards for care.

In the insurance model, the provision of case management services per client (insuree) should carefully reflect the effect of case management services on community-based long-term care costs and institutional care costs. It should also clearly reflect the effect of community-based long-term care services on expected use of institutional care.

Model 5: Fee for service

This model includes fee-for-service independent firms, either for-profit or non-profit, that vend case management services for private geriatric or non-geriatric clients. The firms are paid by clients or relatives out-of-pocket. Typically only case management functions are provided, although it is possible for fee-for-service case managers to provide services. (For example, the case manager may maintain a list of homemakers to whom they refer clients, and in rarer instances, the private case management firm

may directly hire homemakers.) Case management functions are often restricted to needs assessment and arranging community-based long-term care, or may even be limited to placement into appropriate institutional care.

For the for-profits, the goal of the case management unit is to maximize profits or, if self-employed, to maximize a utility function in income and leisure. For non-profits, the goal could be to maximize net income subject to some acceptable ceiling on the hourly billable rate. Fee-for-service case managers are paid out-of-pocket from clients or their relatives by the billable hour or by a total fee per episode of case management services (e.g., nursing home placement). Private case managers are sometimes paid a finder's fee or a proportion of the first month's fees by the residential care facilities that their clients enter (in which case they may or may not bill the client).

The following constraints apply to the fee-for-service case management model:

- The firms face a demand for their services that will determine their revenue (income), with that demand sensitive to the price of engaging the firm and also sensitive to characteristics of the case management service such as the costs of the community-based long-term care or institutional care they arrange for their clients, or how quickly they can procure these services.
- There is a process that relates the amount of time a case manager devotes to each case and the characteristics of the product as noted.

Depending on whether payment is by the billable hour or total fee, and whether the goal is profit or utility maximization, case managers would be expected to allocate time to cases by a complex rule that relates the marginal costs (marginal utility of leisure) to the marginal revenue (marginal utility of income) considering all factors that impact on the firm's demand.

In summary, features of the model important for case management costs are as follows:

- Especially when this case management consists of institutional care placement only, it is narrowly defined case management; when it involves arranging for community-based long-term care services, it may exclude reassessment.
- The demand for this case management service is likely to be quite sensitive to its overall cost to the client or relative, and thus to the amount of case management services performed per case month or per client episode.
- The demand for this case management service may not be very sensitive to the prices or quantities of the community-based long-term care or institutional care that private case managers arrange for their clients compared with other models. (Limited information about these prices is what brings clients to this service.)
- The differences within this model between institutional care placement and arranging for community-based long-term care may define important submodels for comparative cost analysis.

Empirical measures of costs

No single empirical measure of case management costs could usefully serve all models. Our recommended empirical measures of case management costs are as follows:

- For Models 1 and 2, the broker model and the purchase authority model, the difficulty of measuring any at-risk population as well as the long-term nature of the case management services provided suggest that case management costs per case month be used as the empirical measure of costs.
- For Model 3, the capitated model, and Model 4, the insurance model, one could use case management costs per enrollee month and thereby recognize within a single measure both the proportion of enrollees receiving case management services and the costs of case management per user. Alternatively, one might have separate models for these two dimensions within the overall case management models. This latter, disaggregated approach is preferred on the grounds that it is more general in allowing differences in both the specific determinants that influence each dimension as well as the degree to which determinants common to both influences differ for the two subcomponents.
- For Model 5, fee-for-service case management, because of the episodic, short-term nature of the case management services provided, one might choose to use case management costs per client served. This would require that the proportion of total clients served who required institutional care placement (as opposed to those receiving community-based referrals) be controlled for as a variable in the empirical cost function.

Determinants of case management costs

In economic cost modeling, the within-model determinants of costs are generally identified from a full expression of the economic cost model, with its quantitatively expressed goal and each of the specific constraints faced in achieving that goal. We have not provided explicit enough statements of each model's constraints to allow us to identify detailed specifications for each model. We can, however, suggest important determinants likely to be common to most of our case management cost models.

Availability of informal care—The availability of informal care is likely to affect the cost of case management, but the direction is uncertain. If case managers rely heavily on families and friends to provide care, they may do more monitoring and working with the family and friends constellation than in situations where an agency is providing the service. On the other hand, if a family member or friend (e.g., a spouse or live-in daughter) actually assumes coordinating tasks, the case managers may do less.

Scale—A determinant common to all models is some measure of the scale of operations. As is typically assumed for economic cost models, it seems plausible that most case management programs would exhibit increasing and then possibly also decreasing returns to scale within a relevant range of program size.

Mix of case management services—Although our model-defining dimension (nature of services provided) partially restricts the variability of case management services within our models, there remains the likelihood that the relative importance of the individual case management functions varies across programs. One important way for these relative differences to arise is through significant differences in the rates of growth experienced in program size across projects. More rapid buildup in caseloads implies that higher proportions of total case months will be accounted for by the one-time functions generally acknowledged to be more costly than ongoing functions. At a minimum, then, a measure such as the ratio of new client months to total case months should be used within relevant models.

Program client case mix—Variation in the distribution of a program's clients with regard to need for case management services could be expected to be controlled for only in part by the types of case management services available in a program. Thus, there would likely remain significant variation in client case mix across programs even within a given case management model. Controlling for this variation, with one or more functional status measures for a sample of clients, would be desirable.

Labor costs—In common with all models of costs, it is important to control for variation across program sites in the level of wages or salaries case management programs must pay for their staff members. First, however, one must be able to identify well defined categories of personnel relevant to all programs. Although a credential like an advanced degree (for example, master of social work or master of science in nursing) is useful for identifying the more skilled personnel, it is not always easy to identify other categories of labor with specific cost modeling relevance to case management programs.

Geographic dispersion of service areas—The geographic dispersion of the clientele could have relevance to case management costs, particularly when case management functions require a home visit. Geographic dispersion may be a useful proxy measure for the average travel time of caseworkers (though if information about average travel time is available, it is preferable.)

Local service environment—A possible determinant of costs is the character of local community-based long-term care service environments. Aside from the difficulty in generating useful empirical measures to characterize local service environments, the researcher also cannot be clear beforehand how the more easily measured aspects of the service environment might be likely to affect costs. For example, with relatively few vendors of community-based long-term care, the case manager might need less time to acquire current information on vendors' services and prices. If this circumstance also meant relatively limited availability of some community-based long-term care services, the case manager's work might be increased.

Organizational arrangements—Although our case management models restrict to some extent the variability in how case management programs fit into—or are arranged with regard to—other organizations, there is still likely to be substantial within-model variation with cost implications. Different incentives and cost implications are introduced by various "blended" and contractual arrangements. For example, a private pay case

management program may be incorporated into a larger purchase authority program (Model 2), or an insurance program (Model 4) may contract with either fee-for-service providers, or even public sector agencies.

Costs differences among models

Our delineation of a priori models of case management costs and our specification of the determinants of within-model cost variation provide a useful basis on which to undertake empirical analyses of the costs of case management. It would, of course, be useful if we could further suggest how the costs of case management might be expected to differ across these models. However, the policy utility of formulating these comparative cost hypotheses would not be high. We have identified major differences in the goals across subsets of our models that are likely to translate into significant differences in the impacts or benefits accorded by case management programs across these subsets of models. In consequence, to compare costs without at the same time taking into account these likely substantial differences in benefits would clearly not be meaningful.

Although assessing cross-model comparative costs—and hence, generating comparative cost hypotheses—is of little policy utility without simultaneously assessing comparative benefits, careful empirical analyses of within-model costs could make a substantial contribution to policy. We propose three terms of reference that we believe would be useful for understanding differences in the amount of case management services within case management cost models. They would also be useful for fuller evaluations of the costs and benefits of case management across our set of models. We call these the substitution effect, the volume effect, and the prevention effect.

Substitution effect

We suggest that within some range, case managers substitute effort when they cannot readily order services. More rigorously, we define the substitution effect to be the inverse relationship, within a relevant specified range, between the amount that can be expended on community-based long-term care and the expected effort required of the case manager when the underlying need for community-based long-term care and the cost and availability of it are all held constant. This is, clearly, a theoretical construct since when comparing two case management programs, in general one would expect the underlying need for, and/or the costs or availability of, community-based long-term care to vary. For example, one could imagine two case management programs that had clientele comparable in needs but one program might have both more ability to purchase community-based long-term care and greater demands on case managers' time because of the paucity of reliable sources of services. Clearly, differences in the availability of services between programs can obscure the expected inverse relationship between ability to order services and required case manager effort. Finally, we note that the concept of the substitution effect has been invoked in discussions of the Channeling demonstration and other programs (Thornton, C., Will, J., and Davies, M., 1986).

Volume effect

Our second effect states that the more disabled the clientele, the greater the efforts required of the case manager, all other things equal. More rigorously, if the underlying need for community-based long-term care and the amount available to purchase it are allowed to vary proportionately, greater need for such care is expected to entail greater demand on a case manager's time to arrange the additional services. This direct relationship between the amount spent on community-based long-term care and the expected need for case managers' time is called the volume effect. The volume effect could also be considered the effect of case mix. In summary, the amount of case management services provided by two programs can and generally will differ by virtue of both a volume effect and a substitution effect, and these two effects can either reinforce or oppose one another.

Prevention effect

Finally, when an organization or an insurer stands at financial risk for long-term care services or for both long-term care and acute care services, then case managers may expend additional effort to try to minimize future use of more expensive services. We refer to this as the prevention effect. Its consequences for the costs of case management per recipient of case management services are ambiguous. To the extent that these preventive services are provided to individuals already receiving case management services, costs per recipient increase. When these services are provided to an expanded group of recipients, costs per case in this expanded group are likely to be less, reflecting a lower intensity of case management service needs. Consequently, the overall impact for costs per recipient will depend on relative numbers of individuals receiving only preventive or both types of case management services, and the relative magnitudes of the unit costs of both types of services.

Policy relevance and research agenda

Requirements to empirically implement models

To empirically implement any of the five cost models of case management would require detailed, uniform information on operating expenditures of a representative sample of case management programs, together with accurate information on program enrollment or client-episodes and the characteristics of the programs, clients, and service areas that we specified as likely determinants of case management costs. Clearly, the collection of such information would constitute a major research undertaking. Obtaining uniform data on operating costs would be complicated by the fact that distinctly different case management programs can be operated by a single administrative unit, making it often difficult to allocate costs appropriately across individual programs. In addition, a case management program may receive services from separate administrative units that may or may not adequately record such services, which also would complicate accurate costfinding. Data on

characteristics of the clients and/or service areas would likely not all be available from secondary data sources, requiring some sampling of data. Finally, and as we discovered in the course of our larger project, developing a suitable sampling frame from which to draw a cost study sample would itself be a complex task. Model 2, the purchase authority model, would be the easiest to sample since it consists largely of the known universe of Medicaid waiver programs plus case management programs using other public monies.

Policy utility

Substantial information of use to policymakers would be provided by the careful execution of one or more of these empirical cost modeling projects. Case management programs are likely to be characterized by differences in how case management services are provided, even within these models. To the extent that these different case management services "production characteristics" can be grouped into a small number of largely homogeneous categories, it would be possible to test empirically hypotheses about the cost implications of these differences.

Specifically, the following intramodel hypotheses could be addressed:

- Controlling for other determinants of case management costs, what are the effects on costs of differences in the involvement of informal caregivers in the coordination of care?
- Again controlling for other determinants, what is the impact on case management costs of differences in the service environments in which case management programs operate?
- Are the costs of case management sensitive to the scale of operation of case management programs, after other important characteristics of the programs and other specified determinants of case management costs are controlled for?
- Are there significant differences in the costs of case management associated with differing arrangements case management programs may have with other organizations?

It would, of course, be very desirable to collect sufficient information on a large and diverse enough

sample of each case management model to test all of these hypotheses simultaneously within a single multivariate regression model.

Finally, it should be emphasized that these analyses are limited to assessing the impacts on the costs of case management per se. The impacts on overall health costs, the quality of health care, or the quality of life of its recipients are of necessity excluded from consideration. The full assessment of the costs and benefits of the case management services provided by these differing programs must await future large-scale research undertakings with these broader perspectives.

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