The Past and Future of Home- and Community-Based Long-Term Care

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FOR MORE THAN THREE DECADES, RESEARCHERS HAVE sought to quantify the benefits of home care. Recent studies have also assessed costs, invariably on the assumption that home care—later called home and community care—would substitute for institutional care and thereby save money. Dozens of studies—some very weak methodologically, others quite strong—have contributed to a substantial body of findings on the topics. The studies have varied not only in methods, but also in other important ways, including services offered, populations targeted, patients studied, and impacts assessed.

This article reviews the results of home and community care studies conducted over the last several decades. Over 700 citations were examined. All studies conducted after 1960 were included in the review provided they met five criteria: (1) they tested the effects of providing a home- and community-based alternative to existing long-term care services (which in some studies included other home- and community-based services as well as services provided in an institution); (2) they used an experimental design that included a treatment and control group; (3) they included at least 50 individuals in each study group; (4) they used the individual as their primary unit analysis; and (5) they served primarily an elderly population.

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Research Questions

The purpose of the review was to reach overall conclusions on costs and effects of home and community care for the aged by examining findings of research conducted over the past three decades. The study shares some features in common with other efforts to make sense of the growing plethora of home and community care studies (Applebaum, Harrigan, and Kemper 1986; Berkeley Planning Associates 1985; Capitman 1986; Greenberg, Doth, and Austin 1981; Harder, Gornick, and Burt 1986; Hedrick and Inui 1986; Hughes 1985; Stassen and Holahan 1981). It differs from these in the number (27) and scope of individual studies reviewed and in its conceptual framework for analysis. This framework reflects conclusions reached in an earlier summary of the challenges faced by home and community care (Weissert 1985a). For home and community care to produce savings and avoid cost increases, the savings on institutional and outpatient services, plus an imputed value for patient benefits, must collectively be greater than the cost of new home and community care services.

Thus the article examines:

- the extent to which patients served in the studies reviewed were at risk of using a nursing home or hospital;
- how much their institutional care use was reduced by using home and community care;
- how much outpatient care use was reduced by home and community care use;
- what the cost of new services was;
- savings or losses resulting from changes in use of existing and new services; and
- effects on various domains of health status.

Studies that achieved success in reducing the use of existing services or keeping the cost of new services low are examined in more detail, as are subgroups that showed special benefit potential. Results suggest directions for improved policy.

Overview of Studies

For this review, 150 documents were selected for review (from the more than 700 citations identified), from which the 27 most rigorous

and generalizable studies were chosen. Four of the studies—ACCESS, Channeling, Nursing Home without Walls, and Section 222—were each essentially two distinct experiments, with different sample populations and interventions. Each of these "substudies" is treated as a separate study in the review, so although only 27 studies were chosen, the overall number of studies for the analysis is 31.

A listing of the studies, their time periods, research designs, and baseline sample sizes is presented in Table 1. Sources used for the studies are listed in Appendix A. Time periods ranged from the early 1960s to the middle 1980s. About 60 percent of the studies were randomized controlled experiments. Total baseline sample size (treatment plus control group) ranged from BRH Home Aide's low of 100 to Channeling Financial's high of over 2,800.

The term "home and community care" covers a wide range of services. Treatment services varied in both scope and specifics from one service (e.g., public health nurse home visits, emergency alarm response system) for limited populations (e.g., discharges from a rehabilitation hospital, public housing tenants) to case management and multiple services for broader populations (see Tables 2 and 3). The most frequently offered services were case management and those of the home health aide/personal care/homemaker/chore variety. Although populations served by the projects differed, all of the projects targeted the disabled. Functional status/service-need admission criteria used by the projects to identify these persons included dependency in basic activities of daily living (ADL), recent hospital use, the presence of a major disabling chronic condition, qualification for admission to a nursing home, homeboundedness, or other indicators of "high risk" or "vulnerability" (see Table 3).

Substantial variations among the studies in time periods covered, and reported measures of service use, costs, and other outcomes complicate the comparisons. Necessary adjustments are explained in table notes found in Appendix B. Most of the studies included in the review were moderately free of threats to internal validity. Some studies, however, used more rigorous design and analytic techniques than others. The more rigorous studies were those that employed both randomized controls and multivariate statistical techniques to control for baseline or attrition-induced differences between the treatment and control groups.

TABLE 1
Key Characteristics of Studies

Study	Approximate Study Dates	Study Design	Baseline Sample Size	
			Treatment	Control
Continuity in Care[a]	1959–1963	Randomized	100	100
Continued Care[b]	1963–1971	Randomized	150	150
BRI Protective Service	1964–1966	Randomized	76	88
Congestive Heart Failure	1964–1966	Randomized	126	113
BRH Home Aide	1966–1969	Randomized	50	50
Highland Heights	1970–1976	Nonrandomized	228	228
Chronic Disease[c]	1971–1976	Randomized	438	436
Worcester	1973–1975	Randomized	280	205
Section 222[d]	1974–1977	Randomized		
Day Care			194	190
Homemaker			307	323
Health Maintenance Team	1975	Randomized	64	60
Wisconsin CCO/ Milwaukee	1975–1979	Randomized	283	134
Alarm Response	1975–1980	Nonrandomized	139	139
Georgia[e]	1976–1980	Randomized	819	257
Triage	1976–1981	Nonrandomized	307	195
Chicago	1977–1980	Nonrandomized	122	123
On Lok	1978–1983	Nonrandomized	70	70
Project OPEN	1978–1983	Randomized	220	115
Home Health Care Team	1979–1982	Randomized	82	76
NYC Home Care	1979–1984	Nonrandomized	504	200
San Diego	1979–1984	Randomized	549	270
Florida Pentastar[f]	1980–1983	Randomized	723	212
Nursing Home without Walls	1980–1983	Nonrandomized		
Downstate			394	176
Upstate[g]			330	481
South Carolina[h]	1980–1984	Randomized	802	789
Channeling	1980–1985	Randomized		
Basic			1,638	1,123
Financial			1,815	1,064
Acute Stroke	1981–1983	Nonrandomized	440	417
ACCESS	1982–1986	Nonrandomized		
Medicare/Private Pay			832	300
Medicare/Medicaid			199	309
Post-Hospital Support	1983–1985	Nonrandomized	98	93

Note: "A" to "h" superscripts refer to table notes located in Appendix B.

TABLE 2
Description of Treatment Service(s)

Continuity in Care	Public health nurse home visits
Continued Care	Public health nurse home visits
BRI Protective Service	Case management plus a number of ancillary services (fiduciary/guardianship services, financial assistance, home aide services, legal consultation, medical evaluation, nursing consultation and evaluation, placement in a protective setting, and psychiatric consultation)
Congestive Heart Failure	Public health nurse home visits
BRH Home Aide	Home aide visits (escort, health care, housekeeping, leisure, and personal care services)
Highland Heights	Low-income, federally sponsored, medically oriented housing
Chronic Disease	In-home services by an interdisciplinary team composed of a half-time nurse or social worker, a part-time physician, and two full-time health assistants, the latter of which provided the bulk of in-home care (e.g., therapeutic exercises, light housekeeping)
Worcester	Case management and other services not normally covered by Medicaid (architectural modifications, escort, linen, special therapies, telephone reassurance, and transportation)
Section 222 Day Care	Services provided in an adult day-care program (meals, nursing, nutrition, patient activities, personal care, social services, therapies, transportation, and eye, hearing, and podiatric examinations)
Section 222 Homemaker	Homemaker services (chore, personal care, shopping, and escort)
Wisconsin CCO/Milwaukee	Case management and other services not normally covered by Medicaid (adult day health care, advocacy, chore, companion, home-delivered meals, home health aide, housing search, medical equipment/supplies, nutrition education, personal care, respite care, skilled nursing, social day care, and transportation)
Alarm Response	In-home emergency alarm and response system
Georgia	Case management and other services not normally covered by Medicaid (adult day health care, adult foster care, boarding care, congregate living, home-delivered meals, home health aide, homemaker/chore, medical appliances and equipment, medically related transportation, medical social services, skilled nursing, and therapies)
Triage	Case management and other services not normally covered by Medicare (adult day care, chore, companion, dental, homemaker, intermediate care facility, legal aid, meals and meal delivery, medical devices (e.g., eyeglasses), mental health counseling, pharmaceuticals, residential care facility, and transportation)

(*Continued*)

TABLE 2—*Continued*

Chicago	In-home visits by physicians, nurses, social workers, and home health aides (whose tasks included cleaning, personal care, shopping, meals, and laundry), and other services such as telephone reassurance and volunteer friendly visiting
On Lok	Case management and other services not normally covered by Medicare (adaptive/assistive equipment, adult day health care, audiology, dental care, drugs, intermediate care facility, nonemergency transportation, optometry, routine podiatry, and social day care)
Project OPEN	Case management and other services not normally covered by Medicare (adaptive/assistive equipment, adult day health care, audiology, chore, dental equipment/appliances, discharge assistance, escort, eyeglasses, hearing aids, homemaker, home-delivered meals, interpreter, medical social services, mental health counseling, optometry, podiatry, prescription drugs and biologicals, respite care, social day care, therapies, and transportation)
Health Maintenance Team	Up to 12 hours per week of in-home non-skilled nursing care by a health assistant, in-home visits by an RN or LPN as needed, and telephone supervision at a skilled level on a 24-hour-a-day basis
Home Health Care Team	In-home care by an interdisciplinary team composed of a physician, geriatric nurse practitioner, and medical social worker
New York City Home Care	Case management and other services not normally covered by Medicare (8 to 20 hours per week of homemaker/personal care, nonemergency transportation to and from health resources and organized social activities, and prescription drugs and biologicals)
San Diego	Case management and other services not normally covered by Medicare (adult day health care, client/family health education, home-delivered meals, homemaker/personal care, and medical and nonmedical transportation)
Florida Pentastar	Case management and other services not normally covered by Medicaid (adult day health care, homemaker, medical transportation, personal care, pest control, respite care, skilled nursing, and therapies)
Nursing Home without Walls Downstate, Upstate	Case management and other services not normally covered by Medicaid (congregate/home-delivered meals, home maintenance, housing improvements, medical social services, moving assistance, nutrition counseling, respiratory therapy, respite care, social day care, and social transportation)
South Carolina	Case management and other services not normally covered by Medicaid (adult day health care, home-delivered meals, medical social services, personal care, respite care, and therapies)
Channeling Basic	Case management plus a limited amount of discretionary funds to purchase gap-filling services

TABLE 2—*Continued*

Channeling Financial	Case management and other services (adaptive/assistive equipment, adult day care, adult foster care, chore, companion, consumable medical equipment, home-delivered meals, home health aide, homemaker/personal care, housekeeper, housing and emergency assistance, mental health counseling, respite care, skilled nursing, therapies, and transportation)
Acute Stroke	In-home services by an interdisciplinary team composed of a full-time nurse and several part-time staff, a physiotherapist, occupational therapist, speech therapist, and social worker
ACCESS Medicare/Private Pay	Administrative case management and up to 100 days of skilled nursing home and/or home care per year; services included a skilled nursing home benefit intended to offer financial incentives for nursing homes to accept backed-up hospital patients, and a number of home care services not normally covered by Medicare (community health nursing, home health aide services, in-home doctor visits, licensed practical nurse services, medical transportation, personal care aide services, rental or purchase of durable medical equipment and supplies, and therapies)
ACCESS Medicare/ Medicaid	All the above services offered to ACCESS Medicare/Private Pay participants, and some home care services not normally covered by Medicaid (friendly visiting services, heavy chore, limited housing improvements, moving assistance, rental assistance, respite care, and social transportation)
Post-Hospital Support	Case management, nurse, social worker, and health aide home visits, gap-filling services (e.g., incontinence supplies), and services geared to informal caregivers such as respite care, monthly caregiver support group meetings, and on-call services

Impact on Service Use and Expenditures: Nursing Homes

Targeting

If home and community care programs are to avoid raising overall costs, they must serve patients who would have entered nursing homes for long stays. These admissions or stays must be avoided or shortened. Savings produced on reduced nursing home use can be used to offset costs of the new home and community care services. But if patients served would not have gone to a nursing home anyway, or if they had gone would have

TABLE 3
Functional Status/Service Need Eligibility Criteria

Continuity in Care	Patient discharged from the geriatric rehabilitation service of a municipal hospital for the indigent after receiving some rehabilitation training there
Continued Care	Patient who has been in a rehabilitation hospital for at least a week is about to be discharged to a noninstitutional setting, and is not leaving the hospital against medical advice
BRI Protective Service	Person mentally incapable of adequately caring for self or interests who is living in the community without the support of an informal caregiver
Congestive Heart Failure	Person with chronic congestive heart failure who is receiving medical care in the outpatient clinics of a hospital
BRI Home Aide	Patient about to be discharged from a geriatric rehabilitation hospital to a noninstitutional setting who is not already receiving organized home aide, homemaker, or visiting housekeeper services from a community agency
Highland Heights	Functionally disabled or medically vulnerable person in need of the specialized architectural features or ancillary services of Highland Heights and who, if applying alone, is not in need of help transferring either out of or into bed, or of 24-hour-a-day supervision
Chronic Disease	Patient who is either in an ambulatory care facility or about to be discharged from a hospital, who is living in, or will be discharged to, a noninstitutional setting, and who will need assistance for at least three months with regard to bathing, dressing, walking, cardiopulmonary conditions, or arthritis, but will not need skilled nursing service, 24-hour-a-day supervision, or kidney dialysis
Worcester	Person living in the community with some level of service need who primarily receives services from informal sources, or person institutionalized who has the potential to return to the community
Section 222 Day Care	Person who needs health care services to restore or maintain functional ability but not 24-hour-a-day supervision
Section 222 Homemaker	Patient discharged from a hospital in last two weeks after a stay of at least 3 days who needs health care services to restore or maintain functional ability but not 24-hour-a-day supervision
Wisconsin CCO/Milwaukee	Person who is at risk of institutionalization (a score of 20 or less on the Geriatric Functional Rating Scale) as determined by the project
Alarm Response	Medically vulnerable or functionally impaired public housing tenant living alone in an apartment without a built-in emergency alarm and response system
Georgia	Person who was previously institutionalized, had applied to a nursing home within the last month, or was certified as eligible for Medicaid-sponsored nursing home care by the Georgia Medical Care Foundation
Triage	Person in an unstable situation, characterized by medical/social problems, a poor informal social support system, environmental problems, or financial problems, who is in need of case management, health education, medical and social services, and who, if institutionalized, has the potential for deinstitutionalization

TABLE 3—*Continued*

Chicago	Person who is homebound, impaired in ADLs, and in need of medical and social services, but not of 24-hour-a-day supervision
On Lok	Person who is qualified for 24-hour skilled nursing or intermediate care as determined by the project
Project OPEN	Cognitively aware person who has a medical problem, needs assistance to function independently, and meets one of the following conditions: has been in a hospital or skilled nursing facility, or identified as needing skilled nursing care, in the last 30 days; has suffered a personal loss in the last year; requires assistance with personal care; or, is judged by the interviewer to be having difficulty in living independently
Health Maintenance Team	Chronically ill or disabled person who can be maintained at home with periodic health care at the nonskilled level, who wishes to remain in own home, who would benefit from project services, and who cares for self or has nonproject care provider during the nights, weekends, or holidays
Home Health Care Team	Chronically disabled or terminally ill person rendered homebound (unable to be transported in a private care or taxicab) by his/her physical condition who wishes to receive medical care at home, and has at least one family member or friend willing to participate in his/her care
New York City Home Care	Chronically ill person who needs help with leaving the house, walking stairs, dressing, or bathing, and whose needs can be met with 8 to 20 hours of homemaker/personal care services per week
San Diego	Person who is unable to maintain self at home without assistance, at risk of long-term institutional placement or frequent acute hospital admissions, or in need of long-term care but unable to receive traditional home health because of a stabilized chronic or nonhomebound status
Florida Pentastar	Person at risk for institutional placement within a year who is in need of project services
Nursing Home without Walls Downstate, Upstate	Person who is medically eligible for Medicaid-sponsored nursing home care according to New York State standards (a score of 60 or more on the DMS-1) as determined by the project
South Carolina	Nursing home applicant who is certified as eligible for Medicaid-sponsored nursing home care as determined by a mandatory nursing home preadmission assessment by the project
Channeling Basic, Financial	Person impaired in two or more ADLs, three IADLs, or one ADL and two IADLs who has two or more unmet needs or a fragile informal support system, and who, if institutionalized, is certified for discharge within three months
Acute Stroke	Victim of acute stroke
ACCESS Medicare/ Private Pay, Medicare/ Medicaid	Person in need of 90 or more days of long-term care who requires an aggregate of skilled nursing care as determined by the project
Post-Hospital Support	Hospital discharge who has a problem which is expected to last at least a year, who is qualified for skilled nursing care (a score of 180 or more on the DMS-1) as determined by the project, and who has a nonpaid caregiver available

stayed only a short time, costs must go up because nursing home use is not being avoided but new services are being used.

With few exceptions, control-group rates of nursing home use have been relatively low in home and community care studies. Since control-group rates show what treatment-group rates would have been without the treatment, they are very important indicators of how much nursing home use could be avoided by an effective treatment.

Control-group nursing home admission rates were reported by 22 of the studies (see Table 4). They varied between 5.6 and 58.6 percent, with 70 percent of the studies having fewer than one-quarter of their population likely to enter a nursing home even without community care.

Few studies provided average number of days per admission data, but average number of total days per capita provided in Table 4 can be used as a rough proxy. For most studies, the numbers are small, indicating stays of less than one week to just over five months. Most are in the less-than-one-month to one-month range, while a couple are as long as three months.

Short lengths of stay are expected for most nursing home admissions, either because the patients die quickly, are transferred back to a hospital, or go back to the community (one-fourth go back to their own homes [Weissert and Scanlon 1985]).

An important effect of these short stays is that few dollars can be saved by avoiding nursing home stays. While in a few studies average annual nursing home expenses (adjusted for inflation to 1988 dollars) exceeded $5,000 per capita in the control group, they were below $2,100 in two-thirds of the studies (not shown in tables). Low control-group nursing home expenses suggest that there was little potential for offsetting community care treatment costs, an issue discussed shortly.

Effectiveness

Nonetheless, results show that community care can reduce nursing home use when, in fact, it serves patients who are likely to enter a nursing home (see Table 5). Not surprisingly then, comparing Tables 4 and 5 (targeting and effectiveness, respectively) shows that the comparatively more effective studies in terms of reduced nursing home use were also frequently those that did a comparatively better job of targeting: South Carolina, Chicago, BRH Home Aide, Section 222 Day Care, Highland Heights, and the Nursing Home without Walls studies are examples;

TABLE 4
Effectiveness in Targeting on Persons at Risk of Nursing Home Use

	Approximate Study Dates	Percentage of Users in the Control Group	Average Number of Total Days per Capita in the Control Group
South Carolina	1980–1984	58.6%	130.0
ACCESS Medicare/ Medicaid[a]	1982–1986	44.8	156.6
On Lok[b]	1978–1983	34.4	81.9
Chicago[c]	1977–1980	30.3	33.4
BRH Home Aide	1966–1969	28.0	53.1
Channeling Basic[d]	1980–1985	27.7	28.5
Channeling Financial[d]	1980–1985	26.1	26.3
Section 222 Day Care[e]	1974–1977	21.0	9.0
BRI Protective Service	1964–1966	20.0	—
Highland Heights	1970–1976	19.6	49.8
Section 222 Homemaker[e]	1974–1977	18.0	4.0
Triage[f]	1976–1981	18.0	18.6
Home Health Care Team[g]	1979–1982	17.8	13.2
Georgia	1976–1980	15.6	29.0
Wisconsin CCO/Milwaukee[h,i]	1975–1979	13.6	32.4
Post-Hospital Support	1983–1985	11.8	17.3
Continued Care[j]	1963–1971	11.1	29.2
ACCESS Medicare/Private Pay[a,e]	1982–1986	11.0	11.0
New York City Home Care[i]	1979–1984	7.1	—
San Diego[e,k]	1979–1984	7.0	—
Florida Pentastar[k]	1980–1983	5.7	—
Project OPEN[e,l]	1978–1983	5.6	13.4
Nursing Home without Walls Upstate[m]	1980–1983	—	99.4
Worcester[n]	1972–1975	—	49.6
Nursing Home without Walls Downstate[m]	1980–1983	—	40.3
Chronic Disease[o]	1971–1976	—	14.5
Alarm Response[p]	1975–1980	—	11.7

Note: Numbers in the table reflect nursing home use by the control group during the first year after entry to the study. First-year data were not reported by some projects. For these, first year use was estimated from project data whenever possible. Percentage of users was estimated based on the assumption that the time between entry to the study and when a given subject enters a nursing home follows an exponential distribution. Such a representation is suggested by DeGroot (1975). Key to symbols: "a" to "h" superscripts refer to table notes located in Appendix B. "—" indicates data were not available.

TABLE 5
Impact on Nursing Home Use

Study	Approximate Study Dates	Percentage of Users (T-C)	Average Number of Total Days per Capita (T-C)
On Lok[a]	1978–1983	−23.8%~	−63.3~
BRH Home Aide	1966–1969	−20.0*	−44.8*
South Carolina[b]	1980–1984	−16.1* #	−40.0* #
Chicago[c]	1977–1980	−11.2* #	−14.4~
Highland Heights[b]	1970–1976	−10.3* #	−42.9* #
Section 222 Day Care[b,d,e]	1974–1977	−10.0 #	−5.0*
Triage[f]	1976–1981	−10.0~	−10.0~
Home Health Care Team[g]	1979–1982	−5.8~	−6.8~
Section 222 Homemaker[b,d,e]	1974–1977	−2.0 #	−0.0
San Diego[d,h]	1979–1984	−1.8	—
Project OPEN[d,i]	1978–1983	−1.7	−3.6~
Post-Hospital Support	1983–1985	−1.6~	−8.5~
Continued Care[j]	1963–1971	−1.1	−7.3~
Georgia	1976–1980	−1.1~	−7.0
Channeling Basic[k]	1980–1985	−0.9 #	−3.6 #
Channeling Financial[k]	1980–1985	−0.8 #	−3.4 #
Wisconsin CCO/Milwaukee[l,m]	1975–1979	−0.7	−11.6 #
Florida Pentastar[h]	1980–1983	−0.6	—
New York City Home Care[m]	1979–1984	0.2	—
ACCESS Medicare/Medicaid[n]	1982–1986	8.4~	20.0 #
BRI Protective Service	1964–1966	14.0~	—
ACCESS Medicare/Private Pay[d,n]	1982–1986	21.1~	43.5* #
Nursing Home without Walls Upstate[o]	1980–1983	—	−93.6* #
Nursing Home without Walls Downstate[o]	1980–1983	—	−35.6* #
Alarm Response[p]	1975–1980	—	−8.0*
Chronic Disease[q]	1971–1976	—	−5.9 #
Worcester[r]	1972–1975	—	−1.0

Note: Numbers in the table reflect treatment-control-group differences in nursing home use during the first year after entry to the study. First-year data were not reported by some projects. For these, first-year use was estimated from project data whenever possible. Percentage of users was estimated based on the assumption that the time between entry to the study and when a given subject enters a nursing home follows an exponential distribution. Such a representation is suggested by DeGroot (1975). Key to symbols: "a" to "r" superscripts refer to table notes located in Appendix B. "T-C" indicates the control-group average was subtracted from the treatment-group average. "~" indicates the statistical significance of the treatment-control-group difference was not reported. "*" indicates the treatment-control-group difference was statistically significant at the 5 percent level. The results of statistical significance tests are from tests conducted by project evaluators (e.g., on an observed 6-month difference), not by the authors on an estimate of a 12-month difference. "#" indicates the statistical significance of the treatment-control-group difference was assessed using multivariate techniques to control or adjust for baseline characteristics. Adjusted estimates are presented whenever reported. "—" indicates data were not available.

while ACCESS Medicare/Medicaid is an exception—well targeted, but deliberately using nursing home use as an intervention to reduce inappropriate hospital use. The figures for On Lok would seem to indicate that it was another of the well-targeted, effective studies; however, its figures more likely reflect the noncomparability of its treatment and control groups. Forty-four percent of the study's control group was selected from among residents of nursing homes, while 93 percent of its treatment group came from the community.

While most studies showed a reduction in nursing home use rates, only 14 of the 22 studies with available data subjected the difference in their treatment and control group rates to statistical-significance tests. Of those 14, only 4 reported significant findings—all reductions. All but one of the significant findings was estimated using multivariate techniques to control for baseline characteristics. For average days, 8 out of the 16 studies which used statistical-significance tests for this measure reported significant findings. Again, all but one of the significant findings were reductions, and all but three were subjected to multivariate analysis.

In short, home and community care probably did reduce nursing home use in a majority of studies, but typically the level of use available to be reduced was small, the amount of reduction small, and so potential for cost reduction was relatively small.

Per Diem Costs

One comparison not shown in the tables is the success of the demonstration projects in reducing prices charged patients by nursing home providers. Were home and community care providers able to negotiate lower per diem rates for their patients who needed a nursing home? Only 6 studies provided nursing home per diem data needed to make such estimates. Results were inconsistent, 1 (Nursing Home without Walls Upstate) showing slightly higher rates, 2 (Georgia and South Carolina) were about equal, and 3 (Nursing Home without Walls Downstate, and, for traditional Medicare-reimbursed care, the two ACCESS studies) showing lower per diem expenditures for the treatment group as compared to the control group. Of these 6 studies, the ACCESS studies were the only ones that actually negotiated prospective per diem rates with nursing homes—though not with very many, and with the intent of offering a higher reimbursement rate to providers as an incentive to

take hard-to-place patients. While the "regular" rates were lower for the ACCESS treatment groups compared to those for their control groups, the negotiated rates were higher. While it remains a possibility that community care led to placement of some patients in less expensive nursing homes, there is scant evidence that such a thing happened, and even if it did, it made little difference in net expenses, as will be shown later.

Subgroup Analysis of Effects on Nursing Home Use

Of the 31 studies reviewed, 14 undertook some level of subgroup analysis of nursing home use, and all but one used statistical-significance tests. Unfortunately, these subgroup analyses were typically not very systematic in the sense of choosing subgroups on the basis of findings from earlier studies or based upon well-developed a priori assumptions or models. Nor were we able to impose a uniform set of subgroup analyses for comparison. The subgroups studied varied widely across studies; even similarly named subgroups were differently defined. Methods of analysis also differed by study, especially in the extent to which multivariate techniques were used to control for baseline characteristics at the subgroup level. Studies also varied considerably in their internal validity, and sample sizes of subgroups ranged from respectable (over 100) to very small (fewer than 20). Moreover, studies varied in their follow-up periods; for example, some reported subgroup findings at 6 months after enrollment, some at 12 months, and some at both 6 and 12 months. Results discussed here (and throughout the article) are generally 12-month findings unless otherwise noted. For all these reasons, effects of community care on nursing home use at the subgroup level were very difficult to synthesize, and results are, at best, no more than suggestive of directions for further study.

Nor are subgroup results very informative. In only 4 studies did subgroup findings (not shown in tables) differ significantly from the study's aggregate findings. Overall, for only 6 subgroups were findings different from overall study findings, and these appear to be contradictory. Some studies showed that "better-off" patients were most likely to be kept out of nursing homes; others showed that "worse-off" patients were the most likely to benefit. Results are detailed below for three subgroups: (1) physically disabled; (2) socially deprived; and (3) Medicaid-covered, nursing home waitlisted.

Physically Disabled. Continued Care found that the minimally disabled treatment-group members experienced significantly less use of nursing homes than their control-group counterparts. In contrast, both Worcester and Channeling Basic found that those in the treatment group who were "in danger of institutionalization" experienced less nursing home use. ("In danger" was defined in the Channeling study as those estimated to be at "high risk" using multivariate techniques. Worcester did not provide a specific definition.)

Similarly, reductions were also reported by both of the Channeling studies for treatment members in other "disabled" subgroups, including those institutionalized at the beginning of the study period as well as those who were incontinent.

Socially Deprived. For this subgroup, Continued Care found less nursing home use among treatment-group members, but Channeling Financial found that treatment-group members in the low-unmet-needs, that is, socially nondeprived, subgroup experienced fewer nursing home days.

Medicaid Covered, Nursing Home Waitlisted. One of Channeling Financial's subgroups (not in a nursing home at screen but waitlisted and not covered by Medicaid within three months) showed reduced nursing home use among treatment members after the first six months. The effect did not last through the second six months, however. Moreover, subgroup results for Channeling Basic were contradictory. That is, nursing home use was higher among treatment members in a very similar subgroup (not in a nursing home at screen but waitlisted and covered by Medicaid within three months). One obvious possible explanation for these inconsistencies is sampling variation. But the possibility of short-term, transitory benefits for some subgroups has been seen before (Weissert, Wan, and Livieratos 1980) and cannot be ruled out.

Taken as a whole, these subgroup findings provide little direction for policy in terms of individual-patient demographic, diagnostic, or functional capacity measures which can be used to enhance nursing home use reductions through more careful admission practices. Worst of all, the Channeling "Medicaid covered, waitlisted" subgroup finding is inconsistent with the South Carolina project's aggregate finding that nursing home use can be significantly reduced by combining a home and community care program with a nursing home preadmission-screening program.

On the other hand, future researchers might see more success in identifying subgroups with high potential for reduced institutionalization if

they were to employ multivariate techniques not only to control for baseline characteristics, but also to define subgroups. When the Channeling studies defined their subgroups using multivariate estimates of risk of institutionalization, one of them (Basic) found a treatment effect. Future studies might be best served by defining subgroups on the basis of estimated risk of institutionalization using variables and formulae from the large number of studies that have attempted to identify determinants of institutionalization (Branch 1984; Branch and Jette 1982; Cohen, Tell, and Wallack 1986; Greenberg and Ginn 1979; Kane, Matthias, and Sampson 1983; McCoy and Edwards 1981; Palmore 1976; Shapiro and Tate 1985; Weissert and Scanlon 1983). Such an approach is not inconsistent with the only other approach that produced highly effective targeting, South Carolina's joining of preadmission screening and home care. Channeling's contradictory finding notwithstanding, the targeting success achieved by the South Carolina project requires further investigation.

Trends in Targeting and Effectiveness

Focusing again on the aggregate samples rather than subgroups and comparing the control-group rates of institutionalization of earlier studies with those of more recent ones (see Table 4), we find a general trend toward better targeting in later studies. Nonetheless, some studies ending in the mid-1980s targeted very poorly while some of the older studies begun in the early and mid-1970s did better than some of the later ones. South Carolina represents the state of the art. It achieved targeting of such effectiveness that more than one-half of its patients served were at high risk of institutionalization. Still, as will be shown later, that was too few to break even.

Effectiveness in reducing nursing home use rates is mixed (see Table 5). South Carolina, On Lok, and Chicago are recent successes, but Post-Hospital Support, the Channeling studies, San Diego, Florida Pentastar, Project OPEN, and New York City Home Care are recent failures. The ACCESS projects were different types of interventions, trying deliberately to raise nursing home use rates as a way of reducing hospital lengths of stay.

One explanation for the rather limited improvement over time in more effective targeting and nursing home use reduction is that home and community care programs continually face a moving target. While

they increase the rigor of their admission criteria to try to find patients at higher risk of institutionalization, nursing home bed shortages, preadmission screening programs, and the high cost of nursing homes may be making those who are actually at risk of entry a smaller and much sicker group. This can make it difficult for community care programs to find enough high-risk patients in their catchment areas (Weissert 1985b).

Impact on Service Use and Expenditures: Hospitals

Targeting

Hospital use statistics presented in Table 6 tell a substantially different story from nursing home use rates. Rates of hospital admission in the control group have been quite high in many studies, including several recent ones. In 9 of 18 studies for which data were available, hospital use rates exceeded 50 percent. And as the total-days data also presented in Table 6 suggest, hospital lengths of stay in the control group were often quite long—up to 60 days.

These high rates of admission and long stays produced substantial expenditures for hospitals and substantial potential for savings if they had been reduced—enough to produce a potential net savings in some studies.

Effects on Admission Rates

Table 7, however, records that changes in hospital use were typically small and inconsistent. Admissions were reduced in 10 studies. Although the treatment-control-group differences in admission rates for these studies ranged from −0.4 to −19.8, most were smaller than −5.5. Admissions went up in the other 8 studies. Treatment-control-group differences for those studies ranged from 1.6 to 18.6. Few findings were statistically significant (two showing a reduction and two showing an increase). None of the significant findings were subjected to multivariate analysis.

Effects on Total Days

Average total days in a hospital were reduced by between 0 and 47 days in some studies. But, again, in over 6 studies (out of 27), community

TABLE 6
Effectiveness in Targeting on Persons at Risk of Hospital Use

Study	Approximate Study Dates	Percentage of Users in the Control Group	Average Number of Total Days per Capita in the Control Group
Acute Stroke[a]	1981–1983	95.7%	52.4
Channeling Financial[b]	1980–1985	80.4	25.1
Channeling Basic[b]	1980–1985	76.6	18.5
Section 222 Homemaker[c]	1974–1977	73.0	16.0
Chicago[d]	1977–1980	63.5	14.0
Section 222 Day Care[c]	1974–1977	56.0	13.0
Home Health Care Team[e]	1979–1982	55.6	11.8
ACCESS Medicare/Medicaid[f]	1982–1986	55.2	60.1
ACCESS Medicare/Private Pay[c,f]	1982–1986	53.2	59.0
San Diego[c]	1979–1984	46.3	9.1
New York City Home Care[g]	1979–1984	42.0	14.9
South Carolina[h]	1980–1984	38.8	20.0
On Lok[i]	1978–1983	33.7	5.4
Continued Care[j]	1963–1971	33.3	14.6
Triage[k]	1976–1981	32.0	3.4
Project OPEN[c,l]	1978–1983	30.3	7.0
Highland Heights	1970–1976	19.2	6.4
Wisconsin CCO/Milwaukee[m]	1975–1979	14.9	12.2
Post-Hospital Support[n]	1983–1985	—	17.5
Nursing Home without Walls Downstate[o]	1980–1983	—	16.2
Nursing Home without Walls Upstate[o]	1980–1983	—	15.8
Chronic Disease[p]	1971–1976	—	11.6
BRH Home Aide	1966–1969	—	11.4
Congestive Heart Failure[q]	1964–1966	—	10.8
Alarm Response[r]	1970–1975	—	6.6
Worcester[s]	1972–1975	—	4.0
Georgia	1976–1980	—	4.0

Note: Numbers in the table reflect hospital use by the control group during the first year after entry to the study. First-year data were not reported by some projects. For these, first-year use was estimated from project data whenever possible. Percentage of users was estimated based on the assumption that the time between entry to the study and when a given subject enters a hospital follows an exponential distribution. Such a representation is suggested by DeGroot (1975). Key to symbols: "a" to "s" superscripts refer to table notes located in Appendix B. "—" indicates data were not available.

TABLE 7
Impact on Hospital Use

Study	Percentage of Users (T-C)	Average Number of Total Days per Capita (T-C)
Chicago[a]	−19.8%*	−1.5
Section 222 Day Care[b,c,d]	−14.0 ~	−3.0
Acute Stroke[e]	−5.5*	−2.0 ~
Wisconsin CCO/Milwaukee[f]	−5.4	−8.7*#
On Lok[g]	−5.1 ~	−0.7 ~
Home Health Care Team[h]	−5.1 ~	−3.1 ~
Project OPEN[b,i]	−4.1	−1.9 ~
New York City Home Care[j]	−3.0 ~	−3.7 ~
Channeling Basic[k]	−2.0#	0.5#
San Diego[b]	−0.4	−0.6
Channeling Financial[k]	1.6#	−1.2#
Section 222 Homemaker[b,c,d]	4.0#	2.0
ACCESS Medicare/Medicaid[l]	4.1 ~	−47.0*#
South Carolina[m]	5.5#	−2.0#
Triage[n]	8.0 ~	4.0 ~
Highland Heights	8.8*	−0.5
Continued Care[o]	9.6*	0.0 ~
ACCESS Medicare/Private Pay[b,l]	18.6 ~	−17.5*#
BRH Home Aide	—	−4.6
Post-Hospital Support[p]	—	−4.4*
Alarm Response[q]	—	−0.3*
Worcester[r]	—	−0.0
Chronic Disease[s]	—	0.6#
Nursing Home without Walls Downstate[t]	—	1.4#
Congestive Heart Failure[u]	—	2.0 ~
Georgia	—	2.0
Nursing Home without Walls Upstate[t]	—	2.8#

Note: Numbers in the table reflect treatment-control-group differences in hospital use during the first year after entry to the study. First-year data were not reported by some projects. For these, first-year use was estimated from project data whenever possible. Percentage of users was estimated based on the assumption that the time between study entry and when a given subject enters a hospital follows an exponential distribution. Such a representation is suggested by DeGroot (1975). Key to symbols: "a" to "u" superscripts refer to table notes located in Appendix B. "T-C" indicates the control-group average was subtracted from the treatment-group average. "*" indicates the treatment-control-group difference was statistically significant at the 5 percent level. "~" indicates the statistical significance of the treatment-control-group difference was not reported. The results of statistical significance tests are from tests conducted by project evaluators (e.g., on an observed 6-month difference), not by the authors on an estimate of a 12-month difference. "#" indicates the statistical significance of the treatment-control-group difference was assessed using multivariate techniques to control or adjust for baseline characteristics. Adjusted estimates are presented whenever reported. "—" indicates data were not available.

care use was associated with increased rather than decreased hospital use. Five "total days" effects were statistically significant—all reductions. Three were multivariate findings.

In short, community care has shown mixed effects on hospital use. Admissions have increased nearly as often as they have decreased; total days used have sometimes gone down but sometimes have gone up.

Per Diem Costs

Again, potential effects of community care on the day-by-day costliness of care could not be measured definitively since only 6 studies (the two ACCESS studies, Georgia, the two Nursing Home without Walls studies, and South Carolina) provided data adequate to make the calculations. Only one-half of the studies (Georgia and the two Nursing Home without Walls studies) indicated slightly lower per diem expenses for the treatment group.

Subgroup Analysis of Hospital Effects

Results for hospital use at the subgroup level (not shown in tables) are—like those for nursing home use—not particularly informative. Just under one-half of the 31 studies reviewed conducted some level of subgroup analysis of hospital use. Eleven used statistical tests, but only 5 reported subgroup findings that significantly differed from their aggregate findings.

Six subgroups showed lower hospital use by treatment group members as compared to control-group members:

- not severely disabled (Continued Care);
- good prognosis (Nursing Home without Walls Downstate);
- moderate unmet needs (Channeling Financial);
- over 75 and lives alone (Nursing Home without Walls Upstate); and
- high risk of institutionalization (Nursing Home without Walls Upstate).

Higher use was found for treatment-group members in four subgroups:

- extreme impairment in activities of daily living (Channeling Financial);

- poor prognosis (Nursing Home without Walls Downstate);
- over 75 and lives alone (Nursing Home without Walls Downstate); and
- continent (Channeling Financial).

Obviously, these results involve some contradictions (over 75 and lives alone), though prognosis and impairment results are complementary.

All of the studies used either a randomized controlled design or a nonrandomized controlled design with multivariate analysis to control for baseline characteristics. The Channeling studies, however, used both a randomized controlled design and multivariate analysis at the subgroup level. They suggest that targeting home and community care services to patients with only moderate needs, good prognosis, and the support of others might work to achieve cost savings through reduced hospital use. The other subgroup results reported here generally support such a view.

Regrettably, this "target" group is not likely to be one that would also be at high risk of nursing home institutionalization. Indeed, patients likely to be identified by a multivariate model of high risk of institutionalization appear to be similar to those found in the hospital subgroup analysis who are likely to experience increased hospital use as a result of receiving home and community care.

Again, sampling variation and study inconsistencies may be the explanation for these complicated and contradictory findings. But another explanation may be that home and community care populations comprise many subgroups of patients, each presenting different needs and resources and, correspondingly, potentially benefiting in different ways. Studies to date have tended to treat each patient as if he or she was equally likely to benefit in all domains of outcome. Better delineation of patients care needs and benefit potential appears to be a needed change in home and community care practice, even though it likely will lead to the inevitable conclusion that some patients are almost certain to raise rather than lower overall costs. Some of this problem might be overcome by more precise tailoring of interventions to specific patient needs.

Impact on Service Use and Expenditures: Combined Expenditure Effects

Table 8 presents average, annual per capita savings by service category (in 1988 dollars) for each of the 19 studies for which critical data were

TABLE 8
Average Annual per Capita Savings by Service Category (January 1, 1988, Dollars)

Study	Approximate Study Dates	Inpatient Services	Outpatient Services	Treatment Services	All Services
ACCESS Medicare/ Medicaid[a–c]	1982–1986	$11,714	$ −718	$ −7,915	$ 3,081
Highland Heights[c,d]	1970–1976	5,759	0	−2,747	3,012
Project OPEN[c,e]	1978–1983	3,040	1,146	−2,722	1,464
On Lok[c,f]	1978–1983	7,272	0	−6,001	1,271
Nursing Home without Walls Upstate[c,g]	1980–1983	5,163	297	−4,755	705
Alarm Response[h]	1975–1980	722	385	−521	586
Chronic Disease[b–c,i]	1971–1976	630	−54	−492	84
Wisconsin CCO/ Milwaukee[j]	1975–1979	2,027	1,156	−3,288	−105
Home Health Care Team[c,k]	1979–1982	2,211	162	−3,018	−645
South Carolina[l]	1980–1984	1,175	−413	−1,506	−744
Channeling Basic[b–c,m]	1980–1985	74	−125	−976	−1,027
Triage[c,n]	1976–1981	−753	0	−889	−1,642
Chicago[o]	1977–1980	1,346	1,332	−4,606	−1,928
Channeling Financial[b–c,m]	1980–1985	77	0	−2,918	−2,841
Georgia[p]	1976–1980	−315	−38	−2,632	−2,985
Nursing Home without Walls Downstate[c,g]	1980–1983	4,229	194	−10,202	−5,779
Section 222 Day Care[q]	1974–1977	–	–	−8,429	−7,014
Section 222 Homemaker[q]	1974–1977	–	–	−5,967	−8,942
ACCESS Medicare/ Private Pay[b–c,r]	1982–1986	−1,885	−509	−9,141	−11,535

Note: Dollars in the table reflect the treatment-control-group difference (control minus treatment) in average per capita service expenditures over a year's time. Expenditures were annualized from study data when reported for periods other than a year. All expenditures were adjusted for inflation to January 1, 1988, dollars. Key to symbols: "a" to "r" superscripts refer to table notes located in Appendix B. "–" indicates data were not available.

available. Savings, as suggested earlier, may be conceptualized as reductions in inpatient (nursing home and hospital) and outpatient costs that result from using home and community care minus the costs of home and community care (the "treatment" services).

For example, the second column of the table shows that in the ACCESS Medicare/Medicaid project, treatment-group members—that is, those assigned to home and community care—spent $11,714 less per capita on inpatient services than those in the control group. But treatment-group members spent $718 more per capita for outpatient services than their control-group counterparts. Not surprisingly, treatment-group members also spent $7,915 more per capita on home and community care (the "treatment") than control-group members. (ACCESS control-group members, as well as those of some of the other projects, used "treatment-like" services from nonproject sources.) The sum of savings (and losses) across all three service categories shows an overall average, annual per capita savings of $3,081.

Channeling Financial, for another example, produced savings of $77 on inpatient services, zero savings on outpatient services, while spending $2,918 more on home and community care services. The result: negative overall average, annual per capita savings (losses) of $2,841—an unavoidable consequence of high treatment costs combined with small impacts on other health services use.

Overall, the far-right column in Table 8 records that in 7 studies community care saved money, while in 12 studies service expenditures were higher than they would have been without community care. In those, costs of treatment services were one, two, five, or many times larger than savings produced in reduced costs of other services.

Studies Which Saved Money or Came Close

The characteristics of the 7 studies that produced cost savings and the 3 that came close deserve further comment.

ACCESS Medicare/Medicaid. Perhaps most aggressively among the 27 projects reviewed here, the ACCESS project focused its efforts almost exclusively on reducing the hospital stays of high-cost chronic-care patients. ACCESS was willing actually to encourage increased use of nursing homes as well as home care, if the result promised to be reduced hospital costs. Their reasoning was, of course, that hospitals are so much more expensive than nursing homes and home care that any downward

substitution would produce net savings. For the project's dually eligible (Medicare/Medicaid) group, the ACCESS idea apparently proved correct, saving $3,081 per capita per year.

Three additional observations about the ACCESS experience may be warranted, however. First, the demonstration took place in New York, indisputably the area of the country with the most severe post-acute placement-delay problem. This makes it not necessarily true that results would be replicated if the ACCESS approach were used in other locations. Nor is it clear that solution of the post-acute placement-delay problem requires an intervention of the cost and comprehensiveness of the ACCESS program. Future studies might be well served to compare ACCESS to cheaper, more direct placement-delay avoidance techniques.

Second, the treatment period was short. It was limited to 100 days of any combination of skilled nursing or home care days. In study after study, time series data suggest that savings take place in the first few months which are then offset by losses in the last few months. A time-limited treatment captures these savings without incurring the losses. Indeed, terminal care patients were apparently especially likely to prove cost effective, perhaps because their short duration of life limited the time during which treatment costs were incurred, meaning that while their hospital stays were shortened by transfer to a nursing home or home, death came before the patients could persist in the new settings and incur substantial treatment-cost outlays.

Third, it is important to note that even though the cost savings of ACCESS Medicare/Medicaid was $3,081 per capita per year, it was not statistically significant. This means that in another test of the same intervention, the savings might disappear or even become a loss. Treatment-group members did use significantly fewer hospital days than control-group members, particularly fewer Medicaid-covered days. Unfortunately, data available in published reports are inadequate to explain precisely how this length-of-stay reduction came about. But the reports do suggest that some treatment-group members were able to reduce the length of the delays that hospitalized Medicaid patients sometimes experienced while awaiting nursing home placements. This raises questions about the extent to which outlier cases were responsible for the savings shown. Possible biases due to outliers were examined for the cost analysis, according to published reports, but similar analysis for length of stay was not reported. This could be important. The control group

had a much larger maximum Medicaid-covered hospital stay than the treatment group: 326 extra days. At the average Medicaid hospital day cost for the control group, this single case alone could have accounted for approximately 10 percent of the total treatment-control-group members' average cost difference. Other outliers below the maximum could have accounted for more of the savings observed.

In other words, one might speculate that the treatment produced some of its savings by truncating the stays of a few outlier cases, again raising the question of whether a comprehensive case-management type of intervention was needed as opposed to some sort of automatic examination of outlier cases. Interestingly, this outlier difference between the treatment and control groups was not present in the other ACCESS program—for the Medicare/Private Pay group—which lost money. Likewise, savings generated among the Medicare/Medicaid group were exclusively for Medicaid services—which showed the outlier patterns. Medicare use did not show outlier patterns and no money was saved.

Highland Heights. There appears to be little doubt that the Highland Heights project's ability to offer a semi-independent congregate-living situation, in which 24-hour nursing, emergency response, and therapeutic services were available, enabled patients who would have been in nursing homes to be served in the lower-level residential care setting available at Highland Heights.

Indeed, one critic has dubbed the Highland Heights project "institutionalization by another name," suggesting that even though patients were kept out of a nursing home, they were moved from their own homes or a nursing home to a residential setting with closely affiliated inpatient health care services nearby (the project is connected by a tunnel to a hospital).

While this observation is unfair to the philosophy and style of the Highland Heights facility, it does point to the important role played by the housing component of the experiment. Many people would consider such sheltered housing a different kind of intervention than the opportunity to remain in one's own home that is generally implied by the notion of home care.

Project OPEN. This project reported cost reductions in hospital and nursing care, most evident in the first six months. They were based, however, on nonsignificant differences in nursing home and hospital use between the treatment and control groups. In general, the study design was a sound one, relying upon randomization after screening, but

inadequate attention may have been paid to pretest differences between the treatment and control groups and to attrition.

Contamination of the study's treatment and control groups was a major problem. Over 17 percent of the control group's total health and social service expenditures were for waived community care services as compared to only about 26 percent of treatment-group expenditures. Since the treatment consisted only of service coordination and waived services, this suggests that savings resulted primarily from service coordination. It is noteworthy that for some service expenses standard deviations in the control group were substantially higher than in the treatment group. Service coordination may have eliminated outlier utilization patterns and thereby saved money, similar to what may have happened in the ACCESS Medicare/Medicaid program. It is also a concern, however, that multivariate analytic techniques were not used for expenditure comparisons to adjust for possible pretest or attrition-induced case-mix differences between the treatment and control groups.

On Lok. As noted earlier, On Lok used a comparison group that began with a much higher nursing home residency rate than its treatment group; 44 percent of On Lok's control group was in a nursing home at the time treatment began as compared to only 7 percent of the treatment group. These control-group members spent 86 percent of their study days in a nursing home. This may have biased results in favor of the treatment group since these individuals tended simply to remain institutionalized throughout the evaluation period, while the treatment group consisted predominantly of community residents. Admissions to nursing homes from the community are more likely to be of short duration (Retsinas and Garrity 1986) and, as such, have a much higher probability of discharge back to the community than do current residents (Liu and Manton 1984). The mismatch came about as follows. Subjects were matched on four characteristics (diagnosis, age within five years, sex, and living alone or with others). The matching on so few characteristics resulted in noncomparable groups so that, according to the final report:

> The first 25 matched pairs—all living in the community—were compared on a number of functional status variables. The CCODA [treatment] participants were found to be more impaired and more functionally dependent than the non-CCODA [control] participants, especially in cognitive impairment and dependency in performing activities of daily living. Based on these findings and the fact

> that all participants in both groups were certified as nursing home eligible, it was decided to accept some recently institutionalized (within three months of the study) participants for the non-CCODA [control] Group to achieve a more equivalent sample (Zawadski et al. 1984, 3–6).

In other words, because matching failed, a group of nursing home patients was inducted into the control group but not into the treatment group. Subsequently, although only 80 of a planned 120 matched pairs were drawn into the sample, 10 were later dropped for non-comparability. The authors attempted to compensate for these sampling problems by making nursing home use and expenditure comparisons separately, between those who began in the community and those who began in nursing homes. While the treatment-effect difference was diminished, it continued to show net benefits, at least for those who began the study in the community. No statistical significance tests were employed; however, multivariate analysis was not used to control for other factors, and, at the subgroup level, sample sizes were small (e.g., only 5 in one subgroup).

Nonetheless, in the search for causes of reported success in dollar savings, it is interesting to listen to the authors' view of one critical factor. For them, it was respite care. The project's services included a sheltered housing facility of which one unit was used for "respite care . . . designed for short lengths of stay (about two weeks)." Of it, the authors say:

> As a bridge between hospital and home, respite care was a major reason for the decline in nursing home admissions and usage experienced in the CCODA since 1981. It also contributed to a decline in hospitalization days. Although respite care only rarely prevented hospitalization, patients were able to be discharged from hospitals sooner since the entire team could continue monitoring the patient for a period before he/she returned home (Zawadski et al. 1984, 4–11).

In addition, On Lok was one of the few studies that had the power to negotiate lower charge rates for services its patients received. This means that savings on institutional expenses potentially could have been generated even if use was unaffected. Data provided in the project's final report were inadequate for assessing whether or not lower charges were actually achieved, however.

Nursing Home without Walls Upstate. Savings in the upstate program of the Nursing Home without Walls project in New York appear to

have come mostly from reduced nursing home use. Each dollar spent on home care saved more than a dollar in reduced institutional and other outpatient care. While the downstate program also reduced nursing home use, it did not save money.

The authors of the final evaluation report attribute the differential success of the two programs to three factors of the upstate program: (1) better targeting on those at risk of nursing home use; (2) greater effectiveness in reducing nursing home use; and (3) lower treatment costs (Birnbaum et al. 1984). The upstate program's apparent ability to target better may have been partly due to the upstate area's larger nursing home bed supply, thus making it easier to find patients at real risk of admission because admission was a real option. The larger nursing home bed supply also may offer an increased opportunity to substitute home for nursing home care in the upstate area. Lower treatment costs upstate probably are reflective of different philosophies of care that result in less intensive treatment. Moreover, existing home care services were sparse upstate so that the new treatment services had the opportunity for maximum returns on investments. In contrast, existing home care services were so widely available downstate that additional returns from the new treatment services were unlikely to be realized.

In sum, at upstate, moderately high users of health care services were changed to moderate users, while at downstate, moderate users were changed to moderately high users. Outliers were carefully analyzed and alteration of their use patterns was not the explanation for cost savings.

Alarm Response. Success of the Alarm Response project appears principally to lie in the low cost of the intervention, suggesting that perhaps the future of community care may be enhanced by the ability of providers to bring new low-cost technologies to bear on the long-term care problem. It is interesting to note, however, that the alarm system was tested in public housing facilities—again the presence of the congregate housing factor in a successful project.

Yet, success of the alarm-response system may also suggest another principle. It saved money by being so low cost that even with minimal effectiveness its costs were recouped.

Chronic Disease. This project had two factors working in favor of cost savings. First, only 43 percent of the treatment group used services, thereby making per capita treatment costs appear artificially low. Second, savings occurred only when the treatment was short. They were present only after 6 months. By 12 months, continued treatment without

additional benefits in terms of reduced institutionalization had turned the savings into losses.

Home Health Care Team. The near savings achieved by this project were primarily due to substitution of home care for hospital care by treatment group members who died within three months of admission to the study. Because this project was primarily a hospice program, duration of home care use was often quite short. Thus, savings on substitution of home care for inpatient services was not likely to be lost on extended duration of home care use.

Wisconsin CCO/Milwaukee. Data available for this project's cost analysis were limited to Medicaid data, so the picture is incomplete. As was the case for the Nursing Home without Walls Upstate project, however, limited home care services were available to control-group members so that services offered by the treatment program presumably achieved maximum marginal utility.

South Carolina. While this project did not save money or even quite break even, it came close. One explanation is that the project did a good job of targeting high-risk patients: 58 percent of its control group entered a nursing home. Per capita days stay in a nursing home was 130 days. The project jointly operated a nursing home preadmission-screening program that prevented Medicaid and soon-to-become-Medicaid admissions if they were considered appropriate for treatment at a lower level of care. It is possible that it may actually have been the preadmission-screening aspect of the project, however, which produced the reduced nursing home admissions rather than the service substitution. Indications are that some patients were diverted from institutional care but nonetheless used no home or community care services from the project.

A second factor that contributed to low expenses was that only 42 percent of the treatment group used treatment services. As in the Chronic Disease Module, treatment-group costs appeared low because they were reported per capita for all treatment-group members, not just users. Because randomization took place prior to screening for eligibility for and appropriateness of treatment services, many of those assigned to the treatment group were never actually real candidates to use the services. While, on the one hand, this diminished the potential for community care services to reduce nursing home utilization, it also had the effect of artificially reducing treatment costs since expenses of services used by 42 percent of the treatment group were spread for accounting purposes across 100 percent of patients assigned to the

treatment group. These issues raise questions about the replicability of South Carolina's and the Chronic Disease Module's results in an actual operating environment with no distortions produced by the research design.

Finally, while South Carolina's project did better than any other in targeting those at risk of nursing home use, its population was distinctly at low risk of hospital use. Only about 39 percent of its control group had entered a hospital 12 months after entry to the study as compared to percentages 50 to 100 percent higher in other studies. Combined with subgroup results presented earlier, this finding seems to raise the question of whether effective targeting on those at risk of nursing home use nets a group not at high risk of hospital use. If so, this may limit cost-saving potential since hospital stays are so much more expensive than nursing home stays.

Conclusions on Cost-Savings through Reduced Institutionalization

Home and community care as it has been practiced during the past 30 years has not tended to produce cost savings in most studies. Targeting patients at high risk of institutionalization has been a problem for most studies, but the aggregate results of one recent study (South Carolina), and the six-month subgroup results of another (Channeling Financial), suggest that targeting might be enhanced by focusing care on those who have actually applied for nursing home care or on those already in nursing homes. Targeting efforts may be further complicated by possible differences in the characteristics of patients at high risk of nursing home use versus those at high risk of hospital use. Hospital use has also gone up in a number of studies, apparently as a result of using home and community care. Treatment costs have usually exceeded savings on reduced institutional use. One reason may be a tendency of programs to operate inefficiently due to excess capacity, while another may be a lack of community care utilization review.

These results suggest that greater success might be achieved by:

- coupling home and community care programs with nursing home preadmission-screening programs;
- using multivariate models to estimate patients' risk of institutionalization;

- modeling patients' potential savings on institutional care and considering these in setting home care expenditure limits for the patient or a case mix of patients;
- carefully specifying different expected benefits for various subgroups of patients served and considering these different outcomes in care-planning and utilization-review decisions;
- making efforts to reduce treatment costs, possibly by better planning to avoid excess capacity and by utilization control, especially with respect to total volume and duration of care;
- closer attention to control of outlier cases' use and cost;
- steadfastly avoiding treatment decisions that increase hospital use unless patients will clearly benefit; and,
- further investigation of congregate housing as an efficient setting for delivering home and community care.

Perhaps the most interesting observation is that money was saved when cost of the intervention was minimal even though effectiveness—although significant—was also small. Return on investment in home and community care services appears to diminish rapidly after a short time and above a minimal level of intervention. High intensity and long duration appear to add little to effectiveness. In the Channeling project, case management and a few gap-filling dollars did almost as much good as a much more expensive full package of services. Likewise, minimal services did more good in upstate New York than more services added to an already high base of existing services in downstate New York. When money was saved, it was frequently because the treatment was arbitrarily stopped before savings could be turned into losses. ACCESS Medicare/Medicaid and Chronic Disease were two such examples.

One approach to improving cost performance may be prospective budgeting for home and community care. As it has done in the hospital field, it could potentially result in restricting outlays for these new services to something closer to the amount saved on institutional care. Past studies have frequently set quite high treatment-cost caps, based upon the unwarranted assumption that they could produce very large reductions in nursing home and hospital use. Bed shortage areas are partially problematic in savings potential. More modest treatment-effectiveness expectations might lead to more modest expenditures on treatment services to see if institutional cost reductions could be achieved at low treatment cost. In a separate analysis using data from this review (Weissert and

Cready 1988), a prospective budgeting approach is proposed which—even without imputing values for patient benefits—suggests the possibility that home and community care could break even with only small improvements in targeting effectiveness, institutional use reductions, and reduced treatment costs.

Impact on Health Status and Well-Being

Health Status Outcomes: Survival, Physical, and Mental Functioning

Of the 31 studies reviewed, 28 assessed the impact of home and community care on survival; 27 assessed effects on physical functioning; and 19 measured impacts on cognitive functioning. Survival or mortality rates served as the indicator of survival. Physical functioning was measured by an activities of daily living (ADL) scale or one of the wide array of other physical functioning or related health status measures used. Included among these "other" measures were independence in instrumental activities of daily living (IADL), ambulation, restricted activity days, and other less-used measures, such as blood pressure and range of motion. Although measures of cognitive functioning varied across studies, most assessed orientation to person, place, and/or time. Some studies used more than one measure to assess impact in a given domain. Tables 9, 10, and 11 present findings. Results are at best mixed.

Survival. Most treatment-control-group differences in survival were not statistically significant; only 8 of 22 that were subjected to statistical tests were significant, and only 1 of these was a randomized, multivariate finding (see Table 9). When findings were significant, however, they were more likely to be positive than negative (only one negative). Disregarding statistical significance, signs were as likely to be positive as negative: 14 positives and 14 negatives.

Physical Functioning. Taken separately, ADL effects appear to be negligible (see Table 10). About one-fourth of the findings were statistically significant (7 of 29). Two of the significant findings were reported by studies using randomization and multivariate techniques. Both of these were negative. In all, 4 of the significant findings were negative, and 3 were positive. When significance and study design are ignored, positive signs predominate: 16 positives, 10 negatives, and 3 unknowns.

TABLE 9
Impact on Survival

Study	Direction and Significance of Impact	
	Dir.	Sign.
RANDOMIZED CONTROLLED		
Continuity in Care[a]	−	~
Continued Care	−	NS
BRI Protective Service	−	NS
BRH Home Aide	−	NS
Worcester	+	NS
Wisconsin CCO/Milwaukee[b]	+	NS
Georgia	+	*
Project OPEN[c]	−	NS
Health Maintenance Team[d]	+	* #
Home Health Care Team[d]	−	NS #
San Diego[e]	+	NS
Florida Pentaster[e,f]	+	*
South Carolina	+	NS #
Channeling Basic	+	NS #
Channeling Financial	−	NS #
NONRANDOMIZED CONTROLLED		
Highland Heights	+	* #
Chronic Disease	−	~
Section 222 Day Care[g]	+	* #
Section 222 Homemaker[g]	+	* #
Triage[h]	−	~
Chicago[i]	−	~
On Lok[a]	−	~
New York City Home Care	−	NS
Nursing Home without Walls Downstate	+	NS #
Nursing Home without Walls Upstate	+	* #
ACCESS Medicare/Private Pay	−	NS
ACCESS Medicare/Medicaid	−	*
Post-Hospital Support	+	~

Note: Unless noted otherwise, impacts were assessed at the end of the first year after entry to the study. Key to symbols: "a" to "i" superscripts refer to table notes located in Appendix B. "−" indicates a less favorable outcome for the treatment group as compared to the control group. "+" indicates a more favorable outcome for the treatment group as compared to the control group. "~" indicates the statistical significance of the treatment-control-group difference in outcome was not reported. "NS" indicates the treatment-control-group difference in outcome was not statistically significant at the 5 percent level. "*" indicates the treatment-control-group difference in outcome was statistically significant at the 5 percent level. "#" indicates the statistical significance of the treatment-control-group difference in outcome was assessed using multivariate techniques to control or adjust for baseline characteristics.

TABLE 10
Impact on Physical Functioning

	Direction and Significance of Impact									
	ADL		IADL		Mobility		Restricted Days		Other	
Study	Dir.	Sign.	Dir.	Sign.	Dir.	Sign.	Dir.	Sign.	Dir.	Sign.
RANDOMIZED CONTROLLED										
Continuity in Care[a]	+	NS			+	NS				
Continued Care[a,d]	?	NS			?	NS			?	NS
BRI Protective Service	−	NS								
BRH Home Aide	−	NS			+	NS	+	~		
Worcester[c]	+	NS	+,+	*,NS	−	*			−	NS
			+,+	NS						
Wisconsin										
CCO/Milwaukee	+	~								
Georgia	+	NS	−	NS	+,=	NS				
Project OPEN[d]	+	NS	+	NS						
Health Maintenance										
Team[e]	+	NS #			+,+	NS #				
Home Health Care Team[e]					−	NS #				
San Diego[f]	−	* #					−,+	NS #	=,=	NS #
Florida Pentastar[g]	−	NS #	−	* #					−	* #
									+,+	NS #
South Carolina[h]	+	NS #	+	NS #	+	NS #			−	NS
Channeling										
Basic	−,+	NS #	−	NS #			+	NS #		
Financial	−,−	*,NS #	=	NS #			−	NS #		

TABLE 10—*Continued*

	Direction and Significance of Impact									
	ADL		IADL		Mobility		Restricted Days		Other	
Study	Dir.	Sign.	Dir.	Sign.	Dir.	Sign.	Dir.	Sign.	Dir.	Sign.
NONRANDOMIZED CONTROLLED										
Highland Heights	?	NS			?	NS				
Chronic Disease[i]	?	NS			?,?	NS	?	NS		
Section 222[j]										
Day Care	+	NS #								
Homemaker	+	* #								
Triage[k]	−	NS	−	NS						
Chicago[l]	−	* #								
On Lok[m]	+,+	NS #	+	* #					+	* #
									+,+	NS #
New York City Home Care	−	* #	−	* #						
Nursing Home without Walls										
Downstate	+	* #								
Upstate	+	NS #								
Acute Stroke[e]	+	NS								
Post-Hospital Support[n]	+	*	−	*						

Note: Unless noted otherwise, impacts were assessed at the end of the first year after entry to the study. Key to symbols: "a" to "n" superscripts refer to table notes located in Appendix B. "+" indicates a more favorable outcome for the treatment group as compared to the control group. "?" indicates the direction of the treatment-control-group difference in outcome was not reported. "−" indicates a less favorable outcome for the treatment group as compared to the control group. "=" indicates no difference in outcome for the treatment group as compared to the control group. "NS" indicates the treatment-control-group difference in outcome was not statistically significant at the 5 percent level. "~" indicates the statistical significance of the treatment-control-group difference in outcome was not reported. "*" indicates the treatment-control-group difference in outcome was statistically significant at the 5 percent level. "#" indicates the statistical significance of the treatment-control-group difference in outcome was assessed using multivariate techniques to control or adjust for baseline characteristics. A blank in the "Dir." column indicates the outcome was not measured.

TABLE 11
Impact on Mental Functioning

Study	Direction and Significance of Impact	
	Dir.	Sign.
RANDOMIZED CONTROLLED		
Continued Care[a]	?,?	NS
BRI Protective Service	−	NS
BRH Home Aide	+	NS
Worcester	−,−	NS
Georgia	−	NS
Project OPEN[b]	−	NS
San Diego	−	NS#
Florida Pentastar	−,−	NS#
South Carolina	+	NS#
NONRANDOMIZED CONTROLLED		
Highland Heights	?,?,?	NS
Chronic Disease[c]	?,?	NS
Section 222 Day Care[d]	+	NS#
Section 222 Homemaker[d]	+	* #
Triage[e]	+	*
On Lok	+	NS#
New York City Home Care	+	NS#
Nursing Home without Walls Downstate	+	NS#
Nursing Home without Walls Upstate	+	NS#
Post-Hospital Support[f]	+	NS

Note: Unless noted otherwise, impacts were assessed at the end of the first year after entry to the study. Key to symbols: "a" to "f" superscripts refer to table notes located in Appendix B. "?" indicates the direction of the treatment-control-group difference in outcome was not reported. "−" indicates a less favorable outcome for the treatment group as compared to the control group. "+" indicates a more favorable outcome for the treatment group as compared to the control group. "NS" indicates the treatment-control-group difference in outcome was not statistically significant at the 5 percent level. "*" indicates the treatment-control-group difference in outcome was statistically significant at the 5 percent level. "#" indicates the statistical significance of the treatment-control-group difference in outcome was assessed using multivariate techniques to control or adjust for baseline characteristics.

Looking at the effects of home and community care on other physical functioning outcomes, and disregarding statistical significance, most signs were positive: 21 positives, 13 negatives, 4 equals, and 6 unknowns. But only 8 of the findings were statistically significant: 3 positives and

5 negatives. Treatment-group members fared better than control-group members on two measures of IADL and On Lok's Physical Requirements of Living Index. Treatment group members, however, fared worse than their control-group counterparts on three other measures of IADL, one measure of mobility, and Florida Pentastar's count of medical problems. Only 2 of the 8 significant findings were reported by studies using randomization and multivariate techniques: both were negative.

There is some evidence that community care may have an impact on physical functioning, but an unfavorable one. Nine of the 15 statistically significant findings for the class of measures as a whole were negative, and all 4 significant findings reported by studies that used randomized controls and multivariate techniques were negative.

Mental Functioning. Mental functioning may sometimes have been affected, but evidence was again very tenuous (see Table 11). Only 2 of 25 findings were statistically significant—both positive—one of which was a multivariate finding. Signs were slightly more often positive (10) than negative (8), with 7 unknown.

Subgroup Analysis of Health Status Outcomes

Sixteen of the 31 studies reviewed conducted some level of subgroup analysis of health status effects. Thirteen applied statistical significance tests. Only 7 that used such tests reported subgroup findings that significantly differed from their aggregate findings.

Subgroup results for health status measures (not shown in tables) are somewhat more interesting than those reported for service utilization. Again the analysis was plagued by noncomparability of subgroups and variations in subgroup sample sizes and analytical rigor. Nonetheless, one interesting hypothesis is raised by the findings, although results are too skimpy to draw an accurate conclusion. The hypothesis is that younger, minimally disabled patients and those with social support are likely to benefit from community care, while older, severely disabled patients who lack social support are likely to become more dependent when provided community care.

In the "young-old" subgroup, treatment-group members fared significantly better than control-group members on survival (Nursing Home without Walls Upstate), mental functioning (Continued Care), and mobility (Continued Care). Treatment-group members also fared better than control-group members on these same outcomes in a number of

"minimally disabled" subgroups (variously defined across studies) (Nursing Home without Walls Upstate, Continued Care, and BRH Home Aide). Similar results were reported by three studies (Nursing Home without Walls Upstate, Continuity in Care, and Continued Care) for several "socially supported" subgroups (also variously defined across studies).

Unfavorable subgroup effects reported by Chronic Disease are consistent with these results. In that study, "high-risk" members of the treatment group were found to fare worse than "high-risk" control-group members on a measure of mobility, while, conversely, another study found that "high-risk" treatment-group members fared better than "high-risk" control-group members on survival (Nursing Home without Walls Downstate). Finally, "low-risk" patients fared worse with treatment in the Worcester study.

Although there are obviously a few inconsistencies among these findings, and none were reported by studies that used both randomization and multivariate techniques, subgroup results generally suggest that younger, minimally disabled, and/or socially supported patients are likely to receive health status benefits from community care.

What makes this pattern of findings most interesting is its potential implications for cost effectiveness. If the pattern were confirmed in future research, it would suggest that patients who are most likely to benefit from home and community care in health status outcomes are precisely the opposite of the group that is most likely to benefit in terms of avoided nursing home stays, although they are somewhat similar to the group that is most likely to benefit in terms of avoided hospital stays. For health status benefits, and possibly for avoiding hospital stays, community care would target on younger, healthier, less dependent, cognitively functional, socially supported patients. But for avoiding nursing home stays, substantial research tells us that community care would need to target on older, very dependent, cognitively impaired, socially deprived patients—that is, on those at high risk of institutionalization. Findings here are inconclusive but deserve further testing in future studies.

Psychosocial Outcomes

Psychosocial outcomes have shown somewhat more promise than other outcomes. Measures of life satisfaction (contentment, morale, etc.), in particular, have frequently been found to show statistically significant

TABLE 12
Impact on Life Satisfaction

Study	Direction and Significance of Impact	
	Dir.	Sign.
RANDOMIZED CONTROLLED		
BRI Protective Service	+	NS
BRH Home Aide	+,+	*,NS
Worcester	+	NS
Georgia	+	NS
Health Maintenance Team[a]	+,+	NS #
Home Health Care Team[a]	+	NS
San Diego	+	* #
Channeling Basic	+,+	NS #
Channeling Financial	+,+	*,NS #
NONRANDOMIZED CONTROLLED		
Highland Heights	+	NS
Chronic Disease[b]	?	NS
Section 222 Day Care[c]	+	NS #
Section 222 Homemaker[c]	+	* #
New York City Home Care	+	* #
Post-Hospital Support[d]	−	NS

Note: Unless noted otherwise, impacts were assessed at the end of the first year after entry to the study. Key to symbols: "a" to "d" superscripts refer to table notes located in Appendix B. "+" indicates a more favorable outcome for the treatment group as compared to the control group. "?" indicates the direction of the treatment-control-group difference in outcome was not reported. "−" indicates a less favorable outcome for the treatment group as compared to the control group. "NS" indicates the treatment-control-group difference in outcome was not statistically significant at the 5 percent level. "*" indicates the treatment-control-group difference in outcome was statistically significant at the 5 percent level. "#" indicates the statistical significance of the treatment-control-group difference in outcome was assessed using multivariate techniques to control or adjust for baseline characteristics.

beneficial effects from community care participation (see Table 12). All but 2 of the 19 findings reported by 15 studies were positive, including all 5 of the significant findings. To be sure, some of these beneficial findings were reported by nonrandomized controlled experiments, making them particularly suspect since the obvious potential for self-selection might be most likely to affect contentment or satisfaction. But BRH Home Aide, Channeling Financial, and San Diego also found statistically

significant life-satisfaction effects even though patients were analyzed according to their original group assignment. That is, treatment-group patients who did not receive treatment-group services were nonetheless analyzed as if they had received treatment. This eschews the possibility of favorable bias that would result if only those who stayed with the treatment were assessed. Indeed, it biases results against the treatment, suggesting that the beneficial effect is a robust finding.

Four psychosocial outcomes in addition to life satisfaction showed generally positive results: activity participation/performance, social interaction, caregiver burden/satisfaction, and unmet needs. The other psychosocial outcome, informal social support, had slightly more negative findings than positive.

Activity Participation/Performance. Measured variously across 10 studies, social activity was increased by home and community care use (see Table 13). Four of the 14 measurements were statistically significant. All 4 (one a randomized, multivariate finding) showed more activity for the treatment group than the control group.

Social Interaction. Social interaction was also increased by home and community care use (see Table 14). Of the 16 measurements, 4 were statistically significant positives; 8 were nonsignificant positives; 2 were negatives (one significant), and 3 were unknowns. None of the significant findings was from randomized, multivariate studies.

Informal Caregivers. The informal caregivers of home and community care users tended to benefit (see Table 15). Results for the 13 measurements of caregiver outcomes reported by 8 studies were mostly positive: 12 positives and 1 unknown. The 3 statistically significant findings were reported by studies that used a randomized controlled design and multivariate techniques.

Unmet Needs. Home and community care use reduced unmet needs (see Table 16). Nine studies examined unmet needs in physical functioning (ADL and IADL), socialization, medical care, social services, and/or health education. All but 2 of the 35 measurements were favorable for the treatment group and most were statistically significant.

Informal Support. In contrast to the generally favorable findings reported for the other psychosocial outcomes, informal social support tended to decline with home and community care use: 30 negative findings, 22 positives, and 1 equal (see Table 17). Measures were very mixed, however. Six of the 8 studies used global measures of support. Two of these used a randomized controlled design and multivariate techniques,

TABLE 13
Impact on Social Activity

Study	Direction and Significance of Impact	
	Dir.	Sign.
RANDOMIZED CONTROLLED		
Continued Care[a]	?,?	NS
Worcester	+, −, −	NS
San Diego	−	NS #
Florida Pentastar	+	* #
NONRANDOMIZED CONTROLLED		
Highland Heights	+	*
Chronic Disease[b]	?	NS
Section 222 Day Care[c]	+	NS #
Section 222 Homemaker[c]	=	NS #
New York City Home Care	+, +	* #
Acute Stroke[d]	+	NS

Note: Unless noted otherwise, impacts were assessed at the end of the first year after entry to the study. Key to symbols: "a" to "d" superscripts refer to table notes located in Appendix B. "?" indicates the direction of the treatment-control-group difference in outcome was not reported. "+" indicates a more favorable outcome for the treatment group as compared to the control group. "−" indicates a less favorable outcome for the treatment group as compared to the control group. "=" indicates no difference in outcome for the treatment group as compared to the control group. "NS" indicates the treatment-control-group difference in outcome was not statistically significant at the 5 percent level. "*" indicates the treatment-control-group difference in outcome was statistically significant at the 5 percent level. "#" indicates the statistical significance of the treatment-control-group difference in outcome was assessed using multivariate techniques to control or adjust for baseline characteristics.

and most of their findings were negative, 1 of which was significant. Each of the other 4 studies had mostly positive findings, 1 significant. Other measures of informal support used by the studies attempted to assess the receipt of specific types of support provided by informal caregivers. These ranged from support in personal care to service coordination and emotional support. Results were heavily dominated by 4 studies and were more likely to be negative than positive and to be nonsignificant.

Subgroup Analysis of Psychosocial Outcomes. Subgroup analysis of psychosocial outcomes was conducted by 10 of the 31 studies reviewed.

TABLE 14
Impact on Social Interaction

Study	Measure	Direction and Significance of Impact: Dir.	Sign.
RANDOMIZED CONTROLLED			
Continued Care[a]	Number of people talk with daily	?	NS
	Personal interaction	?	NS
BRI Protective Service	Interested parties scale	+	NS
Worcester	Confidante	−	NS
	Number of close friends	−	*
	Offspring contact scale	+	NS
	Contact with other relatives	+	NS
	Contact with friends	+	NS
Channeling Basic	Contacts with family/friends	+	NS #
Channeling Financial	Contacts with family/friends	+	NS #
NONRANDOMIZED CONTROLLED			
Highland Heights	Frequency talk to friends	?	NS
	Number of neighbors who are friends	+	*
	Frequency talk to child/grandchild	+	NS
	Frequency see child/grandchild	+	NS
New York City Home Care	Number of close friends and relatives	+	* #
	Frequency of contact with informal supports	+	* #

Note: Unless noted otherwise, impacts were assessed at the end of the first year after entry to the study. Key to symbols: "a" superscript refers to table notes located in Appendix B. "?" indicates the direction of the treatment-control-group difference in outcome was not reported. "+" indicates a more favorable outcome for the treatment group as compared to the control group. "−" indicates a less favorable outcome for the treatment group as compared to the control group. "NS" indicates the treatment-control-group difference in outcome was not statistically significant at the 5 percent level. "*" indicates the treatment-control-group difference in outcome was statistically significant at the 5 percent level. "#" indicates the statistical significance of the treatment-control-group difference in outcome was assessed using multivariate techniques to control or adjust for baseline characteristics.

TABLE 15
Impact on Informal Caregivers

Study	Measure	Direction and Significance of Impact: Dir.	Sign.
RANDOMIZED CONTROLLED			
BRI Protective Service	Collateral stress	+	*
BRH Home Aide	Household morale	+	NS
	Household stress	+	NS
Health Maintenance Team[a]	Household stress	?	NS
Home Health Care Team[a]	Caretaker satisfaction with patient health care	+	* #
Channeling Basic[b]	Caregiver life satisfaction	+	NS #
	Caregiver satisfaction with patient care arrangements	+	NS #
Channeling Financial[b]	Caregiver life satisfaction	+	* #
	Caregiver satisfaction with patient care arrangements	+	* #
NONRANDOMIZED CONTROLLED			
Acute Stroke[a]	General health questionnaire	+	NS
Post-Hospital Support[c]	Caregiver illness index	+	NS
	General health questionnaire	+	NS
	Impact on caregiving index	+	NS

Note: Unless noted otherwise, impacts were assessed at the end of the first year after entry to the study. Key to symbols: "a" to "c" superscripts refer to table notes located in Appendix B. "+" indicates a more favorable outcome for the treatment group as compared to the control group. "?" indicates the direction of the treatment-control-group difference in outcome was not reported. "*" indicates the treatment-control-group difference in outcome was statistically significant at the 5 percent level. "NS" indicates the treatment-control-group difference in outcome was not statistically significant at the 5 percent level. "#" indicates the statistical significance of the treatment-control-group difference in outcome was assessed using multivariate techniques to control or adjust for baseline characteristics.

TABLE 16
Impact on Unmet Needs

Study	Measure	Direction and Significance of Impact: Dir.	Sign.
RANDOMIZED CONTROLLED			
BRI Protective Service	Concrete assistance index	+	*
BRH Home Aide	Concrete assistance index	+	NS
Worcester	Unmet needs	+	NS
Georgia	Getting enough help	+	*
Home Health Care Team[a]	Patient satisfaction with health care	+	* #
Channeling Basic	Number of unmet needs	+	* #
	Unmet need:		
	Transfer	+	* #
	Dressing	+	NS #
	Toileting	+	NS #
	Bathing	+	* #
	Meal preparation	+	* #
	Housekeeping	+	* #
	Transportation	+	NS #
	Medical treatments	+	NS #
	Satisfaction with service arrangements	+	* #
	Confidence about receipt of care	+	* #
Channeling Financial	Number of unmet needs	+	* #
	Unmet need:		
	Transfer	−	NS #
	Dressing	+	NS #
	Toileting	+	NS #
	Bathing	+	* #
	Meal preparation	+	NS #
	Housekeeping	+	* #
	Transportation	+	NS #
	Medical treatments	−	NS #
	Satisfaction with service arrangements	+	* #
	Confidence about receipt of care	+	* #

TABLE 16—*Continued*

Study	Measure	Direction and Significance of Impact: Dir.	Sign.
NONRANDOMIZED CONTROLLED			
Chicago[b]	Unmet social activities need	+	* #
	Unmet personal care need	+	* #
	Unmet nursing care need	+	* #
	Unmet physical therapy need	+	NS #
New York City Home Care	Unmet physical/mental health needs	+	* #
	Unmet health education needs	+	NS #
	Unmet social service needs	+	* #
	Unmet IADL needs	+	* #

Note: Unless noted otherwise, impacts were assessed at the end of the first year after entry to the study. Key to symbols: "a" to "b" superscripts refer to table notes located in Appendix B. "+" indicates a more favorable outcome for the treatment group as compared to the control group. "−" indicates a less favorable outcome for the treatment group as compared to the control group. "*" indicates the treatment-control-group difference in outcome was statistically significant at the 5 percent level. "NS" indicates the treatment-control-group difference in outcome was not statistically significant at the 5 percent level. "#" indicates the statistical significance of the treatment-control-group difference in outcome was assessed using multivariate techniques to control or adjust for baseline characteristics.

Subgroups included age, social resources, and ADL dependency subgroups. Most results came from only a few of the 10 studies, however, and often were based upon small subgroup sample sizes (fewer than 50). Typically, they did not employ multivariate control techniques at the subgroup level. Results (not shown in tables) generally suggest that no group of patients is more or less likely to experience psychosocial benefits from home and community care.

For life satisfaction, for example, 7 studies conducted subgroup analysis. Results usually did not significantly differ from the aggregate

TABLE 17
Impact on Informal Social Support

Study	Measure	Direction and Significance of Impact: Dir.	Sign.
RANDOMIZED CONTROLLED			
Worcester	Children do what should for you	+	NS
	Children treat you compared to others	−	NS
	Can informal supports continue to help	+	NS
	Informal supports able to respond to additional need	−	NS
	Someone nearby in daytime	+	NS
	Someone nearby at night	+	NS
	Someone help if needed	+	NS
South Carolina	Receipt of any informal support	+	~
Project OPEN[a]	Social network scale	+	*
Channeling Basic[b]	Receipt of any in-home care from informal caregivers	–	NS #
	Number of visits per week from informal caregivers	+	NS #
	Number of hours per day from primary informal caregiver	−	NS #
	Receipt of care provided by informal caregivers:		
	Therapy	+	NS #
	Other medical treatments	+	NS #
	Help taking medicine	−	NS #
	Personal care	−	NS #
	Meal preparation	−	NS #
	Housework/laundry/shopping	−	NS #
	General supervision	−	NS #
	Chores	−	NS #
	Help managing money	−	NS #
	Other help	−	NS #
	Prepared meals	−	NS #
	Transportation	−	NS #
Channeling Financial[b]	Receipt of any in-home care from informal caregivers	–	* #
	Number of visits per week from informal caregivers	−	NS #
	Number of hours per day from primary informal caregiver	+	NS #
	Receipt of care provided by informal caregivers:		
	Therapy	−	NS #
	Other medical treatments	+	* #
	Help taking medicine	−	NS #
	Personal care	−	NS #
	Meal preparation	−	* #

TABLE 17—*Continued*

Study	Measure	Direction and Significance of Impact: Dir.	Sign.
	Housework/laundry/shopping	−	* #
	General supervision	−	NS #
	Chores	−	NS #
	Help managing money	−	NS #
	Other help	=	NS #
	Prepared meals	−	* #
	Transportation	−	NS #
NONRANDOMIZED CONTROLLED			
Alarm Response[c]	Use of informal support services:		
	Supervision of home physical therapy program	−	NS
	Provision of meals	−	NS
	Homemaking	−	NS
	Daily checking	−	*
	Transportation	+	NS
Chicago[d]	Perception of time help available from social supports if ill	+	NS #
On Lok[e]	Receipt of services provided by informal caregivers:		
	Medical/nursing care	+	*
	Personal care	+	NS
	Homemaking	+	NS
	Meals	+	*
	Transportation	+	NS
	Help with finances	+	*
	Service coordination	+	*
	Emotional support	+	NS

Note: Unless noted otherwise, impacts were assessed at the end of the first year after entry to the study. Key to symbols: "a" to "e" superscripts refer to table notes located in Appendix B. "+" indicates a more favorable outcome for the treatment group as compared to the control group. "−" indicates a less favorable outcome for the treatment group as compared to the control group. "=" indicates no difference in outcome for the treatment group as compared to the control group. "NS" indicates the treatment-control-group difference in outcome was not statistically significant at the 5 percent level. "∼" indicates the statistical significance of the treatment-control-group difference in outcome was not reported. "*" indicates the treatment-control-group difference in outcome was statistically significant at the 5 percent level. "#" indicates the statistical significance of the treatment-control-group difference in outcome was assessed using multivariate techniques to control or adjust for baseline characteristics.

findings, which were generally favorable. Not surprisingly, the 3 studies that did report significantly different subgroup results found higher satisfaction for subgroup treatment-group members than control-group members. No clear pattern of subgroup benefits is evident, however. Using a variation of Blenkner and Bloom's contentment index (1970), Chronic Disease found higher contentment for treatment-group

members in the less-disabled subgroups of young-old and minimally ADL dependent. BRH Home Aide found higher contentment for treatment-group members in a different and, in part, more-disabled set of subgroups (potential caregiver not present in household, arthritis, 75 or older, and female) using a similar variation of the same index. Georgia (using an entirely different scale) also found higher "contentment" among treatment-group members in a more-disabled subgroup (those recommended for alternative living services).

Three studies analyzed social interaction at the subgroup level. Findings significantly differed from aggregate results for most treatment-control-group comparisons, in that treatment-group members of the subgroups studied did worse than control-group members. Continued Care reported lower interaction for the old-old, low economic status, social deprivation, severely ADL dependent, minimally ADL dependent with dementia, and those with a high-risk diagnosis. In contrast, higher interaction was reported by Worcester for those institutionalized or in danger of institutionalization. Continued Care also reported that community care increased house confinement in several subgroups (males, high economic status, living with others, and socially active), whereas Worcester—consistent with its social interaction subgroup results—found community care decreased confinement for the institutionalized. Again, no clear pattern is evident.

For unmet needs and informal support, 5 studies conducted subgroup analysis using statistical significance tests. Of these, only 1 reported subgroup findings that differed from its aggregate findings. New York City Home Care found that treatment-group members with minimal impairment had fewer unmet needs (for health education). But those with maximal impairment had greater unmet needs than similarly impaired control-group members. Interestingly, the same study reported reduced informal IADL support for those in the minimally impaired subgroup. The study also reported, however, that treatment-group members who started out with a lot of informal ADL support continued to receive that type of support, whereas control-group members did not, regardless of impairment.

Summary of Findings on Health Status and Well-Being

Survival and mental functioning may have sometimes been positively affected by the receipt of community care, but not by much and evidence

was tenuous. Effects on physical functioning have been extensively measured, and although little effect was found in the aggregate—except perhaps a negative one—treatment members in some subgroups may have benefited, compared to controls. Patients who were young-old, minimally disabled, and socially supported may have benefited. But others got worse: the old-old, the severely dependent, and socially deprived patients may have become more dependent and functioned less well when given community care. These subgroup findings are tentative, however, due to small sample sizes and some conflicting results.

Increased life satisfaction appears to be a relatively consistent benefit of community care. Caregivers and patients who use community care are more satisfied. As a whole, community care users may also have fewer unmet needs and become more socially involved. But evidence for most benefits is often based on findings that typically reflect small subgroup sample sizes and a small number of studies, often lacking appropriate controls and typically producing effects of very small magnitudes. Even effect sizes for contentment were generally of small magnitude. For example, only about 6 percent more of the treatment group in Channeling Financial were more satisfied with life compared to the control group at 12 months; and, among Channeling Financial caregivers, less than 9 percent of the treatment group were more satisfied with life at 12 months than their control-group counterparts. Satisfaction effects in the Channeling studies also were short-lived—typically gone after 18 months despite continued care.

Summary, Implications and Recommendations

This analysis of home- and community-based long-term care studies has shown that such services usually raise overall health care service use and costs. Targeting on patients at high risk of institutionalization has been uneven and best accomplished when accompanied by a mandatory nursing home preadmission-screening program. Effect sizes have been quite small, usually saving too little money on institutional care to offset costs of the new treatment—home and community care. Hospital use may actually have been increased by home and community care in some studies.

Health status effects are quite limited, primarily to patient and caregiver satisfaction and reduction of unmet needs. Other health status

benefits may be produced for some subgroups, such as those who are not at high risk of institutionalization—the young-old who are functionally and mentally competent and who have social supports that offer a resource base upon which to capitalize rehabilitation potential.

Future home and community care efforts should carefully prestratify patients according to the types of outcome benefits expected and then relate treatment plans to these expected outcomes. This is especially important as home care programs have recently begun to expand their target populations to the homeless, underserved minority groups, the terminally ill, and those recently discharged from acute care hospitals at possibly earlier stages in their recovery periods than may have been the case before Medicare prospective reimbursement to hospitals. Otherwise, similar sets of services may be inappropriately and inefficiently provided to dissimilar subgroups of patients with differing needs and benefit potential. The evidence suggests that expected benefits should be modest, however.

Nonetheless, support remains strong for community care among elderly patients, their caregivers, the provider community, and many policy makers. One suggestion is to abandon hopes of cost savings and render community care simply because it may raise contentment of patients and caregivers (Weissert 1985a). Recent evidence is convincing that we can expect this type of outcome benefit from community care, although the magnitude of the benefit is small and persistence beyond several months remains problematic. The rationale for such a position is not unreasonable. We provide nursing home care with little expectation of positive outcomes and complete certainty of increased expenditures. Since most who use home and community care are frail, dependent, sick, old, alone, or a burden to caregivers, why is it not enough to provide them with care which satisfies them? We expect even less from nursing homes.

Such normative questions are for legislatures to answer, of course. But regardless of their decisions, one technical question which can be addressed is this: Is it possible to make home and community care more efficient? If it is, more patients could be served with fixed budgets, and fewer added dollars would be required for this type of care to meet demand.

For community care to operate at lowest net costs, the new costs of community care services must be substantially offset by savings on the use of existing services, such as institutional care. One approach that has not been exploited for community care is prospective budgeting. Managers have assumed that large savings on institutional care would

offset their home and community care service costs. When institutional savings were small, net costs were high because home and community care services had proved costly. An unanswered question raised by this review is: If managers had been given a more reasonable estimate of institutional savings likely to be produced, could they have used that as a prospective budget target to try to break even, or come close to it by keeping their treatment costs down? That few have done it is discouraging and may suggest that being stingy on treatment costs would reduce institutional savings and lead to poorer patient outcomes. But several studies' results suggest that home and community care services quickly reach a point of diminishing returns in both intensity and duration. Shorter, cheaper interventions appear to do about as well as expensive longer ones. Cost caps set considerably lower than has been done in the past, reflecting more realistic expectations about what is likely to be saved on institutional care, could come close to guaranteeing that home and community care programs would break even, apparently without substantially limiting their benefit potential.

Using the results of this review, the authors have simulated such a social-cost break-even, prospective-budgeting model for home- and community-based long-term care (Weissert and Cready 1988). This preliminary work indicates that a break-even point may, in fact, be within reach if better management techniques are employed by home and community care program directors. The model shows that despite the limited success in the various parameters of program performance (e.g., targeting, avoidance of institutional admissions, and reductions of length of stay), home and community care projects apparently cost on the average only a few percentage points more than control-group costs in past studies. Improvements of only about that same magnitude may be required in targeting, nursing home use reductions, avoidance of increased hospital use, and reduced treatment costs to achieve a break-even point, even without imputing values for patient benefits.

Until such a prospective-budgeting approach is actually tested in a demonstration setting, we cannot know the real potential which home and community care programs have for providing new services to the frail elderly without substantially increasing overall long-term care outlays.

The results of this review also suggest, however, that home and community care supporters would be well served by redoubling their efforts at making home and community care more effective in increasing patient and caregiver satisfaction. While perhaps it can successfully be argued that a wealthy society should be willing to pay to provide efficiently

managed home and community care services to its most frail and dependent noninstitutionalized elderly and their caregivers, the argument would be greatly enhanced if the magnitude of effectiveness were larger than it has been in past studies.

In short, results from past studies suggest the following specific directions for future efforts:

- Further efforts to achieve more effective targeting on those at risk of nursing home use by coupling community care with preadmission-screening programs and by adopting multivariate screening criteria which actually estimate risk of institutionalization of each applicant;
- Development of more systematic and accurate methods of estimating demand for community care in a catchment area so that programs are able to assess their competition and define their service area in such a way as to enhance likelihood of operating at or near capacity where per capita costs are low;
- Better delineation of subgroups of patients served and development of care plans which set realistic benefit expectations in whatever domains are appropriate so that patients who are unlikely to benefit from reduced institutionalization can be served for other treatment objectives;
- Better utilization control and more aggressive cost-reduction efforts in the production of home and community care, possibly including a presumption of short treatment duration unless there are good reasons to extend it;
- Special attention to reducing outliers' use and costs;
- Vigilant efforts to avoid causing increased use of hospitals by home and community care participation unless patient benefits are clearly expected;
- Systematic exploration of the potential for joining benefits of housing interventions with home and community care interventions;
- Redoubling of efforts to produce and effectively measure life-satisfaction benefits in patients and caregivers and lowering of health status benefit expectations from home and community care so that these psychosocial outcomes are accepted as adequate returns on investment;
- Development, testing, and adoption of prospective-budgeting methods that set reimbursement rates for home and community care at the value of its net social savings, including both reduced

institutional care use and imputed values for patient and caregiver benefits and reduced caregiver opportunity costs; and,

- Improved methods of imputing values reflecting society's willingness to pay for patient and caregiver well-being.

Concerted efforts in these directions are likely to lead to efficient, more effective home care and its eventual full coverage by Medicare, Medicaid, and private insurance.

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Appendix A

Study	Source Document(s)
ACCESS Medicare/Private Pay, Medicare/Medicaid	Berkeley Planning Associates 1987
Acute Stroke	Wade et al. 1985
Alarm Response	Ruchlin and Morris 1981
BRH Home Aide	Blenkner et al. 1970; Nielsen et al. 1972
BRI Protective Service	Blenkner, Wasser, and Bloom 1967; Blenkner, Bloom, and Nielsen 1971
Channeling Basic, Financial	Applebaum and Harrigan 1986; Granneman and Grossman 1986; Kemper et al. 1986; Phillips, Stephens, and Cerf 1986; Thornton and Dunstan 1986; Wooldridge and Schore 1986
Chicago	Hughes, Cordray, and Spiker 1984
Chronic Disease	Papsidero et al. 1979
Congestive Heart Failure	Hanchett and Torrens 1967
Continued Care	Katz et al. 1972
Continuity in Care	Posman et al. 1964
Florida Pentastar	Maurer et al. 1984
Georgia	Skellie et al. 1982
Health Maintenance Team	Selmanoff et al. 1979
Highland Heights	Sherwood et al. 1981
Home Health Care Team	Groth-Juncker 1982
Nursing Home without Walls Downstate, Upstate	Birnbaum et al. 1984
NYC Home Care	Sainer et al. 1984
On Lok	Yordi and Waldman 1982a, 1982b; Zawadski et al. 1984
Post-Hospital Support	Oktay and Volland 1986
Project OPEN	Sklar and Weiss 1983
San Diego	Pinkerton and Hill 1984
Section 222 Day Care, Homemaker	Wan, Weissert, and Livieratos 1980; Weissert, Wan, and Livieratos 1980; Weissert et al. 1980a, 1980b
South Carolina	Brown et al. 1985
Triage	O'Rourke, Raisz, and Segal 1982
Worcester	Commonwealth of Massachusetts 1975
Wisconsin CCO/Milwaukee	Seidl et al. 1983

Appendix B: Notes to Tables

Table 1

a Continuity in Care used two control groups. One ($n = 60$) was assessed at the same intervals as the treatment group; the other ($n = 40$) was assessed at study entry and at the end of the 24-month evaluation period only. A pooled control group (including both types of controls) was used in the treatment-control-group comparisons presented in this review.

b Continued Care used two sets of treatment and control groups. One set ($n = 75$ each) was assessed at regular 3-month intervals; the other set ($n = 75$ each) was assessed at study entry and at the end of the 24-month evaluation period only. While the regularly assessed sample ($n = 150$) was used for most of the treatment-control-group comparisons presented in this review, the entire sample ($n = 300$) was used for treatment-control-group comparisons of longevity, and nursing home and hospital use.

c Although Chronic Disease used a randomized controlled design, many treatment-control-group comparisons presented in this review exclude treatment-group members who used no or low levels of assigned services.

d Similarly, although the Section 222 studies also used a randomized controlled design, the treatment-control-group comparisons presented in this review exclude treatment-group members who did not use assigned services, and control- and treatment-group members who received homemaker, chore, or day care services under Medicaid or Title XX.

e Sample size is for the 12-month sample since the treatment-control-group comparisons presented in this review used that sample only. In the full sample, there were 1,012 in the treatment group and 320 in the control group at baseline.

f Florida Pentastar used two control groups. Only the randomly assigned control group was used in the treatment-control-group comparisons presented in this review.

g The Nursing Home without Walls Upstate program used two control groups. One consisted of "nonparticipants" within the project catchment area; the other consisted of "contrasts" in counties outside the project catchment area. A pooled control group

(including both "nonparticipants" and "contrasts") was used in the treatment-control-group comparisons presented in this review.

h Medicaid-only nursing home level of care study. Sample size is for the 12-month sample since the treatment-control-group comparisons presented in this review used that sample only. In the full sample, there were 953 in the treatment group and 914 in the control group at baseline.

Table 2

No notes.

Table 3

No notes.

Table 4

a Follow-up range from 12 to 24 months after entry to the study. Percentage of users was estimated from "18-month" (the follow-up midpoint) data. Average days were estimated from average per month data.

b Estimated from 24-month data on skilled nursing facility use only.

c Estimated from 9-month data.

d Percentage of users was estimated from 6-month data. Average days were estimated by summing the averages reported for the first and second 6 months after entry to the study.

e Skilled nursing facility use covered by Medicare only.

f Estimated by doubling reported levels of skilled nursing facility use for a typical 6-month evaluation period.

g Estimated from 6-month data.

h Follow-up ranged from 12 to 16 months after entry to the study. Estimated from "14-month" (the follow-up midpoint) data on nursing home use covered by Medicaid only.

i Nursing home use of survivors only.

j Percentage of users was estimated from 24-month data. Average days were estimated from the percentage of total days spent in a nursing home during the 24-month evaluation period.

k Estimated from 18-month data.

l Follow-up ranged from 18 to 36 months after entry to the study. Estimated from "27-month" (the follow-up midpoint) data.

m Estimated from average per month data.

n Estimated from the average time spent in a nursing home over the 12-month evaluation period.
o Estimated by summing the averages reported for the first and second 6 months after entry to the study.
p Estimated by summing the averages reported for chronic and rehabilitation hospital, skilled nursing facility, and intermediate care facility use over the 13-month evaluation period, and converting the sum to an annual figure.

Table 5

a Estimated from 24-month data on skilled nursing facility use only.
b Unadjusted estimates of the treatment-control-group differences are presented. Adjusted estimates were not reported.
c Estimated from 9-month data.
d Skilled nursing facility use covered by Medicare only.
e Although the Section 222 studies used a randomized controlled design, the treatment-control-group comparisons presented here exclude treatment-group members who did not use assigned services, and control- and treatment-group members who received homemaker, chore, or day care services under Medicaid or Title XX. Such comparisons tend to overstate treatment effects.
f Estimated by doubling reported levels of skilled nursing facility use for a typical 6-month evaluation period.
g Estimated from 6-month data.
h Estimated from 18-month data.
i Follow-up ranged from 18 to 36 months after entry to the study. Estimated from "27-month" (the follow-up midpoint) data.
j Percentage of users was estimated from 24-month data. Average days were estimated from the percentage of total days spent in a nursing home during the 24-month evaluation period.
k Percentage of users was estimated from 6-month data. Average days were estimated by summing the averages reported for the first and second 6 months after entry to the study. Although statistical tests for the sum were not reported, separate tests for the two 6-month periods indicated that the treatment-control-group difference in use was not significant for either evaluation period.

l Follow-up ranged from 12 to 16 months after entry to the study. Estimated from "14-month" (the follow-up midpoint) data on nursing home use covered by Medicaid only.
m Nursing home use of survivors only.
n Follow-up ranged from 12 to 24 months after entry to the study. Percentage of users was estimated from "18-month" (the follow-up midpoint) data. Average days were estimated from average per month data.
o Estimated from average per month data.
p Estimated by summing the averages reported for chronic and rehabilitation hospital, skilled nursing facility, and intermediate care facility use over the 13-month evaluation period, and converting the sum to an annual figure. Although statistical tests for the sum were not reported, separate tests for the three types of use indicated significant treatment-control-group differences in skilled nursing facility and intermediate care facility use.
q Estimated by summing the averages reported for the first and second 6 months after entry to the study. Although statistical tests for the sum were not reported, separate tests for the two 6-month periods indicated that the treatment-control-group difference in use was not significant for either evaluation period.
r Estimated from the average time spent in a nursing home over the 12-month evaluation period.

Table 6

a Estimated from 6-month data. Average days were estimated excluding 16 cases who were admitted to the hospital for a reason other than for a stroke.
b Percentage of users was estimated from 6-month data. Average days were estimated by summing the averages reported for the first and second 6 months after entry to the study.
c Hospital use covered by Medicare only.
d Estimated from 9-month data.
e Estimated from 6-month data.
f Follow-up ranged from 12 to 24 months after entry to the study. Percentage of users was estimated from "18-month" (the follow-up midpoint) data. Average days were estimated from average per month data.

g Hospital use of survivors only.
h Those whose only hospitalization was at initial assessment were not counted users in the percentage-of-users measure of hospital use.
i Estimated from 24-month data.
j Percentage of users was estimated from 24-month data. Average days were estimated from the percentage of total days spent in a hospital during the 24-month evaluation period.
k Estimated by doubling reported levels of hospital use for a typical 6-month evaluation period.
l Follow-up ranged from 18 to 36 months after entry to the study. Estimated from "27-month" (the follow-up midpoint) data.
m Follow-up ranged from 12 to 16 months after entry to the study. Estimated from "14-month" (the follow-up midpoint) data on hospital use covered by Medicaid only.
n Estimated by taking the difference between two averages. The average number of days of the initial hospital stay during which the patient entered the study was subtracted from the average total number of days spent in a hospital from entry to the study to the end of the 12-month evaluation period. This was done because the baseline assessment (and the start of the 12-month evaluation period) did not occur until a month after discharge from the initial stay.
o Estimated from average per month data.
p Estimated by summing the averages reported for the first and second 6 months after entry to the study.
q Follow-up averaged 15 months for the control group. Estimated from "15-month" data.
r Estimated from 13-month data.
s Estimated from the average time spent in a hospital over the 12-month evaluation period.

Table 7

a Estimated from 9-month data.
b Hospital use covered by Medicare only.
c Although the Section 222 studies used a randomized controlled design, the treatment-control-group comparisons presented here exclude treatment-group members who did not use assigned

services, and control- and treatment-group members who received homemaker, chore, or day care services under Medicaid or Title XX. Such comparisons tend to overstate treatment effects.

d Unadjusted estimates of the treatment-control-group differences are presented. Adjusted estimates were not reported.

e Estimated from 6-month data. Average days were estimated excluding 7 cases in the treatment group and 16 cases in the control group who were admitted to the hospital for a reason other than for a stroke.

f Follow-up ranged from 12 to 16 months after entry to the study. Estimated from "14-month" (the follow-up midpoint) data on hospital use covered by Medicaid only.

g Estimated from 24-month data.

h Estimated from 6-month data.

i Follow-up ranged from 18 to 36 months after entry to the study. Estimated from "27-month" (the follow-up midpoint) data.

j Hospital use of survivors only.

k Percentage of users was estimated from 6-month data. Average days were estimated by summing the averages reported for the first and second 6 months after entry to the study. Although statistical tests for the sum were not reported, separate tests for the two 6-month periods indicated that treatment-control-group difference in use was not significant for either evaluation period.

l Follow-up ranged from 12 to 24 months after entry to the study. Percentage of users was estimated from "18-month" (the follow-up midpoint) data. Average days were estimated from average per month data.

m Those whose only hospitalization was at initial assessment were not counted as users in the percentage-of-users measure of hospital use.

n Estimated by doubling reported levels of hospital use for a typical 6-month evaluation period.

o Percentage of users was estimated from 24-month data. Average days were estimated from the percentage of total days spent in a hospital during the 24-month evaluation period.

p Estimated by taking the difference between two averages. The average number of days of the initial hospital stay during which the patient entered the study was subtracted from the average total number of days spent in a hospital from entry to the study to the

end of the 12-month evaluation period. This was done because the baseline assessment (and the start of the 12-month evaluation period) did not occur until a month after discharge from the initial stay. Although statistical tests for the difference between the two averages were not reported, separate tests indicated a significant treatment-control-group difference in total days but not in initial stay days.

q Estimated from 13-month data.

r Estimated from the average time spent in a hospital over the 12-month evaluation period.

s Estimated by summing the averages reported for the first and second 6 months after entry to the study. Although statistical tests for the sum were not reported, separate tests for the two 6-month periods indicated that the treatment-control-group difference in use was not significant for either evaluation period.

t Estimated from average per month data.

u Follow-up averaged 13 months for the treatment group and 15 months for the control group. Estimated from "13-month" data for the treatment group and "15-month" data for the control group.

Table 8

a Estimated by multiplying treatment- and control-group average monthly per capita service expenditures by Medicare and Medicaid by 12. Included in the treatment component were the costs of case management and home care services. The costs of waived skilled nursing facility services were included in the inpatient component.

b Estimated from data adjusted for baseline characteristics.

c "Treatment" costs were reported for the control group.

d Estimated by dividing project estimates of treatment- and control-group total expenditures for the first year after entry to the study by group-sample size. Project estimates were derived by applying local per diem charges to self-reported utilization data. Included in the treatment component were housing charges, costs of food and sundries, visiting nurses services, home health aides, homemaker services, therapies, and physician services, and estimates of the construction and operational costs of housing.

e Estimated by multiplying treatment- and control-group average monthly per capita service expenditures by all payers by 12. Included in the treatment component were the costs of case management (direct service, program, and indirect) and waived services.

f Estimated by first dividing project estimates of treatment- and control-group total service expenditures for the 24-month evaluation period by 2, and then dividing the results by group-sample size. Project estimates were derived from project records, provider bills, and self-reports of service utilization. Included in the treatment component were the costs of both outpatient and in-home services.

g Estimated by multiplying treatment- and control-group average monthly per capita service expenditures by Medicare and Medicaid by 12. Separately reported costs for the two Upstate control groups ("nonparticipants" and "contrasts") were combined for this analysis. Included in the treatment component were the costs of both waived and nonwaived Medicaid home health services.

h Estimated by first dividing project estimates of treatment- and control-group total service expenditures for the 13-month evaluation period by group-sample size, and then converting the results to annual rates. Project estimates of inpatient and outpatient costs were derived by applying local per diem charges to self-reported utilization data. However, the project cost estimate of the treatment was based on actual program experience, and reflected administrative, direct operating, and equipment costs.

i Treatment- and control-group average per capita service expenditures based on self-reported data were reported by the project for the 6th and 12th months of the 12-month evaluation period. Annual rates were estimated by first computing average monthly rates and then multiplying the results by 12. Included in the treatment component were the costs of "noninstitutional health care"—nurses, other health care providers (including health assistants but not physicians), medications, and other related costs.

j Estimated by converting average per capita inpatient and outpatient service expenditures by Medicaid for the approximately 15-month evaluation period to annual rates, and by multiplying average monthly per capita treatment service expenditures by 12. Included in the treatment component were the costs of CCO administration, service coordination, and services.

k Estimated by applying local service unit costs in 1981 (given in the project final report) to treatment- and control-group average per capita units of service use. Service use was captured through participant diaries. Included in the treatment component were the costs of all in-home care (except social worker visits).

l Estimated by first multiplying treatment- and control-group average Medicare and Medicaid service expenditures per day of participation in the first year after entry to the study by the average number of participation days during that year, and then dividing the results by group-sample size.

m Estimated by converting average per capita service expenditures by all payers for the 18-month evaluation period to annual rates. Included in the treatment component were the costs of case management and formal community services.

n Estimated by doubling project estimates of treatment- and control-group average per capita service expenditures by all payers for a typical 6-month evaluation period. Service use and expenditure data for the treatment group were obtained from project records. Service use for the control group was based on participant diaries and provider, Medicare, and Medicaid records. Project estimates of service expenditures for the control group were derived by applying state prevailing charges in 1982 to service-use rates. Included in the treatment component were the costs of physician, visiting nurse, therapy, home health aide, homemaker, chore, and companion services.

o Estimated by converting project estimates of treatment- and control-group average per capita service expenditures for the 9-month evaluation period to annual rates. Project estimates of inpatient and outpatient costs were derived by applying local per diem charges to self-reported utilization data. However, the project cost estimate of the treatment was based on actual program experience, and reflected costs of nurse, social worker, and home health aide visits, including travel and overhead.

p Treatment- and control-group average per capita service expenditures by Medicare and Medicaid in the first year after entry to the study.

q Treatment- and control-group average per capita service expenditures by Medicare in the first year after entry to the study. Although the Section 222 studies used a randomized controlled

design, the treatment-control-group comparisons presented here exclude treatment-group members who did not use assigned services, and control- and treatment-group members who received homemaker, chore, or day care services under Medicaid or Title XX. Such comparisons tend to overstate treatment effects.

r Estimated by multiplying treatment- and control-group average monthly per capita service expenditures by Medicare by 12. Included in the treatment component were the costs of case management and home care services. The costs of waived skilled nursing facility services were included in the inpatient component.

Table 9

a 24-month data.
b Follow-up ranged from 12 months to 16 months after project enrollment.
c Follow-up ranged from 18 months to 36 months after project enrollment.
d 6-month data.
e 18-month data.
f Those who died after they entered a nursing home were excluded.
g Although the Section 222 studies used a randomized controlled design, the treatment-control-group comparison presented here excludes treatment-group members who did not use assigned services, and control- and treatment-group members who received homemaker, chore, or day care services under Medicaid or Title XX. Such comparisons tend to overstate treatment effects.
h 48-month data.
i 9-month data.

Table 10

a 24-month data.
b The impact presented in the "other" column was assessed by a range-of-motion measure.
c The impact presented in the "other" column was assessed by a functioning-of-limbs scale.
d 18-month data.
e 6-month data.
f Impacts presented in the "other" column were assessed by measures of right-sided edema and blood pressure.

g 18-month data on "other" outcomes. Impacts presented in the "other" column were assessed by medical conditions and special care needs indices, and a range-of-motion scale.
h The impact presented in the "other" column was assessed by a measure of poor nutritional intake.
i Although Chronic Disease used a randomized controlled design, the treatment-control-group comparisons presented here exclude treatment-group members who used no or low levels of assigned services. Such comparisons tend to overstate treatment effects.
j Although the Section 222 studies used a randomized controlled design, the treatment-control-group comparison presented here excludes treatment-group members who did not use assigned services, and control- and treatment-group members who received homemaker, chore, or day care services under Medicaid or Title XX. Such comparisons tend to overstate treatment effects.
k Follow-up ranged from 6 to 48 months; comparison based on data from subjects' last follow-up whenever it occurred.
l 9-month data.
m Impacts presented in the "other" column were assessed by physical requirements of living, upper/lower extremity, and illness compensation indices.
n Based on data from the 9th to the 12th month of the 12-month evaluation period.

Table 11

a 24-month data.
b 18-month data.
c Although Chronic Disease used a randomized controlled design, the treatment-control-group comparisons presented here exclude treatment-group members who used no or low levels of assigned services. Such comparisons tend to overstate treatment effects.
d Although the Section 222 programs used a randomized controlled design, the treatment-control-group comparison presented here excludes treatment-group members who did not use assigned services, and control- and treatment-group members who received homemaker, chore, or day care services under Medicaid or Title XX. Such comparisons tend to overstate treatment effects.
e 6–48 month data; comparisons based on data from subjects' last reassessment whenever it occurred.

f Based on data from the 9th to the 12th month of the 12-month evaluation period.

Table 12

a 6-month data.
b Although Chronic Disease used a randomized controlled design, the treatment-control-group comparison presented here excludes treatment-group members who used no or low levels of assigned services. Such comparisons tend to overstate treatment effects.
c Although the Section 222 programs used a randomized controlled design, the treatment-control-group comparison presented here excludes treatment-group members who did not use assigned services, and control- and treatment-group members who received homemaker, chore, or day care services under Medicaid or Title XX. Such comparisons tend to overstate treatment effects.
d Based on data from the 9th to the 12th month of the 12-month evaluation period.

Table 13

a 24-month data.
b Although Chronic Disease used a randomized controlled design, the treatment-control-group comparison presented here excludes treatment-group members who used no or low levels of assigned services. Such comparisons tend to overstate treatment effects.
c Although the Section 222 studies used a randomized controlled design, the treatment-control-group comparison presented here excludes treatment-group members who did not use assigned services, and control- and treatment-group members who received homemaker, chore, or day care services under Medicaid or Title XX. Such comparisons tend to overstate treatment effects.
d 6-month data.

Table 14

a 24-month data.

Table 15

a 6-month data.
b 6- or 12-month data.

c Based on data from the 9th to the 12th month of the 12-month evaluation period.

Table 16

a 6-month data.
b 9-month data.

Table 17

a 18-month data.
b 6- or 12-month data.
c 13-month data.
d 9-month data.
e 24-month data.