Resident Medical Care Utilization Patterns in Continuing Care Retirement Communities

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This article presents the findings of an evaluation of medical care service utilization by two elderly cohorts: one living in continuing care retirement communities (CCRCs) and the other living in traditional community settings. CCRC residents' overall use of Medicare-covered medical services did not differ significantly from that of the traditional community-residing elders. Both groups incurred annual per capita expenditures of approximately $2,000. In their last year of life, however, CCRC residents displayed significantly lower expenditures for hospital care ($3,854 versus $7,268) but higher expenditures for Medicare or non-Medicare-covered nursing home care ($5,565 versus $3,533).

INTRODUCTION

CCRCs are an innovative attempt to integrate service delivery and financing. For an entry fee and a monthly maintenance fee, CCRCs provide housing, social services, and medical care. Although the scope of services covered by the monthly fee can vary both across and within facilities, depending on type of accommodation selected and the extensiveness of the health care contract that is offered, and although facilities are usually not restricted with regard to the frequency with which they raise their monthly fees, the unique feature of this financing system is that it places the service provider at some risk for the resident's health care costs.

The concept embodied by CCRCs is far from new. It can be traced back to the medieval guilds' attempts in Europe to insure against losses arising from death, injury, and old age, and to mutual aid societies established in the United States by 18th and 19th century immigrants (Winklevoss and Powell, 1984). Despite these roots, CCRCs as they are known today are a relatively new entity. The average CCRC has been in operation for fewer than 30 years, and the CCRC industry has experienced its most dramatic growth during the 1970s and 1980s. Because the industry is still evolving, there is no agreement as to the number of existing CCRCs. A widely used estimate is that there were about 700 such facilities in operation by 1987 (American Association of Homes for the Aging and Ernst and Young, 1989).

Despite the interest that social planners and policymakers have in the CCRC concept, very little empirical research exists on this service delivery mechanism. Much of the literature focuses either on describing the structure and evolution of the industry, or on regulatory issues (American Association of Homes for the

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Aging, 1987; Cohen, 1980; Netting and Wilson, 1987; Pies, 1984; Sherwood, Ruchlin, and Sherwood, 1989; Stearns et al., 1990; Tell, Wallack, and Cohen, 1987; Tell and Cohen, 1990; U.S. Senate, 1983; Williams, 1986; Winklevoss and Powell, 1984). A few studies have discussed considerations that must be recognized in establishing fees (Cole and Marr, 1984; Hartzler, 1984; Winklevoss and Powell, 1981), factors that explain variation in health center use across CCRCs (Bishop, 1988), and the financial viability of CCRCs (Ruchlin, 1987 and 1988). With the exception of nursing home use (Cohen, 1988; Cohen, Tell, and Bishop, 1988), no study has assessed the utilization of medical care services by CCRC residents in a typical year or in a resident's last year of life vis-a-vis service utilization by elderly living in more traditional community settings.

The major services provided directly by CCRCs in addition to housing and meals are household maintenance, personal care, and skilled and non-skilled nursing home care. CCRCs, as a rule, do not provide medical care services, but their residents have Medicare coverage. One could hypothesize that as a result of the availability of the CCRC service package, the use of Medicare-covered services may be reduced as social services and non-covered long-term care services provided by the CCRC are substituted for Medicare-covered services. Alternately, CCRCs may be able to cause reimbursable skilled medical services covered by Medicare to substitute for less intensive non-Medicare-covered services for which they are at risk, thereby increasing the use of Medicare-covered services. The research presented in this study seeks to clarify the impact of CCRC living on the use of Medicare-covered medical care services.

DATA AND METHODS

Selecting the Study Sample

A representative sample of 20 CCRCs drawn from the four geographic areas with the largest concentration of these facilities—Arizona, Florida, Pennsylvania, and Southern California—was recruited for this study. Recruitment of facilities was guided by a desire to include CCRCs that varied systematically on three key characteristics: age of facility (open prior to 1978 or not[1]), economic status of the residents (more than 30 percent or less than 30 percent of the residents could be classified as low income), and type of health care contract offered to the majority of the tenants (extensive versus limited). (The major difference between extensive and limited-care contracts is that the former include unlimited nursing home care at no extra cost to the resident, whereas the latter limit the amount of such care that can be received without additional payments.) One facility was dropped when it became clear that it did not assume any financial risk for the care of its residents. In 10 of these sites, the CCRC was at risk for all nursing home use, whereas in the other 9 sites, residents were only partially covered for nursing home use. Ten sites had special personal care units which provided special assistance with activity of daily living (ADL) tasks.

[1]The year 1977 was selected as the boundary date to reflect changes in capital financing prevailing within the CCRC industry. CCRCs built prior to 1977 typically secured either Federal Housing Administration-insured mortgages or conventional mortgages with relatively low interest rates, whereas those built after 1977 had to pay higher interest costs.

A stratified random sample of residents was selected from these 19 facilities for the main service utilization analysis. Stratification reflected the length of time a person resided in the CCRC (less than 1 year, and 1 year or more). Two residents living in the CCRC for 1 year or more were selected for each resident living in the CCRC for less than 1 year. Sample members were accepted into the study during a 15-month period (July 1985 to September 1986); medical service utilization and cost data were gathered for each sample member for a 1-year exposure period commencing with their entry into the study. Individuals eligible for inclusion in the last-year-of-life analysis included the first 33 people in each facility who died during the 15-month intake period plus everyone in the stratified random sample who died during the study followup. The study period for the death sample consists of the 12 months prior to death.

For assessing resource utilization patterns, a comparison sample was created by selecting individuals from a longitudinal stratified random sample, representative of all community-residing elders in Massachusetts,[2] that was constructed by the Research and Training Institute, Gerontological Research Division of the Hebrew Rehabilitation Center For Aged (HRCA).[3] This sample, referred to as the traditional community residence sample, included data for 1982, 1984, 1986, and 1987. To match the period covered by this study, a 12-month exposure period encompassed by the 1986-87 data was selected. The Massachusetts and CCRC data-gathering instruments encompassed the same utilization elements; data gathering staff were subject to the same training protocols; and the same protocol was used for obtaining data from proxies when the respondent could not provide information because of a physical health or cognitive problem. Data for the CCRC sample were gathered through personal interviews; telephone interviews were used for gathering data for the Massachusetts sample. For both samples, telephone interviews were used to gather data from proxies for decedents. A small proportion of each sample (9 percent for the original CCRC sample and 4 percent of the original Massachusetts sample) refused to complete the followup survey. An additional 4.6 percent of the CCRC sample could not be located at followup.

The main study sample consisted of 1,666 CCRC and 1,379 traditional community residents. For the last-year-of-life sample, the necessary follow-up data were obtained for 364 CCRC residents and 464 traditional community residents. (The overall death rates for both samples were comparable—6.4 percent for the CCRC sample and 7.3 percent for the Massachusetts sample.) To assess impact across a uniform-sized cohort, and to preserve all the available degrees of freedom for the statistical analyses, the two cohorts in the sample were weighted to an *N* of 1,552 and 414, respectively.

Service Utilization and Cost Data

Medicare identification numbers were solicited from the sample members, and

[2]The sample was stratified on two criteria: geography and respondent age. Twenty-seven geographic locations were used representing each of the State's home care corporation regions. Two age categories were used: under 75 years of age, and 75 years of age or over.

[3]The cost of gathering a special comparison sample would have been prohibitive. There were no existing data sets that were directly comparable with the four States represented in the CCRC sample. The Massachusetts sample was selected as its contents, methods of data collection, and recall period closely resembled the data collected for the CCRC sample.

utilization and expenditure data were derived from the Health Care Financing Administration's (HCFA) Medicare Automated Data Retrieval System (MADRS) Part A - Part B skeleton file. In generating the hospital payment variable, adjustments to the initial payment and payments for direct and indirect medical education costs, capital costs, bad debts, and having a disproportionate share of indigent patients were included with the basic payment for care. Specific utilization data (admissions, length of stay, and visits) were available only for services covered by Part A. Payment data only were available for services covered by Part B (ambulatory medical care).

Detailed self-reported data on socioeconomic status, functional status, and medical care utilization were also gathered in the sample surveys by HRCA. All self-reported hospital and nursing home admission and length-of-stay information were validated through direct contact with the facility that was used. This information was used to proxy for missing data, and to adjust the utilization and expenditure profiles for exogenous factors. For individuals in the death sample, the self-reported data were gathered from proxy respondents. Sixty-eight percent of the proxy respondents for the CCRC group and 74 percent of the proxy respondents for the traditional community residence group were either spouses, daughters, sons, daughters-in-law, or sons-in-law. Five percent of the proxy respondents in each cohort were either friends, neighbors, or formal care providers. The balance were other relatives.

Imputing Missing Data

For the main impact analysis, Medicare identification numbers could not be obtained for 41 CCRC residents (2.5 percent of the actual cohort) and for 339 traditional community residents (24.6 percent of the actual cohort). Statistical techniques were used to predict which of these individuals would use care, and for those predicted to use care, how much care they would use. Two adjustments were also made to the MADRS physician utilization data to correct for suspected data misclassification and under-reporting. The proxying process and data adjustments are detailed in a Technical Note at the end of the article.

Medicare identification numbers could only be obtained for 87 CCRC residents in the last-year-of-life sample (24 percent of the CCRC death sample). Consequently, self-reported medical care utilization data and constant dollar shadow prices were used for both the CCRC and the traditional community residence cohorts for this part of the analysis. Average hospital payments per admission, derived from the available MADRS data for the CCRC and non-CCRC cohorts in this sample, and State-specific 1986 Medicaid per diem nursing home rates were used to monetize self-reported utilization. Use of home health care and physician care were not available from the self-reported data and, therefore, were not included in this aspect of the analysis. Furthermore, no attempt was made (in the death sample) to exclude nursing home use not covered by Medicare.

Adjusting for Exogenous Factors

Utilization and expenditure profiles were adjusted to net out the effect of personal characteristics, geographic resource availability, and cost differences unique to each of the sample cohorts.

The personal characteristic variables selected for use in the main impact analysis (based on findings from other aspects of this project [Sherwood et al., 1992] which indicated that they differentiated between the two cohorts) were: age, sex, number of children living nearby, income level, years of schooling, number of limiting medical conditions, ability to do shopping and errands, whether a spouse provided help or could be relied on to provide help, and whether the person lived alone. For the last-year-of-life analysis, the variables were age, sex, orientation (12 months before death), and ability to do personal grooming.

To further control for individual's health status and propensity to use medical care, a variable indicating self-reported use of that service in the year before the baseline date was also used in the main impact analysis. Medical care utilization levels are fairly consistent over time (Densen, Shapiro, and Einhorn, 1959; McCall and Wai, 1983; Anderson and Knickman, 1984; Mossey and Shapiro, 1985), suggesting that pre-measures are a good health status proxy. Because a direct premeasure for inpatient physician care and home health care was not available, inpatient hospital use was used as a proxy for inpatient physician care, and the amount of (self-reported) personal care a person could do on his or her own was used as the proxy for home health care. For the last-year-of-life analysis, a variable was used indicating whether the person was in a community or institutional setting 12 months prior to death.

Selected county-level data were abstracted from the 1986 area resource file (ARF) (Health Resources and Services Administration, 1986) and were used to control for resource availability and, in the case of physician care, also for area-specific charge levels. The ARF variables selected as potential covariates for each resource utilization area were per capita income (all services), number of physicians per 1,000 population (hospital care, home health care, and physician visits), inpatient beds per 1,000 population (hospital and nursing home care), hospital occupancy rate for medical-surgical beds (hospital, nursing home, and home health care), and the prevailing charge index for generalists and specialists combined (physician care). Total nursing home beds per 1,000 population over 65 years of age was also considered for the nursing home care variables but was dropped as its use totally defined the sample.

The Statistical Package for the Social Science's MANOVA (a generalized multivariate analysis of variance and covariance) program was used to generate the adjusted variable values that follow. (Standard deviations are not generated by this program and therefore do not appear in the tables for the adjusted means.) Logistic regressions were also run to derive predicted values for the "any use" variables and thus check the accuracy of the MANOVA values which do not embody a logistic regression specification. The adjusted values generated by this process were comparable with those generated by the MANOVAs, and are not reported here. Given the very small number of people utilizing Medicare-covered nursing home care, and as a result the limited degrees of freedom, all the potential personal characteristic, ARF, and health premeasure variables could not be used as covariates in the MANOVA runs for nursing home care in the main impact analysis. A two-step process was used to select the two most important covariates,

which were then entered into the MANOVAs. First, for each aspect of nursing home care a zero-order correlation matrix was generated, and the variable with the highest correlation was selected. Second, a partial correlation matrix was generated controlling for the variable that was just selected, and the variable with the highest correlation in this set was selected, yielding two covariates for inclusion in the MANOVAs.

Data Presentation

Unadjusted and adjusted service use and expenditure data are reported for both utilizers and for the entire study cohorts. The utilizer data reflect only the experience of sample members who used that type of care. The cohort profiles also include those individuals with no service utilization in the denominators. Although the utilizer profiles are of interest from a medical care utilization perspective, the results presented in the cohort columns form the basis for assessing overall economic impact.

Expenditure data used in the main impact analysis spanned a multiyear period. All expenditures were converted to base year (1985-86) levels through the use of a 6-percent discount rate. Three alternate rates—4 percent, 8 percent, and 10 percent—were used to assess the sensitivity of the findings to the selection of a particular discount rate. The use of constant dollar shadow prices in the last-year-of-life analysis obviated the need for discounting in this aspect of the study.

FINDINGS

Characteristics of the Study Samples

From a sociodemographic perspective, significant differences exist between the

Table 1

Characteristics of the Study Samples

Characteristic	Main Impact Analysis		Death Sample	
	CCRC	Community	CCRC	Community
Total Number	1,552	1,552	414	414
Age	81.8 (5.6)	*77.8 (5.9)	84.5 (6.3)	84.5 (6.3)
Female	75.0 (43.3)	*60.7 (48.9)	68.4 (46.5)	**60.9 (48.9)
Married	40.2 (49.0)	41.4 (49.3)	—	—
Income Less Than $20,000	22.3 (41.7)	*66.9 (47.1)	—	—
Education: High School Graduate	89.7 (30.4)	*46.1 (50.0)	84.2 (36.5)	*43.3 (49.6)
Health Conditions (1 or More Limiting Conditions)	44.1 (49.7)	*39.6 (48.9)	—	—
ADL Limitations (1 or More)	8.9 (28.5)	**11.5 (31.9)	—	—
IADL Limitations (1 or More)	58.1 (49.3)	*47.8 (50.0)	—	—

*Statistically significant at $p \leq .01$.
**Statistically significant at $p \leq .05$.

NOTES: Numbers in parentheses are standard deviations. ADL is activities of daily living. IADL is instrumental ADLs. CCRC is continuing care retirement communities.

SOURCE: Hebrew Rehabilitation Center for Aged: Data from the Research and Training Institute, Gerontological Research Division.

CCRC and traditional community residence cohorts that constitute the main impact analysis. As can be seen from the data presented in Table 1, the CCRC cohort was older, had a higher representation of females, had higher income levels and educational attainment, had more individuals with limiting health conditions, and had more people with instrumental activity of daily living (IADL) limitations. However, its members had fewer ADL limitations. (Areas encompassed by the ADL measure are bathing, dressing, medications management, personal care, and transferring. The tasks included in the IADL measure are chores, light housekeeping, meal preparation, shopping and small errands, and transportation.) Only limited socio-demographic data were available for members of the death sample. These data indicate that differences also existed between both of the study cohorts.

Main Impact Analysis

Hospital Care

Approximately 18 percent of both cohorts reported some use of hospital care during the 12-month study period, as can be seen from the data in Table 2. Of those who had a hospital admission (i.e., utilizers), individuals in the traditional community residence group had a greater number of admissions per year than those in the CCRC group (1.70 versus 1.43; $p < .05$). Individuals in the traditional community residence group with a hospitalization also reported more days in the hospital during the study year than those in the CCRC group (16 versus 12; $p = .12$). Because of the greater number of admissions per year, average Medicare payments (cost) per utilizer were higher in the traditional community residency group than in the CCRC group ($8,200

Table 2

Continuing Care Retirement Communities (CCRC) Versus Community Residence Samples: Medicare-Covered Hospital Utilization Profiles

	Utilizers		Cohort	
Variable	CCRC	Community	CCRC	Community
Total Number	270	306	1,552	1,552
Unadjusted Values				
Any Hospital Care (Percent)	—	—	17.42	19.68
			(37.90)	(39.80)
Average Number of Admissions	1.44	*1.68	0.25	*0.33
	(0.74)	(0.99)	(0.63)	(0.80)
Average Number of Covered Days	10.89	*17.34	1.90	*3.41
	(9.85)	(21.28)	(5.82)	(11.68)
Average Medicare Payment (Cost)	$6,858	**$8,208	$1,194	*$1,616
	(6,230)	(7,222)	(3,675)	(4,571)
Average Payment per Admission	$4,631	$4,675	—	—
	(3,199)	(3,184)		
Adjusted Values				
Any Hospital Care (Percent)	—	—	18.28	18.78
Average Number of Admissions	1.43	**1.70	0.26	0.32
Average Number of Covered Days	12.20	16.06	2.33	2.98
Average Medicare Payment	$6,882	$8,200	$1,277	$1,533
Average Payment per Admission	$4,873	$4,418	—	—

*Differences statistically significant at $p \leq .01$.
**Differences statistically significant at $p \leq .05$.

NOTE: Numbers in parentheses are standard deviations.

SOURCE: Hebrew Rehabilitation Center for Aged: Data from the Research and Training Institute, Gerontological Research Division.

versus $6,882) although this difference fails to attain statistical significance ($p = .18$). Average cost per admission for both groups was in the $4,000 - $4,900 range.

When viewed from the perspective of the entire cohort, fairly comparable hospital admissions per year (0.32 versus 0.26; $p = .17$) and covered day (3 versus 2.3; $p = .23$) profiles emerge. Although a 20-percent differential emerged with regard to average annual Medicare expenditures ($1,533 versus $1,277), this difference is not statistically significant even at a relaxed threshold of $p = .10$.

Nursing Home Care

Very few people in either cohort used Medicare-approved nursing home care during the 12-month study period. (The nursing homes in 5 of the 19 CCRCs were not Medicare-certified. None of the 374 residents of these facilities included in this study had any Medicare-covered nursing home admissions. A review of their self-reported data uncovered two nursing home admissions among this group. The nature of these admissions are not known. Their exclusion from the analysis reported here does not affect the overall direction of the findings reported in this section.) As seen in Table 3, only 1.3 percent of the CCRC group and 0.4 percent of the traditional community residency group ($p < .01$) reported any use of Medicare-covered nursing home care. For those who did use nursing home care in each group (i.e., the utilizers), no statistically significant differences emerged at $p = .05$ or lower. The average number of admissions was slightly more than 1, and the average number of Medicare-covered nursing home days was in the 19-40 day range. Average expenditure per admission appears much lower in the CCRC group ($1,309 versus $3,139, $p = .06$).

Table 3

Continuing Care Retirement Communities (CCRC) Versus Community Residence Samples: Medicare-Covered Nursing Home Utilization Profiles

	Utilizers		Cohort	
Variable	CCRC	Community	CCRC	Community
Total Number	23	3	1,552	1,552
Unadjusted Values				
Any Nursing Home Care (Percent)	—	—	1.50	*0.18
			(12.20)	(4.30)
Average Number of Admissions	1.32	**1.00	0.02	*0.002
	(0.63)	(0.00)	(0.17)	(0.04)
Average Number of Covered Days	28.60	29.61	0.43	*0.05
	(22.97)	(30.91)	(4.43)	(1.65)
Average Medicare Payment (Cost)	$1,610	$3,135	$24	**$6
	(794)	(4,116)	(218)	(194)
Average Payment per Admission	$1,313	$3,135	—	—
	(698)	(4,116)		
Adjusted Values				
Any Nursing Home Care (Percent)	—	—	1.31	*0.37
Average Number of Admissions	1.20	1.12	0.02	*0.001
Average Number of Covered Days	39.68	18.53	0.47	*0.01
Average Medicare Payment	$1,844	$2,901	$27	*$3
Average Payment per Admission	$1,309	$3,139	—	—

*Differences statistically significant at $p \leq .01$.
**Differences statistically significant at $p \leq .05$.

NOTE: Numbers in parentheses are standard deviations.

SOURCE: Hebrew Rehabilitation Center for Aged: Data from the Research and Training Institute, Gerontological Research Division.

However, during the entire 12-month exposure period, average total expenditures were not significantly different ($1,844 versus $2,901, $p = .25$).

Viewed from the perspective of the entire cohort, a large difference in nursing-home utilization emerges, even though a comparable difference did not emerge with regard to hospital use. Individuals in the CCRC group, in addition to having more people with a Medicare-covered nursing home stay than the traditional community residence group, also had, on average, more admissions during the year (0.02 versus 0.001, $p < .01$) and more Medicare-covered days (0.47 versus 0.01, $p < .01$). Medicare payments per cohort member were also higher for the CCRC group ($27 versus $3, $p < .01$).

Home Health Care

Eighty-eight people in the traditional community residence cohort and 23 people in the CCRC group received Medicare-covered home health care ($p < .01$). No statistically significant difference was noted among those who used this service in annual number of visits (approximately 20) or average Medicare payments (approximately $800) (Table 4). Average payment per visit, however, was higher in the CCRC group ($45 versus $37, $p < .05$).

On a cohort-wide basis, only one significant difference emerges: the overall use rate previously noted. Despite the relatively high differential in the average number of visits (0.33 versus 0.93) and the average payments ($13 versus $35), these differentials lack statistical significance at conventional levels. (Their p values are 0.09 and 0.12, respectively).

Physician Care

Average annual payments for inpatient physician care among those who had a hospital stay was in the $1,200 - $1,290 range for both groups. When these costs are spread over the entire cohort, the average expenditure for physician inpatient care was in the $220 - $237 range (Table 5).

Table 4

Continuing Care Retirement Communities (CCRC) Versus Community Residence Samples: Medicare-Covered Home Health Care Utilization Profiles

	Utilizers		Cohort	
Variable	CCRC	Community	CCRC	Community
Total Number	23	88	1,552	1,552
Unadjusted Values				
Any Home Health Care (Percent)	—	—	1.50	*5.68
			(12.20)	(23.20)
Average Number of Visits	25.48	15.47	0.38	**0.88
	(45.08)	(21.34)	(6.23)	(6.20)
Average Medicare Payment (Cost)	$1,044	$562	$16	$32
	(1,790)	(880)	(249)	(246)
Average Payment per Visit	$44	*$38	—	—
	(8)	(10)		
Adjusted Values				
Any Home Health Care (Percent)	—	—	1.69	*5.51
Average Number of Visits	19.23	21.76	0.33	0.93
Average Medicare Payment	$774	$833	$13	$35
Average Payment per Visit	$45	**$37	—	—

*Differences statistically significant at $p \leq .01$.
**Differences statistically significant at $p \leq .05$.

NOTE: Numbers in parentheses are standard deviations.

SOURCE: Hebrew Rehabilitation Center for Aged: Data from the Research and Training Institute, Gerontological Research Division.

A significant difference emerges for physician care rendered in a nursing home setting. Two hundred and seventy-three members of the CCRC group had bills for such care compared with only 29 people in the traditional community residence sample ($p < .01$). (An even larger differential emerges when one uses the adjusted data. However, these values must be used with caution because of their derivation, which is described in a footnote to Table 5.) Average Medicare payments for physician care rendered in a nursing home were much higher for the 29 people in the community group using such care than for the 273 people in the CCRC group ($275 versus $117, $p < .01$). However, when these payments are averaged over the entire cohort, a $46 versus $5 profile ($p < .01$) emerges in favor of the traditional community residence group.

Ninety-seven percent of the CCRC cohort and 85 percent of the traditional community residence cohort had physician bills for ambulatory medical care

Table 5

Continuing Care Retirement Communities (CCRC) Versus Community Residence Samples: Medicare-Covered Physician Care Utilization Profiles

	Utilizers		Cohort	
Variable	CCRC	Community	CCRC	Community
Unadjusted Values				
In Hospital:				
Total Number	270	306	1,552	1,552
Percent with Bills	—	—	17.42	19.68
			(37.90)	(39.80)
Average Payment	$1,412	*$1,073	$246	$211
	(1,572)	(1,015)	(846)	(620)
In Nursing Home:				
Total Number	273	29	1,552	1,552
Percent with Bills	—	—	17.60	*1.87
			(38.10)	(13.60)
Average Payment	$111	$280	$20	*$5
	(112)	(675)	(63)	(98)
Ambulatory Medical Care:				
Total Number	1,536	1,285	1,552	1,552
Percent with Bills	—	—	98.98	*82.81
			(10.10)	(37.70)
Average Payment	$332	*$466	$328	**$386
	(491)	(819)	(489)	(766)
Adjusted Values				
In Hospital:				
Percent with Bills	—	—	17.94	19.13
Average Payment	$1,202	$1,288	$221	$237
In Nursing Home:				
Percent with Bills	—	—	19.71	[1]*1.87
Average Payment	$117	*$275	$46	[1]*$5
Ambulatory Medical Care:				
Percent with Bills	—	—	97.10	*84.67
Average Payment	$297	*$501	$284	*$430

*Differences statistically significant at $p \leq .01$.

**Differences statistically significant at $p \leq .05$.

[1]In any instance (i.e., average payment and percent of bills for the nursing home category) where either of the two adjusted means were computed by the MANOVA program to be less than zero, the negative adjusted mean was replaced with the original (unadjusted) mean and the second adjusted mean was estimated by adding to it the difference between the two adjusted means.

NOTE: Numbers in parentheses are standard deviations.

SOURCE: Hebrew Rehabilitation Center for Aged: Data from the Research and Training Institute, Gerontological Research Division.

($p < .01$). For those with such bills, average annual payments were $297 for the CCRC group and $501 for the traditional community residence group ($p < .01$). At the cohort-wide level, annual expenditures were $284 and $430 for the CCRC and traditional community residence cohorts ($p < .01$).

All Medicare-Covered Services

Ninety-six percent of the CCRC group and 86 percent of the traditional community residence group ($p < .01$) used at least one Medicare-covered service during the 12-month study (Table 6). Among the utilizers, average annual Medicare expenditures were $1,936 in the CCRC group and $2,625 in the traditional community residence group ($p = .05$). When this utilization is spread over the entire cohort, the resulting averages are $1,772 and $2,312, a differential that attains statistical significance only at a relaxed threshold of $p = .09$. Within the CCRC sector, no significant differences emerged when the data were disaggregated into the four geographic regions from which the CCRC sample was drawn.

Use of a 4-percent, 8-percent, or 10-percent discount rate has a minimal effect on the findings. Only at a 10-percent discount rate does the difference noted for the utilizer groups fail to attain significance at the conventional threshold of $p = .05$. At the cohort level, use of a 4-percent or 8-percent discount rate leads to a significant finding only at a relaxed threshold of $p = .08$ and $p = .10$, respectively.

Table 6

Continuing Care Retirement Communities (CCRC) Versus Community Residence Samples: Total Medicare Expenditures

Variable	Utilizers		Cohort	
	CCRC	Community	CCRC	Community
Total Number	1,536	1,291	1,552	1,552
Unadjusted Values				
Any Utilization (Percent)	—	—	98.98	*83.15
			(10.10)	(37.40)
Average Expenditure	$1,847	*$2,712	$1,828	**$2,256
(6 Percent Discounting)	(4,635)	(5,851)	(4,615)	(5,430)
Average Expenditure	$1,864	*$2,779	$1,845	**$2,311
(4 Percent Discounting)	(4,677)	(5,993)	(4,656)	(5,562)
Average Expenditure	$1,831	*$2,649	$1,812	**$2,203
(8 Percent Discounting)	(4,595)	(5,714)	(4,575)	(5,304)
Average Expenditure	$1,815	*$2,589	$1,796	$2,153
(10 Percent Discounting)	(4,557)	(5,584)	(4,537)	(5,183)
Adjusted Values				
Any Utilization (Percent)	—	—	95.92	*86.18
Average Expenditure (6 Percent Discounting)	$1,936	**$2,625	$1,772	$2,312
Average Expenditure (4 Percent Discounting)	$1,958	**$2,686	$1,791	$2,365
Average Expenditure (8 Percent Discounting)	$1,914	**$2,567	$1,753	$2,262
Average Expenditure (10 Percent Discounting)	$1,893	$2,512	$1,736	$2,214

*Differences statistically significant at $p \leq .01$.
**Differences statistically significant at $p \leq .05$.

NOTE: Numbers in parentheses are standard deviations.

SOURCE: Hebrew Rehabilitation Center for Aged: Data from the Research and Training Institute, Gerontological Research Division.

Institutional Care in the Last Year of Life

Hospital Care

As reported in Table 7, a greater proportion of the traditional community residence group than of the CCRC group used hospital care in their last year of life (78 percent versus 52 percent, $p < .01$). Although those using hospital care in the traditional community residence group appeared to have, on average, more admissions during this period (1.81 versus 1.47), longer stays (35 versus 20 days), and higher estimated expenditures for care ($8,997 versus $7,910), none of these differences are statistically significant at conventional levels. However, when this utilization is viewed from a cohort perspective, statistically significant differences favoring the CCRC group emerge. As a group, they had fewer admissions in the study year (0.75 versus 1.41, $p < .01$), fewer days of care (10 versus 26, $p < .01$), and lower estimated average expenditures ($3,854 versus $7,268, $p < .01$).

Nursing Home Care

A different pattern was noted for the use of nursing home care. More people in the CCRC group than in the traditional community residence group were in a (skilled nursing or intermediate care) nursing home during their last year of life (66 percent versus 36 percent, $p < .01$). Although no statistically significant differences emerged with regard to either the amount or the estimated expenditures for nursing home care among those who used this type of care, significant cohort level differences emerged. On average, CCRC residents used 118 days of nursing home care compared with 69 days for those in the traditional community residence group ($p < .01$). Expenditures for nursing home care were also higher in the CCRC group—$5,565 versus $3,533 ($p < .01$).

All Institutional Care

Aggregating across both types of institutional care indicates that about 85 percent of each group used some institutional care in their last year of life. Although CCRC residents used more total days of care (128 versus 96, $p < .01$) they generated lower cohort-wide aggregate expenditures ($9,485 versus $10,746, $p < .01$).

SUMMARY AND DISCUSSION

The data presented in this study indicate that for an average year at the cohort-wide level, living in a CCRC is not associated with significantly lower annual expenditures for medical care services that are covered by Medicare. Although the CCRC cohort incurred about $540 less in annual expenditures than the traditional community residence cohort ($1,772 versus $2,312), this difference is not statistically significant at even a relaxed threshold of $p = .10$. Submerged within this overall finding are two others worthy of note. A larger percent of the CCRC cohort reported use of medical care services during the 12-month impact period (96 percent versus 86 percent, $p < .01$). However, for those with any utilization, individuals living in a CCRC had, on average, lower expenditure profiles ($1,936 versus $2,623, $p < .05$). The net effect of these two findings is overall cohort-wide patterns that were not significantly different.

In both settings, inpatient hospital care accounted for about 70 percent of total

expenditures. Very few sample members in either setting used Medicare-covered skilled nursing home or home health care. Both of these services combined accounted for less than 2 percent of overall annual expenditures. Statistically significant expenditure differences at the cohort level were noted for only one of these services—skilled nursing home care. More individuals residing in CCRCs used this service than people living in traditional community settings (1.2 percent versus 0.3 percent) and had higher average annual costs ($27 versus $3). Similar

Table 7

Continuing Care Retirement Communities (CCRC) Versus Community Residence Samples: Self-Reported Utilization and Expenditures for Institutional Care in the Year Prior to Death

	Utilizers		Cohort	
Variable	CCRC	Community	CCRC	Community
Unadjusted Values				
Hospital Care:				
Total Number	237	321	414	414
Percent with Use	—	—	57.14	*77.63
			(49.50)	(41.70)
Average Number of Admissions	1.52	*1.85	0.87	*1.43
	(0.90)	(1.11)	(1.01)	(1.25)
Average Number of Days	18.29	*31.65	10.45	*26.14
	(32.29)	(38.72)	(26.01)	(42.80)
Average Payment	$7,791	*$9,375	$4,566	*$7,278
	(4,692)	(5,653)	(5,313)	(6,332)
Nursing Home Care:				
Total Number	266	145	414	414
Percent with Uses	—	—	64.29	*35.05
			(48.00)	(47.80)
Average Number of Days	176.06	190.64	113.18	*66.83
	(148.84)	(142.99)	(146.14)	(124.21)
Average Payment	$8,289	**$9,710	$5,329	*$3,404
	(7,008)	(7,282)	(6,880)	(6,326)
Total Institutional Care:				
Total Number	353	347	414	414
Percent with Use	—	—	85.71	84.30
			(35.00)	(36.40)
Average Number of Days	145.17	*110.84	123.63	*92.97
	(147.97)	(133.77)	(145.97)	(129.11)
Average Payment	$11,584	**$12,684	$9,895	$10,682
	(7,105)	(7,476)	(7,717)	(8,244)
Adjusted Values				
Hospital Care:				
Percent with Use	—	—	51.84	*77.85
Average Number of Admissions	1.47	1.81	0.75	*1.41
Average Number of Days	19.52	34.61	9.76	*26.31
Average Payment	$7,910	$8,997	$3,854	*$7,268
Nursing Home Care:				
Percent with Use	—	—	65.89	*36.42
Average Number of Days	181.07	189.68	118.01	*69.40
Average Payment	$8,526	$9,669	$5,565	*$3,533
Total Institutional Care:				
Percent with Use	—	—	83.72	85.47
Average Number of Days	150.96	**113.33	127.83	*95.69
Average Payment	$11,495	*$12,490	$9,485	*$10,746

*Differences statistically significant at $p \leq .01$.
**Differences statistically significant at $p \leq .05$.

NOTE: Numbers in parentheses are standard deviations.

SOURCE: Hebrew Rehabilitation Center for Aged: Data from the Research and Training Institute, Gerontological Research Division.

findings with regard to nursing home care were reported by Cohen (1988) and Cohen, Tell, and Bishop (1988).

CCRC residents had higher annual cohort-wide expenditures for physician care rendered within a nursing home setting ($46 versus $5), but lower expenditures for ambulatory physician care ($284 versus $430). Expenditures for physician care rendered in a hospital did not differ across settings.

In the aggregate, Medicare-related expenditure and service utilization profiles reported here generally conform to national patterns. At the specific service level, however, a few notable differences do emerge. During the impact period covered by this study (1986-87) average Medicare expenditures per enrollee were $2,491 (Helbing, Latta, and Keene 1991)[4] Our estimates reported in Table 6 for the traditional community residence sample are a bit lower, but not all Medicare-covered services were included in this study. CCRC residents had a lower expenditure profile, a pattern consistent with that noted in this study. With regard to the use of inpatient hospital care, the national average number of admissions per enrollee was 0.31. Average payment per admission was $4,262, and average payment per enrollee was $1,310 (Latta and Keene, 1990). With the exception of the CCRC hospital admission rate which was lower, the remaining hospital utilization patterns reported in Table 2 for both the CCRC and the traditional community residence cohorts were in line with the national data. Similarly, payments for physician care in both study cohorts resembled the national level of about $600 per year (Helbing, Latta, and Keene, 1991).

Nationally, about 1 percent of all Medicare enrollees used Medicare-covered skilled nursing care in 1986-87. Those using this type of care had an average stay of 26.1 days, and average payments for this stay of $2,019. On a per enrollee basis, the number of covered days was 0.26, and average payments for care were $20.35 (Silverman, 1991). CCRC residents had a slightly higher utilization rate, used more days of care, but reported lower payments. Members of our traditional community residence sample had a much lower utilization rate, used fewer days of care, but had higher costs (Table 3). A different pattern emerges with regard to Medicare-covered home health care. Unpublished HCFA data indicate that about 5 percent of all enrollees used this care; they had about 24 visits per year, and generated total payments of $1,119. Use of this type of care by members of the traditional community residence group generally conformed to this national pattern. A much lower utilization profile existed within our CCRC cohort (Table 4).

In assessing the service utilization and expenditure findings reported in this study, one must remember that the scope of the analysis was limited to services and expenditures relevant to Medicare. The impact of CCRC living on non-Medicare-covered nursing home and home health care, and on the use of both formal and informal community-based social services remains to be explored. Similarly, out-of-pocket payments to cover deductibles, copayments, and fees that exceeded Medicare's customary, prevailing, and reasonable threshold were not in-

[4]Data presented in Helbing, Latta, and Keene (1991) reflect total Medicare program expenditures. Separate data for the aged and disabled populations were not reported. Unpublished average Medicare enrollment data, provided by HCFA staff for 1986-87, was 32,080,456. This statistic was used to calculate expenditures per enrollee.

cluded in the current analysis. It is possible that when the analysis is broadened to encompass these types of care and out-of-pocket payments, a different overall finding may emerge.

Two attributes of the data sets used in this study must be recognized. First, the comparison sample was drawn from one State—Massachusetts. Given the known regional variation in medical care utilization, one can question whether this selection exerted an independent impact on the study's findings. As previously noted, the total Medicare expenditure profile for the community (Massachusetts) sample was fairly comparable with national norm. The same applies for the hospital care and home health care expenditure patterns. However, this was not the case for nursing home care. Given the very low use of Medicare-covered nursing home care in both study cohorts, it is doubtful that any significant bias was introduced into the study through the use of the Massachusetts data set as our comparison group.

One must also recognize that the CCRC and traditional community residence cohorts were not comparable with regard to sociodemographic, health, and functional status. The CCRC group was better educated, wealthier, and healthier. The covariance adjusted measures sought to control for these (and supply-related) factors. One can question whether the full effect of these factors has been accounted for.

The analysis focusing on the last year of life, which is based on self-reported data collected from proxies, indicates that living in a CCRC is associated with lower expenditures for hospital care but higher expenditures for all nursing home care during this period of time. When both types of institutional care are combined into a total institutional use category, the CCRC cohort displays lower total expenditures. While recognizing the origin of the data used in this aspect of the study, the results do support a hypothesis that residence in a CCRC generates overall medical care cost savings during a person's last year of life. The primary source of these savings would be lower expenditures for hospital care, a service that accounts for the bulk of Medicare expenditures. Even though CCRC residents used more (Medicare-covered or non-Medicare-covered) nursing home care during the last year of life, the savings repeated from a lesser use of hospital care still appear to be large enough to generate overall savings. Had we been able to exclude non-Medicare-covered nursing home use from this aspect of the study, the estimated savings may have been much larger.

Additional research is clearly needed to test this hypothesis, and to extend the scope of the analysis to encompass physician care and home care. Given the fact that hospital costs drive the system, there is no reason to predict that broadening the scope of the analysis to include non-institutional care should dramatically reverse the Medicare-relevant profiles presented here.

The research reported here is just a first step in deepening our understanding of the CCRC industry. The retirement community industry has continued to evolve, and new entities embodying modifications of the traditional CCRC financing mechanism have emerged. Furthermore, the impact of CCRC living on the use of non-Medicare covered long-term care services still remains to be explored. Additional research is clearly called for to ex-

pand our knowledge of this innovative long-term care service and financing mechanism.

TECHNICAL NOTE

Proxying for Cases Without MADRS Data

A two-step process was used to impute hospital and home health care use where data were missing for members in the traditional community residence sample whose Medicare identification numbers could not be obtained. First, a discriminant analysis was conducted using the self-report data to predict whether a person would have used a particular service or not, based on his or her sociodemographic, functional, and health status. For those predicted to be users who did not have MADRS data, utilization was imputed by applying the ratio of MADRS to self-reported use (for those with both data) to the self-reported use of those with no MADRS data. Expenditures were then proxied by using the average Medicare payment per service for individuals with MADRS data who, based on the discriminant analysis, were predicted to be users of that type of care, to the imputed utilization level.

A modification of this process was used for imputing expenditure data for physician care. A MADRS to self-reported use ratio could not be calculated for inpatient physician care, because the self-reported data did not include such information. Therefore, the average expenditure for those with MADRS data was used. For ambulatory care, a MADRS payment per self-reported visit was calculated for those who, based on the discriminant analysis, were predicted to use this type of care. This statistic was then multiplied by the number of self-reported visits for those without MADRS data who were predicted to use ambulatory physician care.

Because only 34 CCRC sample members had no MADRS data, and because the self-reported usage for these people was close to the expected use derived from data on the 1,345 sample members with MADRS data, a discriminant analysis to predict users was not used here. Rather, the MADRS to self-reported rates were used to impute their usage. Expenditures were proxied based on averages derived from the MADRS data for those who used care.

Medicare-covered nursing home care for both samples was imputed by a different method because the self-report data did not indicate whether the stay was for skilled nursing care or was covered by Medicare. It was assumed that all stays of 30 days or fewer were for medical recuperative purposes and hence covered by Medicare. Data from the MADRS file were used to calculate a per diem payment for Medicare-covered nursing home care and that rate was applied to these imputed days of care. Medicare expenditures for physician care rendered to people in nursing homes was proxied by first calculating the average physician payment for care rendered in a nursing home per Medicare-covered nursing home day for each sample member with MADRS data. This value was then multiplied by the self-reported number of nursing home days.

Adjusting the MADRS Physician Data

An initial examination of the data indicated that 76 people in the CCRC sample and 37 people in the Massachusetts sample had bills for inpatient physician care,

but no data within a 3-month period encompassing that bill for an inpatient hospital stay. Assuming that this discrepancy resulted from a coding error as to the site of care, all physician inpatient care bills which could not be matched with a hospital stay were considered to be for ambulatory medical care.

MADRS data on the utilization of physician care indicated that only 54 percent of the traditional community residence (Massachusetts) sample, and 71 percent for the CCRC sample used any physician care in the 1-year study period.[5] Self-reported physician use for these groups was 77 percent and 95 percent. Data reported in the literature indicate that about 80 percent of the community-residing elderly have at least one physician contact per year (Wilensky and Bernstein, 1983; U.S. Senate, 1988). Consequently, physician utilization and expenditures were imputed for this suspected underreporting. For those cases with self-reported data and no MADRS physician utilization data, average MADRS annual expenditure levels for ambulatory medical care were used as proxies for the presumed missing MADRS data.

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[5]The method used for proxying for missing data is not responsible for the low MADRS utilization statistics. The utilization rate for the Massachusetts sample with actual MADRS data was only 56 percent.

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