

**Evaluation of the
Program of All-
Inclusive Care for
the Elderly (PACE)
Demonstration**

**Determinants of
Enrollment Among
Applicants to the
PACE Program**

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I. Introduction

The Program of All-Inclusive Care for the Elderly (PACE) is an innovative demonstration that provides long-term care services to frail elders in a day care setting. The PACE approach was conceived and refined at On Lok, an organization in the Chinese community of San Francisco. This program attempts to maintain and improve health by integrating a range of preventive, acute care, and long-term care services and providing these services in a day care setting. Costs are controlled under a capitated payment system. The anticipated benefits of program participation include the avoidance of the client's functional decline and use of more costly nursing home services. The distinguishing features of the PACE approach are:

- A clientele consisting of impaired and frail elders who, despite living at home, are nursing home eligible and likely to require custodial care for the rest of their lives.
- Provision of comprehensive medical and social services by a group of specialists (physicians, nurses, therapists, and social workers) working together as an inter-disciplinary team.
- The use of an adult day health center.
- Continued community residence for most participants.
- Capitation of Medicare and Medicaid reimbursements at a fixed amount per client; the PACE project faces the risk for the costs of participants' care, but is free of any service-by-service restrictions (Zimmerman et al., 1996).

As of June 30, 1997, enrollment in the PACE demonstration had reached 3,524 persons after seven years of operation in 11 sites. The Health Care Financing Administration (HCFA) awarded a contract to Abt Associates Inc. in 1991 (Contract 500-91-0027) to evaluate the PACE demonstration. In partial fulfillment of this contract, this paper evaluates the determinants of enrollment into the demonstration among applicants to the 11 PACE programs receiving Medicare and Medicaid capitated payments. The primary research question is to determine what factors drive applicants to actually enroll. In particular, what role does the applicant's health status play in his or her choice to take-up the program?

Because our data only include applicants to the programs in the demonstration, a complete investigation of selection effects is not feasible. To fully understand adverse selection we would need to determine the extent of differences between applicants to PACE and the eligible population, as well as the differences between PACE enrollees and applicants. We are able to discuss the later type of difference, but we have little evidence of the former type of difference.

Using data collected from applicants from January 1995 through the end of February 1997, the characteristics of applicants are described and where possible, compared to other samples of elderly described in the literature. The determinants of enrollment are initially explored through rates of

enrollment by applicant characteristic. Multivariate analysis is used to determine significant predictors of enrollment and to clarify the role played by health status.

Our findings indicate that:

- Using a qualitative comparison to other published research, it appears that PACE demonstration *applicants* disproportionately represent minority groups and have low educational attainment levels and income compared to samples of elders used in other studies of innovative health care programs.
- The only demographic characteristics significantly associated with the probability of enrollment are, gender, low educational attainment, and home ownership. While women and those with less than 12 years of education are more likely to enroll, homeowners are less likely to enroll. The large representation of minorities and low educational attainment levels combined with the influence of home ownership on the decision to enroll reflect programmatic incentives for low income elderly. Those not qualifying for Medicaid benefits face a site-specific sliding scale co-payment ranging from \$5 to \$3,000 per month. The size of the co-payment is dependent on the individual's income and assets.
- The role played by health status suggests that those with the lowest levels of health and incurring the largest Medicare expenditures are the least likely to enroll. PACE applicants dying within three months of the baseline interview have a significantly lower take-up rate. More importantly, those whose Medicare reimbursements during the six months prior to the interview fall in the highest quartile of reimbursements are significantly less likely to enroll compared to those in the lowest quartile. However, these are only suggestive findings because the former relationship between death and enrollment is likely to be overestimated and the latter relationship between reimbursements and enrollment does not take Medicaid reimbursements into account. Because 80 percent of applicants are Medicaid eligible at the time of the interview, the lack of Medicaid data in the study is a significant omission.
- An apparent contradiction to the preceding finding is that PACE appears to be attracting those individuals requiring greater assistance in the instrumental activities of daily living (IADLs). The number of dependencies in the activities of daily living (ADLs) is not found to be associated with enrollment. Enrollees have a significantly greater need for homemaking services compared to those applicants not enrolling, but are no more likely to need assistive care such as that provided by home health aides.
- Applicants with a history of attending senior day centers prior to their application to PACE are significantly more likely to enroll. Presumably these individuals are more likely to understand day center based care and view this system as an acceptable care alternative.
- An applicant's access to medical care also significantly influences the enrollment decision. Applicants reporting a usual physician are less likely to take-up the PACE program than otherwise. Also, those who are unwilling to change providers for one that offers

comprehensive services in one location have significantly lower enrollment rates compared to others. Recent unmet need is not found to influence the decision to enroll, however.

In the following section the literature describing enrollment into programs such as Medicare HMOs and Social HMOs is examined. The literature indicates that these programs have not been popular among elders and that elders in poor health are less likely to take-up these programs. Even though the PACE program targets a different segment of the elderly population, some of these findings may carry over to PACE. The only previous study of the PACE enrollment experience argues that this program is also not attracting those with the lowest levels of health (On Lok, 1993). But, the findings of this earlier work is questioned in this report. Section III describes the primary data used for our study. In section IV a series of tables documenting the characteristics of applicants and the rate of enrollment by applicant characteristic is presented. When possible these characteristics are related to what we already know about the general population of frail elders. Multivariate analysis of the decision to enroll is presented in section V. Our conclusions are discussed in section VI.

II. Review of the Literature¹

Literature describing the Medicare HMOs and Social HMOs indicates that enrollment into these programs has been limited. Evidence suggests that Medicare HMOs have experienced favorable selection in their enrollment, and the same is true for Social HMOs, although these later findings have been challenged. Currently little is known about the enrollment experience of the PACE program, although compared to nursing home residents, PACE enrollees are believed to have a higher level of functioning (On Lok, 1993). Using data gathered from applicants to the program we enhance this literature by describing the enrollment decision among applicants to the PACE program.

Enrollment in traditional Medicare HMOs and other prepaid health plans has increased substantially in recent years, but these enrollees still account for a small proportion of Medicare beneficiaries. In 1997, there were approximately 5.5 million, or 14 percent of Medicare beneficiaries enrolled in managed care plans, which was up from less than 0.5 million in 1985 (HCFA, 1997). Many elders have always obtained their health care in fee-for-service markets and they are likely to be reluctant to change during a period of life when utilization of health care services can be intensive. Many gatekeeping mechanisms used by managed care organizations may be unattractive to the elderly who are accustomed to the choice offered by fee-for-service. However, Schlesinger and Mechanic (1993) point out that from the consumer's perspective, capitated Medicare payments allow for increased flexibility in the mix of services available to a population such as the elderly – a population with wide ranging and diverse medical care needs.

The initial evaluations of the Medicare HMO enrollment experience point toward favorable selection biases. Brown et al. (1993) found that relative to fee-for-service Medicare beneficiaries, enrollment in Medicare HMOs was associated with better health, fewer dependencies in ADLs and IADLs, fewer reports of a family history of cancer, heart disease, or stroke, and a lower probability of death within nine

¹ Some material in this section represents a summary of a review by Wiener and Skaggs (1995).

months of the interview date. They also found that prior Medicare reimbursements were 23 percent lower for new HMO enrollees than nonenrollees. Riley et al. (1989) found that, low mortality, the variable they used to help determine health status, in HMO enrollees can initially be attributed to selection. HMOs may be under-enrolling individuals who are terminally ill because these patients are more reluctant to change their health care provider. More recent work by Morgan et al. (1997) finds that those more likely to enroll in HMOs are Medicare beneficiaries who use fewer services. Those who then disenroll from the HMO show higher service use than average. Because of the low usage by Medicare beneficiaries enrolled in HMOs and the high usage by beneficiaries who disenrolled, it is “difficult for the Medicare system to realize the anticipated cost savings from the HMO program.”

Social HMOs, which show evidence of some, although weaker, favorable selection, extend the concept of managed care by including a package of long-term care services. Under this model the plan is at financial risk to provide a full range of acute and long-term care benefits to Medicare beneficiaries who enroll in the program and pay a monthly premium for services. Enrollees receive all Medicare-covered acute, post acute, and ambulatory services, as well as supplemental benefits such as prescription drugs. For qualified beneficiaries, enrollees can also receive nursing home, home health care, homemaker, personal care, and adult day care services. The plans do not provide coverage for extended-stay nursing home care or long-term, intensive home care.

Social HMOs were designed to serve a cross-section of the elderly population with the goal of improving quality of care and life. Manton et al. (1993) argue that Social HMOs have attracted a favorable casemix. Their fee-for-service comparison group is a biased sample and they underestimate the extent of this relationship. Cost data indicated that the frailest and most disabled among the fee-for-service beneficiaries were disproportionately lost in their sampling process.

Because PACE enrollees are nursing home certified and more than three-quarters are dually-eligible, they have higher rates of impairment compared to the overall population of elders. Do PACE enrollees represent a general cross-section of the frail elderly population? The answer is not clear and only one study has attempted to document the extent of any differences. A comparison between PACE enrollees and a sample of elders in the 1985 National Nursing Home Survey suggests that PACE enrollees were less dependent in the ADLs (On Lok, 1993). A nursing home population, however, is not an ideal comparison group. Wiener and Skaggs (1995) suggest that there may be fundamental differences between PACE enrollees and nursing home residents, such as their motivation or ability to remain living in the community. Frail elders capable of attending a day health center may differ along several dimensions from those already in a nursing home. In addition, because disability is not a static condition, the PACE sample may show impacts of the demonstration; enrollees may have experienced better maintained or improved functional status due to the services offered by the PACE program. Consequently, one can not distinguish in this comparison between selection effects and impacts of the demonstration services.

The current paper addresses some of the limitations in the previous study of PACE enrollment. By using those applicants who do not enroll in PACE as a comparison group, we eliminate the problem of distinguishing between the characteristics of selection and impacts of PACE services. However, because we do not observe non-applicants and can not rigorously determine whether applicants generally

represent all frail elders, a complete study of the enrollment process and selection effects experienced by the program is not possible using these data. As a result, the current work is restricted to looking at the determinants of the enrollment within a sample of applicants.

III. The Data

A survey of PACE applicants at 10 PACE demonstration sites, and On Lok, began in early January 1995. The survey was administered as an in-person interview in the applicant's home shortly after the individual made an initial application to the local PACE site and the site had made an initial determination that the applicant was eligible. Thus, the sample used here is based solely on applicants to the PACE program.

Individuals who apply have been referred to the program through a variety of sources. The process of client intake usually begins with a telephone call regarding a potential client placed either by a referral agency or the family or by the caregiver. Some applicants are referred by providers such as acute care hospitals, home care agencies, clinics, and rehabilitation facilities. Others are referred by social service organizations. However, through time, referrals by friends, family, and word-of-mouth have become one of the most important referral sources for these programs (Zimmerman et al., 1996). When a PACE site receives a referral, staff at the PACE site call the potential client and/or family. If the referred person appears eligible and interested in the program, PACE staff conduct an initial in-home assessment (sometimes two), after which a medical release form may be signed and a center visit is scheduled. PACE eligibility standards require that the individual be at least 55 years of age; reside in the catchment area; be Medicare and Medicaid eligible, or be Medicare eligible and willing to pay the monthly costs of participation; be certified by the state as meeting the SNF/ICF level of care requirements; and have the potential to remain in the community with assistance. After the individual is determined to be eligible, and he or she is willing to consider enrollment into the program, the applicant is asked to participate in the applicant survey administered in the applicant's home.

In addition to general demographic information, the in-person applicant survey collected information on the following topics:

- Health: self-reported health status and presence of particular medical conditions;
- Vision, hearing, and cognitive impairment;
- Limitations in ADLs and IADLs and use of assistive devices;
- Medical care utilization patterns during the six months prior to the survey;
- Client satisfaction with and access to medical care services; and
- Quality of life.

This comprehensive interview was administered early in the application process and was followed by six-month follow-up interviews until a respondent died or the data collection period ended, which occurred in September 1997. This paper uses data from the first interview only.

Between January 1, 1995 and February 28, 1997, we recorded 3,009 eligible individuals as having applied to the 11 PACE demonstration sites (see Table 2.1). The largest number of applicants at a single site during this period was 394, representing approximately 13 percent of all applicants, while the smallest number was only 124, or four percent of applicants. These differences may be due to variation among the sites in their target populations, marketing efforts, and program maturity.

Among these applicants, only 44 percent completed the baseline interview. This response rate causes us to question the generalizability of the survey data. Of the 3,009 persons who applied and were deemed eligible during this period, 64 percent decided to join PACE and 32 percent did not (see Table 2.1).^{2,3} Among those applicants answering the survey, 68 percent enrolled compared to only 61 percent of non-respondents. Higher enrollment rates among survey respondents were seen at all but one site.⁴

The disparity in enrollment rates between survey respondents and non-respondents suggests that the sample of applicants used in this study may not be representative of the entire applicant pool. Our concern is whether respondents have a substantially different level of health relative to non-respondents. Using data from the Medicare Eligibility Database and Medicare claims we are able to measure differences between survey respondents and non-respondents in regard to gender, age, participation in a risk-based or cost-based group health plan, the death rate within the three months following the initial home visit, and total Medicare reimbursements during the six months prior to the individual's application to the program.⁵ Respondents are substantially more likely to be female (70 percent compared to 59 percent), one year younger on average, and are less likely to have been in a group health plan prior to their application to PACE (see Table 2.2). Survey respondents had a three month death rate of 41 per 1,000, not statistically different from the rate among non-respondents which was 52 per 1,000. Reimbursements during the prior six months, which average between \$11,304 and \$11,491, also are not statistically different across the two groups.⁶ Monthly Medicare capitated payments in 1995 ranged from \$737 up to \$1,623. Medicaid capitated payments ranged from monthly payments of \$1,486 up to \$2,928.

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- 2 The status of four percent of all applicants is unknown. In approximately half of these cases, the applicant died within three months of the home visit and may not have had enough time to make an enrollment decision.
 - 3 In the following discussions we refer to applicants, respondents, and enrollees. PACE applicants are those individuals who start the application process. Respondents and non-respondents are those applicants respectively responding or not responding to the survey. Enrollees are those applicants actually enrolling in the PACE program.
 - 4 At this site 75 percent of survey respondents enrolled while 84 percent of non-respondents did so.
 - 5 297 individuals were lost from this analysis due to an inability to match accurately on Medicare ID number, date of birth, social security number, and name between the PACE Tracking file, which recorded each applicant, and the Medicare files.
 - 6 It should be noted that reimbursements are compared only among those in the fee-for-service system because those in group health plans do not have equivalent reimbursement information.

Table 2.1
*Evaluation of the Program of All-Inclusive Care
 for the Elderly (PACE) Demonstration*

**PACE Enrollment by Survey Response
 January 1, 1995 through February 28, 1997**

	Survey Respondents	Survey Non-Respondents	All Applicants ^a
PACE Enrollees	909 (68%)	1,019 (61%)	1,928 (64%)
PACE Decliners	399 (30%)	573 (34%)	972 (32%)
Status Unknown^b	28 (2%)	81 (5%)	109 (4%)
All Applicants^a	1,336 (100%)	1,673 (100%)	3,009 (100%)

Source: PACE Tracking File, Abt Associates Inc.

- Notes: a. Applicants are those individuals who receive the initial home visit and are deemed eligible for PACE by February 28, 1997.
- b. Some PACE applicants have unknown status due to incomplete information received from sites or because they died within three months of the home visit date and possibly did not have enough time to make an enrollment decision.

Table 2.2
***Evaluation of the Program of All-Inclusive Care
for the Elderly (PACE) Demonstration***
Characteristics and Medicare Reimbursements
by Survey Response

	Survey Respondents	Survey Non-Respondents	Difference
Female	69.8%	59.2%	10.6%***
Age at Home Visit			
Under 75	36.6%	24.5%	
75 - 84	38.0%	37.1%	
85 and over	25.4%	26.4%	
Missing	0.1%	12.1%	
Mean years	78 years	79 years	-1 year***
Participation in Group Health Plan 6 Months Prior to Application			
Risk-Based	7.5%	13.9%	-6.4%***
Cost-Based	1.5%	4.4%	-2.9%***
Death Rate w/in 3 Months of Home Visit	41/1,000	52/1,000	-11/1,000
Average Medicare Reimbursements 6 Months Prior to Application ^a	\$11,304	\$11,491	-\$187
Number of Observations	1,289	1,423	

Source: Merged PACE Tracking File and Medicare claims, Abt Associates Inc.

Notes: *** Statistically significantly different from zero at p=.0001.

a. Reimbursements exclude those in risk- or cost-based group health plans.

These few crude proxy measures of health do not indicate clear systematic differences between survey respondents and non-respondents. However, our analysis must be considered to be incomplete. As will be seen below, approximately 80 percent of applicants receive Medicaid benefits so that a full analysis of differences between survey respondents and non-respondents also needs to include Medicaid dollars.⁷ The analysis that follows uses the full sample, however, analysis was also done eliminating the three sites with the lowest response rates.⁸ The results did not qualitatively change.

IV. Applicant Characteristics and Enrollment Rates

This section contains a series of tables documenting the frequency of specific characteristics found among PACE applicants and the associated rate of enrollment. The sample is the set of persons who completed their first interview by the end of February, 1997. Within this sample of 1,308 respondents⁹, approximately 70 percent enrolled in the PACE program.

Demographics

Because individuals not qualifying for Medicaid benefits face monthly co-payments ranging from \$5 to \$3,000, depending on the individual's income and assets and the state, PACE applicants are likely to over-represent low income households and PACE enrollees are likely to have lower incomes relative to applicants who decline to enroll. The majority of PACE applicants are women, black or hispanic, at least 75 years of age, widowed, with low educational attainment levels, and Medicaid and/or Social Security beneficiaries (Table 3.1). One-third live alone and only a quarter own their home. Survey respondents also report their monthly income by source. Among those reporting, the average monthly income is \$726, for an annual income of \$8,712 (not presented).¹⁰

It is not surprising that PACE applicants are predominately women; disability is more prevalent among women, they are disabled for longer periods, and widowhood increases the need for non-family care options (Manton et al., 1993). Applicants to PACE demonstration sites, however, appear to be unique compared to other samples of the elderly regarding their racial and ethnic background and their low educational attainment levels. Samples of Medicare HMO and Social HMO enrollees indicate that less than 10 percent are minorities, between 47 and 55 percent are married, and many have higher levels of education (this information is tabulated in Appendix Table 1). Indicators consequently suggest they have higher incomes compared to our sample (Newcomer et al., 1996, Harrington et al., 1993, Manton et al., 1993, and Retchin et al., 1992). A more comparable sample of elders is those who participated in the Channeling experiment – a demonstration for frail disabled elders which attempted to substitute home care for nursing home based care. Kemper (1992) and Applebaum (1988) found that among elders in this demonstration 72 percent were female, slightly more than one-quarter were

7 As of this report, Medicaid claims had been requested, but not received.

8 These sites had response rates of 10, 14 and 15 percent.

9 This sample equals the total of all who responded to the survey, 1,336, minus those applicants whose status is unknown, 28.

10 87 percent reported monthly income from at least one source. Median reported monthly income is \$625 for an annual median income of \$7,440.

Table 3.1
Evaluation of the Program of All-Inclusive Care
for the Elderly (PACE) Demonstration
Demographic Characteristics

Demographics	Applicants (n=1,308)	Percent Enrolling
	<i>Percent</i>	
Overall	100.0	69.5
Gender		
Female	69.7	70.8
Race/Ethnicity		
White (not Hispanic)	38.6	69.1
Black (not Hispanic)	33.1	72.3
Hispanic	19.8	68.0
Other	7.0	62.0
Missing	1.5	
Age		
Under 75	36.5	68.8
75-84	38.2	69.5
85 and older	25.3	70.4
Missing	0.1	
Mean Age	77.8 years	
Marital Status		
Married	21.8	63.5
Widowed	56.3	72.2
Not Married	20.9	68.1
Missing	1.1	
Educational Attainment		
Grades up to 12	68.4	71.8
Grade 12	17.0	63.1
Grades 13 and above	9.9	68.2
Missing	4.8	
Household		
Lives Alone	32.2	67.2
Mean Number of Household Members	2.4 members	
Income		
Owns Home	24.7	62.2
Medicaid Beneficiary	80.3	70.6
Receives Income from ^a :		
Social Security	85.2	68.9
Other Government Payments	33.1	75.8
Food Stamps	12.5	66.9
Veteran's Benefits	4.6	71.7
Pension/Annuity	21.1	62.0
Other	5.8	59.2

Source: PACE Applicant Survey, January 1995 - February 1997.

Notes: a. Income categories are not mutually exclusive.

minorities, 42 percent had 12 or more years of education, and 32 percent were married. In addition, only 22 percent were Medicaid beneficiaries, 52 percent had an income below \$500/month, and 57 percent reported their only asset as their house. Bauer (1996), in a recent study of the Arizona Long-Term Care System (ALTCS) drew a sample of beneficiaries where 33 percent were minorities, 22 percent were married, and nearly a quarter owned their homes. Insofar as the PACE program disproportionately enrolls minorities and elders with low education levels and low incomes, this program enrolls a population that is likely to be in poorer health and experience more access problems relative to other frail elders.

Table 3.1 also shows rates of enrollment by demographic characteristics. Across the various characteristics, few differences in enrollment rates are apparent. Individuals slightly more likely to enroll are blacks, 72 percent, those receiving other government payments such as SSI benefits, 76 percent, and the small group receiving veteran's benefits, 72 percent. Individuals reporting receipt of pension/annuity income or other income are less likely to enroll, 62 and 59 percent respectively. These rates suggest a weak negative relationship between income and enrollment.

Measures of Health

Previously, it was noted that the literature on Medicare HMOs and Social HMOs indicated that these capitated programs appeared to experience favorable selection. These results are not particularly surprising given the incentives created by capitated payments. Because PACE also uses a capitated payment methodology, it is possible that this program is also experiencing favorable selection. As noted previously, the data do not allow us to determine the nature of selection within the targeted population because we only observe applicants to the program. We can, however, look within the applicant pool and determine whether those with better health are more likely to enroll. In this and the next three subsections, we look at a variety of health measures and proxies of health status and their relationship to rates of enrollment.

A rich array of health measures is available in the data. In this section we look at self-reported health status, as well as the applicant's report of medical conditions and disabilities. Subsequent sections look at the level of functioning through dependencies in activities and need for medical services as demonstrated by utilization of medical services in the six months preceding the baseline interview.

Data presented in Table 3.2.1 indicate that the majority of PACE applicants report that they are in fair or poor health (56 percent). Compared to what is presented in the literature, PACE applicants appear to be in poorer health than Social HMO enrollees, but in slightly better health relative to Channeling clients. Harrington et al. (1993) find in a sample of Social HMO enrollees that only 22 percent report fair or poor health (see Appendix Table 1). Only 30 percent report this level in a similar sample used by Manton et al. (1993). Of the Channeling clients examined by Applebaum (1988), 83 percent reported their health as fair or poor.

Health status is not a static condition. Among frail elders we can expect their general health status to either be stable or declining with periods of improvement. The survey data allow us to look at the relationship between stable and declining health and the likelihood an individual enrolls in a PACE demonstration site. Survey respondents were asked to rate their health status one year prior to the

Table 3.2.1

*Evaluation of the Program of All-Inclusive Care
for the Elderly (PACE) Demonstration*
Self-Reported Health Status

Self-Reported Health Status	Applicants (n=1,308)	Percent Enrolling
	<i>Percent</i>	
Overall	100.0	69.5
Current Health Status^a		
Excellent/Very Good	14.4	72.9
Good	26.2	65.0
Fair	33.0	71.2
Poor	23.2	69.7
Missing	3.2	
Prior Decline in Health Status		
No	61.7	68.2
Moderate Decline ^b	23.5	73.4
Marked Decline ^c	7.9	68.0
Missing	6.9	
Expected Decline in Health Status		
No	58.0	68.6
Moderate Decline ^b	14.8	70.6
Marked Decline ^c	5.7	67.6
Missing	21.6	71.6

Source: PACE Applicant Survey, January 1995 - February 1997.

- Notes: a. Proxy assessment if survey answered by proxy.
b. A decline of one level (e.g., from very good to good, or good to fair, or fair to poor).
c. A decline of at least two levels (e.g., from very good to fair or good to poor).

survey and what they expected their status to be one year into the future. When the answers to these questions are compared to the individual's report of current health status we find that 62 percent of applicants report that in the prior year their health status had been stable. Declining health has been experienced by 31 percent of the sample. Of those with declining health, three-fourths report only a moderate decline of one level (e.g., from very good to good or fair to poor). The other fourth reports a marked decline of at least two levels (e.g., from very good to fair or poor). When current health status is compared against expectations for the future, 58 percent report they do not expect a decline, 15 percent expect a moderate decline of one level and only six percent expect a marked decline of two or more levels. (Almost all of the remaining 22 percent of the sample are unable or unwilling to predict their future health status.)

The enrollment rates presented in Table 3.2.1 do not present any clear relationship between enrollment and health status among applicants. Of the three self-reported health status measures, none show a systematic relationship between an individual's health status and enrollment.

At the time of the first interview applicants report an average of 3.7 comorbidities (see Table 3.2.2). The most commonly reported medical conditions are: arthritis (61 percent), high blood pressure (49 percent), angina (34 percent), cataracts (32 percent), and diabetes (30 percent). In Bauer's sample of ALTCS beneficiaries, 39 percent had arthritis and 26 percent were diabetic (see Appendix Table 1). In Manton's et al. (1993) sample of Social HMO and fee-for-service beneficiaries, 57 and 18 percent respectively had arthritis and diabetes. Seventy-one percent of Channeling clients had arthritis and 21 percent had diabetes (Applebaum, 1988).

The rate of enrollment does not appear to be systematically related to the number of comorbidities of the applicant, and no apparent enrollment patterns are seen when single medical conditions are considered.

Approximately 30 percent report a physical disability and 25 percent are determined to be cognitively impaired. The inability to read regular print even with glasses or contact lenses or to hear without the speaker raising his or her voice is reported, respectively, by 25 and 21 percent of applicants. Bladder and bowel incontinence problems are also common (38 and 16 percent respectively). Few applicants are bed bound, but 14 percent are wheelchair bound.

Physical Dependencies

The previous measures of health may not adequately reflect the functional outcomes of medical conditions or the general decline of functioning that occurs as individuals age. Nor do these measures of health adequately reflect an individual's level of independence and need for daily or periodic assistance.

Table 3.3.1 indicates that applicants to the PACE program have high levels of dependency. Given PACE eligibility requirements, this finding is not surprising. Impairment within the general population of elders is relatively common. A GAO report (1994) cites an earlier Brookings Institution study which estimated that 17 percent of the elderly population was severely impaired and had five or more impairments in ADLs.

A distinction may be drawn between two levels of dependency. First is a general dependency which is based on the individual's need for help, either assistance or having someone nearby in case assistance is required when performing a given activity. The other is a marked dependency which requires the direct assistance of another person in order for the individual to perform an activity. For example, a general dependency in the activity of eating indicates that the respondent usually eats with help from another person or has someone present to give help if needed. Those with a marked dependency in eating report that they usually need someone to assist in the mechanics of eating.

On average applicants have 2.7 general dependencies in ADLs, 26 percent have five or more which is comparable to Applebaum's (1988) and Kemper's (1992) studies of Channeling demonstration

Table 3.2.2
Evaluation of the Program of All-Inclusive Care
for the Elderly (PACE) Demonstration
Measures of Health

Health Status Measures	Applicants (n=1,308)	Percent Enrolling
	<i>Percent</i>	
Overall	100.0	69.5
Number of Comorbidities		
0 - 2	33.3	70.1
3 - 5	47.8	69.0
6 or more	19.0	69.8
Mean	3.7 comorbidities	
Medical Conditions		
Cataracts	31.9	72.4
Diabetes	29.9	70.6
Stroke	26.0	73.2
Constipation	21.0	74.8
Neurologic Problems ^a	19.0	69.9
Arthritis	60.7	68.1
High Blood Pressure	49.0	69.3
Angina	33.9	68.0
Emphysema ^b	13.6	67.4
Skin Disorders	11.2	68.5
Osteoporosis	10.9	66.4
Disabilities		
Physical	29.9	71.1
Cognitive ^c	25.3	74.0
Visual ^d	24.7	72.1
Hearing ^e	20.5	73.5
Bed Bound	1.2	60.0
Wheel Chair Bound	14.2	69.9
Incontinence		
Bladder	38.2	74.8
Bowel	16.2	77.8

Source: PACE Applicant Survey, January 1995 - February 1997.

- Notes: a. Alzheimer's and Parkinson's
b. Emphysema and Asthma
c. Scored 5 or more incorrect responses, out of 10, on Mental Status Questionnaire (MSQ).
d. Can not read regular print even with glasses or contact lenses
e. Can not hear without speaker raising voice.

Table 3.3.1
*Evaluation of the program of All-Inclusive Care
for the Elderly (PACE) Demonstration*

Dependencies in Physical Functioning

	General Dependency ^a		Marked Dependency ^b	
	Applicants (n=1,308)	Percent Enrolling	Applicants (n=1,308)	Percent Enrolling
	<i>Percent</i>			
Activities of Daily Living				
5 or more dependencies	26.1	71.9	13.7	72.6
Dependencies in:				
Bathing	62.3	71.7	50.1	70.4
Dressing	48.6	71.7	46.3	71.9
Grooming	45.2	69.9	26.5	69.4
Walking	36.0	69.6	27.4	69.3
Toileting	29.4	70.4	19.8	73.8
Transferring	26.2	71.4	12.6	73.3
Eating	18.0	77.5	16.3	78.9
Mean	2.7 dependencies		2.0 dependencies	
Instrumental Activities of Daily Living				
5 or more dependencies	80.4	72.3	62.6	72.5
Dependencies in:				
Shopping	86.9	70.7	77.8	71.4
Housework	86.5	70.6	72.1	71.1
Transportation	86.3	70.2	75.7	70.6
Laundry	84.9	72.0	72.2	71.9
Meal Preparation	81.6	71.6	62.0	72.6
Money Management	78.1	71.6	64.7	72.3
Medication	64.8	71.7	49.0	73.5
Mean	5.7 dependencies		4.7 dependencies	

Source: PACE Applicant Survey, January 1995 - February 1997.

- Notes: a. Usually requires that either someone assist in the activity or that someone be in the room to provide assistance if required.
- b. ADLs: usually requires direct help from another person. IADLs: unable to perform the activity without help, even if he or she needed to.

enrollees. Applebaum's sample had an average of 2.7 ADL dependencies while Kemper's sample of approximately 2,000 Channeling demonstration enrollees found that 23 percent had five or more ADL dependencies. In addition, Bauer's sample (1996) of ALTCS beneficiaries also had an average of three dependencies in the ADLs (see Appendix Table 1). The most commonly reported general dependencies among PACE applicants are in the activities of bathing (62 percent), dressing (49 percent), and grooming (45 percent).

Marked dependencies in ADLs are also common. On average applicants have two marked dependencies and 14 percent have five or more. Approximately 50 percent have a marked dependency in bathing while 46 percent reported marked dependencies in dressing and more than one-quarter reported marked dependencies in grooming and/or walking.

Dependencies in IADLs are even more prevalent within this sample. On average applicants have 5.7 general IADL dependencies and 4.7 marked dependencies. Marked dependencies are defined as activities the respondent could not complete without assistance even if he or she needed to perform the activity. Five or more general dependencies are reported by 80 percent of the sample, while 63 percent report as many marked dependencies. Almost all applicants have at least one dependency (97 percent) which is comparable to Applebaum's study (1988), in which all Channeling clients had at least one IADL dependency. The most frequently cited dependencies are in shopping, housework, and transportation.

Few distinctive patterns are seen in the rate of enrollment and dependency in activities. Those with one or more general or marked dependency are only slightly more likely to enroll in PACE, and enrollment rates neither increased nor decreased as the number of dependencies increased. Those with a dependency in eating have the highest rates of enrollment: 78 to 79 percent within this subgroup enroll. In the case of dependencies in IADLs, the small number of individuals with no or few dependencies renders the estimated rates of enrollment unreliable at the lower end of that distribution.

Persons active in the community have higher rates of enrollment relative to others, particularly if the individual regularly attends a senior center: 89 percent of this subgroup enrolled. Table 3.3.2 shows that the majority of PACE applicants function at a minimal level in the wider community. In the sample, 68 percent do not attend functions outside their homes. Approximately 47 percent report their health always limits their social activity. Senior centers are only attended by 15 percent of the sample.

Medical Care Utilization Patterns During the Six Months Prior to the Interview

An alternative way of measuring health care needs, or the severity of clinical and functional problems, is to examine medical care utilization patterns. Prior utilization patterns are also good predictors of current and short-term future utilization patterns. The survey of PACE applicants collected information about the individual's utilization of hospitals, nursing homes, ambulatory visits, prescription medications, and a variety of home services during the six months prior to the survey.

The frailty of PACE applicants is shown in their use of a variety of medical care services. Table 3.4.1 shows that hospital and nursing home admissions are relatively common (45 and 15 percent

Table 3.3.2
*Evaluation of the Program of All-Inclusive Care
for the Elderly (PACE) Demonstration*

Level of Community Functioning

	Applicants (n=1,308)	Percent Enrolling
	<i>Percent</i>	
Overall	100.0	69.5
Functioning in the Community		
Frequently Attend Outside Functions		
Not at All	68.0	66.6
Once a Week	21.7	74.7
More than Once a Week	9.3	78.7
Missing	1.0	
Health Limits Social Activity		
Always	46.6	68.7
Some Times	33.3	70.0
Hardly Ever	17.7	69.8
Missing	2.3	
Regularly Attends Senior Center, Day Health Center, or other social center		
Yes	15.3	88.5
No	84.4	66.1
Missing	0.3	

Source: PACE Applicant Survey, January 1995 - February 1997.

Table 3.4.1
*Evaluation of the Program of All-Inclusive Care
 For the Elderly (PACE) Demonstration*

**Medical Care Utilization Patterns
 in Preceding Six Months**

Utilization Patterns in Preceding Six Months	Applicants (n=1,308)	Percent Enrolling
		<i>Percent</i>
Overall	100.0	69.5
Hospitalizations		
No Admissions	53.4	70.1
One or more Admissions	45.3	68.4
Missing	1.3	
No Hospital Days	53.4	70.1
One to 30 Hospital Days	36.9	69.7
31 or more Hospital Days	5.9	61.0
Missing	3.8	
Nursing Home		
No Admissions	85.2	69.2
One or more Admissions	14.7	71.4
Missing	0.2	
No Nursing Home Days	85.3	69.2
One to 30 Nursing Home Days	6.1	73.8
31 or more Nursing Home Days	7.3	70.5
Missing	1.3	
Ambulatory		
No Visits	13.1	71.4
One to four Visits	46.0	70.3
Five or more Visits	29.3	69.7
Missing	11.6	
Prescription Medication		
Average Number of Prescriptions		4.3 prescriptions

Source: PACE Applicant Survey, January 1995 - February 1997

respectively). In more general samples of the elderly, between 23 (Manton et al., 1993) and 39 percent (Harrington et al., 1993) are hospitalized in the preceding 12 months (see Appendix Table 1). In Kemper's (1992) sample from the Channeling experiment, 48 percent have a previous hospitalization while Bauer (1996) finds a six month hospitalization rate of 53 percent among ALTCS beneficiaries. Ambulatory services are used by 75 percent of applicants and on average they report five visits during the six months prior to the interview.¹¹ Reflective of the presence of several comorbidities, applicants report on average the use of four different prescription medications.

The use of home care services is wide spread among applicants (see Table 3.4.2). The most common form of home care is provided by a resident informal caregiver (65 percent) such as a spouse or child. Non-resident informal caregivers such as friends and formal home care provided by local agencies or volunteer groups are used respectively by 48 and 46 percent of the sample. Non-resident informal caregivers on average visit five times per week while formal caregivers do so approximately six times a week (an average of 5.8 visits per week). Combining these two types of home services, users report receiving an average of five visits per week. Including any resident caregivers, the data indicate that the average applicant relied on three different individuals to help in the home (2.7 caregivers on average). Few caregivers are paid by these applicants, even if the caregiver does not live with the applicant.

Visiting nurses and other skilled providers are the least prevalent form of home services used by this sample (39 percent). Users of this service report receiving on average a skilled visit once a week during the preceding six months. Considering all four types of home care, most report the use of at least one type – only seven percent reported no home care. A small group, 16 percent, reported using all four types of care. When asked to identify the person who shares the most responsibilities for the applicant's overall care, 37 percent identified a daughter or daughter-in-law. Only 13 percent identified a spouse even though 22 percent reported that they were married (see Table 3.1).

There are no distinctive and consistent patterns between use of services and enrollment. Applicants more likely to enroll include the six percent reporting a moderate number of nursing home days prior to application (74 percent eventually enrolled). Those least likely to enroll are the six percent reporting in excess of 30 hospital days in the preceding six months (only 61 percent eventually enrolled) and the 13 percent who have a spouse sharing most responsibilities for the applicant's overall care (61 percent enrolled).

¹¹ The median number of visits is three.

Table 3.4.2
*Evaluation of the Program of All-Inclusive Care
 For the Elderly (PACE) Demonstration*

**Home Care Service Utilization Patterns
 In Preceding Six Months**

Utilization Patterns in Preceding Six Months	Applicants (n=1,308)	Percent Enrolling
	<i>Percent</i>	
Overall	100.0	69.5
Use Skilled Home Care		
No	60.4	69.5
Yes	38.5	69.8
Missing	1.1	
No Visits	60.8	69.4
One to 30 Visits	23.3	70.2
31 or more Visits	6.5	64.7
Missing	9.4	
Use Formal Home Care^a		
No	53.8	67.3
Yes	46.1	72.1
Missing	0.1	
Non-Residential Informal Caregiver		
No	51.7	70.3
Yes	47.9	68.9
Missing	0.4	
Residential Informal Caregiver		
No	35.1	67.5
Yes	64.8	70.5
Missing	0.2	
Person Who Shares the Most Responsibilities for Overall Care		
Spouse	13.4	61.1
Daughter or Daughter-in-Law	36.5	71.8
Son or Son-in-Law	10.4	64.0
Sibling	4.0	75.0
Other	14.8	74.6
No one	18.5	69.4
Missing	2.1	

Source: PACE Applicant Survey, January 1995 - February 1997

Prior Access to Care

An impetus behind the development of the PACE program was to find a model of care that could effectively address some of the access barriers in the health care system, particularly in a system where long-term and acute care services are not well integrated. Frail elders who face access problems with their current care arrangements presumably will be more likely to enroll in PACE if they perceive that the PACE program will adequately address these problems. Given that 80 percent of applicants are Medicaid beneficiaries and 76 percent must rely on someone for transportation, access problems are likely to be relatively prevalent within this sample.

Approximately 15 percent of applicants report that at some point in the prior year they were unable to obtain medical care when it was needed (see Table 3.5). Eight percent of the sample report no usual place of care, while another 19 percent say that they do not have a usual physician. One-fifth of the sample has been obtaining care at their usual place of care for less than one year.

Enrollment patterns weakly suggest that PACE is attracting those applicants with less access and fewer attachments to particular providers. Those who did not get care when it was needed, or have few attachments to providers are slightly more likely to take-up the PACE program relative to other applicants. Among the 19 percent who do not have a usual physician, 73 percent enrolled.

Satisfaction with Prior Care Arrangements and Quality of Life

Enrollment is most likely to occur when an individual perceives that his or her level of satisfaction with health care services will be at least as high upon enrollment. Presumably frail elders least satisfied with their current care arrangements will be more likely to enroll compared to those reporting the highest level of satisfaction, *ceteris paribus*.

Overall the majority of applicants (82 percent) are satisfied with the quality of the medical care that they received in the past year (see Table 3.6.1). Applicants also report a high level of satisfaction with all care arrangements. While 48 percent are very satisfied with these arrangements, 36 percent are only somewhat satisfied, suggesting room for improvement. Despite the high level of satisfaction, many applicants (75 percent) report that they would be likely to change to another doctor or medical professional if they could enroll in a health program that provided for all their needs. This response suggests a lack of attachment to particular providers within this sample. Among the 10 percent dissatisfied with the quality of their care, 73 percent enrolled. Conversely, only 53 percent of those unwilling to change providers to enroll in a program like PACE, actually did so.

The willingness to change providers points to an individual's overall flexibility to change particular aspects of his or her life, which may include joining a program such as PACE which includes day center based activities. The survey gets at this issue in several ways through a series of questions pertaining to an individual's happiness with various aspects of

Table 3.5
*Evaluation of the Program of All-Inclusive Care
 For the Elderly (PACE) Demonstration*

Prior Access to Care

	Applicants (n=1,308)	Percent Enrolling
	<i>Percent</i>	
Overall	100.0	69.5
Prior Access to Care		
Didn't Get Care when Needed		
No	81.4	68.9
Yes	15.1	71.7
Missing	3.4	
Has Usual Place of Care		
No	7.8	73.5
Yes	91.1	69.1
Missing	1.1	
Has Usual MD		
No	19.0	73.4
Yes	80.4	68.6
Missing	0.6	
How Long Respondent been Attending Usual Place of Care		
Less than 1 Year	20.7	74.5
1 to 4 Years	37.8	65.4
5 or More Years	30.6	69.8
Missing	10.9	

Source: PACE Applicant Survey, January 1995 - February 1997

Table 3.6.1
*Evaluation of the Program of All-Inclusive Care
for the Elderly (PACE) Demonstration*

Satisfaction

	Applicants (n=1,308)	Percent Enrolling
	<i>Percent</i>	
Overall	100.0	69.5
Satisfaction		
Overall Quality of Medical Care in Prior Year		
Satisfied	81.6	69.1
Neutral	4.9	62.5
Dissatisfied	10.0	73.3
Missing	3.5	
Level of Satisfaction with all Care Arrangements		
Very Satisfied	48.2	71.2
Somewhat Satisfied	35.5	67.9
Not Too Satisfied	7.6	67.7
Missing	8.7	
If you could enroll in a health program that provided for all your health care needs, how likely would you be to change to another doctor or medical professional?		
Likely	75.0	73.0
Unlikely	14.3	52.9
Missing	10.7	

Source: PACE Applicant Survey, January 1995 - February 1997

his or her life and acceptance of change. Table 3.6.2 indicates that while the majority of applicants like their daily routines, up to 51 percent like variety and like to try new things and activities. The 51 percent of applicants expressing a desire for variety and a taste for new activities still falls short of the 75 percent willing to change providers under the right circumstances. Enrollment rates indicate that those who like variety are slightly more likely to enroll in PACE. Among those who like to try new activities, 72 percent enroll, suggesting that social aspects of PACE are attractive for some applicants. In support of this argument, we find that among the 25 percent of respondents indicating that social aspects such as program activities or social opportunities are the best features of the PACE program, 72 percent enroll (not shown).¹²

Even though the majority of respondents like routine, events happen that are beyond their control and which affect how a frail elder might arrange for care. As shown previously, the majority of applicants rely on some form of home care provided by family and friends, 65 percent receive homecare from friends and family with whom they live and 48 percent from non-residential family and friends (see Table 3.4.2). The loss of a caregiver can therefore significantly disrupt an elder's home care arrangements and in some cases, may lead the elder to enroll in the PACE program.

Within the sample, 24 percent had a person close to them die within the six months prior to the survey. Of those experiencing such a loss, 51 percent lost a relative such as a sibling or cousin, 35 percent lost a friend, and nine percent lost a spouse. The data do not support the argument that the death of someone close influences an individual's decision to enroll. Of those who lost someone close to them, 68 percent enrolled in PACE.

12 The first response out of a possible three was chosen as the best feature of the PACE program.

Table 3.6.2
*Evaluation of the Program of All-Inclusive Care
for the Elderly (PACE) Demonstration*

Quality of Life

	Applicants (n=1,308)	Percent Enrolling
	<i>Percent</i>	
Overall	100.0	69.5
Changes		
I am happiest when my daily routines do not change very much		
Agree	71.0	69.5
Neutral	11.2	67.4
Disagree	13.8	70.0
Missing	4.1	
I like to watch the same television shows every day or every week		
Agree	52.9	70.1
Neutral	15.8	64.0
Disagree	27.7	71.0
Missing	3.6	
I like to eat pretty much the same things most of the time		
Agree	51.5	67.9
Neutral	9.4	73.2
Disagree	37.2	70.2
Missing	1.9	
I look forward to trying new activities for the first time		
Agree	51.0	71.7
Neutral	13.5	64.8
Disagree	29.3	66.8
Missing	6.3	
Significant Event		
Death of any friends or family members in past six months		
No	72.9	69.9
Yes	24.2	67.8
Missing	2.8	

Source: PACE Applicant Survey, January 1995 - February 1997

IV. Modeling the Decision to Enroll

Enrollment rates by characteristic, although suggestive, do not allow us to draw conclusive inferences about factors related to enrollment. In addition, the associations seen in the preceding tables do not necessarily reflect the true relationships between variables. For example, the relationship between enrollment and health status seen in Table 3.2.1 reflects not only the direct role of health status in determining enrollment, but also the indirect role of correlated factors such as race and poverty status which systematically affect health status. In this section multivariate analysis is used in an attempt to isolate the direct relationship between enrollment and various factors believed to influence this decision.

The decision to enroll in the PACE program is predicated on a combination of factors, including other care options available to the individuals. We model the enrollment decision by assuming that every applicant has an unobserved propensity, y^* , to enroll and that this propensity can be represented by a linear model:

$$y^* = X'\beta - \epsilon$$

where ϵ has the standard logistic distribution and is independent of X . We observe enrollment when the factors determining enrollment are such that

$$\text{enrollment} = 1 \text{ if } y^* \geq 0 \text{ and } 0 \text{ if } y^* < 0.$$

Table 4.1 presents the estimated logistic model. The model assumes that the enrollment decision is a function of socio-demographic factors, the nature of current care arrangements, satisfaction, and health status. The model also includes a trend factor to control for when the applicant entered the sample during the sampling period. Sampling for the survey was based on an ongoing rolling design that added new observations from weekly reports of new applicants to the demonstration sites. These weekly reports were obtained from notifications sent by the 11 sites. On going analyses of the data during the 26 month period of sample collection indicated that over time, the rate of enrollment among applicants was increasing. Either PACE demonstration sites were improving their marketing and/or improved their targeting of the program. Also, as noted earlier, over time referrals from friends and family began to be an increasingly important referral source for many of the sites. Individuals following up on personal referrals may have been more predisposed to the program and interested in participating. The time trend proxies for this type of change over time.

The model also includes site-specific indicators to capture site-specific enrollment effects. For example, the range of other care options that compete or complement PACE services is likely to vary across the different PACE sites. The availability of other services influences the decision to enroll and our data do not otherwise allow us to explicitly control for these site-specific market characteristics.

Lastly, because the estimated model includes prior Medicare reimbursements, applicants who were in a group health plan during the six months preceding the interview are excluded from the analysis because they do not have comparable reimbursement information. The model was also estimated

Table 4.1
Evaluation of the Program of All-Inclusive Care
For the Elderly (PACE) Demonstration
Logistic Model of the Decision to Enroll in PACE

Variable	Estimated Coefficient (Standard Error)		Marginal Effects ^a
Socio-Demographics			
Female	0.320**	(0.161)	0.067
Black	0.014	(0.186)	0.003
Hispanic	-0.168	(0.259)	-0.035
85 yrs and older	-0.112	(0.169)	-0.024
Widowed	0.203	(0.158)	0.043
Less than 12 yrs of School	0.336**	(0.156)	0.071
Household Size	0.068	(0.050)	0.014
Own Home	-0.345**	(0.164)	-0.073
Medicaid Beneficiary	0.056	(0.180)	0.012
Current Care Arrangements			
Daughter shares most responsibilities	-0.086	(0.156)	-0.018
Usually attends a senior day center	1.567***	(0.284)	0.330
Has usual physician	-0.382**	(0.185)	-0.080
Satisfaction			
Dissatisfied with Quality of Medical Care	0.311	(0.246)	0.065
Unlikely to be willing to change providers	-0.843***	(0.201)	-0.177
Health Status			
Report at least Good Health	-0.153	(0.147)	-0.032
Died within 3 months of interview	-0.943**	(0.389)	-0.198
# of ADL Dependencies	-0.010	(0.037)	-0.002
# of IADL Dependencies	0.131***	(0.045)	0.028

Table 4.1
Evaluation of the Program of All-Inclusive Care
For the Elderly (PACE) Demonstration
Logistic Model of the Decision to Enroll in PACE

Variable	Estimated Coefficient (Standard Error)	Marginal Effects ^a
Prior Utilization of Medical Care Services^b		
Hospital Admission	-0.145 (0.170)	-0.030
Nursing Home Admission	0.152 (0.221)	0.032
Medicare Reimbursements^c		
Second Quartile	-0.132 (0.203)	-0.028
Third Quartile	-0.338 (0.210)	-0.071
Fourth Quartile	-0.539** (0.232)	-0.113
Time Trend	0.033*** (0.010)	0.007
Intercept	-0.031 (0.583)	
Log-Likelihood	1286.802	
Number of Observations	1,191	
Mean of Dependent Variable	0.699	

Source: PACE Applicant Survey, January 1995 - February 1997.

Notes: Models also control for site specific effects.

* Statistically significantly different from zero at the 0.10 level.

** Statistically significantly different from zero at the 0.05 level.

*** Statistically significantly different from zero at the 0.01 level.

a. Marginal effect for variable $x_i = p \times (1 - p) \times b_i$, where p is the probability that enrollment occurs and b_i is the estimated coefficient for variable I .

b. All measures are based in the six month period prior to the interview. Service use is self-reported. Medicare reimbursements are from Medicare claims files.

c. First Quartile: \$0 to \$461.30. Second Quartile: \$461.30 to \$4,361.63. Third Quartile: \$4,361.63 to \$15,634.24. Fourth Quartile: \$15,634.24 to \$138,115.51.

excluding applicants from the three sites that had response rates under thirty percent. The results were not qualitatively different so in the work below we present the larger sample that includes these sites.

Socio-Demographic Factors

Socio-demographic factors include those commonly found in the literature – gender, race/ethnicity, age, marital status, education, household size, home ownership, and Medicaid reciprocity. The only demographic factors associated with enrollment are the applicant’s gender, education, and home ownership. Women are more likely to enroll by 6.7 percentage points. Those with less than 12 years of education are more likely to enroll by 7.1 percentage points while the probability that a home owner will enroll is 7.3 percentage points less than that of an applicant who does not own his or her home, *ceteris paribus*. While the later two relationships are indicative of an income effect, Medicaid beneficiaries are no more likely to enroll than others.

In preliminary work using a smaller sample, an income effect was noted – those who were not home owners *or* were Medicaid beneficiaries were significantly more likely to enroll. It is not clear why the receipt of Medicaid is no longer a predictor of enrollment in the larger sample. In the earlier sample, 75 percent reported enrollment in the Medicaid program and in the current sample the same is true of 80 percent of the sample. The lack of robustness between samples suggests that if an income effect is present, it is weak.

Current Care Arrangements

This group of variables includes an indicator for cases when a daughter or daughter-in-law shares the most responsibility for the applicant’s care, whether the applicant usually attends a senior day center, and a measure of provider attachment. It is hypothesized that elders who rely on working age women will be more likely to enroll because relative to other caregivers, these younger women may have less time to care for an elderly parent due to labor market attachments and other family obligations. A small literature exists that looks at opportunity costs incurred by caregivers. Ettner (1996) recently reviewed and expanded this work in an analysis of the impact of caring for disabled elderly parents on the work hours of men and women. She notes that the literature is mixed regarding the relationship between caregiving and labor supply. Her own work indicates that while work hours are reduced by caregiving, the effect is significant only for women providing care to a parent living in another household.

Usual attendance at a senior day center is also hypothesized to be positively associated with the probability of enrollment. Seniors accustomed to day centers are likely to be more receptive to the PACE model.

The last measure of current care arrangements addresses the issue of provider attachment. Elders with little attachment to a provider may view the PACE program as an opportunity to establish such a relationship. Conversely, those elders who already have a usual source of care are unlikely to be interested in changing providers in order to enroll in the PACE program.

The person who shares the most responsibilities for the applicant’s care is not associated with the decision to enroll. In a preliminary study which used only those individuals who applied to the program from January 1995 through September 1995, it was found that those who relied on daughters or

daughters-in-law to share the responsibilities for their care were significantly more likely to enroll. This result does not hold in the larger sample. The lack of robustness in this relationship, however, supports the less than conclusive findings of Ettner (1996) regarding caregiving and labor supply of younger children.

Those applicants who are already in the habit of attending a senior day center are substantially more likely to enroll.¹³ Senior center attenders have a predicted probability of enrollment 33 percentage points greater than non-attenders, *ceteris paribus*. This is a robust and meaningful result and one that suggests that those who are already familiar with day centers find the PACE program an attractive alternative. It is possible that some of this relationship is driven by individuals who like to try new activities. When an indicator that captures these individuals is entered into the model, it is statistically insignificant and marginally reduces the size of the estimated coefficient on usual senior day center attendance.

Provider attachment precludes enrollment. Those with a usual physician have a probability of enrolling that is eight percentage points less than those without a usual physician, *ceteris paribus*. This result is indicative of an elder's reluctance to leave an established provider-patient relationship. Alternatively, PACE may be attracting those individuals with few attachments to the health care system. However, access problems *per se* are not an impetus to enrollment. When access problems are measured directly with a binary measure for whether an individual failed to receive care when needed, the estimated coefficient is not significantly different from zero and does not influence the coefficient on the provider attachment measure.

We also theorize that home care provided by family, friends, agencies, and volunteer groups may influence a person's decision to enroll. When various measures capturing the amount of home care received by respondents are entered into the models (e.g., number of caregivers, number of hours per week of caregiver services), they are statistically insignificant and their inclusion does not alter the other estimated relationships. While it is possible that more home caregivers or more home care reduces the need for some services provided by PACE programs, as well as caregiver burnout, this type of care does not perfectly substitute for the medical services offered by PACE programs. In addition, increasing numbers of caregivers may be the result of an unstable care system, thereby countering the problems associated with too few caregivers and resulting in caregiver "burnout."¹⁴

It can also be argued that the current number of caregivers or the current amount of caregiving an elder receives reflects what is needed at the time or a "steady state" of care. What is important in the decision to enroll is whether there has been a disruption in these arrangements or because of other changes, the arrangements are no longer satisfactory. In the data, this type of disruption can be controlled for through an indicator that the individual recently experienced the death of someone close. This indicator, however, is not statistically significant in these models. Alternatively, we tried to capture the mix of residential and non-residential home care that an individual might rely on such as the exclusive reliance on only residential help or the exclusive use of non-residential help. Nothing was apparent in the results to

13 The question in the survey is stated as follows: "Do you regularly go to a senior center, a day health center, or any other place where senior citizens spend a good part of the day and enjoy social activities, and perhaps receive some of your health care services or your medications during the day?"

14 The authors are grateful to Elizabeth Goldstein at HCFA for this point.

suggest that the mix of arrangements influenced an individual's enrollment decision. Arguably all these are imperfect proxies for unstable or unsatisfactory home caregiving arrangements.

Satisfaction

Individuals dissatisfied with their current medical care arrangements are more likely to be willing to take-up a program like PACE if they believe their level of satisfaction will be at least as great when they do so. The model includes two measures of satisfaction: an indicator that the individual is dissatisfied with the quality of his or her current medical care¹⁵ and an indicator that the individual is unwilling to change to another medical provider even if he or she could enroll in a health program that provided for all medical needs.¹⁶

While the level of satisfaction with the quality of care does not influence the enrollment decision, willingness to change providers in order to have one provider handle all medical needs of an individual does. Those unwilling to change providers to get comprehensive care at one location are 18 percentage points less likely to enroll.

Measures of Health

Our model includes health measures that capture the applicant's health status, level of dependence, and utilization of services during the six months prior to the survey. Self-reported health status is included in the estimated models because it reflects the individual's perception of possible need for health care in the near-term. Also included is a dummy variable indicating whether the applicant died within three months of the interview. This dummy variable is a proxy for those individuals who are likely to be in a terminal state and perhaps appropriate candidates for hospice care. We include a measure of the individual's need for health aide services as indicated by level of general dependence in ADLs and need for homemaker services as evidenced by level of general dependence in IADLs.¹⁷ The model also includes self-reported utilization measures of hospital and nursing home services and from Medicare claims, the level of Medicare reimbursements during the six months prior to the home visit.

The regression results are mixed, but suggestive. While those applicants reporting excellent, very good, or good health are no more likely to enroll relative to those reporting fair or poor health, those with lower levels of functioning as evidenced by more dependencies in the IADLs are significantly more likely to enroll. That is, regardless of their own perceptions of their health status, those in need of homemaker services are more likely to take-up the PACE program. On the other hand, individuals dying within three months of the interview and who have high levels of Medicare reimbursements prior to their application are less likely to enroll. So that while PACE is attracting applicants with higher levels of IADL dependencies, those who are acutely ill and possibly in a terminal state are less likely to enroll.

15 The question was: "The overall quality of the medical care you have received in the last year. Are you very satisfied, moderately satisfied, neither satisfied nor dissatisfied, moderately dissatisfied, or very dissatisfied?"

16 The question was: "If you could enroll in a health program that provided for all your health care needs, how likely would you be to change to another doctor or medical professional? Would you be – very likely, somewhat likely, somewhat unlikely, or very unlikely?"

17 General dependencies in ADLs and IADLs is defined as the individual usually requires that either someone assist in the activity or that someone be in the room to provide assistance if required.

Applicants reporting at least good health have a probability of enrolling that is only three percentage points less than for those in fair or poor health (not a statistically significant difference). In earlier work with a smaller sample, this indicator was a significant predictor of enrollment and it indicated that those reporting at least good health were less likely to enroll relative to those in fair or poor health. It is not clear why this relationship should not be present in this larger sample. In the earlier work, Medicare claims were not available, but even when prior Medicare reimbursements are deleted from the model, the indicator on self-reported health status does not become a statistically significant predictor in the model. Earlier it was argued that health status is not static, particularly among the frail elderly who are more likely to experience declining health. When measures of prior or expected declines in health are tested in the model, these measures are insignificant predictors of enrollment, nor does their inclusion alter the estimated relationships between enrollment and other predictors in the models.

Applicants who die within three months of the home visit have a probability of enrolling that is 20 percentage points less than those who survive during this period. This is a statistically significant and large effect. We believe this effect may be somewhat overstated. In the sample, 36 people died within this three month period, half of these individuals enrolled and the other half declined. In all but nine cases the sequence of dates that mark the home visit, the enrollment decision, and death are plausible and occur in their proper order. In the nine exceptions, there are three instances where the enrollment date is prior to the home visit date. In the other six, the death date is prior to the enrollment date. In all but one case, these individuals decided not to enroll.¹⁸ This noise in the data suggests that not only is our estimate imprecise, but that if these cases were removed from the sample, the qualitative characteristic of the relationship would remain, but that the marginal effect would be less.¹⁹

The only negative relationship between health status and enrollment is reflected in the number of IADL dependencies. Each additional IADL dependency is associated with an approximate three percentage point increase in the predicted probability of enrollment. The positive association between IADL dependency and enrollment is surprising given the lack of any noticeable increase in the rate of enrollment among those with five or more dependencies in IADLs (see Table 3.3.1). The relationship between dependencies in IADLs and enrollment is robust in that when the level of general dependency is replaced with the level of *marked* dependency, the number of marked dependencies in IADLs is also a statistically significant but weaker predictor of enrollment.²⁰ These findings suggest that PACE enrollees are no more likely to require health aide services relative to non-enrollees, but they do need more homemaker services.²¹ Sites providing housing, therefore, may be particularly attractive for those requiring a broad array of assistance in the home.

18 Death dates were retrieved from the HCFA Enrollment DataBase used to track all Medicare beneficiaries. The date of the enrollment decision was reported by the demonstration sites. It is possible that some of the dates reported by the sites represent the date the site learned of the individual's death.

19 When these observations are removed, the percent of those declining the PACE program who die during this period is slightly more than one and an half times that of the enrollees (2.8 percent compared to 1.8 percent). With them in the sample the difference is slightly more than two times (4.5 percent compared to 2.0 percent).

20 Marked dependencies in ADLs is defined as: usually requiring direct help from another person. Marked dependencies in IADLs is defined as: unable to perform the activity without help, even if he or she needed to.

21 It has been suggested that increasing dependency in IADL proxies for an increasing rate of cognitive impairment. When an indicator for cognitive impairment is entered into the model, however, the indicator itself is not statistically significant and the statistical significance on the number of IADL dependencies is not affected.

The IADL finding is not supported by a similar relationship between enrollment and the applicant's level of dependence in ADLs, which is not statistically significant in this model. There is one exception. Dependency in eating is a marker of intensive needs for care attendant services. When an indicator for the presence of an eating dependency is entered in the model, the coefficient is positive and statistically significant at the 0.05 level. Those with an eating dependence have a probability of enrolling that is approximately 10 percentage points greater than those who do not. In addition, the estimated coefficient on the number of dependencies in ADLs increases by three and becomes statistically significant at the 0.10 level, suggesting that as the number of ADL dependencies increases, the individual is less likely to enroll. A relationship that supports other findings presented below.

Because one intention of the PACE program is to substitute community-based care for custodial nursing home care, prior use of hospital and nursing home services are included in the estimated models. Applicants who had at least one hospital admission or nursing home stay in the six months prior to the interview are no more likely to enroll in the PACE program relative to other applicants. In a prior study which used a smaller sample of applicants, a nursing home admission was found to increase the probability an applicant would enroll significantly and substantially. This result can be expected to the extent that the PACE program substitutes for nursing home care within this group of applicants. It is not clear why this finding does not carry over to this larger sample. It is possible that through time PACE programs are drawing applicants from a wider pool of elders who have a more diverse array of health care needs, and this diversity can increase the difficulty of detecting differences between groups. When an interactive term capturing those applicants reporting a prior hospital stay and nursing home admission is entered in the model to separate out those individuals who are likely to only need nursing services for a short period in order to recover from a hospital stay, it is insignificant and does not influence the significance level of the estimated coefficient on nursing home admissions.

The intensity of use of these services was also tested and found to be an insignificant predictor. Insofar as long hospital and nursing home stays indicate long-term and extensive critical care needs, these needs are likely to be closely related to prior Medicare reimbursements. However, when reimbursements are eliminated from the model, the results do not change. Those with prior hospital or nursing home admissions are no less likely to enroll than others. Applicants intensively using nursing home and skilled nursing services may also have needs that PACE is not designed to address. However, when a binary measure indicating those applicants reporting extensive use of skilled nursing care is entered in the model, it is statistically insignificant.²² In a preliminary study using a smaller sample of applicants, this variable was a significant predictor and the estimated coefficient was negative. As in earlier differences between this an earlier work, the difference in significance level is not clear. It is possible that in the earlier model the indicator for extensive use of skilled nursing care captures individuals in a terminal state because those models did not include an indicator for individuals dying within three months of the interview. However, when this indicator of death is removed from the model, results do not change.

22 Extensive users of skilled nursing care are those applicants reporting a number of nursing home days or home nursing visits that are two standard deviations above the mean among users of each type of service. In a statistical sense these applicants are heavy users of these services relative to other applicants.

In order to more fully understand the meaning of the relationship between health and enrollment in PACE and the extent of differences between those who report different levels of health, Table 4.2 presents predicted probabilities of enrollment using an array of health status profiles. These profiles are based on the statistically significant predictors of enrollment: death within three months of the interview, number of IADL dependencies, and total Medicare reimbursements during the six months prior to the interview. Together they present three different dimensions of health, a health status outcome (death), the level of functional limitation, and utilization of services as represented by reimbursements. The probabilities are derived using the model in Table 4.1. All variables are set to their sample mean except for the three variables used in the profiling.

It is obvious that those who die have considerably lower probabilities of enrollment. However, from a policy point of view, it is the survivors who will continue to use services and incur costs and therefore will be the focus of this analysis. Among survivors, the probability of enrollment varies from 0.49 to 0.81. Those in the top quartile of reimbursements have probabilities that are between 0.10 to 0.13 points less than those in the bottom quartile.

Table 4.2
*Evaluation of the Program of All-Inclusive Care
For the Elderly (PACE) Demonstration*
Predicted Probability of Enrollment

Number of Dependencies in IADLs			
	0	4	7
Prior Medicare Reimbursements in First Quartile (\$0 up to \$461.30)			
Died w/in 3 months of Home Visit			
No	.625	.738	.807
Yes	.394	.523	.620
Prior Medicare Reimbursements in Fourth Quartile (\$15,634.24 or More)			
Died w/in 3 months of Home Visit			
No	.493	.622	.709
Yes	.275	.391	.487

Prior Medicare reimbursements represent the individual's level of reimbursements during the six months prior to the interview. All other explanatory variables in the model are set at their sample mean.

V. Conclusions

This paper uses data collected from a sample of PACE applicants to determine those characteristics and factors associated with the likelihood of enrollment. The demographic, health, and satisfaction characteristics of the sample are initially described. Multivariate analysis, based on a logistic regression model of the probability of enrollment, is used to model the decision to enroll.

Findings address the demographic characteristics of the sample and the association between income and enrollment, the complexities of the relationship between health, disability, and enrollment, the propensity of senior day center attenders to enroll, and provider attachment.

The first finding indicates that, relative to other samples of elders, applicants to the PACE program are predominantly from minority groups and have low educational attainment levels and income. Several PACE sites in the sample specifically target communities of minority elders so that the predominance of minority groups in the sample is not surprising. These groups are also more likely to have lower educational attainment levels and income relative to others. The programmatic differences in PACE which draw in minorities causes this program to stand out from other programs for the elderly such as ALTCS and the Channeling experiment.

The PACE program also has incentives that make it less attractive for elders not on Medicaid. Co-payments that range from \$5 to \$3,000, depending on the site and the individual's income and wealth, are required when an elder is not a Medicaid beneficiary. Applicants are therefore predominately Medicaid enrollees (80 percent). The regression analysis indicates that gender, education, and home ownership are the only demographic characteristics predictive of a person's decision to enroll – women and those with less than 12 years of education are more likely to enroll while homeowners are less likely. This finding is suggestive of an income or wealth effect. The estimated effect of the receipt of Medicaid benefits is statistically insignificant, however, and does not support this finding.

Our second finding is that PACE applicants have high rates of poor health, but that the relationship between health status and enrollment is somewhat mixed. More than half report that their health is fair or poor (56 percent). On average, they report approximately four comorbidities. The most commonly reported medical conditions are: arthritis (61 percent), high blood pressure (49 percent), angina (34 percent), diabetes (30 percent), and cataracts (32 percent). Another 19 percent report a neurologic problem, the majority of these applicants have Alzheimer's disease. A quarter fail a cognitive test. Rates of disability are also high, 26 percent report five or more ADL dependencies while 80 percent report five or more IADL dependencies. These high rates of disability are reflected in the ability of these elders to function within the community; 68 percent say they do not attend functions outside their home and 47 percent say that their health always limits their social activity.

The regression analysis indicates that while self-reported health status is not predictive of enrollment, death within three months of the interview, increasing numbers of impairments requiring homemaker services, and prior Medicare reimbursements are. Applicants in a terminal state are less likely to enroll, as are those with Medicare reimbursements in the six months prior to the interview in the fourth quartile of reimbursements. It may be that those elders who are near death at the time of the interview are inappropriate candidates for PACE services. Those in a terminal state are perhaps best cared for by hospice services, while the acutely ill (as proxied by prior Medicare reimbursements) may require a level of skilled supervision that PACE is not designed to handle. However, these are cautionary

interpretations. Obviously it is difficult to know what an individual's true health status is three months prior to death. Medicare reimbursements are also imperfect measures of health status and health care needs. It is possible that those incurring substantial Medicare costs represent those who have adequate access to care while those incurring fewer costs have less access. The latter may be more likely to take-up PACE if the program is perceived to improve access. Also, it is important to note that due to some noisiness in the data, the relationship between death shortly after the interview and enrollment is likely to be somewhat overstated. In addition, the relationship between prior Medicare reimbursements and enrollment is not conclusive given that Medicaid reimbursements were not available for this study and 80 percent of the sample is Medicaid eligible.

The negative relationship between health status and enrollment is contradicted by the finding that as the level of need for homemaker services increases (as proxied by the number of dependencies in the IADLs), enrollment rates increase. These elders presumably require on-going custodial care in order to at least maintain their level of functioning. While custodial care can occur over a long period of time, it is a less costly form of care relative to some acute care services that include hospitalization and rehabilitation. In many cases, homemaker services may be paid out-of-pocket rather than through third-party payers such as Medicare or Medicaid.

The third finding indicates that applicants who routinely attend a senior day center are more likely to enroll in PACE. Those accustomed to the day center concept are likely to be more comfortable with the PACE program and view this system as an acceptable care alternative. In the sample, approximately 15 percent of applicants usually attend a senior day center, among these elders, 89 percent enroll in PACE compared to 70 percent within the entire sample. It is also noted that elders who frequently attend functions outside their home (nine percent) have higher rates of enrollment than those who do not attend outside functions.

The last finding indicates that applicants who do not have a usual physician are more likely to enroll in PACE. Also, those who are unlikely to leave an established provider relationship for a provider offering comprehensive services at one location are less likely to take-up the PACE program relative to others. Only 19 percent of the sample is unable to identify a usual physician, but 73 percent of these individuals enroll. The issue of provider attachment is important because frail elders presumably have high rates of utilization of medical services. Approximately 45 percent of the sample report a hospitalization in the six months prior to the interview, 15 percent report a nursing home admission. This finding is, therefore, not surprising to the extent that applicants are less likely to change providers because the relationship has become well developed through numerous contacts over time. However, the relationship between provider attachment and enrollment is not particularly robust. Applicants who at least identify a usual place of care are not more likely to enroll than those that do not. More importantly, applicants recently experiencing a barrier to care (15 percent of the sample) are no more likely to enroll than others.

While findings are indicative of the types of applicants who become enrollees, enrollment is not completely addressed in this paper. As noted previously, we can not test for program selection effects because the sample does not draw from the universe of eligible frail elders. In addition, we only analyze the decision to enroll. Capitated programs are not only interested in determining which individuals are attracted to the program, but also which individuals are long-term enrollees. The daily census of a PACE program will be dominated by long-term enrollees, and if long-term enrollees have particular health characteristics, for example they are more likely to be cognitively impaired, over time program

administrators may shape services to better meet the needs of these individuals. A full study of enrollment, therefore, would look at the determinants of an enrollee's duration in the program, as well as the determinants of enrollment.

Appendix Table 1
Evaluation of the Program of All-Inclusive Care
for the Elderly (PACE) Demonstration
Comparison of Study Samples

	PACE	ALTCS	Channeling	Social HMOs			Medicare HMOs
Author(s)	Irvin, Dorsey, and Lamkin (1996)	Bauer (1996)	Kemper (1992)	Newcomer, Preston, and Harrington (1996)	Harrington, Newcomer, and Preston (1993)	Manton, Newcomer, Lowrimore, Vertrees, and Harrington (1993)	Retchin, Clement, Rossiter, Brown, Brown, and Nelson (1992)
Sample Information	PACE applicants from Jan. 1995 through June 1, 1996	Elderly and physically disabled who had a long-term care placements in the ALTCS program from Jan. 1989 through Dec. 1991 and were initially placed in a home and community based program	Disabled elderly who applied or were referred to Channeling and had unmet need. Disability defined as moderate or severe impairments in ADLs or IADLs.	S/HMOs members enrolling in 1985-1986 and responding to the survey and probability samples of Medicare beneficiaries in the S/HMO market areas as of 1986.	Probability sample of S/HMO members who were active in these plans between June 1986 and Dec. 1988, and disenrollees who left between June 1987 and Sept. 1988.	S/HMO enrollees in June 1988 and non-institutionalized Medicare FFS clients living in S/HMO market areas.	Random sample of HMO enrollees in 17 plans between Nov. 1984 and Jan. 1985 and a sample of FFS Medicare beneficiaries matched by geographic market.
Sample Size	935	2,923	5,150	2,995	1,353	27,503	3,157
% Female	70.2	66.3	71.5	60.5	58.1	62.6	59.0
Race/Ethnicity	White = 38.4 Black = 28.9 Hispanic = 22.9 Other = 8.0 Missing = 1.8	White = 66.7 Hispanic = 17.7 Native American=9.6 Black = 4.9 Other 1.2	White/Other = 74.1 Black = 22.3 Hispanic = 3.6	N/A	Nonwhite = 3.5	N/A	White = 91.7
Age	77.0	67.8	80.0	77.7	65-74 = 49.7 75-84 = 40.6 85+ = 9.8	75.3	74.9
Married	21.7	21.9	31.4	46.6	57.1	51.3	55.4

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