

Title:

Longevity of Frail Elders in a PACE Program

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ABSTRACT

LONGEVITY OF FRAIL ELDERLY IN A PACE PROGRAM

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Objective: To assess the longevity (life) distribution of Center for Elders' Independence (CEI) participants in a Program of All-inclusive Care for the Elderly (PACE) as a preliminary step to searching for distinct sub-populations that may benefit selectively from the PACE environment.

Methods: Criteria for inclusion in the study were all participants who enrolled in the program from 7/1/92 to 6/30/99 and disenrolled due to death or were still in the program as of 6/30/99. This yielded a sample size of 276 participants, 108 of whom had died while in the program. The hazard distribution was plotted based upon estimated death rates for 6-month intervals from entry into the program.

Results: 12.5% of participants were estimated to die in the first year after admission. The median length of stay of participants in this PACE site was estimated at 52.85 months (4.4 years). Older participants tended to remain alive longer in this program for very frail disabled elders.

Conclusion: Compared with nursing home care, PACE may extend length and quality of life. Preliminary findings support the value of PACE's emphasis on activities, environmental adaptations and creative therapies that stimulate autonomy, social integration and individual creativity. They also suggest a positive impact of fully integrating preventive services and rapid primary care interventions.

INTRODUCTION

Background on PACE

PACE, the Program of All-inclusive Care for the Elderly, integrates chronic, acute, long-term, and preventive health care into a community social environment, the Adult Day Health Center (ADHC)¹. Situated at the ADHC are an adjunctive physical therapy/occupational therapy center, a clinic, a transportation system, and a homecare department with in-home nursing support capability. A site-based interdisciplinary care team, facilitated by the site manager, coordinates all services for the case management process. The interdisciplinary team includes a physician, rehabilitation therapists, often a nurse practitioner, registered clinic and homecare nurses, activities staff, dietician, social workers, and a transportation representative. The team usually meets daily to discuss and review client care plans. Goals of PACE teams include maintaining autonomy and independence, avoiding unnecessary hospitalizations and nursing home placements, encouraging creative expression, health promotion and aggressive primary, as well as secondary and tertiary prevention. Capitated at 2.39 times the Medicare Plus Option capitation rate, PACE programs are restricted to the frail and functionally disabled elderly. Average functional compromise in PACE programs are 2.8 ADL dependencies and greater than 90% dependent in each IADL. The average PACE participant has 8.4 major medical diagnoses². PACE serves the lowest economic stratum (almost all PACE participants are Medicaid recipients) which has the highest mortality rates.³

Measuring Quality of Life

The PACE model has been in existence for over 20 years. Over its life span, PACE has been exceptionally powerful at maintaining quality of life, and reducing hospital and nursing

home days and costs. However, measuring quality of life, a global indicator without universally agreed upon parameters in a frail and disabled population, has proven difficult. Participant and proxy reporting on health status and satisfaction, which are subject to responder biases, are often used as surrogates. Although length of life is also an indirect marker of quality of life, it is an objective outcome that can be easily assessed, and co-morbidities can be controlled for.

Background on Longevity

Research on longevity in PACE programs and nursing homes is revealing. An ABT Associate evaluation across PACE sites estimated 10% of participants died after 1 year⁴. In comparison with applicants who did not enroll in PACE, PACE participants lived 1.3 times longer. Another study of all Virginia Medicaid reimbursed entrants to nursing home facilities found that 35% died within the first year⁵. Of those entrants who returned to community living without needing skilled nursing support, 26.5% died within the first year. This is 2.65 times the reported PACE rate. Two studies of nursing home residents, one from Maryland and another from Germany, found median survival times of 2.7 and 2.75 years, respectively.^{6,7}

METHODS

Center for Elders Independence (CEI), a PACE site in Oakland, CA, became Medicaid capitated on July 1, 1992. This study assesses longevity in the CEI population from July 1, 1992 through June 30, 1999. Criteria for inclusion in the study were all participants who enrolled in the program from July 1, 1992 to June 30, 1999 and disenrolled due to death or were still in the program as of June 30, 1999. This yielded a sample size of 276 participants, 108 of whom had died while in the program. Kaplan-Meier lifetables analysis was used to calculate 6-month

interval hazard rates from entry into the program. The estimated hazard distribution was plotted. Length of stay vs. age was graphed and then the correlation coefficient was calculated.

RESULTS

The median length of stay of CEI, PACE participants was estimated at 52.85 months (4.4 years). The hazard rates (probability of dying) with 95% C.I. were calculated and graphed in six-month intervals. (Table 1 and Figure 1.) Though not based on large numbers, the low slope suggests a nearly constant hazard rate. Twelve and a half percent (12.5%) were estimated to die in the first year after entry. After 6.5 to 7 years, 28% of the participants were estimated to still be alive.

When longevity in CEI is plotted against actual age at death for the 108 deaths (Figure 2.) the best-fit line suggests no correlation ($R^2 = 0.06$) between age and probability of death.

DISCUSSION

In general, survival is significantly attenuated by loss of function (ADL/IADL measured) and disease morbidity^{8,9,10}. PACE participants are believed to have comparable functional losses and comorbidities to nursing home residents¹¹. Our data citing 12.5% of CEI, PACE participants dying within the first year supports the earlier mentioned ABT study of 10%. These rates are less than half that of the Virginia study where 26.5% died within the first year among those returning to the community without requiring skilled nursing. The estimated median length of life of 4.4 years at CEI also suggests effective life prolongation. This is 1.6 times longer compared to nursing home studies sited earlier.

The finding that longevity correlates poorly with age and tends towards older participants living longer is remarkable if compared to national life table statistics. Figure 3 shows a plot of

10-year interval, age-specific incident death rates for 1997¹². Although death rates have been declining throughout the 20th century, an exponential-like rise in death rates from age 55 to the over 85 group persists in the general population today. As a "risk factor" age remains the strongest predictor of death for the elderly in general, and particularly the old old. Two discordant explanations for the poor correlation are 1) Factor(s) in the PACE environment and/or methodology are highly effective at preventing death, controlling morbidity, and presumably at maintaining quality of life, and 2) PACE serves such a frail population that disability profiles and co-morbidity contribute more to early death than age within PACE.

The relative contribution of the PACE environment and disability/morbidity status to lengthening and shortening life span, respectively, cannot be estimated at this time. However, our longevity data supports the hypothesis that PACE decreases the impact of disease morbidity and functional loss in comparison with non-PACE populations. Weaknesses of this study derive from the small numbers of participants and actual deaths analyzed (276, 108 respectively); the absence of other PACE program analyses; and the absence of a pertinent comparison group outside of PACE. These problems should be addressed in future research. A national PACE collaboration has been proposed.

CONCLUSION

PACE appears to extend life for the frail elderly it serves. Many of its participants die in a supported hospice environment from chronic illnesses and co-morbidities. The prolongation of life, however, suggests that PACE provides a major contribution to the quality of life of frail elders who choose, or whose families and support systems choose for them, to live out their lives in community settings. This enhancement of quality of life is probably the result of at least the

following complementary aspects of the program: 1) social stimulation and the social integration of the disabled into valued identity roles that are similar to an independent population, 2) intensive medical monitoring, early medical/nursing intervention and seamless integration of medical care into the social environment which decreases the perceptive burden of extreme physical and mental co-morbidities, and 3) maximizing continuity of care, early medical evaluation and intensive intervention reduces hospitalizations and thus morbidity in the last few years of life.

To look further at these issues, efforts will be made to examine the relative impact on length of life in PACE in subgroups with differing diagnostic, functional, and co-morbidity profiles.

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Figure 1.

Hazard Rate by 6 Month Intervals

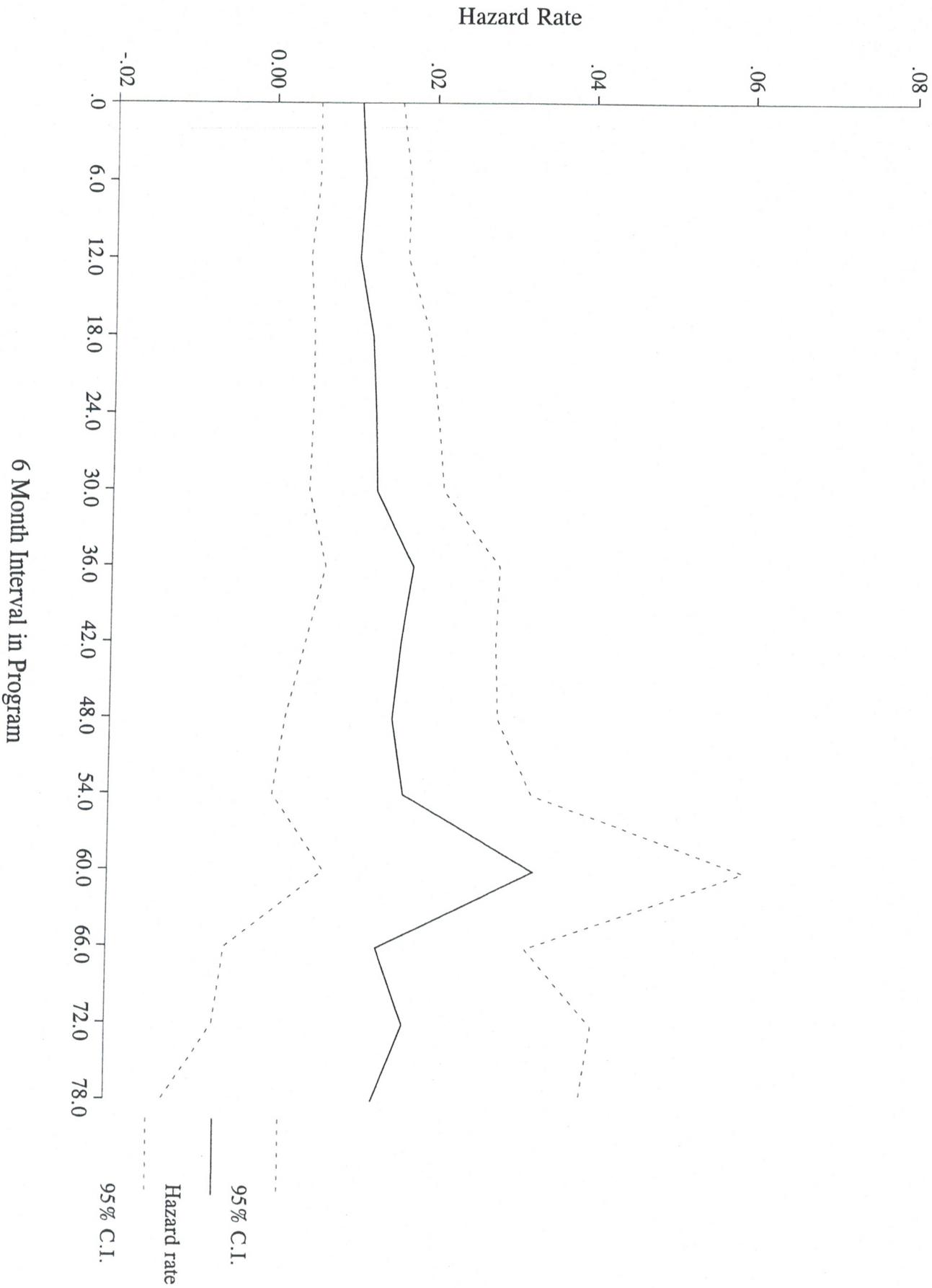


Figure 2.

CEI Length of Stay by Age for Deceased Clients

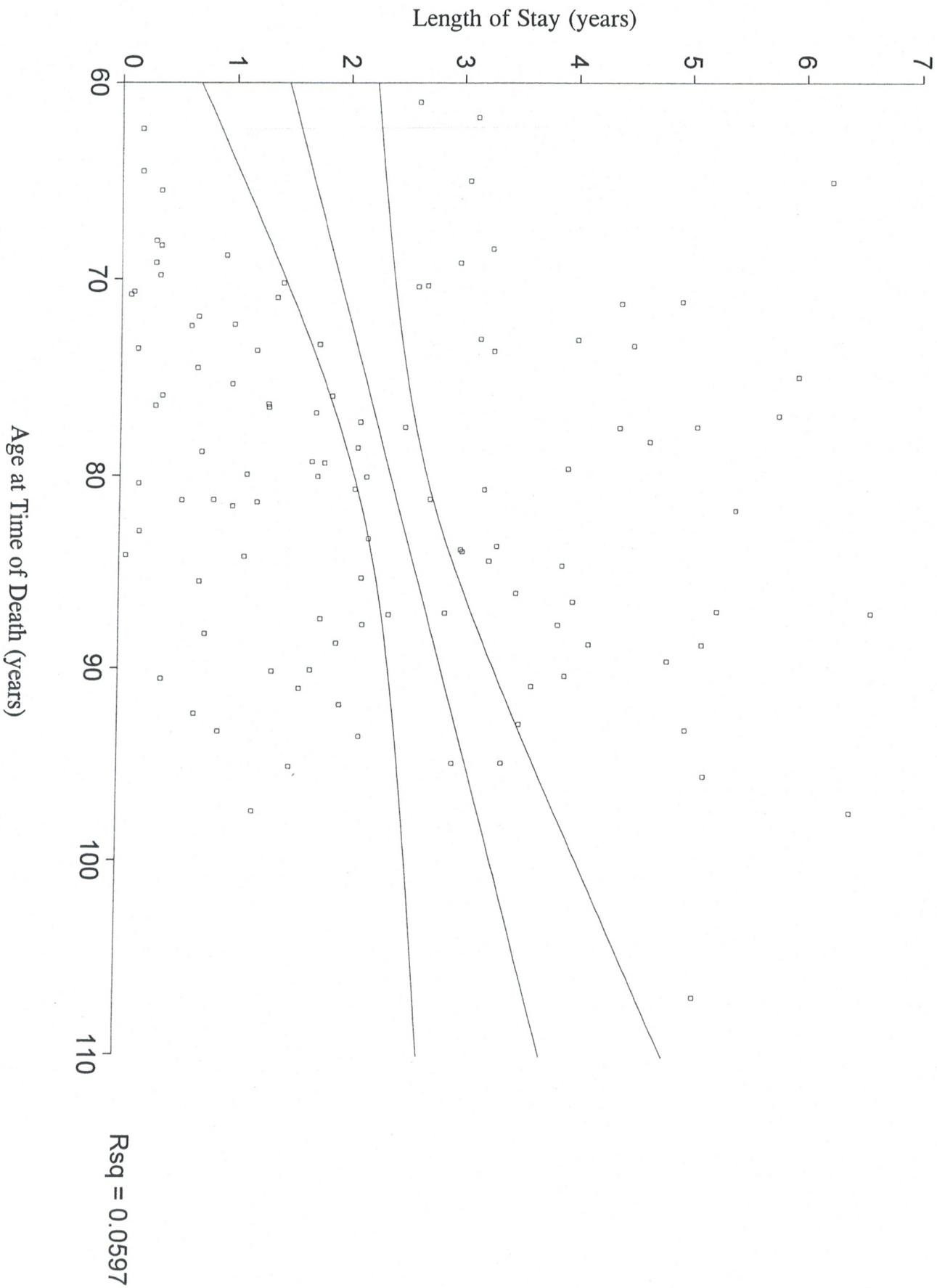


Table 1: Calculated Lifetables for 276 CEI clients that enrolled in the PACE program on or after 07/01/92 and either expired in the program or where still enrolled as of 06/30/99.

Interval Start Time (months)	Number Entering This Interval	Number Withdrawing During This Interval	Number Exposed to Risk	Number of Terminal Events	Proportion Terminating	Proportion Surviving	Cum. Proportion Surviving at End of Interval	Hazard Rate
0	276	27	262.5	16	0.0610	0.9390	0.9390	0.0105
6	233	28	219	14	0.0639	0.9361	0.8790	0.0110
12	191	18	182	11	0.0604	0.9396	0.8259	0.0104
18	162	11	156.5	11	0.0703	0.9297	0.7678	0.0121
24	140	5	137.5	10	0.0727	0.9273	0.7120	0.0126
30	125	8	121	9	0.0744	0.9256	0.6590	0.0129
36	108	17	99.5	10	0.1005	0.8995	0.5928	0.0176
42	81	11	75.5	7	0.0927	0.9073	0.5378	0.0162
48	63	11	57.5	5	0.0870	0.9130	0.4911	0.0152
54	47	10	42	4	0.0952	0.9048	0.4443	0.0167
60	33	0	33	6	0.1818	0.8182	0.3635	0.0333
66	27	3	25.5	2	0.0784	0.9216	0.3350	0.0136
72	22	3	20.5	2	0.0976	0.9024	0.3023	0.0171
78	17	8	13	1	0.0769	0.9231	0.2791	0.0133
84	8	8	4	0	0.0000	1.0000	0.2791	**

** These calculations for the last interval are meaningless.

The median survival time for these data is 52.85 months or 4.4 years.