

# The Effects of Residential Mobility on ADL and IADL Limitations Among the Very Old Living in the Community

Pei-Chun Chen<sup>1</sup> and Janet M. Wilmoth<sup>2</sup>

<sup>1</sup>Department of Sociology and Anthropology, Center on Aging and the Life Course,  
Purdue University, West Lafayette, Indiana.

<sup>2</sup>Center for Policy Research, Syracuse University, New York.

**Objectives.** We attempt to understand the influence of residential mobility on changes in objective activity of daily living (ADL) and instrumental ADL (IADL) limitations, while taking into account the subjective reason for the move.

**Methods.** We examine noninstitutionalized adults aged 70 and older who are in the Longitudinal Study of Aging. We use bivariate regression to identify differences between nonmovers and various types of movers in 1988 and 1990 ADL and IADL limitations. Multivariate residualized regression models estimate the effect of residential mobility on the changes in limitations between 1984–1988 and 1988–1990. We give particular attention to the timing and reason for the move.

**Results.** Controlling for demographic, social support, health status, and social integration characteristics, we find that residential mobility is associated with a short-term increase in ADL and IADL limitations. However, an additional analysis reveals that this short-term increase in limitations is only experienced by older adults who move for subjective health reasons. Compared with nonmovers, movers do not have significantly different changes in limitations over the long term.

**Discussion.** Older adults and service providers need to be concerned with short-term increases in objective ADL and IADL limitations that accompany residential relocations, especially for those who move for subjective health reasons. However, from a long-term perspective, residential relocation may serve as a mechanism for accommodating age-related changes that threaten effective functioning.

AS adults experience age-related physical and social changes, tension mounts between two potential courses of action: aging in place at one's current residence, and moving to a new residence. On the one hand, aging in place provides security to older adults because of their familiarity and comfort with a known environment (Ivry, 1995; Wagnild, 2001). On the other hand, residential relocation provides a chance to improve the quality of the physical and social environment (Bean, Myers, Angel, & Galle, 1994) and should enhance residents' long-term ability to function effectively. However, the potential benefits gained from living in a different physical and social environment might be offset, at least in the short term, by the stresses that arise from a move.

The evidence about the relationship between residential mobility and functional health outcomes among noninstitutionalized older adults is mixed (Baglioni, 1989). This is due, in part, to the complex relationship between residential mobility and health. Researchers often conceptualize later-life residential moves as environmental adaptations to changing health status. The commonly cited typologies of later-life residential mobility (Litwak & Longino, 1987; Meyer & Speare, 1985; Wiseman, 1980) emphasize the impact of declining health on the likelihood of residential relocation. These typologies assume a downward trajectory of health that precedes the residential move and continues after the moving event, often prompting subsequent moves. Research confirms the role of declining health in increasing the likelihood of assistance-seeking and institutional moves, which are more likely to occur among the very old

(Angel, De Jong, Cornwell, & Wilmoth, 1995; Miller, Longino, Anderson, James, & Worley, 1999; Silverstein & Zablotsky, 1996; Speare, Avery, & Lawton, 1991; Wolinsky, Callahan, Fitzgerald, & Johnson, 1993; Worobey & Angel, 1990).

However, the extant research provides conflicting evidence regarding health outcomes after the moving event. Some authors maintain that residential mobility has a negative impact on health, particularly when the move is involuntary or unexpected (Danermark & Ekstrom, 1990; Ferraro, 1982; Kahana & Kanaha, 1983). Others suggest that health may decline around the time of the move and shortly thereafter, but then stabilizes and potentially improves over time (Findley 1988; King, Dimond, & McCance, 1987). Therefore, even though the existing research consistently indicates health declines increase the risk of residential mobility among the very old, the impact of residential mobility on health outcomes in this population is not clearly documented.

To disentangle the relationship between residential mobility and health outcomes, changes in health have to be modeled in relation to the moving event. In this regard, it is important to distinguish between short-term changes that accompany a residential move from long-term changes that occur after the migration event. In addition, it is critical to consider the heterogeneity among very old movers (Bean et al., 1994). As potential movers, older adults continuously reevaluate their residential situation with respect to their needs, desires, and resources, the characteristics of their current geographic location and the area to which they are considering moving, and perceptions of

potential outcomes (Haas & Serow, 1993; Wiseman, 1980). This continual evaluation may shape the reasons for moving and the outcomes of the moving process. Thus, the subjective motivation for moving should have a substantial impact on objective health outcomes.

Research indicates that not all of the very old move for health reasons: less than one fifth of adults aged 70 and older who move cite health as the primary reason for their move. Affiliation, economic security, and comfort are also common motivations for later-life residential mobility (De Jong, Wilmoth, Angel, & Cornwell, 1995). However, none of the empirical studies that examine health outcomes among very old movers distinguish between these self-reported reasons for moving. They only make broad comparisons between movers and nonmovers, without considering the motivation for moving.

Therefore, the purpose of this research is to use data from a nationally representative sample of noninstitutionalized adults aged 70 and older to examine the relationship between residential mobility and two types of limitation outcomes: activity of daily living (ADL) limitations and instrumental ADL (IADL) limitations. In particular, this research asks the following research questions: First, do movers have a greater increase in ADL and IADL limitations than nonmovers? Second, do these increases in ADL and IADL limitations occur over the short term and long term? Third, do short-term and long-term limitation outcomes vary by the reason of move?

#### *A Framework for Understanding the Potential Impact of Residential Mobility on Health Among the Very Old*

From the perspective of Lawton's (1982) person-environment theory, aging includes various events that increase environmental press (i.e., physical and social demands). Adaptations, such as altering a home's physical structure, changing the household composition, or moving to a new environment, provide an opportunity to decrease environmental press and enhance functioning. Thus, residential mobility is one mechanism of changing one's physical and social environment to accommodate age-related changes that threaten effective functioning. If moving decreases environmental press, then the older migrants should experience improved, or at least stable, functioning.

However, moving involves stresses that can cause health decline, particularly among nonvoluntary migrants (Baglioni, 1989; Danermark & Ekstrom, 1990; Ferraro, 1982). These negative health outcomes may be more pronounced over the short term. Findley (1988) suggested that postrelocation health outcomes are not linear over time; health may decline immediately after relocation but the speed of deterioration subsequently slows down. This idea is supported by King and colleagues (1987), who found that some older adults suffer a period of declining physical health around the time of the move, but many report renewed health within 1 year. Although this empirical evidence may seem counter to the person-environment theory, it is actually consistent with it. Residential mobility may be prompted by health declines, and the move can involve enough stress to produce short-term health declines. However, those health declines should stabilize over the long term once the older adult has adapted to his or her new environment.

Finally, to understand the impact residential mobility may have on an older adult's health, one must consider the factors

that shape the decision to move. Declining physical health and increasing limitations are often cited as important impetuses for moving in later life (Colsher & Wallace, 1990; Longino, Jackson, Zimmerman, & Bradsher, 1991), particularly when the older adult lacks assistance (Miller et al., 1999). Family structure and social support, socioeconomic resources, and housing tenure also influence later-life residential mobility (Bean et al., 1994; Meyer & Speare, 1985; Speare & Meyer, 1988; Speare et al., 1991; Zimmerman, Jackson, Longino, & Bradsher, 1993). Various factors motivate moves within the community during later life, including health, family affiliation, economic security, physical comfort, functional independence, and changes in a spouse's health (De Jong et al., 1995).

These subjective motivations for moving reflect the underlying reason the older adult wants to change his or her physical and social environment. Given this, motivations are indirect indicators of the type of environmental press being experienced by the older adult. For example, older adults who are motivated to move for subjective health and functional independence reasons probably experience high demands from their physical environment. Conversely, older adults who are motivated to move for family affiliation and spousal health reasons are probably experiencing high demands from their social environment. Moving provides an opportunity to alleviate both types of environmental demand. However, given that this research is focused on objective ADL and IADL limitations, which are a prevalent problem in the community-dwelling older population (Rudberg, Parzen, Leonard, & Cassel, 1996), it is reasonable to expect that older adults who report moving for subjective health reasons will experience greater objective limitations over the short term than older adults who move for other reasons. However, if moving is an adaptive process, the objective limitations of these moving groups should not be any different than nonmovers over the long term.

Therefore, it is hypothesized for adults aged 70 and older that (a) movers will have greater increases in objective ADL and IADL limitations than nonmovers; (b) movers will experience greater increases in objective ADL and IADL limitations over the short term (i.e., during the interval that contains the moving event) than the long term (i.e., during the interval after the moving event); and (c) older adults who report moving for subjective health reasons will have more substantial short-term increases in objective ADL and IADL limitations than those who move for other reasons, but older adults who report moving for subjective health reasons will not have significantly different long-term increases in objective ADL and IADL limitations.

#### **METHODS**

The hypotheses are tested with data from the Longitudinal Study on Aging (LSOA), which contains a nationally representative sample of noninstitutionalized persons aged 70 and older. Although the LSOA is becoming dated, we intentionally selected this source of data because it has been extensively used by various researchers to examine residential mobility among the very old (e.g., Choi, 1996; De Jong et al., 1995; Longino et al., 1991; Miller et al., 1999; Silverstein & Zablotsky, 1996). However, almost all of the authors of these studies have been concerned with how health status influences the likelihood of residential mobility. Choi (1996) is the only one that systematically considered the impact of residential mobility

on health outcomes. However, only short-term changes in health status were considered, and the multivariate models included a limited number of demographic controls. Using the same data set (LSOA), we use motivations as one of the major predictors of postrelocation limitations and distinguish between short- and long-term changes. In addition, our models include more extensive controls, including social support, health status, and social integration. Therefore, this research provides a more comprehensive model that disentangles the relationship between residential mobility and health outcomes among the very old.

The members of the baseline LSOA sample were interviewed in 1984, with follow-up interviews in 1986, 1988, and 1990. However, only a subset of the baseline sample was interviewed in 1986. To ensure that the analysis contains a sufficient number of cases in the subjective reason for move categories, we use data collected from the original respondents living in the community (i.e., not institutionalized) in 1984, 1988, and 1990 ( $N = 7,512$ ). We take into account the complex sampling design by weighting all of the analyses with the final LSOA weight. In addition, we correct the standard errors in the multivariate analysis by using the robust and cluster commands in Stata (Stata, 2001).

This research examines changes in objective ADL and IADL limitations among movers and nonmovers during two time periods: the 4-year period from 1984 to 1988 and the 2-year period from 1988 to 1990. In 1988, 4,963 baseline respondents were interviewed, and 2,549 had left by attrition. By 1990, an additional 1,124 respondents had left by attrition from the sample, making the valid number of cases equal to 3,839. We include a lambda term in the multivariate models to control selection out of the sample over time (Heckman, 1979). We created this term in Stata (Stata, 2001) by using a two-stage model that predicted attrition as a function of baseline age, gender, number of medical conditions, participation in regular exercise, and whether the interview was provided by a proxy respondent (which serves as the instrumental variable).

There are two dependent variables that measure limitations: ADLs and IADLs. Both of these variables measure whether the respondent is able to perform essential activities of daily life that facilitate living independently in the community. For ADLs, the respondents indicated whether they have difficulty with bathing or showering, dressing, eating, getting in or out of bed or a chair, walking, getting outside, and using the toilet (1 = yes). These items are summed into a scale of the total number of ADLs. For IADLs, respondents identify whether they have difficulty with preparing meals, shopping, managing money, using the telephone, doing heavy housework, and doing light housework. These items are summed into a scale of the total number of IADLs. The models in this research only include the cases that have valid responses to the ADL and IADL items. Removing the cases with invalid ADL responses reduces the number of cases in the 1988 ADL model to 4,925 and those in the 1990 ADL model to 3,794. Removing the cases with invalid IADL responses reduces the number of cases in the 1988 IADL analysis to 4,887 and those in the 1990 IADL analysis to 3,761.

The primary independent variable, residential mobility, is based on two items. All participants in the 1988 and 1990 waves were asked (a) if they had moved since the last interview and (b), if so, what was the primary reason for the move. For

the subset of cases interviewed in 1986, it was necessary to also use the 1986 residential mobility questions to create accurate measures. This information is used to construct the four different sets of residential mobility measures.

The first set of residential mobility measures is a simple indicator of whether the respondent moved between 1984 and 1988 (1 = yes) or between 1988 and 1990 (1 = yes). This is used in an analysis predicting short-term changes in objective ADL and IADL limitations during 1984–1988 and 1988–1990, respectively. This analysis captures whether health was declining around the time of the migration event. As a result of data limitations, we are not able to identify the exact sequence of health declines and residential mobility over the short term.

The second measure uses all of the information about residential mobility over the 6-year study period to determine the timing of the respondent's moves. It indicates whether the respondent was a nonmover (reference), a mover during 1984–1988 only, a mover during 1988–1990 only, or a mover during 1984–1988 and 1988–1990. This measure is used in an analysis that models change in objective ADL and IADL limitations during 1988–1990. This analysis will provide insight into the short- and long-term limitation outcomes among migrants. The coefficients for respondents who moved during 1988–1990 only and during both time periods will represent short-term changes in limitations that occur during the interval containing the move. The coefficient for respondents who moved during 1984–1988 only will represent long-term limitation outcomes that occurred after the moving event (i.e., 1988–1990). Thus, the structure of the data allows us to disentangle the timing of a move and subsequent health declines for a subset of this population.

The third and fourth measures take into account the primary reason for the move. A modified version of the motivations for a moving conceptual framework (De Jong et al., 1995) is used to assign the reason for moving into five categories: health-related reasons (poor health; sample person's loss of independence), family-related reasons (live closer to or with children, sibling, and other relatives; remarriage; poor health, death, or institutionalization of spouse), environmental reasons (limitations of residence; weather or climate; move to retirement or community home; better or improved living conditions), financial reasons (money; financial considerations), and unknown reasons (other; no response or refused).

The third residential mobility measure is a simple reason for moving variable that indicates whether the respondent reported moving for one of the previously mentioned reasons during either the 1984–1988 or the 1988–1990 time periods. These measures will be used in an analysis of short-term change in ADL and IADL limitations during 1984–1988 and 1988–1990, respectively. The analysis will identify whether objective limitation changes are more pronounced among those who report moving for subjective health reasons.

Although this may seem like an obvious point, it is not a forgone conclusion. Older adults who subjectively report moving for health reasons do not necessarily have objective increases in ADL and IADL limitations. Their health condition might require special treatment, support, or equipment that can be more readily received or used at the destination location. In this circumstance, an older adult might report moving for health reasons even though his or her ADL and IADL status is stable. What is more important is that distinguishing between the

Table 1. Weighted Descriptive Statistics (1984)

Variables	Total Sample
Demographic characteristics	
Age ( <i>M</i> )	76.83 (5.60)
Gender (% female)	61.32
Race (% White)	90.48
Education ( <i>M</i> )	9.96 (3.66)
Household income, \$ (%)	
Low (<10,000)	37.09
Mid (10,000–14,999)	27.07
High (15,000+)	18.73
Missing	17.11
Widowhood (%)	47.57
Social support	
Living alone (%)	36.25
Receiving help	
Help with ADLs (% yes)	12.09
Help with IADLs (% yes)	26.90
Health status	
Chronic disease or condition ( <i>M</i> )	1.82 (1.47)
Fall recently (% yes)	22.33
Regular exercise (% yes)	25.59
Needs a convenient living environment (% yes)	28.83
Social integration	
Objective scale ( <i>M</i> )	4.00 (1.66)
Subjective social life (%)	
Less than expected	19.97
About enough	67.64
More than expected	1.31
Missing	11.07
<i>N</i>	7,512
Weighted <i>N</i>	17,278,916

Notes: Standard deviations are shown in parentheses. ADL = activities of daily living; IADL = instrumental ADL.

subjective reasons for moving allows us to identify whether older adults who report moving for reasons other than health are experiencing an increase in ADL and IADL limitations around the time of the move and after the moving event. This measure will clarify whether the negative outcomes of migration that have been observed in other studies systematically occur for all movers regardless of the reason for moving.

Because in the analysis we are particularly interested in limitation outcomes among those who move for subjective health reasons, the fourth measure focuses on the timing of moves among health movers during 1984–1990. The categories of this variable include the following: did not move (reference), moved once for subjective health reasons during 1984–1988, moved once for subjective health reasons during 1988–1990, moved twice for subjective health reasons during 1984–1988 and 1988–1990, or had some other combination of moving between 1984 and 1990. These categories enable us to identify the short- and long-term limitation outcomes among those who moved for subjective health reasons. The coefficients for those who moved once during 1988–1990 for subjective health reasons and moved twice for subjective health reasons will indicate short-term limitation outcomes among health movers, whereas the coefficient for those who moved once during 1984–1988 for subjective health reasons will indicate the long-term limitation outcomes among health movers. Once

again, this measure enables us to uniquely identify the short-term changes that accompany a move from long-term changes that occur after a move.

Previous research indicates that various demographic, health, and interpersonal characteristics influence the likelihood of moving in later life (e.g., De Jong et al., 1995; Miller et al., 1999; Zimmerman et al., 1993) and transitions in functional status (Anderson, James, Miller, Worley, & Longino, 1998). Therefore, control variables include the older adults' baseline demographic characteristics (i.e., age, sex, race, education, income, and widowhood), social supports (i.e., living arrangements, receiving assistance with ADLs), health status (i.e., chronic diseases and conditions, regular exercise, recent fall, and the need for a convenient living environment), and social integration (i.e., an objective scale based on reported activities with family and friends and a subjective scale that reports the respondent's satisfaction with his or her level of social activity). To retain respondents in the multivariate analysis, the few cases with missing values on education and the objective report of social activities were mean substituted and a missing category was created for income and the subjective satisfaction with social activities. Table 1 presents the weighted descriptive statistics for the control variables.

## RESULTS

### *Bivariate Differences Between Movers and Nonmovers*

The first step of the analysis is for us to present the mean ADL and IADL limitations in 1988 and 1990 by moving category. We use bivariate regression to identify significant differences between the specific categories for each residential mobility measure. Table 2 contains four panels; there is one for each of the four residential mobility measures. The first panel of Table 2, which presents the simple move measure, shows that 1984–1988 movers had significantly higher levels of ADL and IADL limitations in 1988 than nonmovers. The 1988–1990 movers also experienced significantly higher 1990 ADL and IADL limitations than nonmovers. This indicates that, as a group, movers experience poorer ADL and IADL limitation outcomes than nonmovers.

The second panel in Table 2 indicates the residential mobility only has short-term effects on limitations. Respondents who move during both time intervals (i.e., 1984–1988 and 1988–1990) and those who move during 1988–1990 have significantly higher ADL and IADL limitations in 1990 than nonmovers. However, those who move only between 1984 and 1988 do not have significantly different ADL and IADL limitations in 1990 than nonmovers. This suggests that, although there may be increases in limitations that occur during the moving interval, movers do not experience long-term decrements in functioning.

The third panel, which shows the simple reason for move measure, indicates those who report moving for subjective health reasons have substantially greater ADL and IADL limitations in 1988 and 1990 than nonmovers. In addition, those who report moving for family reasons have higher IADL limitations in 1988, whereas those who move for financial reasons have lower ADL limitations in 1990. An additional analysis (not shown) also indicates movers who move for subjective health reasons have significantly higher ADL and IADL limitations than those who move for the other four

Table 2. ADL and IADL Limitations Among Nonmovers and Movers

Measure	1988		1990	
	ADL	IADL	ADL	IADL
Simple move, 1984–1988 and 1988–1990				
Nonmovers	<i>1.15</i>	<i>1.01</i>		
1984–1988	(1.91)	(1.61)		
	<i>n</i> = 4,324	<i>n</i> = 4,296		
Movers	<b>1.44**</b>	<b>1.41***</b>		
1984–1988	(2.11)	(1.92)		
	<i>n</i> = 601	<i>n</i> = 591		
Nonmovers			<i>1.25</i>	<i>1.05</i>
1988–1990			(1.99)	(1.63)
			<i>n</i> = 3,534	<i>n</i> = 3,514
Movers			<b>1.66**</b>	<b>1.79***</b>
1988–1990			(2.25)	(2.13)
			<i>n</i> = 260	<i>n</i> = 247
Timing of move, 1984–1990				
Nonmovers			<i>1.23</i>	<i>1.03</i>
			(1.98)	(1.61)
			<i>n</i> = 3,181	<i>n</i> = 3,166
Movers				
Move			1.44	1.24
1984–1988			(2.12)	(1.87)
only			<i>n</i> = 353	<i>n</i> = 348
Move			<b>1.61*</b>	<b>1.74***</b>
1988–1990			(2.23)	(2.14)
only			<i>n</i> = 175	<i>n</i> = 172
Move both			<b>1.77*</b>	<b>1.92**</b>
1984–1988 and			(2.31)	(2.12)
1988–1990			<i>n</i> = 85	<i>n</i> = 75
Simple reason for move 1984–1988 and 1988–1990				
Nonmovers	<i>1.15</i>	<i>1.01</i>		
1984–1988	(1.91)	(1.61)		
	<i>n</i> = 4,324	<i>n</i> = 4,296		
Movers 1984–1988				
Move for	<b>3.14***</b>	<b>2.87***</b>		
health	(2.59)	(2.32)		
reasons	<i>n</i> = 88	<i>n</i> = 85		
Move for	1.06	<b>1.44**</b>		
family-related	(1.87)	(1.96)		
reasons	<i>n</i> = 179	<i>n</i> = 177		
Move for	1.21	1.01		
environmental	(1.91)	(1.58)		
reasons	<i>n</i> = 133	<i>n</i> = 128		
Move for	0.95	1.18		
financial	(1.61)	(1.62)		
reasons	<i>n</i> = 90	<i>n</i> = 90		
Move for	1.40	0.94		
unknown	(2.04)	(1.57)		
reasons	<i>n</i> = 111	<i>n</i> = 111		
Nonmovers			<i>1.25</i>	<i>1.05</i>
1988–1990			(1.99)	(1.63)
			<i>n</i> = 3,534	<i>n</i> = 3,514
Movers 1988–1990			<b>3.44***</b>	<b>3.51***</b>
Move for			(2.67)	(2.27)
health			<i>n</i> = 73	<i>n</i> = 64
reasons			1.22	1.36
Move for			(1.79)	(1.89)
family-related			<i>n</i> = 69	<i>n</i> = 69
reasons			0.86	1.12
Move for			(1.51)	(1.57)
environmental			<i>n</i> = 34	<i>n</i> = 36
reasons				

(Table 2 continues)

Table 2. ADL and IADL Limitations Among Nonmovers and Movers  
(Continued)

Measure	1988		1990	
	ADL	IADL	ADL	IADL
Move for			<b>0.68**</b>	0.82
financial			(1.25)	(1.35)
reasons			<i>n</i> = 36	<i>n</i> = 35
Move for			1.06	1.40
unknown			(1.81)	(1.92)
reasons			<i>n</i> = 48	<i>n</i> = 43
Timing and reason of move, 1984–1990				
Nonmovers			<i>1.23</i>	<i>1.03</i>
			(1.98)	(1.61)
			<i>n</i> = 3,181	<i>n</i> = 3,166
Movers				
Move once,			<b>2.43**</b>	<b>2.28***</b>
for health reason,			(2.32)	(2.38)
1984–1988			<i>n</i> = 48	<i>n</i> = 49
Move once,			<b>3.35***</b>	<b>3.47***</b>
for health reason,			(2.65)	(2.25)
1988–1990			<i>n</i> = 64	<i>n</i> = 57
Move twice,			<b>4.07**</b>	<b>3.86**</b>
both for health			(2.83)	(2.55)
reasons			<i>n</i> = 9	<i>n</i> = 7
Other reasons			1.18	1.13
and timings			(1.91)	(1.73)
of moves			<i>n</i> = 492	<i>n</i> = 482

Notes: Boldface indicates a significant difference in means between nonmovers (shown in italics) and the indicated category. Standard deviations are shown in parentheses. ADL = activities of daily living; IADL = instrumental ADL.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

reasons. This provides preliminary evidence that increases in objective limitations during the interval that contains the move only systematically occur among those who move for subjective health reasons.

The fourth panel, which includes the timing and reason of move measure, indicates that those who move only once for subjective health reasons (during 1984–1988 or 1988–1990) or twice for subjective health reasons (during 1984–1988 and 1988–1990) have substantially greater limitations in 1990 than nonmovers and those who move for other reasons. Those who move for other reasons are not significantly different than nonmovers. This indicates that, for subjective health migrants, there are short- and long-term decrements in objective limitations. However, it is important for us to control for the other factors that can influence limitation outcomes and selection out of the sample before drawing any conclusions about the differences between nonmovers and the various mover categories.

#### Multivariate Differences Between Movers and Nonmovers

We use residualized change models to test the relationship between relocation and limitation changes. These models predict  $Y_2$  (i.e., limitations in 1988 or 1990) as a function of  $Y_1$  (i.e., limitations in the previous time period) and  $X$  (i.e., baseline control variables; see Allison, 1990). The tables only present the baseline limitation and residential mobility coefficients. Complete tables are available from P.-C. Chen upon request.

Table 3. Residualized Regression Predicting 1988 and 1990 Limitation Outcomes as a Function of Baseline Limitations, the Simple Move Measure, and Control Variables

Variables	1988		1990	
	ADL	IADL	ADL	IADL
ADL 1984	0.4300*** (0.04) <sup>a</sup>			
IADL 1984		0.2456*** (0.05)		
ADL 1988			0.7156*** (0.02)	
IADL 1988				0.5282*** (0.03)
Nonmovers (reference)				
Move 1984–1988	0.2373** (0.77)	0.3508*** (0.08)		
Move 1988–1990			0.2336* (0.11)	0.6254*** (0.12)
<i>F</i> value	105.09***	53.51***	140.57***	52.29***
<i>R</i> <sup>2</sup>	0.3580	0.2691	0.5299	0.3743
<i>n</i>	4,925	4,887	3,794	3,761

Notes: Control variables include age, gender, race, education, income, widowhood, living alone, receiving help with ADLs, receiving help with IADLs, social integration, chronic disease and conditions, regular exercise, fall recently, needs a convenient living environment, and attrition. ADL = activities of daily living; IADL = instrumental ADL.

<sup>a</sup>Robust standard errors are shown in parentheses.

\**p* < .05; \*\**p* < .01; \*\*\**p* < .001.

Table 3 provides insight to the general differences in objective limitation outcomes between movers and nonmovers. It indicates that residential relocation is accompanied by short-term increases in ADL and IADL limitations. Both 1984–1988 movers and 1988–1990 movers have more accelerated increases in limitations than nonmovers. The evidence supports the first hypothesis and is consistent with previous research, which finds that residential mobility is accompanied by health declines.

Table 4 identifies the short-term and long-term effects of relocation by modeling changes in limitations during 1988–1990. The results indicate that those who moved recently (i.e., during 1988–1990 only) experience greater increases in ADL and IADL limitations. In addition, those who moved during both time periods (i.e., 1984–1988 and 1988–1990) had more accelerated IADL increases compared to nonmovers. Those who move during 1984–1988 do not have significantly different ADL or IADL changes than nonmovers. This suggests that the increases in objective limitations that occur around the time of a move are not long-lived.

Table 5 indicates that older adults who move for subjective health reasons during 1984–1988 or during 1988–1990 have greater ADL and IADL limitation increases than nonmovers. In addition, those who move for family-related reasons between 1984 and 1988 have greater increases in IADL limitations between 1984 and 1988. Supplementary *t* tests for the equality of coefficients (not shown) indicate that those who report moving for subjective health reasons have significantly greater changes in limitations than those in all of the other reasons of move categories. Thus, health movers have significantly greater increases in objective limitations during the move interval than nonmovers and other movers.

Table 4. Residualized Regression Predicting 1990 Limitation Outcomes as a Function of Baseline Limitations, the Timing of Move Measure, and Control Variables

Variables	ADL 1990	IADL 1990
ADL 1988	0.7156*** (0.02) <sup>a</sup>	
IADL 1988		0.5276*** (0.03)
Nonmovers (reference)		
Move only in 1984–1988	0.0464 (0.08)	0.0260 (0.09)
Move only in 1988–1990	0.2696 <sup>†</sup> (0.14)	0.6072*** (0.15)
Move both in 1984–1988 and 1988–1990	0.1710 (0.17)	0.6783** (0.21)
<i>F</i> value	129.07***	48.45***
<i>R</i> <sup>2</sup>	0.5299	0.3744
<i>n</i>	3,794	3,761

Notes: Control variables include age, gender, race, education, income, widowhood, living alone, receiving help with ADLs, receiving help with IADLs, social integration, chronic disease and conditions, regular exercise, fall recently, needs a convenient living environment, and attrition. ADL = activities of daily living; IADL = instrumental ADL.

<sup>a</sup>Robust standard errors are shown in parentheses.

<sup>†</sup>*p* < .1; \**p* < .05; \*\**p* < .01; \*\*\**p* < .001.

Table 6 confirms that there are short-term, but not long-term, increases in objective limitations for those who move for subjective health reasons. Recent health-related moves and multiple health-related moves are associated with short-term increases in ADL and IADL limitations. However, those who move once for subjective health reasons have long-term limitation changes that are similar to those of nonmovers.

In conclusion, controlling for various individual-level characteristics, we found that relocation is associated with accelerated changes in ADL and IADL limitations. However, a simple dichotomous measure of moving masks differences between various types of movers. When we categorize movers into reasons of move, moving for subjective health reasons presents unique effects on objective limitations. Those who move for subjective health reasons have greater ADL and IADL increases. Furthermore, the timing of the move affects limitation changes. Large differences in limitation changes between 1988 and 1990 are evident for those who move only between 1988 and 1990 or those who move multiple times, whereas those who move only between 1984 and 1988 are not significantly different from nonmovers. This finding suggests that the negative impact of relocation may become weaker over time. Moreover, the short-term effects of relocation only apply to those who report moving for subjective health reasons. Other types of movers do not appear to be on a trajectory of health decline at the time of the move.

## DISCUSSION

Although many researchers have emphasized the complexity of later-life residential mobility (e.g., Bean et al., 1994; Silverstein & Zablosky, 1996), few have paid close attention to the connection between the subjective prerelocation decision-making process and postrelocation health outcomes. This research was designed to articulate that connection. The findings

Table 5. Residualized Regression Predicting 1988 and 1990 Limitation Outcomes as a Function of Baseline Limitations, the Simple Reason for Move Measure, and Control Variables

Variables	1998		1990	
	ADL	IADL	ADL	IADL
ADL 1984	0.4288*** (0.04) <sup>a</sup>			
IADL 1984		0.2472*** (0.05)		
ADL 1988			0.7103*** (0.02)	
IADL 1988				0.5217*** (0.03)
Nonmovers (reference)				
Move for health reason	1.2319*** (0.26)	1.3443*** (0.26)	1.4715*** (0.26)	2.0139*** (0.30)
Move for family-related reason	-0.0537 (0.14)	0.4260** (0.14)	-0.2108 (0.18)	0.1690 (0.22)
Move for environmental reason	0.1993 (0.13)	0.1082 (0.12)	-0.1459 (0.18)	0.1231 (0.23)
Move for financial reason	-0.0498 (0.16)	0.2301 (0.17)	-0.1833 (0.16)	0.0109 (0.19)
Move for unknown reason	0.2270 (0.16)	-0.1037 (0.13)	-0.3054* (0.15)	0.3339 (0.22)
F value	74.66***	39.23***	123.91***	49.01***
R <sup>2</sup>	0.3637	0.2775	0.5394	0.3894
n	4,925	4,887	3,794	3,761

Notes: Control variables include age, gender, race, education, income, widowhood, living alone, receiving help with ADLs, receiving help with IADLs, social integration, chronic disease and conditions, regular exercise, fall recently, needs a convenient living environment, and attrition. ADL = activities of daily living; IADL = instrumental ADL.

<sup>a</sup>Robust standard errors are shown in parentheses.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

suggest that certain movers, particularly those who have moved recently, those who have several successive moves, and those who move for subjective health reasons, have more accelerated increases in objective ADL and IADL limitations around the time of the move. However, these increases do not continue over the long term. The lack of long-term differences between movers and nonmovers may be due to the fact that moving provides the opportunity for a more optimal match between the person and his or her environment. Moving can potentially increase personal competence and enhance functioning by reducing environmental press.

This research builds on previous research in three ways. First, the analysis takes into account the heterogeneity among very old movers by using information about the subjective reason for moving. This allows us to identify those who report moving for health reasons, who are at the greatest risk of experiencing health declines and limitation increases after the moving event. Second, we extend previous research regarding the negative effect of residential mobility (e.g., Choi, 1996; Ferraro, 1982) by finding that the negative effects only occur over the short term. Although this point has been raised before (e.g., Findley, 1988; King et al., 1987), the comparison of long-

Table 6. Residualized Regression Predicting 1990 Limitation Outcomes as a Function of Baseline Limitations, the Timing and Reason for Move Measure, and Control Variables

Variables	ADL 1990	IADL 1990
ADL 1988	0.7114*** (0.02) <sup>a</sup>	
IADL 1988		0.5211*** (0.30)
Nonmovers (reference)		
Move once for health reason, 1984–1988	-0.2239 (0.22)	-0.0333 (0.25)
Move once for health reason, 1988–1990	1.4768*** (0.30)	1.9633*** (0.31)
Move twice for health reason, 1984–1988 and 1988–1990	1.4548*** (0.38)	2.4456** (0.80)
Other combination of move, 1984–1990	-0.0276 (0.07)	0.0927 (0.07)
F value	136.41***	51.18***
R <sup>2</sup>	0.5390	0.3892
n	3,794	3,761

Notes: Control variables include age, gender, race, education, income, widowhood, living alone, receiving help with ADLs, receiving help with IADLs, social integration, chronic disease and conditions, regular exercise, fall recently, needs a convenient living environment, and attrition. ADL = activities of daily living; IADL = instrumental ADL.

<sup>a</sup>Robust standard errors are shown in parentheses.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

term versus short-term effects has not been made with nationally representative data such as the LSOA. In addition, to our knowledge, this is the first research to demonstrate that these short-term negative health outcomes only apply to the subset of older adults who report moving for health reasons. Third, the effects of attrition are controlled in the models to minimize the selection bias. Therefore, the lack of negative long-term outcomes among movers cannot be attributed to the unique characteristics of the surviving respondents.

Future research should explore in more detail the factors that affect postmobility adaptation among older adults, such as the perception of control over the move, preference for living arrangements and neighborhood characteristics, changes in the older adult's social support system, and specific changes in his or her physical environment. This study was unable to directly account for these factors as a result of data limitations. However, the findings suggest that later-life residential mobility may be an adaptive process that enables older adults, particularly those who are experiencing a trajectory of health decline, to gain access to a physical and social environment that is more appropriate given their current needs, abilities, and interests. There are theoretical reasons for expecting that changes in the older adult's social environment play an important role in postmobility adaptation. Social integration promotes one's subjective well-being (Moody, 2000), and social support serves as a buffer against stressful life events (Pillemer & Glasgow, 2000). Therefore, the negative effect of relocation may be buffered by social support. Furthermore, if residential mobility strengthens the older adult's social support system, then environmental press should decrease and functioning should be enhanced.

Future research on improving the living environment for both movers and nonmovers is also needed. We need a better understanding of the physical features of the living environment

that encourage optimal functioning. From the person–environment perspective, environmental demands should match an individual’s level of competence. Given this, living environments should take into account the abilities of older adults with different levels of competence. Research suggests that an environment that poses few physical demands may maximize functioning among older adults with lower levels of competence, but it may not provide sufficient challenges to older adults with high competence. For this group, living in a more demanding physical environment may prevent premature functional decline (Shipp & Branch, 1999). Therefore, future research should examine whether the postmove environment provides sufficient challenges given the older adult’s competence. It should also consider how the match between the individual’s competence and the press provided by the postmove environment influences health outcomes.

Studies of residential mobility in later life have benefited from the increased availability of nationally representative longitudinal data. Although we are able to claim that residential mobility has a short-term impact on ADL and IADL limitations, we do not completely resolve the confounded relationship between health and residential mobility. In addition, given that this analysis focuses on moves that occur among community-based elders, it does not provide any evidence regarding short- and long-term health outcomes among older adults who move into assisted living facilities and institutions that provide long-term care. Older adults experiencing these types of moves may be on a trajectory of health decline that would be associated with short- and long-term increases in ADL and IADL limitations. However, it is not clear whether older adults who move into more supportive environments have slower trajectories of decline than their counterparts who do not move. More recent data, such as that from the Second Longitudinal Study of Aging (LSOA II) and the Health and Retirement Study (HRS)/Asset and Health Dynamics Among the Oldest Old (AHEAD), that contain multiple waves collected at regular intervals over several years are required for us to fully understand the health consequences of a wide range of later-life residential mobility options. They will also provide insight into whether the relationship between migration and health has changed for more recent cohorts. However, even these data sets have limited information on the specific timing of migration events and health decline. Therefore, further data collection may be necessary for us to fully explicate the relationship between residential mobility and health among the very old.

Ultimately, the goal of these studies is to understand the characteristics of a “successful” move. Although moving is less likely at older ages, a substantial proportion of older adults experience a move at some point in later life (Siegel, 1993). We know from previous research that successful moves are more likely among young older adults with higher socioeconomic resources and better premove health status (Choi, 1996; Ferraro, 1982). Successful moves are also more likely when the move is voluntary (Danermark & Ekstrom, 1990; Ferraro 1982; Kahana & Kanaha, 1983). This research indicates that a successful move, at least in terms of ADL and IADL limitation outcomes, is more likely to occur among those who do not move for subjective health reasons. For those who move for subjective health reasons, postmobility adaptation could be facilitated by living environments that are appropriate given the

older adult’s competence, and by assistance from informal caregivers and formal support services designed to maximize functioning in the new living environment. Overall, this research suggests that, even for those who move to compensate for declining health, moving enables the older adult to make adjustments in his or her physical and social environment that enhance long-term functioning. Despite the short-term disruption caused by a move, residential mobility is a mechanism for accommodating age-related changes that threaten effective functioning.

#### ACKNOWLEDGMENTS

This research was supported by Grant 1-K07-AG01055-01 from the National Institute on Aging and a fellowship from the Purdue Research Foundation. Support was also provided by the Center for Policy Research at Syracuse University. We appreciate Dr. Kenneth Ferraro and Dr. Jessica Kelley-Moore for their comments on early drafts.

Address correspondence to Pei-Chun Chen, Department of Sociology and Anthropology, Purdue University, Stone Hall, 700 W. State Street, West Lafayette, IN 47906. E-mail: chenp@soc.purdue.edu

#### REFERENCES

- Allison, P. D. (1990). Change scores as dependent variables in regression analysis. In C. C. Clogg (Ed.), *Sociological methodology* (pp. 93–114). Washington, DC: American Sociological Association.
- Anderson, R. T., James, M. K., Miller, M. E., Worley, A. S., & Longino, C. F. (1998). The timing of change: Patterns in transitions in functional status among elderly persons. *Journal of Gerontology: Social Sciences, 53B*, S17–S27.
- Angel, J., De Jong, G., Cornwell, G., & Wilmoth, J. (1995). Diminished health, non-metropolitan residence, and premature institutionalization: Evidence from the Longitudinal Study on Aging. *National Journal of Sociology, 9*, 31–57.
- Baglioni, A. J., Jr. (1989). Residential relocation and health of the elderly. In K. S. Markides & C. L. Cooper (Eds.), *Aging, stress and health* (pp. 119–137). Chichester, England: Wiley.
- Bean, F. D., Myers, G. C., Angel, J. L., & Galle, O. R. (1994). Geographic concentration, migration, and population redistribution among the elderly. In L. G. Martin & S. H. Preston (Eds.), *Demography of aging* (pp. 319–355). Washington, DC: National Academy Press.
- Choi, N. G. (1996). Older persons who move: Reasons and health consequences. *The Journal of Applied Gerontology, 15*, 325–344.
- Colsher, P., & Wallace, R. (1990). Health and social antecedents of relocation in rural elderly persons. *Journal of Gerontology: Social Sciences, 45*, S32–S38.
- Danermark, B., & Ekstrom, M. (1990). Relocation and health effects on the elderly. *Journal of Sociology and Social Welfare, 17*, 25–49.
- De Jong, G. F., Wilmoth, J. M., Angel, J. L., & Cornwell, G. T. (1995). Motives and the geographic mobility of very old Americans. *Journal of Gerontology: Social Sciences, 50B*, S395–S404.
- Ferraro, K. F. (1982). The health consequences of relocation among the aged in the community. *Journal of Gerontology, 38*, 90–96.
- Findley, S. E. (1988). The directionary and age selectivity of the health-migration relation: Evidence from sequences of disability and mobility in the United States. *International Migration Review, 22*, 4–29.
- Haas, W. H., & Serow, W. J. (1993). Amenity retirement migration process: A model and preliminary evidence. *The Gerontologist, 33*, 212–220.
- Heckman, J. (1979). Sample selection bias as a specification error. *Econometrica, 45*, 153–161.
- Ivry, J. (1995). Aging in place: The role of geriatric social work. *Families in Society, 76*, 76–85.
- Kahana, E., & Kahana, B. (1983). Environmental continuity, futurity, and adaptation of aged. In G. D. Rowles & R. J. Ohta (Eds.), *Aging and milieu* (pp. 205–228). New York: Academic Press.
- King, K. S., Dimond, M., & McCance, K. L. (1987). Coping with relocation. *Geriatrics Nursing, 8*, 258–261.
- Lawton, M. P. (1982). Competence, environmental press, and the adaptation of older people. In M. P. Lawton, P. G. Windley, & T. O. Byerts (Eds.), *Aging and the environment: Theoretical approaches* (pp. 33–59). New York: Springer.



- Litwak, E., & Longino, C. F., Jr. (1987). Migration patterns among the elderly: A developmental perspective. *The Gerontologist*, *27*, 266–272.
- Longino, C. F., Jr., Jackson, D. J., Zimmerman, R. S., & Bradsher, J. E. (1991). The second move: Health and geographic mobility. *Journal of Gerontology: Social Sciences*, *46*, S218–S224.
- Meyer, J. W., & Speare, A., Jr. (1985). Distinctively elderly mobility: Types and determinants. *Economic Geography*, *61*, 79–88.
- Miller, M. E., Longino, C. F., Jr., Anderson, R. T., James, M. K., & Woley, A. S. (1999). Functional status, assistance, and the risk of a community-based move. *The Gerontologist*, *39*, 187–200.
- Moody, H. R. (2000). *Aging—Concept and controversies* (3rd ed.). Thousand Oaks, CA: Pine Forge Press.
- Pillemer, K., & Glasgow, N. (2000). Social integration and aging—Background and trends. In K. Pillemer, P. Moen, E. Wethington, & N. Glasgow (Eds.), *Social integration in the second half of life* (pp. 19–27). Baltimore: The Johns Hopkins University Press.
- Rudberg, M. A., Parzen, M. I., Leonard, L. A., & Cassel, C. K. (1996). Functional limitation pathways and transitions in community-dwelling older persons. *The Gerontologist*, *36*, 430–440.
- Shipp, K. M., & Branch, L. G. (1999). The physical environment as a determinant of the health status of older population. *Canadian Journal on Aging*, *18*, 313–327.
- Siegel, J. S. (1993). *A generation of change: A profile of America's older population*. New York: Russell Sage Foundation.
- Silverstein, M., & Zablotsky, D. L. (1996). Health and social precursors of later life retirement—Community migration. *Journal of Gerontology: Social Science*, *51B*, S150–S156.
- Speare, A., Jr., Avery, R., & Lawton, L. (1991). Disability, residential mobility, and changes in living arrangements. *Journal of Gerontology: Social Sciences*, *46*, S133–S142.
- Speare, A., Jr., & Meyer, J. (1988). Types of elderly residential mobility and their determinants. *Journal of Gerontology: Social Sciences*, *43*, S74–S81.
- Stata. (2001). *Stata reference manual* (Release 7, Vol. 3). College Station, TX: Stata Press.
- Wagnild, G. (2001). Growing old at home. *Journal of Housing for the Elderly*, *14*, 71–84.
- Wiseman, R. F. (1980). Why older people move—Theoretical issues. *Research on Aging*, *2*, 141–154.
- Wolinsky, F. D., Callahan, C. M., Fitzgerald, J. F., & Johnson, R. J. (1993). Changes in functional status and the risks of subsequent nursing home placement and death. *Journal of Gerontology: Social Sciences*, *48*, S93–S101.
- Worobey, J., & Angel, R. (1990). “Functional capacity and living arrangements of unmarried elderly persons. *Journals of Gerontology: Social Sciences*, *45*, S95–S101.
- Zimmerman, R. S., Jackson, D. J., Longino, C. F., Jr., & Bradsher, J. E. (1993). Interpersonal and economic resources as mediator of the effect of health decline on the geographic mobility of the elderly. *Journal of Aging and Health*, *5*, 37–57.

Received February 24, 2003

Accepted August 25, 2003

Decision Editor: Charles F. Longino, Jr., PhD