Shifting coresidence near the end of life: Comparing decedents and survivors of a follow-up study in China

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ABSTRACT:

What we know about transitions in coresidence of elders in China is based on panel data involving survivors. This paper examines the tendency to and determinants of shifts in coresidence among very old, comparing survivors with those that died. Data come from the CLHLS. Baseline and follow-up surveys indicate shifts in coresidence, defined as change from not living to living in the same household as an adult child, and the reverse. Rates of shifting are adjusted for time to follow-up. Regressions examine predictors among four groups: baseline coresidents and non-coresident survivors and decedents. Decedents and non-coresidents are more likely to shift than survivors and coresidents. Covariates related to physical and material need and marital status are the strongest predictors of shift. We conclude the period nearing the end of life is a time of flux and coresidential shifts are underestimated when those that die during a follow-up study are ignored.

INTRODUCTION

The current study aims to extend the understanding of living arrangement transitions among the very old in China by focusing on the probability of shifts in child co-residence within two distinct samples, one of which lived to respond to a follow-up survey period and another of which died during the inter-survey period. We refer to the former as survivors and the latter as decedents. By a shift in coresidence, we mean changing living arrangement from not being coresident with an adult child to being coresident, or from being coresident to not, from time of baseline to follow-up, with follow-up referring to a scheduled survey two or three years after baseline for those that survived, and approximately time of death for those that died. In essence our study evaluates shifts among four separate groups: 1) survivors who were coresident at baseline; 2) survivors who were non-coresident at baseline; 3) decedents who were coresident at baseline, and; 3) decedents who were non-coresident at baseline. While decedents are those in the initial sample that died between waves of data collection, living arrangements and some other characteristics of this group prior to death are known because of post-mortality follow-up surveys with next of kin.

The significance of the topic comes chiefly from the fact that what we currently know about child coresidence among older adults in China (as well as elsewhere) is based upon cross sectional or panel data that consider only those that lived to be interviewed in a follow-up survey, or survivors as they are termed in the current analysis (United Nations 2005). At times, mortality is incorporated as a 'competing risk,' that is, a potential outcome on par with other living arrangement transitions (Brown et al. 2002; Zimmer 2005). But, the competing risk strategy does not allow for the examination of whether and how living arrangement transitions among those that died prior to follow-up differ from others. Those that die, or decedents as they are termed in the current analysis, may in fact represent a distinct group with divergent characteristics, needs and behavior patterns that distinguish them from survivors. While the needs and behavior patterns of decedents are likely to

diverge from survivors when measured at baseline, the time just before death may be even more important, being characterized by a unique set of experiences such as a brief period of extreme dependence. By ignoring decedents, the full effects of these experiences are unobserved. Indeed, the usual publicly available follow-up survey with two, three or more years between waves can, by its design, overlook a number of transitions that occur during the inter-survey period and therefore result in underestimates of shifts in important life events. By contrast, the inclusion of decedents in a study of shifts in child-coresidence not only allows for better estimates of shift, but also can lead to an expansion of our understanding regarding the roles and behaviors of family in the lives of the very old near the end of life as well as enhanced comprehension of the ways and means that support is bestowed upon the very old, ill and frail in a developing country like China.

The current analysis considers child-coresidence experiences at and near the end of life by using unique questions from the Chinese Longitudinal Healthy Longevity Survey (CLHLS) that, through the use of a post-mortality survey with surviving family members, explicitly recorded living arrangement at time of death. An additional advantage of the CLHLS is a large sample of oldest-old who are more likely than those at other ages to experience changes in characteristics related to support needs, such as functional health and marital status, and have high probabilities of mortality during an inter-survey period. Child-coresidence shifts are examined among samples of survivors and decedents aged 80 and older at baseline using two analytical steps. First, there is a comparison of the probability of shifting coresidence status. Second, there is a contrast of the determinants of these co-residential shifts.

BACKGROUND

A normative system of coresidence, with an older adult living with at least one adult child, has long been the basis of much old-age support in China (Bongaarts and Zimmer, 2002; Knodel and

Debavalya, 1997; Logan, Bian, and Bian 1998; Silverstein, Cong, and Li 2006; Sokolovsky 2001). Adult children are indeed considered by many to be the foundation of the support system for the very old and for other elders in need of instrumental and material assistance. Living with a child is thought also to have health advantages (Li, Zhang and Liang 2009; Silverstein et al. 2006). But, China is one of a number of developing countries experiencing fundamental social changes that may be impacting on these traditional structures. One is the movement from a young to an older aged population, which reduces the availability of adult children with whom to coreside (Kane and Choi 1999; Poston and Duan 2000; Yuan et al. 1992). Another is concomitant socio-economic change, which may impact attitudes and values surrounding traditional modes of old-age support (England 2005).

To be sure, non-coresident children can and do provide substantial levels of assistance to elderly parents in China. But, the importance of notions of filial piety and related Confucian teachings means that coresidence remains a way of transferring intergenerational support and is still regarded as an indicator of well-being for the functionally limited and the very old (Ebrey 2000; Hermalin and Myers 2002; Phillips 2000; Yuan 1990). The centrality of this tradition, coupled with social changes that are occurring, has resulted in a certain amount of deliberation and concern regarding the possibility of deterioration of the tradition of child coresidence (Gui 2001; Sheng and Settles 2006; Whyte 2003; Zhang and Goza 2006). Given this concern, there are surprisingly few studies that have examined stability versus change in child coresidence. Those investigations that do exist suggest mixed realities including resiliency of coresidence norms and evidence of rates of coresidence decline (Du 1998; Logan et al. 1998; Zeng and Wang 2003; Zhang 2004; Zimmer 2005). The data we use for the current analysis indicates that among the oldest old in China, between 1998 and 2005, about two-thirds with at least one living child resided with a child and about one-third resided in a different situation.

The current study borrows from past literature to develop two perspectives that relate to the discussion surrounding child coresidence in developing countries like China that are undergoing social and demographic change. The first is a 'demographic' view, which maintains that coresidence patterns are driven by the availability or supply of children with whom to coreside (DaVanzo 1994; Martin 1989). This view recognizes that declines in fertility are leading to both population aging and smaller family sizes, which decrease the availability of adult children with whom to coreside, a factor that is often pointed to as being among the most challenging features of the shifting demographic reality in China (Banister 1990; Lin 1994; Zeng and George 2001; Zimmer and Kwong 2003). Some writings even convey a type of panic regarding the possibility that older adults will, in the future, not have enough family to fulfill their needs, creating urgency for public interventions of unprecedented magnitude (Du and Guo 2000; Gui 2001; Phillips 2000). Older adults in China also tend to state a preference for living with a son and the availability of a son is an additional concern (Logan and Bian 1999).

There are several demographic counters to the kin availability argument that have been made in reference to China as well as other countries in the region (e.g., Hermalin, Ofstedal and Shih 2003; Knodel, Chayovan and Siriboon 1992; Knodel, Saengtienchai and Ingersoll-Dayton 1996; Zimmer and Korinek 2008; Zimmer and Kwong 2003). First, some predict that fertility decline will have overall minor impacts on coresidence or support. The reason is that one child is all that is technically needed for the provision of some support. In turn, childlessness is likely to remain uncommon in China and the rest of the region, and even single child households will be rare for some time to come. In contrast, the probability of coresiding and receiving support from a child does not change much as families increase in size upward from two children. Second, a form of quasi-coresidence, or living not with but nearby older persons, could overtake coresidence as a key living arrangement, a situation that though different in form may maintain the functionality of the

current family. Third, improvements in survival may offset declines in fertility when it comes to number of children surviving to ages where they are most needed for supporting very elderly and frail parents.

The demographic perspective may also overlook social explanations that revolve around embedded customs that can act upon society in ways that overshadow changes in family size (Ofstedal, Reidy, and Knodel 2004; Whyte 2003). Thus, an 'altruistic' framework, with its roots in writings on family economy, is gaining recognition (Becker 1974; Frankenberg, Chan, and Ofstedal 2002; Hermalin 2002; Lee, Parish and Willis 1994). The perspective relies on notions of the primacy of family over individual interests in shaping decisions and behaviors. The perspective interconnects with norms of filial piety, respect for elders and indebtedness to parents which are common in Chinese philosophical thinking (Whyte 2003; Yuan 1990). Individuals acting within an altruistic system consider the needs of older family members to be important in decision-making. Thus, the younger generation, who are able to work and secure material resources, provide help when aging parents do not receive income or develop physical functioning problems, such as disabilities, which hamper their ability to complete necessary daily tasks.

Given the current period of rapid social change, some have also discussed the notion of a "modified extended family," which is concurrent with the idea of altruism (Chen 2005; Knodel and Saengtienchai 2007). The suggestion here is that the intergenerational support and personal contact that is discussed within altruistic thinking can be maintained at a distance with means such as cellular phone use or material remittances when adult children migrate away from origin communities It is likely however that distance relationships are insufficient for meeting the heightened needs for direct care that may occur close to a parent's passing. In addition, episodes of acute illness that might occur prior to death, a function of sudden declines in health and functioning, may be too demanding

for a surviving spouse. Hence, periods before death may be times when older adults and grown children are drawn together both emotionally and for practical purposes.

To be precise, the current study is not focused on long-term changes in coresidence on a population level in China. Rather, we consider that these changes raise concerns about traditional family structures that can be addressed using contemporary data to test hypotheses that arise out of the above discussed theoretical perspectives. That is, these perspectives lead to hypotheses regarding the probability and determinants of shifts in coresidence that might occur to individual people that are living within a changing Chinese environment. Thus, we first anticipate that the tendency to rally around family members in need will result in shifts in coresidence being more common among decedents than survivors. In particular, we would expect older adults that are non-coresident at baseline to have higher probabilities of shifting to live with children prior to death than would survivors at the time of survey follow-up. However, nothing in the theoretical outline reviewed suggests that determinants of coresidential shifts would be substantially different between decedents and survivors. This is because both groups would be motivated by demographic realities related to kin and son availability, and to physical and material needs, which may be measured by characteristics such as health, income and widowhood status. Thus, we would also hypothesize that a heightened tendency to shift into coresidence in particular among decedents would in large part be a function of increasing needs that may arise during the brief period before death, while a greater tendency to remain coresident should be consistent among decedents and survivors who have similar levels of need.

METHODS

Data come from the Chinese Longitudinal Healthy Longevity Survey (CLHLS), a survey conducted in counties and cities in 22 Chinese provinces, which together account for over 85% of the total

population of China. The survey consists of four waves of data. The first wave, conducted in 1998, included 8,803 oldest-old between ages 80 and 105. Interviews were conducted with the elders themselves or, when necessary because of health reasons, a proxy, in their own homes. Some cases older than 105 were reported but are omitted in the current study due to unreliability in age reporting (Zeng and Gu 2008). Follow-up waves, conducted in 2000, 2002 and 2005, involved returning to persons interviewed previously, plus an add-on component to make up for attrition. The 2002 survey began to include individuals aged 65 to 79. In a case of death during the inter-survey period, a short post-mortality follow-up interview was conducted with 'next of kin' considered to be spouse first and adult child second. This unique aspect of the survey design makes the CLHLS valuable for the examination of coresidence shifts prior to death.

Due to the overall aim of the CLHLS, which is to examine factors associated with healthy longevity, the surveys over-sample extremely old persons. This is balanced with a weighting scheme that measures the inverse of the probability of being selected based on population estimates by age and sex (Zeng et al. 2002). All results in this study use the weighted sample except where noted. Several assessments of data reliability and response rates have been conducted (Zeng et al. 2002). According to their website, the CLHLS had, at time of this writing, produced twenty-seven academic English language publications in peer-reviewed journals, many more in Chinese language journals, book chapters, dissertations, MA theses, conference presentations, and a manuscript that reviews many of the fundamental findings of the survey (Zeng et al. 2008).

The current analysis uses a stacked sample of those aged 80 to 105 at baseline where one survey wave is considered as baseline and the next wave as follow-up. Hence, the 1998 wave is considered as a baseline with the 2000 wave as follow-up. Respondents from the 2000 survey, including surviving respondents and newly sampled individuals, are considered as the next baseline with the 2002 survey as its follow-up. Finally, the 2002 survey is a baseline with 2005 wave as its

follow-up. These baseline and follow-up waves are stacked so that one individual may contribute up to three observations. Standard errors are adjusted for individual clustering using Huber-White sandwich estimators (White 1982). To be included as a valid observation, an individual must have at least one living child at baseline, live outside of an institution at baseline and follow-up, and have coresidence information recorded at baseline and follow-up. While there are 30,712 observations across the three baseline waves, the selection criteria bring the number of valid cases down to 23,460. Specifically, about 3,000 have no children at baseline, about 3,000 more are lost to follow-up and therefore have no coresident information for the inter-survey period, and about 1,000 more are living in institutions. Sensitivity analyses were conducted that included runs that added those living in institutions, considering institutionalization both as a separate residence outcome and as a form of non-coresidence, and these findings compare closely with those reported below.

For the approximately 3,000 cases omitted due to loss to follow-up, information about survivorship is not recorded and therefore it is not possible to divide the number for whom information is lacking among survivors and decedents. Thus, we do not know whether those lost to follow-up are more likely to be survivors or decedents. But, there are some health differences at baseline, which in turn may suggest loss to follow-up could be higher among decedents. For instance, there is a lower level of missing cases among those without versus those with Activity of Daily Living limitations at baseline (11% versus 13%). Still, the differences here are not that substantial. There is no missing living arrangement data among those that are followed-up, regardless of survivor status. There is very little difference in loss to follow-up by number of living children at baseline. Loss to follow-up is 12% among the childless, 13% among those with one child, and 12% among those with two or more children.

Being 'coresident' is defined as living with at least one child who, due to the age of the sample, would in all cases be an adult (the term 'child' reflects convention). At baseline, coresidence

is determined from a household roster that noted the relationship of each household member to the interviewee. At follow-up coresidence is measured differently depending upon survival status. For survivors, interviews were completed with the older adult or proxy and coresidence was based on the household roster. If an interviewer returned and found the respondent had died during the inter-survey period, the post-mortality questionnaire with next of kin asked about the elder's living arrangement at time of death.

Our conceptualization of the analysis leads us to divide the sample into four distinct groups: 1) decedents that were coresident at baseline (N=2,553); 2) survivors that were coresident at baseline (N=4,210); 3) decedents that were non-coresident at baseline (N=7,575) and; 4) survivors that were non-coresident at baseline (N=9,122). This conceptualization best allows for the examination of distinct shifting behaviors and determinants acting upon individuals with different life circumstances. The main outcome, which is a 'shift' in coresidence, is defined as a change in status from baseline to follow-up. So, for non-coresidents at baseline this means living with at least one child at follow-up and for coresidents it means not living with any children at follow-up. A shift is coded as 1; stable coresidence status is coded as 0. Multivariate models that predict shifts use a basic logit link function. Significance levels are recorded as are standard errors, the latter of which allow for some determination of whether confidence intervals for coefficients overlap across groups. In total, 21.2% of the baseline sample shifted coresidence status.

Follow-up surveys were conducted at about the same time of year as baseline surveys and therefore inter-survey periods are two years for the 1998 and 2000 baselines and three years for the 2002 baseline. Thus, the follow-up period is around 24 months or 36 months for survivors. The follow-up period is shorter for decedents because information that was obtained during an interview with next of kin anchored responses to the time of death. The longer the period from baseline to

follow-up, the greater is exposure to the possibility of a shift in co-residence. Therefore, we adjust for duration of time to follow-up in the analysis.

Covariates are divided into five categories that address, as best as possible given current data, the demographic and altruistic perspectives discussed above, as well as other available factors that may logically be determinants of living arrangements. All are measured at baseline only, except for marital status and Activities of Daily Living (ADL) limitations, which are measured both at baseline and follow-up. For marital status and ADLs then, we examine not only baseline effects, but by adjusting for baseline level and adding follow-up level, we also examine the effects of change. Covariates and distributions by survival and coresidence status at baseline are shown in Table 1.

Table 1 about here

1) Demographic characteristics. Include age, sex, and place of residence (urban or rural). Place of residence is de facto, not based on official household registration.

2) Availability. Include number of children and having a son. The former is categorized into 1, 2 or 3, 4 or 5, and 6 or more children.

3) Socioeconomic characteristics. Include main occupation throughout life and highest level of education. Specific occupations are difficult to determine given the current data, but a broad categorical response allows separation into agriculture (the comparison group), white collar (administrative, clerical, etc.), industrial (for example, working in factory) and other. Other includes military occupations, housewife, and occupations that are otherwise unclassified. Education is determined from a survey question on years of formal schooling and coded as none (the comparison group), primary (1 to 6 years) and more than primary (7 or more years). There are a small number of missing cases for education, and 'education unknown' is included as a category.

4) Needs. Needs most closely relate to the altruistic view and indicate potential physical and material characteristics that may necessitate assistance and therefore promote a move towards

coresidence, or encourage stability in a current coresidential arrangement. The first measure, examined at baseline only, is whether the older adult's main source of financial support is a pension. In China, having a pension is a proxy for having worked within a state owned enterprise, but it also indicates whether other material support is required for those not working. The second is marital status, recorded at baseline and follow-up. Marital status for survivors is determined at the scheduled interview time. For decedents, it is determined from the post-mortality interview. Being married at follow-up, (which almost always will mean being married at both baseline and follow-up, that is remaining married), is the contrast category and is compared to being married at baseline only (which usually maps to experiencing widowhood in the inter-survey period) and not being married at baseline or follow-up (which will almost always mean being widowed prior to baseline and remaining unmarried). The third need characteristic, also measured at baseline and follow-up, is based on questions about disability using the Katz ADL scale (Katz et al. 1963). Individuals were asked if they could perform a series of activities on their own, without assistance from others or devices. These included: bathing, dressing, toileting, transferring and feeding. A limitation score is created by summing the number of items with which an individual reports a difficulty.

For survivors, follow-up items are asked at the time of the scheduled interview. For decedents, these questions were posed to next of kin during the post-mortality interview with a time frame referring to the two weeks preceding death. A couple of issues regarding the collection of this follow-up information should be noted. First, baseline measurement of needs and some of the follow-up measures, such as marital status, will post date change in living arrangement. For this reason, we are cautious about using causal language and rather use terminology related to association. Second there are challenges in collecting information, especially ADL limitations, from kin in a post-mortality interview. For instance, proxy reports may differ from self-reports. There are also problems associated with recollection. Still, those kin that reported on ADL limitations were very

likely to be individuals involved in the care of the elder prior to death and thus their memory of whether the older adult had an ADL limitation is likely valid and the quality of the information is likely as good as can be given alternatives. In addition, our measure of ADL limitations as a scale indicating yes or no to each item is likely more accurate than one that would use the degree of difficulty in conducting specific tasks.

Multivariate models consider ADL limitations at both baseline and follow-up simultaneously. When baseline limitations are controlled, the impact of follow-up ADL limitations can be interpreted as the impact of a change in limitations on shift in coresidence. In addition, models test for interactions between baseline and follow-up with the notion that it may be limitations at both times that concurrently provide the greatest impetus for coresidence. Only significant interactions are included in the final models. Given marital status and ADL measures at baseline and follow-up it is possible to determine whether changes in some basic need factors relate concurrently to shifts in coresidence.

5) Time to follow-up. This is measured as months that passed between baseline and follow-up.

The analysis is conducted in two stages. First, the probability of shifting coresidence for the four groups is calculated. The probability is reported unadjusted and then adjusted for the time that elapsed between baseline and follow-up. The unadjusted probability indicates the chance that an individual will have shifted coresidence status based on coresidence status at baseline and follow-up. The adjusted probability calculates a monthly rate of shifting based on the total probability and the average number of months to follow-up for each grouping. These adjusted estimates assume, by necessity (given lack of detailed information on number and timing of shifts in coresidence), that one change in coresidence is made over the inter-survey period for the shifters, the changes occur at random times over the period, and no changes are made for the non-shifters. Second, logistic

regression models examine predictors of shift in coresidence separately for each analytical group (Non-coresident, Decedents; Non-Coresident, Survivors; Coresident, Decedents; Coresident, Survivors). Models adjust for covariates simultaneously and standard errors are shown, which allows an assessment of homogeneity of coefficients across groups. An intuitive understanding of the regression results as they relate to physical needs is provided by adding figures on predicted probabilities across ADL limitations at baseline and follow-up.

RESULTS

Probability of a Coresident Shift

Table 2 indicates the numbers 80 and older in the current sample according to their coresidence status at baseline and follow-up and disaggregated by survivor/decedent status. The N's at the top of the table, which are unweighted numbers, indicate that about 70% of the current sample lived with a child at baseline. The weighted result (not reported) is about 67%. The row labeled 'probability of shifting unadjusted for months to follow-up' in Table 2 indicates the chance that an individual who began in one coresident state at baseline ends up in the opposite state at follow-up. Non-coresidents clearly have a higher probability of shifting; meaning shifting into coresidence with a child is more common than shifting out. Within the non-coresident group, those that died were more likely to move prior to death than were survivors prior to follow-up. For baseline coresidents, unadjusted results indicate that decedents and survivors are equally likely to shift. These results occur even though the follow-up period would be longer for survivors and thus the time exposure to the chance of a change in coresidence would be greater.

The bottom row of the table, which shows the average monthly rate of shifting coresidence, assuming that one change in coresidence is made over the inter-survey period for shifters and no changes are made for non-shifters, adjusts for time exposure. It indicates that the rate of shift is

much greater for decedents than survivors, regardless of baseline coresidence status. Decedents that were non-coresident have a monthly shifting rate of .0368 compared to .0117 for their survivor counterparts. This means the average percent of non-coresident decedents who shifted coresidence each month was 3.68%, given the assumptions made regarding timing and number of changes, while the average percent was 1.17% for survivors. Decedents that are coresident at baseline have a monthly shifting rate of .0087, as compared to .0060 for their survivor counterparts. It is probable that many of the changes would have occurred close to the time of death, so there is very likely great variation from this average on a month to month basis. However, despite what we do not know about the timing and number of coresident changes during the inter-survey period, the monthly rate highlights the greater tendency of decedents to shift coresidence in comparison to survivors. Note that these differences are statistically significant.

Table 2 about here

Determinants of Coresident Shift

Table 3 presents four logistic regression models that predict a shift in coresidence, with each considering one of the groupings. The most notable result emerging is a strong and consistent association of physical and material need with shifts in coresidence. Number of ADL limitations at follow-up, which we take to be an indicator of magnitude of disability at follow-up, positively associates with the probability that a non-coresident ends up with a child and negatively associates with the probability that a coresident does not. This pattern holds among both decedents and survivors, with survivors who were non-coresident at baseline displaying a significantly larger coefficient by magnitude (+.272, $p < .01$) than the other groups. ADL limitations at baseline are not very predictive of shifts, suggesting that it is *change* in limitations that is the essential determinant.

However, the interaction between baseline and follow-up ADL limitations, shown only when significant, is important for survivors, moderating the impact of limitations at follow-up.

Table 3 about here

Also of paramount importance in determining coresidence shift is marital status. Those married at follow-up, which is the reference category, have a lower probability of shifting from non-coresidence to coresidence, and a higher probability of shifting from coresidence to non-coresidence, among decedents and survivors. Those married at follow-up are highly likely to have been married at both baseline and follow-up since very few remarry at this very old age. Being married at baseline but not follow-up is very likely the result of becoming widowed. Those becoming widowed are more likely to shift into coresidence with a child and less likely to shift out. The same effects occur among those not married at either time period. For those not married at baseline or follow-up, non-coresident decedents have a coefficient that is statistically larger than other groups. Therefore, not having a spouse appears to be particularly important in determining coresidence shift for this group. Pension has some effect as well. If the main source of income is a pension, non-coresidents are less likely to end up living with a child and coresidents are more likely to move in the other direction.

Other results are overshadowed by the strength of covariates indicative of need. Having a son does significantly increase the chance of a shift in coresidence among non-coresident survivors, but overall the impacts of the 'availability' covariates are moderate. Having a white collar occupation increases the chance that a non-coresident decedent will live with a child before death but also increases the chance that a coresident survivor will not, suggesting that white collar respondents are particularly mobile. Education has some effects, but they are moderate. Finally, there is a surprising effect of time to follow-up. Longer follow-up is associated with a greater probability of shifts among survivors. For survivors, greater time between surveys provides greater opportunity for or exposure to shifts in coresidence. The same is not true for decedents, where

effects of time are not significant. Follow-up time is shorter for decedents overall, perhaps compressing opportunities, and decisions about changes in coresidence may have more to do with the impending death and the need for care than other reasons that may associate with time.

In order to show the combined effect of ADL limitations at follow-up by coresidence and decedent status, predicted probabilities are presented in Figures 1 and 2. Figure 1 plots the probability that an individual with no limitations at baseline shifts coresidence. Figure 2 plots the probability for an individual with two ADL limitations at baseline. Figure 1 shows that increasing limitations by follow-up greatly increases the chance that a non-coresident becomes coresident. The probability increases for decedents, for instance, from about 0.45 for those remaining without disability to about 0.60 for those developing five disabilities by follow-up. For baseline coresidents, more limitations reduce the chances of becoming a non-coresident. For instance, among decedents the probability goes from 0.20 to 0.10 when moving from zero to five limitations. Comparing Figures 1 and 2 suggests some influence of the number of baseline limitations on the probability of a coresident shift for survivors. Specifically, the slopes are slightly less dramatic in Figure 2, suggesting that survivors with ADL limitations at baseline may already have made the change in coresidence that addresses their needs.

Figures 1 and 2 about here

Also of note in both figures is that decedents, more so than survivors, experience a greater probability of shifting coresidence, regardless of baseline status. This is somewhat non-intuitive for those that are coresident at baseline since it means that someone who lives with a child stops living with a child prior to death more frequently than would have occurred had they not died. It also means, however, that decedents are in a greater state of living arrangement flux than survivors. To aid in interpretation we turn to an additional question from the CLHLS post-mortality questionnaire which asked the next of kin who the decedent's main caregiver was at time of death. The results are

shown in Table 4. Among all four groups, a child is most frequently listed as the main caregiver. But, among those making the move from coresident to non-coresident, the child is the main caregiver only 53% of the time compared to 92% of the time for those that remained coresident. Similarly, among non-coresidents at baseline, the child is named as the main caregiver 43% of the time for those that remained non-coresident but 82% of the time among those that became coresident. While causal direction cannot be assumed from this information, it does suggest that changes in coresidence are at least partly a function of who is providing pre-death care.

Table 4 about here

DISCUSSION

The theme of child coresidence is destined to gain momentum as a consequence of population aging in rapidly developing societies. The reasons for this relate to demographic and economic transformations that accompany rapid social change that have the potential to threaten cultural underpinnings in ways that could alter relations between elderly members of the society and others. Given traditions that are often described as being geared toward ensuring filial behaviors, and given the previously abundant supply of children resulting from high fertility rates, such changes pose challenges related to maintaining support structures, especially for the oldest-old in greatest need. They also imply that increased obligations may be placed on the formal sector. There is good reason, therefore, to monitor child-coresidence in a country like China to determine whether traditional forms of organization are being maintained in the face of rapid social change.

No previous research, to our knowledge, has examined shifts in coresidence during the period prior to death except as a competing living arrangement risk. While we hypothesized that decedents, defined as those that did not survive to a follow-up survey two or three years after baseline, would be likely to exhibit more shifting of child-coresidence than those that did survive, in

large part due to increasing needs and obligations of family to provide support at close distance, the magnitudes were perhaps greater than expected. Shifts in coresidence among decedents occurred with regularity, especially among those that were non-coresident at baseline. In fact, almost half of these individuals changed to living with a child during the inter-survey period, a rate that was calculated to be an average of about 3.7% per month. In comparison, non-coresident survivors shifted at a rate of about 1.1% per month. This marked difference suggests that studies that examine coresidential transitions among the surviving elderly may over-emphasize the stability of living arrangements. Indeed, there are a number of previous studies in the region that have highlighted the stability of living arrangements among older adults using data that considers only survivors of follow-up surveys (e.g., Brown et al. 2002; Frankenberg et al. 2002; Zimmer 2005). It is clear that these studies underestimate the overall number of changes in coresidence that occur among older adults, particularly among the oldest old.

Although the tendency of non-coresidents to shift is higher than coresidents, it is also true that the decedents who did not survive to the follow-up survey two or three years after baseline are more likely to change coresidence prior to death regardless of whether they began living with or without a child than those that did survive. This too emphasizes that living situations near the end of life are fluid and highly adaptable. Overall, the results suggest that the time near the end of life is a critical period and likely consequential for understanding old-age support and decision making within families.

On balance, results lend support to hypotheses derived from an altruistic perspective regarding the role of family support in China. This is particularly based on the finding that across all the groupings covariates associated with need, specifically physical functioning as measured by ADL limitations at baseline and follow-up, material needs as measured by receipt of pension, and existence of a main support source as measured by marital status at baseline and follow-up, were by

far the strongest determinants of shifts in coresidence. Coefficients were generally homogenous across four analytical groups with some notable exceptions: being not married at baseline or follow-up was more consequential for non-coresident decedents, and ADL limitations at follow-up were more consequential for non-coresident survivors. So, although decedents tend to be in a greater state of flux vis-à-vis coresidence, determinants of shifts in coresidence are fairly similar across survivor and coresident status. Moreover, our results imply that there may be a coresident response to changes in need. Although the exact timing of events between surveys is not available, an increase in disability from baseline to follow-up is associated with a change to living with a child, and as just mentioned, this is particularly true for survivors. The perspective is supported also by the fact that interval time is a determinant of shifts in co-residence only among survivors but not decedents, regardless of baseline status, suggesting that the tendency to shift will be strong no matter how much time passes after measurement among those that die during the inter-survey period. Put another way, if the period near the end of life is one of extreme need, then the time that has expired between baseline and death should not be a factor in determining the chances of coresidential shifts. The chances are simply dominated by level of need of the soon to be deceased elder. While need factors are also important for those that do not die during the inter-survey period, because death is not apparently as imminent, the time that expires between baseline and follow-up, which determines exposure, to a shift in coresidence, is also a factor.

It may be surprising that coresidents soon to die are more likely, than are survivors, to move out of a situation where they are living with children. Additional analyses not reported here indicate that this cannot be explained by the soon to be deceased moving to an institutional setting. Indeed, movements into institutions are still relatively rare in China. We reason that this living arrangement mobility prior to death is consistent with, and an extension of, the general fluidity of living arrangements that we witness among older adults in contemporary China. One can posit several

explanations for a continuation or magnification of this living arrangement fluidity in the period prior to death. For one, if an older adult has been living with adult children away from his or her home village, the time prior to death may be a time when she/he seeks to return to this home place because it provides more comfort or familiarity. Another explanation may lie in a common motivation for parent-child coresidence in China – older parents' assistance with care of grandchildren (Chen, Short and Entwisle 2000). As end of life nears, grandparents once involved in grandchild care may become frail and less capable of providing such care, and thus may move out of a living situation in which they were serving as a caregiver. Finally, it is important to note that living with a child does not necessarily equate with that child providing care. Adult children, especially those with children of their own, may experience demands on their time that prohibit their devoting extensive time to their elderly parent. Thus, late-life living arrangement transitions, including those in which the older adult seeks greater instrumental support and care, may actually involve moving out of a child coresident situation. This need not imply a failure or loss of familial altruism, as children who do not coreside are known to provide diverse and extensive support to parents, support that is responsive to the degree of need experienced by parents (Lee and Xiao 1998). It is also important to note that we provided descriptive results (in Table 4) that suggested that the caregiver of the decedent may determine the occurrence and direction of the shift. A shift away from living with a child was more likely when someone other than a child, such as a spouse or other family member, had been the main caregiver.

While the study provided suggestions about what happens to coresidence prior to death among very old in China, limitations suggest the need for further investigation. First, despite the longitudinal nature of the data, causal connections are difficult to establish. It is uncertain, for instance, whether a change in coresidence occurs because another network member subsumed the role of caretaker, or whether a change in coresidence prompts a change in caretaker. Second, our

study does not indicate who is moving. That is, data does not distinguish situations where the older adult is moving in with a child or a child is moving in with the older adult. Each situation may occur for different reasons. We have been careful to use terminology such as shift and change in coresidence rather than moving in or out. Third, as noted earlier on, the reporting of ADLs by different sources may be problematic. At baseline, some limitations are reported by proxies. At follow-up, all limitations for decedents are reported by proxies. Proxy reports may be different from self reports, and proxy reports given after time has passed may be subject to recall error. While we believe that next of kin are likely to provide quality responses to ADL items, it is also the case that the results are so robust that slight adjustments based on differences between proxied and non-proxied responses would be unlikely to change overall conclusions. Fourth, it is unknown when a shift in coresidence occurred or whether there was more than one over time. The former issue may be particularly problematic for decedents who moved only for a very short period, such as a few days, just before death. The rate of coresidential shifting among decedents could, in this case, be reflective of the need for short-term care rather than longer-term planning. It is also certain that in some instances changes in coresidence will predate changes in need. Yet, our results overall imply that there is a probable coresident reaction to needs among both decedents and survivors, and decedents, for a large number of reasons that relate to additional needs, are more likely to shift status.

The future of family coresidence arrangements are intertwined with numerous policy-making concerns in a rapidly aging China. The current analysis provides evidence that informs recent debate on pension system reform and implementation, particularly concerning the feasibility of social insurance for rural China's rapidly growing elderly population and whether pensions and public transfers to older adults will 'crowd out' private, family transfers (Li 1999). Recent research conducted in urban China (Cai, Giles and Meng 2006) suggests that even in cases where pension

transfers are received, private transfers from children occur and are responsive particularly when elderly income falls below the poverty level. Our own findings indicate that, likely due to a financial independence mechanism, receipt of a pension does lessen the likelihood of coresidence with children. However, our results also suggest that as parental need arises, for instance due to increasing physical limitations, children are inclined to coreside with parents, irrespective of their pensioner status. Certainly additional, policy-based research is needed in this field, but the current analysis suggests that, while pensions may alleviate some of the financial needs that precipitate certain instances of parent-child coresidence, the traditional preferences and needs for instrumental care that commonly figure into Chinese coresidential living arrangements are unlikely to be overturned by a broader based pension system.

Finally, the fate of intergenerational living arrangements in China may be dependent upon future declines in family size that will soon register for elders in need of old-age support. This study of very old people living in China reflects upon a current demographic reality, fixed in time, based on a particular cohort that completed their childbearing long before fertility decline and China's one-child policy. These people have large family sizes and a high probability of a living son. The families of future cohorts will look different. It is possible that as long as there are large numbers of living children, need will dominate living arrangement decision making. When family sizes drop, informal access may change, which may also result in necessary changes to institutional access and services. However, there are several other ways of looking at events that may occur. For instance, the types of radical change in family size that are likely to alter relationships between need and receipt of support may be some time off. A recent study by Ding and Hesketh (2006), reporting on Chinese National Family Planning Commission data collected across all 31 provinces and autonomous regions, indicated that only about 1% of women aged 40 to 49, that is, women who recently completed their fertility, were childless, about 26% had one child, and the remaining 73%

had two or more children. This suggests that childlessness will remain uncommon in China while two child families are likely to be more customary than may be conventional thinking. And, as we have noted elsewhere, having two children provides relatively similar chances of co- or pseudo co-residence in comparison to those with many children, in China and elsewhere in the region (Zimmer and Korinek 2008). These demographic realties, coupled with the results of the current study that support need rather than kin based determinants of coresidence, all bode fairly well for the state of family support among the most aged and frail within China.

REFERENCES

Banister, J. 1990. "Implications of the Aging of China's Population." Pp. 268-308 in *Changing Family Structure and Population Aging in China: A Comparative Approach*, edited by Y. Zeng, C. Zhang, and S. Peng. Beijing: Peking University Press.

Becker, G.S. 1974. "A Ttheory of Social Interactions." *Journal of Political Economy* 82:1063-93.

Bongaarts, J. and Z. Zimmer. 2002. "Living Arrangements of the Elderly in the Developing World: An Analysis of DHS Household Surveys." *Journal of Gerontology: Social Sciences* 57:145-57.

Brown, J.W., J. Liang, N. Krause, H. Akiyama, H. Sugisawa and T. Fukaya. 2002. "Transitions in Living Arrangements Among Elders in Japan: Does Health Make a Difference?" *Journal of Gerontology: Social Sciences* 57:209-20.

Cai, F., J. Giles, and X. Meng. 2006. "How Well Do Children Insure Parents Against Low Retirement Income? An Analysis Using Survey Data from Urban China," *Journal of Public Economics* 90:2229-55.

Chen, F. 2005. "Residential Patterns of Parents and Their Married Children in Contemporary China: A Life Course Approach." *Population Research and Policy Review* 24:125-48.

Chen, F., S.E. Short,.and B. Entwisle. 2000. "The Impact of Grandparental Proximity on Maternal Childcare in China," *Population Research and Policy Review* 19:571-90.

DaVanzo, J. and A. Chan. 1994. "Living Arrangements of Older Malaysians: Who Co-Resides With Their Adult Children?" *Demography* 31:95-113.

Ding, Q.J. and T. Hesketh. 2006. "Family Size, Fertility Preferences, and Sex Ratios in China in the Era of the One Child Family Policy: Results From National Family Planning and Reproductive Health Survey." *British Medical Journal* 333:371-5.

Du, P. 1998. "Changes in Living Arrangements of the Elderly in Beijing." *Chinese Journal of Population Science* 10:231-40.

Du, P. Z.G. Guo. 2000. "Population Aging in China." Pp. 194-290 in *Ageing in the Asia-Pacific Region: Issues, Policies and Future Trends*, edited by D.R. Phillips. New York: Routledge.

Ebrey, P.B. 2000. *China*. New York: Cambridge University Press.

England, R.S. 2005. *Aging China: The Demographic Challenge to China's Economic Prospects*. Westport: Praeger.

Frankenberg, E, A. Chan and M.B. Ofstedal 2002. "Stability and Change in Living Arrangements in Indonesia, Singapore, and Taiwan, 1993-1999." *Population Studies* 56:201-13.

Gui, S. 2001. "Care of the Elderly in One-child Families in China: Issues and Measures." Pp. 115-124 in *Elderly Chinese in Pacific Rim Countries: Social Support and Integration*, edited by I. Chi, N.L. Chappell and J. Lubben. Hong Kong: Hong Kong University Press.

Hermalin, A.I. 2002. "Theoretical Perspectives, Measurement Issues, and Related Research." Pp. 101-141 in *The Well-Being of the Elderly in Asia*, edited by A.I. Hermalin. Ann Arbor: The University of Michigan Press.

Hermalin, A.I. and L.G. Myers. 2002. "Aging in Asia: Facing the Crossroads." Pp. 1-24 in *The Well-Being of the Elderly in Asia: A Four-Country Comparative Study*, edited by A.I. Hermalin. Ann Arbor: The University of Michigan Press.

Hermalin, A.I., M.B. Ofstedal and S.R. Shih. 2003. "Patterns of Intergenerational Support in Urban China and Urban Taiwan." Pp 255-275 in *China's Revolutions and Intergenerational Relations*, edited by M.K. Whyte. Ann Arbor: The University of Michigan Press.

Kane, P. and C.Y. Choi. 1999. "China's One Child Family Policy." *British Medical Journal* 319:992-4.

Katz, S., A.B. Ford, R.W. Moskowitz, B.A. Jackson and M.W. Jaffee. 1963. "Studies of Illness in the Aged: The Index of ADL, a Standardized Measure of Biological and Psychosocial Function." *Journal of the American Medical Association* 185:914-9.

Knodel, J., N. Chayovan and S. Siriboon. 1992. "The Impact of Fertility Decline on Familial Support for the Elderly: An Illustration From Thailand." *Population and Development Review* 18:79-103.

Knodel, J. and N. Debavalya. 1997. "Living Arrangements and Support Among the Elderly in South-East Asia: An Introduction." *Asia-Pacific Population Journal* 12:3-14.

Knodel, J. and C. Saengtienchai. 2007. "Rural Parents with Urban Children: Social and Economic Implications of Migration for the Rural Elderly in Thailand." *Population, Space and Place* 13:193-210.

Knodel, J., C. Saengtienchai and B. Ingersoll-Dayton. 1996. "Family Care for Rural Elderly in the Midst of Rapid Social Change: The Case of Thailand." *Social Change* 26:98-115.

Lee, Y.J., W.L. Parish and R.J. Willis. 1994. "Sons, Daughters and Intergenerational Support in Taiwan." *American Journal of Sociology* 99:1010-41.

Lee, Y.J., and Z. Xiao. 1998. "Children's Support for Elderly Parents in Urban and Rural China: Results From a National Survey," *Journal of Cross-Cultural Gerontology* 13:39-62.

Li, L. 1999. "Family Insurance or Social Insurance Policy Options for China's Social Security Reform," *International Journal of Economic Development* 1:431-50.

Li, L.W., J. Zhang and J. Liang. 2009. "Health Among the Oldest-Old in China: Which Living Arrangements Make a Difference?" *Social Science and Medicine* 68:220-7.

Lin, J. 1994. "Parity and Security: A Simulation Study of Old-Age Support in Rural China." *Population and Development Review* 20:423-48.

Logan, J.R. and F. Bian. 1999. "Family Values and Coresidence with Married Children in Urban China." *Social Forces* 77:1253-82.

Logan, J.R., F. Bian and Y. Bian. 1998. "Tradition and Change in the Urban Chinese Family: The Case of Living Arrangements." *Social Forces* 76:851-82.

Ofstedal, M.B., E. Reidy and J. Knodel. 2004. "Gender Differences in Economic Support and Well-Being of Older Asians." *Journal of Cross Cultural Gerontology* 19:165-201.

Martin, L.G. 1989. "Living Arrangements of the Elderly in Fiji, Korea, Malaysia, and the Philippines." *Demography* 26:627-43.

Phillips, D.R. 2000. "Ageing in the Asia-Pacific Region: Issues, Policies and Contexts." Pp. 1-34 in *Ageing in the Asia-Pacific Region: Issues, Policies and Future Trends*, edited by D.R. Phillips. New York: Routledge.

Poston, D.L. Jr. and C.C. Duan. 2000. "The Current and Projected Distribution of the Elderly and Eldercare in the People's Republic of China." *Journal of Family Issues* 21:714-32.

Sheng, X. and B.H. Settles. 2006. "Intergenerational Relationships and Elderly Care in China: A Global Perspective." *Current Sociology* 54:293-13.

Silverstein, M.Z. Cong and S. Li. 2006. "Intergenerational Transfers and Living Arrangements of Older People in Rural China: Consequences for Psychological Well-Being." *Journal of Gerontology: Social Sciences* 61:256-66.

Sokolovsky, J. 2001. "Living Arrangements of Older Persons and Family Support in Less Developed Countries." Pp. 162-192 in *Living Arrangements of Older Persons: Critical Issues and Policy Responses*, edited by the U.N. New York: United Nations.

United Nations. 2005. *Living Arrangements of Older Persons Around the World*. New York: United Nations.

White, H. 1982. "Maximum Likelihood Estimation of Misspecified Models." *Econometrica*, 50:1-25.

Whyte, M.K. 2003. "China's Revolutions and Intergenerational Relations." Pp 3-32 in *China's Revolutions and Intergenerational Relations*, edited by M.K. Whyte. Ann Arbor, MI: The University of Michigan Press.

Yuan, F. 1990. "Support for the Elderly: The Chinese Way." Pp. 341-358 in *Changing Family Structure and Population Aging in China: A Comparative Approach*, edited by Y. Zeng, Z. Chunyan and P. Songjan. Beijing: Peking University Press.

Yuan, T.H., T. Zhang, Y. Ping, J. Li and Z. Liang. 1992. "China's Demographic Dilemmas." *Population Bulletin* 47(1):1-44.

Zeng, Y. and L.K. George 2001. "Extremely Rapid Ageing and the Living Arrangements of the Elderly: The Case of China." *Population Bulletin of the United Nations*, 42/43:255-87.

Zeng, Y. and D. Gu. 2008. "Reliability and Age Reporting Among the Chinese Oldest-Old in the CLHLS Datasets." Pp. 61-78 in *Healthy Longevity in China: Demographic, Socioeconomic, and Psychological Dimensions*, edited by Y. Zeng, D.L. Poston, D.A. Vlosky and D. Gu.. New York: Springer.

Zeng, Y., D.L. Poston, D.A. Vlosky and D. Gu., eds. 2008. *Healthy Longevity in China: Demographic, Socioeconomic, and Psychological Dimensions*. New York: Springer.

Zeng, Y. J. Vaupel, W., X. Zhenyu, Z. Chunyuan and L. Yuzhi. 2002. "Sociodemographic and Health Profiles of the Oldest Old in China." *Population and Development Review*, 28:251-73.

Zeng Y. and Z. Wang. 2003. "Dynamics of Family and Elderly Living Arrangements in China: New Lessons Learned From the 2000 Census." *The China Review* 3(2):95-119.

Zhang Y. and F.W. Goza 2006. "Who Will Care for the Elderly in China? A Review of the Problems Caused by China's One-Child Policy and Their Potential Solutions." *Journal of Aging Studies* 20:151-64.

Zhang, Q.F. 2004. "Economic Transition and New Patterns of Parent-Adult Child Coresidence in Urban China." *Journal of Marriage and the Family* 66:1231-45.

Zimmer, Z. 2005. "Health and Living Arrangement Transitions Among China's Oldest-Old." *Research on Aging* 27:526-55.

Zimmer, Z. and K. Korinek. 2008. "Does Family Size Predict Whether an Older Adult Lives With or Proximate to an Adult Child in the Asia-Pacific Region?" *Asian Population Studies* 4:135-59.

Zimmer, Z. and J. Kwong. 2003. "Family Size and Support of Older Adults in Urban and Rural China: Current Effects and Future Implications." *Demography* 40: 23-44.

Table 1. Distributions of covariates by survival and coresident status at baseline

Baseline coresident status	Non-coresident		Coresident	
Survival status	Decedents	Survivors	Decedents	Survivors
Demographic characteristics				
Mean age	84.3	83.0	84.9	83.6
% Female	50.6	56.5	62.3	66.9
% Rural resident	68.0	67.6	72.5	70.6
Availability				
Number children				
% With 1 child	12.6	11.7	12.7	12.0
% With 2 or 3 children	27.5	29.3	31.9	32.3
% With 4 or 5 children	35.7	36.0	33.0	32.4
% With 6+ children	24.1	23.0	22.4	23.2
% that have a son	89.6	88.3	90.8	92.4
Socioeconomic characteristics				
Main lifetime occupation				
% Agricultural occupation	37.9	42.3	38.3	45.0
% White collar occupation	5.8	8.9	4.3	5.3
% Industrial occupation	44.6	37.8	46.0	35.3
% Other	11.7	11.0	11.4	14.5
Education				
% No education	61.3	62.3	68.3	66.7
% Primary education	30.7	29.1	24.9	25.7
% More than primary	7.8	8.4	6.2	7.2
% Education unknown	0.2	0.2	0.6	0.5
Needs				
% Main support is pension	19.7	21.5	11.4	14.6
Marital status				
% Married at follow-up	36.5	39.3	12.6	16.2
% Married at baseline only	8.5	7.4	8.1	6.3
% Not married either time	55.1	53.3	79.3	77.5
Mean baseline ADL limitations	0.7	0.2	0.8	0.3
Mean follow-up ADL limitations	2.2	0.4	2.6	0.6
Mean time to follow-up	16.0	28.1	16.3	27.8

Note: All differences across coresident and survival status significant to $p<.00$.

Table 2. Probability of a coresident shift by survival and coresidence status at baseline

	Non-coresident at baseline		Coresident at baseline	
	Decedents	Survivors	Decedents	Survivors
Baseline N[a]	2,553	4,210	7,575	9,122
Number that shifted[a]	1,327	1,233	1,088	1,330
Probability of shifting unadjusted for months to follow-up[b]	.471	.282	.154	.155
Average months to follow-up	17	28	19	28
Monthly rate of shifting adjusted for time to follow-up[b,c]	.0368	.0117	.0087	.0060

[a] Unweighted.
[b] Assuming one change in coresidence over the average number of months of follow-up for every person shifting status.
[c] Differences are statistically significant

Table 3. Logistic regression results predicting shift in child-coresidence by baseline coresidence and survival status, showing log odds ratios, significance and standard errors in parentheses

	Non-coresident at baseline vs. Coresident at follow-up		Coresident at baseline vs. Non-coresident at follow-up	
	Decedents	Survivors	Decedents	Survivors
Demographic characteristics				
Age	.008 (.020)	.025† (.015)	-.005 (.017)	-.005 (.013)
Female	-.144 (.223)	.100 (.150)	.146 (.197)	.079 (.130)
Rural resident	.068 (.190)	.188 (.122)	.133 (.153)	-.002 (.104)
Availability				
Number children (comparison 1)				
2 – 3	.535† (.302)	.172 (.191)	-.139 (.277)	.118 (.174)
4 – 5	.064 (.316)	-.107 (.203)	-.044 (.285)	.031 .179)
6 +	.016 (.348)	-.049 (.222)	-.014 (.297)	.093 (.186)
Has a son	-.127 (.292)	.358* (.183)	.103 (.277)	.253 (.226)
Socioeconomic characteristics				
Occupation (comparison agriculture)				
White collar	.653† (.373)	.087 (.220)	-.061 (.305)	.462* (.218)
Industry	.149 (.203)	.048 (.137)	.012 (.173)	-.089 (.135)
Other	-.305 (.335)	.193 (.214)	.111 (.273)	-.233 (.170)
Education (comparison none)				
Primary	.044 (.209)	.268† (.148)	.098 (.207)	-.014 (.134)
More than primary	.232 (.357)	.047 (.136)	.169 (.278)	-.614** (.215)
Unknown	.281 (1.181)	.580 (.768)	-1.980† (1.051)	.324 (.743)
Needs				
Main support source is pension	-.461† (.242)	-.265† (.161)	.423* (.207)	.067 (.145)
Marital status (comparison married follow-up)				
Married baseline, not follow-up	1.410** (.306)	1.212** (.188)	-1.075** (.376)	-.098 (.220)
Not married baseline or follow-up	1.261** (.224)	.755** (.147)	-.976** (.197)	-.842** (.133))
ADL Limitations				
ADL limitations at baseline	.011 (.060)	.074 (.105)	.004 (.052)	-.109 (.078)
ADL limitations at follow-up	.123** (.050)	.272** (.049)	-.133** (.046)	-.159** (.044)
Baseline X follow-up interaction	---	-.071† (.037)	---	.049† (.028)
Time to follow-up	.005 (.010)	.023* (.010)	-.000 (.009)	.029** (.011)
Constant	-2.158	-4.924	-.510	-1.645
Log likelihood	-1615.8	2356.3	-3137.7	-3800.3
Chi-square (model)	73.2**	128.1**	47.7**	100.0**

** $p < .01$ * $.01 < p < .05$ † $.05 < p < .10$

Table 4. Distribution of main caregiver at time of death by coresident status at baseline and follow-up

Coresident status at baseline	Non-coresident		Coresident	
Coresident status at follow-up	Non-coresident	Coresident	Non-coresident	Coresident
Main caregiver at time of death				
- Child	43.3	82.4	53.4	92.0
- Spouse	30.7	4.1	11.4	2.1
- Other family/friend	11.1	7.0	19.8	3.6
- Service	5.2	1.3	2.3	0.5
- None	9.7	5.3	13.0	1.8
	100.0	100.0	100.0	100.0

Figure 1. Predicted probability of shifting coresidence status among those without ADL limitations at baseline, by number limitations at follow-up, originating and survival status

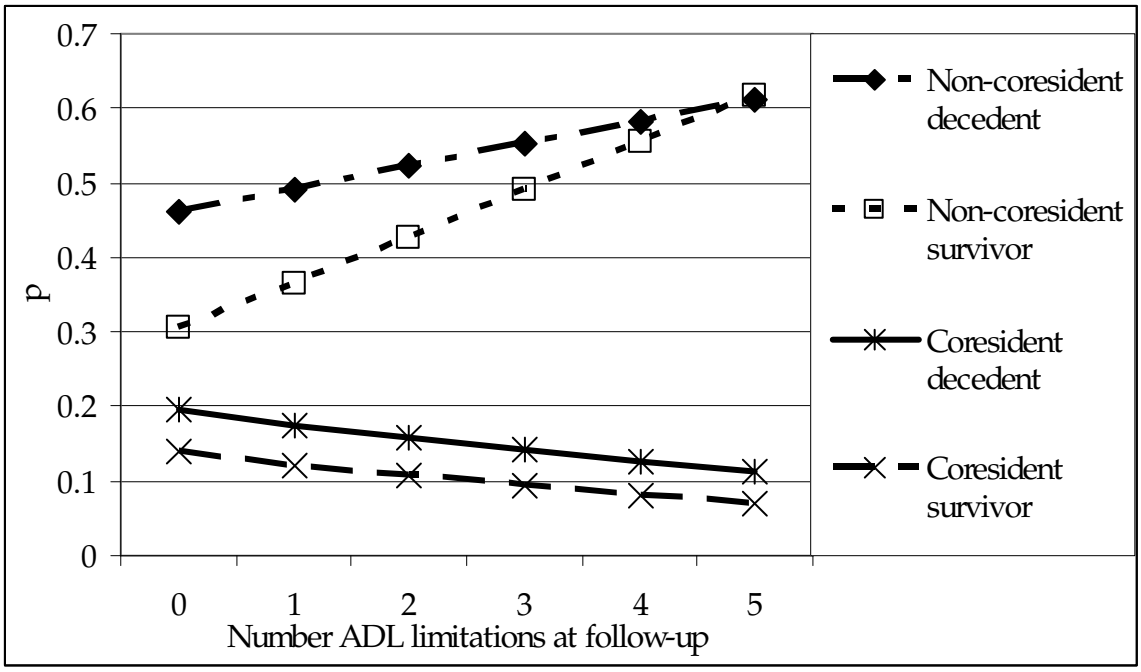

Figure 2. Predicted probability of shifting coresidence status among those with two ADL limitations at baseline, by number of limitations at follow-up, originating and survival status