Original Article

Functioning, Forgetting, or Failing Health: Which Factors Are Associated With a Community-Based Move Among Older Adults?

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Abstract

Objective: To examine whether the health and functioning of middle-aged and older adults are associated with an increased likelihood of community-based moves.

Method: Biennial data from adults aged 51 and older in the Health and Retirement Study (HRS) and discrete-time survival models were used to assess the likelihood of community-based moves from 2000 to 2010 as a function of 11 measures of health and functioning.

Results: Respondents diagnosed with heart disease, stroke, hypertension, lung disease, and psychiatric problems were more likely to move during the study period than those with no such diagnosis. Changes in activities of daily living and instrumental activities of daily living functioning, cognitive impairment, and falls were also related to a greater likelihood of moving during the study period. Cancer and diabetes were not related to overall moves, although diabetes was associated with an increased likelihood of local moves. For the most part, it was longstanding not recent diagnoses that were significantly related to the likelihood of moving.

Discussion: Although some health conditions precipitate moves among middle-aged and older adults, others do not. This work has important implications for understanding the role of different aspects of health and functioning in the likelihood of migration among older adults.

Keywords: Activities of daily living—Aging—Cognition—Health—Health and Retirement Study—Migration

Background

According to the U.S. census between 2005 and 2010, about 27% of adults aged 65 and older moved (Ihrke & Faber, 2012), with poor health operating as a potentially important precipitating factor (Bekhet, Zauszniewski, & Nakhla, 2009; Hays, 2002; Longino, Bradley, Stoller, & Haas, 2008; Perry, Andersen, & Kaplan, 2014; Pope & Kang, 2010).

Although moves at older ages include community as well as institutional moves, recent years have seen a shift away from institutions, aided in part by more Medicaid support for home- and community-based long-term care. In 2010, for instance, only 3% of the 65 and older population lived in nursing homes, representing a 20% decline in this population since 2000 (West et al., 2014). With a growing proportion of older adults remaining in community settings for longer periods of time, it is important to identify the

ways older adults deal with the demands of new and existing health conditions, with one strategy involving moves to new communities with social and other resources.

Past work on the relationship between health and community moving, however, has several limitations. For instance, this work is typically focused on only one or a few health factors. In addition, studies examining health outcomes often suffer generalizability limitations and most have assessed the association between health and moves at concurrent time periods so that temporal ordering cannot be evaluated. Identifying the specific health factors that precipitate moving in later life may provide opportunities for targeted interventions to help older adults remain independent in their homes and communities.

Prior Research on Health and Migration

The vast majority of literature to date examines functional limitations, primarily activities of daily living (ADLs) and instrumental activities of daily living (IADLs; Longino, Jackson, Zimmerman, & Bradsher, 1991; Miller, Longino, Anderson, James, & Worley, 1999; Wilmoth, 2010; Zhang, Engelman, & Agree, 2013). These studies find that an increase in the number of functional limitations is associated with moving (Longino et al., 1991; Miller et al., 1999). Falls, another aspect of poor physical functioning, are also related to migration, specifically falling within the prior year is positively associated with intentions to move within the next 2 years (Stoeckel & Porell, 2010). Other health factors associated with a greater likelihood of moving are depressive symptoms (Stoeckel & Porell, 2010) and self-rated health (Johnson, 2012; Wilmoth, 2010). Finally, in several recent articles focusing specifically on moves to be nearer to kin, ADL difficulties were related to moves to be nearer to kin (Zhang et al., 2013), and cardiovascular events (Choi, Schoeni, Langa, & Heisler, 2015) were associated with migration of either the older adult or his or her child to increase proximity of parents and children.

Theoretical Framework

Litwak and Longino's (1987) "life course model of later life migration" provides a framework to understand and identify the different types of moves made by adults of retirement age and beyond. They lay forth three types of moves that may occur over the life cycle of older adults, all of which are related to health: enhanced lifestyle and retirement moves when in good health; moves to be closer to family when experiencing moderate chronic disability; and moves to nursing homes when health conditions become severe.

Our focus, too, is on health as a precipitator of community-based moves. We draw on the Selective Optimization with Compensation (SOC) theory of aging (Baltes & Baltes, 1990; Baltes & Carstensen, 2003; Freund & Baltes, 2002) to understand why new and existing health conditions might

result in migration in later life. Paul Baltes and Margaret Baltes (1990) proposed the SOC models to describe three strategies for adaptively responding to anticipated or actual physical declines in later life: selection, optimization, and compensation. Compensation, or the use of alternative means to adapt to a health loss, is the mechanism most pertinent to this article. Unlike the other mechanisms, which usually precede changes in health, compensation is a strategy specifically utilized after a loss or declines in health and functioning.

One mechanism for compensating or adapting to a new or worsening health condition may be to move to a new environment with access to new resources or social connections. Although we expect that most, if not all, of these conditions would be related to an increased likelihood of moving, there should be variation in the strength of the relationship. There is already some evidence that ADLs and IADLs and falls are related to moving, likely bringing older adults with personal care needs closer to family and friends who can help them. We hypothesize that many other disease conditions would prompt moves for similar reasons, particularly those that come with greater needs for personal care and assistance. For instance, strokes and heart attacks generally have a good prognosis but may require personal assistance. Conditions such as hypertension and mental health problems should fall into this category as well. Diabetes, on the other hand, may be less likely to be associated with moves as it typically does not come with the same needs for personal care and assistance and is controllable through medication and diet.

Our goal is to examine a variety of health conditions across several domains of health to pinpoint the extent to which different health factors are compensated for in old age through community-based moves.

Current Study

Although some evidence suggests that poor health may be associated with community-based migration at older ages, most of the studies on older adult health and migration observe changes in health and moves at concurrent time intervals making it difficult to assess the causal timing of these events as well as whether these are new or longstanding diagnoses. A notable exception is the work by Wilmoth (2010), which examines trajectories of health and functioning in the two waves prior to moving, and Stoeckel & Porell's (2010) examinations of falls, which avoid this concern by looking at future intentions to move.

In addition, a number of earlier studies on this topic focus on smaller geographic areas that have unknown generalizability to the broader U.S. population. Finally, many health factors beyond functional limitations that may potentially cause a move have not yet been examined. For instance, to our knowledge, no work to date has examined whether there is a relationship between cognitive impairment and

community-based moves, nor has other work investigated diagnosed health conditions beyond that of cardiovascular disease (Choi, Schoeni, Langa, & Heisler, 2015). A more comprehensive study is therefore needed to evaluate and compare different types of health conditions.

We use longitudinal data from the Health and Retirement Study to examine the relationship between health and community-based moves. Throughout the article, we employ the terms “migration” and “move” to describe changes in residence that may be local (i.e., between census tracts within a metropolitan statistical area (MSA) or long distance (i.e., between MSAs, counties, or states). This usage has some precedent in the literature (Bradley, 2011; Perry et al., 2014). We also conduct sensitivity analyses in which we employ a measure of migration that distinguishes between local and long-distance moves. We build on prior work in two critical ways by (1) using a decade of rich longitudinal data on health and moves, which allows us to look at changes in health *before* moves occur and (2) considering a variety of measures of health and functioning covering three distinct domains of health, including (a) diagnosed health conditions (e.g., cardiovascular disease, stroke, cancer, diabetes, lung disease, hypertension, and psychiatric disorders); (b) functional limitations and falls (ADLs, IADLs, and falls); and (c) cognitive health.

We investigate two primary research questions:

- (1) Which health factors precede community-based moves among adults older than 50 years?
- (2) Are there differences in the associations between health factors and moving depending on whether they are recent or longstanding conditions?

Data and Methods

Data

Data come from the 1998–2010 waves of the Health and Retirement Study (HRS), a nationally representative sample of noninstitutionalized U.S. individuals aged 51 and older and their spouse or partner, if any. The study is comprised of six birth cohorts that have been assessed biennially since 1998, including the “original” HRS cohort (born 1931–1941) launched in 1992; the AHEAD cohort of older adults (born before 1924) added in 1993; the Children of the Depression (born 1924–1930) and the War Babies (born 1942–1947) cohorts added in 1998; the Early Baby Boomers (born 1948–1953) added in 2004; and the Mid Boomers (born 1954–1959) added in 2010. The RAND-HRS, a cleaned and streamlined version of HRS variables, is our primary source of data. In order to study migration, we employed data on the respondents’ residential addresses in each wave that were geocoded to 2000 Census tract boundary definitions.

We examine biennial migration events defined by changes in the respondents’ residential census tracts between survey waves. Our study period begins with moves

occurring between the 2000 and 2002 waves and ends with moves occurring between the 2008 and 2010 waves. Over these 10 years of data collection, the survey producers provide geocoded addresses using the same 2000 Census tract boundary definitions and geocoding methodology. Health changes are assessed prior to a change in residence; thus, data on health status come from the 1998–2008 biennial survey waves.

The six cohorts of the HRS comprise a total of 36,985 sampled individuals. From this initial sample, 4,012 individuals were lost to follow-up before the 1998 wave. From the 32,973 respondents assessed in 1998, we retain 21,121 respondents observed in at least three sequential waves over the biennial assessments from 1998 through 2010. An additional 254 respondents were dropped because they were younger than 51 years of age in 2002, another 35 individuals were lost to follow-up due to missing geocode information, and another 443 individuals were dropped because they were living in nursing homes at the first wave that they were observed in our study period (1998–2010). Finally, an additional 703 respondents (for 6,781 biennial person-years of observations) were excluded because they had missing information on one or more model covariates. Our final sample is comprised of 19,686 respondents who are observed for a period of 59,721 biennial person-years. The “falls” subsample is smaller than our main analytic sample, with 9,170 respondents and 35,435 biennial person-years, because the HRS only collected this information for respondents aged 65 and older.

Measures

Moves

Our key dependent variable is the likelihood of moving between two waves. To capture moves occurring between the current wave (w) and the preceding wave ($w-1$), we created an indicator variable for whether a person had a change in census tract between the current and prior wave. The move indicator was coded 1 if a person moved to a new census tract between waves $w-1$ and w and 0 otherwise. Respondents are censored after a first move, upon death, upon entry into a nursing home, loss to follow-up, or the end of the survey period in 2010. This gives us a total of 6,100 first moves between 2000 and 2010 for the full sample and 2,645 first moves for the subsample of respondents aged 65 and older who were surveyed about falls.

We also created an alternative categorical migration indicator in which migration events were categorized as either local or long distance. For individuals residing within an MSA, local moves were defined as moves from one census tract to another within the same MSA and long-distance moves were defined as a move to a census tract in a new MSA, county, or state. For individuals residing outside of an MSA, local moves were defined as moves from one census tract to another within the same county and

long-distance moves were defined as a move to a census tract in a new MSA, county, or state.

Diagnosed Health Condition

Respondents were asked whether they *ever* received a doctor's diagnosis for any of several health conditions, including hypertension, diabetes, cancer (excludes skin cancer), lung disease; stroke; or emotional/psychiatric problems. If a respondent reported ever having received a doctor's diagnosis for a given health condition in one wave, that information was retained by the HRS and the question was not asked again. We constructed a categorical variable to measure the respondent's history of health conditions from the two survey waves ($w-2$ and $w-1$) that predate the assessment of moving as follows: (1) *never diagnosed* at $w-1$ (and thus also at $w-2$ and all preceding waves); (2) *recent diagnosis* in which the respondent reports ever diagnosis at $w-1$ but not at $w-2$ and (3) *nonrecent diagnosis* in which the respondent reported ever diagnosis at both $w-1$ and $w-2$.

Cognitive Function

The HRS assesses cognitive function with a multidimensional measure of cognitive functioning, based upon a telephone screening instrument (Brandt, Spencer, & Folstein, 1988), and modeled after the Mini-Mental State Exam (Folstein, Folstein, & McHugh, 1975). In summary, respondents are asked a series of questions that include assessments of word recall, working memory, episodic memory, mental processing, vocabulary, and general orientation. Respondents unable to complete the survey were assessed by a proxy-respondent who rates the respondent's memory, judgments, and decision making. The HRS provides a total summary score for a battery of self-reported cognitive questions and for the proxy-reported questions in which missing data on one or more items in the self-reported instrument have been imputed (Fisher, Hassan, Rodgers, & Weir, 2013). Using these data, we employ a categorical definition of cognitive impairment based on prior studies using the HRS (Langa, Kabeto, & Weir, 2009; Langa et al., 2001, 2005, 2008), which has been validated elsewhere (Crimmins, Kim, Langa, & Weir, 2011). This measure uses cut-points to categorize respondents as having normal cognition, cognitive impairment no dementia (CIND), or probable dementia (PD). We compare individuals with normal cognition with those who already have or develop some form of cognitive impairment (i.e., either CIND or PD).

We summarize the pattern of change in cognitive status over the two waves preceding the migration assessment as (1) *no cognitive impairment* at $w-2$ or $w-1$; (2) *recent onset cognitive impairment* at $w-1$ with no cognitive impairment at $w-2$; or (3) *nonrecent onset cognitive impairment* at $w-2$. The nonrecent onset category includes respondents who were cognitively impaired at both $w-2$ and $w-1$ and those assessed as no longer impaired at $w-1$. We do not separate the latter group due to sample power considerations and;

also, in sensitivity analyses findings were similar whether or not these respondents were included in the nonrecent onset category. CIND and PD categories were also disaggregated in sensitivity analyses, but findings were comparable, so we combine them in these analyses.

Falls

Respondents older than 65 years were asked whether they fell and how many times since the prior wave. We constructed the following indicator: (1) *no falls* between $w-2$ and $w-1$ (2) *fell once* between $w-2$ and $w-1$; or (3) *fell multiple times* between $w-2$ and $w-1$. Respondents who reported that they fell but reported that they "don't know" the number of times were coded as having fallen multiple times. Those refusing to provide the number of times fell were coded missing.

Functional Limitations

We used summary indices of ADLs and IADLs (Katz, 1983) provided in the RAND-HRS. These included an indicator of whether at least some difficulty was reported for one or more of five tasks (i.e., bathing, eating, dressing, walking across a room, and getting in or out of bed), with values ranging from 0 (*no task had some difficulty*) to 5 (*some difficulty or worse in all 5 tasks*). For the IADL tasks, a dichotomous indicator captures difficulties with one or more of three tasks: using a telephone, taking medication, and handling money. Values range from 0 (*no task had some difficulty*) to 3 (*some difficulty or worse in all 3 tasks*). We constructed two separate variables capturing changes in the number of ADL and IADL limitations, respectively, as assessed in the two waves preceding the assessment of migration. For ADLs, this measure was (1) *no ADLs* at either $w-1$ or $w-2$; (2) *onset of limitation* with a change from one or more ADLs at wave $w-1$ to none at $w-2$; (3) *recovery from limitation* with a change from no ADLs at $w-1$ to one or more at $w-2$; and (4) *persistent limitation* with one or more ADLs at both $w-1$ and $w-2$. The measure for IADLs was constructed similarly.

Age

Age dummies were constructed based on birth year and birth month. Due to small cell sizes, ages less than 54 years are collapsed into a single age group and those greater than 85 years are grouped into a single age group. For the analyses that included falls, which were only asked of those 65+, the youngest ages are coded <67 and the oldest ages were grouped into age 85+.

Time-Invariant Sociodemographic Covariates

We coded race/ethnicity: (1) White, non-Hispanic, (2) Black, non-Hispanic, (3) Hispanic, and (4) other. Education was coded as an ordinal variable: (1) no degree/GED, (2) high school, (3) some college, (4) and BS or BA degree or higher.

Time-Varying Covariates

The fully adjusted models provide more information about whether and the extent to which the relationship between health and moving persists after controlling for a subset of social and material resources that are generally well established prior to entering later adulthood, including homeownership, wealth, marital status, and number of children. We constructed a three-category homeownership variable based on self-reported data in the HRS, coded (1) rent, (2) own, and (3) other. Wealth information presented in constant 1996 dollars includes imputed information on a person's net value of total wealth (i.e., the sum of all reported assets net of any debt). Due to the skewed distribution, wealth is categorized into (1) negative wealth/debt; (2) \$0 to less than \$50,000; (3) \$50,000 to less than \$150,000; (4) \$15,000 to less than \$400,000; and (5) more than \$400,000. To capture availability of kin, we also control for marital/partnership status, coded as (1) married or partnered, (2) not married or partnered, and for self-reported total number of children.

Methods

We use a discrete-time, proportional hazard model (Yamaguchi, 1991) to assess the relationship between health status changes and the subsequent likelihood of moving.

Respondents are included in the risk pool from their first entry into the panel on or after 2000 until they experience a first move or are censored due to death, entry into a nursing home, loss to follow-up, or the end of the survey period in 2010. The discrete survival times for respondents in the risk pool are indexed by their time-varying age so that the probability of moving is modeled as discrete-time proportional hazards.

As depicted in Figure 1, the temporal ordering of the control variables (observed at wave $w-2$), health changes (observed at wave $w-1$, for changes between $w-2$ and $w-1$), and moving (observed at wave w , for moves between $w-1$ and w) allows us to improve our causal inferences about the role of health changes in moving, controlling for sociodemographic characteristics.

All analyses used survey weights and adjust for the stratified sample design using Stata version 13, software. We employ the Stata margins commands to estimate predicted probabilities of a community-based moves and marginal effects of health changes on community-based moves,

along with standard errors for the marginal effects using the delta method.

Results

Table 1 shows the characteristics of our analytic sample for the first year a respondent is assessed on migration in the study.

Thirteen percent of respondents move during the period of observation. About 9% of moves are local (i.e., between

Table 1. Descriptive Characteristics in Year of Entry Into Sample

Respondent's characteristics	All (<i>n</i> = 19,686)	Falls subsample (<i>n</i> = 9,170)
Moved during observation period (%)	13.0	11.7
Local move	8.9	7.9
Long-distance move	4.2	3.8
Current age in years (mean, <i>SD</i>)	65.6 (9.3)	76.2 (5.6)
Sex (%)		
Male	46.0	41.6
Female	54.0	58.4
Race/ethnicity (%)		
White	81.3	84.6
Black	9.5	8.3
Hispanic	7.4	5.7
Other	1.7	1.5
Schooling (%)		
<HS	19.4	28.4
HS degree	34.4	36.6
Some college	22.8	17.9
College degree+	23.5	17.2
Marital status (%) ^a		
Married/partnered	69.7	62.2
Unmarried	30.3	37.8
Wealth in categories (%) ^a		
Negative wealth (debt)		
\$0 to <\$50,000		
\$50,000 to <\$150,000		
\$150,000 to <\$400,000		
\$400,000+		
Number of children (mean, <i>SD</i>) ^a	3.0 (2.1)	3.3 (2.3)
Homeownership (%) ^a		
Rent	12.6	13.4
Own	73.6	72.3
Other	13.8	14.3

Note: Weighted using HRS survey weights. For individuals residing within an MSA, local moves were defined as moves from one census tract to another within the same MSA; for individuals residing outside of an MSA, local moves were defined as moves from one census tract to another within the same county. Long-distance moves were defined as a move to a census tract in a new MSA, county, or state. Time-varying descriptive information is reported for the preceding survey wave, so reports correspond to assessment in the wave prior to the first period of observation for migration. HRS = Health and Retirement Study; HS = high school; MSA = metropolitan statistical area.

^aLagged two survey waves (4 years).

Figure 1. Temporal ordering of time-varying control variables, health changes, and community-based moves.

census tracts within the same MSA or county) and 4% are long-distance moves (i.e., between MSAs, counties, or states). The median distance moved was 6 miles overall, or a median of 3 miles moved by local movers and 458208 miles by nonlocal movers (not shown).

For the falls sample, the percent moving is fairly comparable. Respondents in the full sample are, on average, 66 years old. Respondents in the full sample and those in the falls subsample are mostly comparable in terms of descriptive statistics with the exception of educational attainments and marital status.

Table 2 shows descriptive information on the health measures for each individual in the year the respondent entered into the analytic sample and averaged across all person-years. The vast majority of respondents have no disease diagnosis when they first enter the sample. An exception is hypertension for which 38% of respondents were previously diagnosed. ADL and IADL limitations are rare upon entry into the study as well. Eight-three percent have no ADLs and 91.5% have no IADLs. About 78% have no cognitive impairment. About 14% of respondents fell once and 12.5% fell more than once in the last two years. The percent of biennial person-years with no diagnosed health conditions ranges from 51% (hypertension) to 94% (stroke). The percent of person-years with no ADLs and IADLs reported are 83% and 92%, respectively, 29% of person-years indicate a fall, and 22% indicate cognitive impairment.

Table 3 reports the results of discrete-time hazard models for diagnosed health conditions, Table 4 for cognitive impairment, and Table 5 for falls. These tables present predicted probabilities and marginal probabilities of migration for a change in health status compared with having had no health event. The first two columns in each table present the results of models that include time-invariant sociodemographic characteristics. The second set of columns reports results of models that also adjust for time-varying sociodemographic covariates, including marital status, homeownership, number of children, and wealth categories.

In the models adjusting for sociodemographic factors, only individuals who do not receive a diagnosis of heart disease have a predicted probability of moving by the following wave of .1 (Table 3). Those with a nonrecent diagnosis have a .013 significantly greater predicted probability of moving than those with no diagnosis. By comparison, a new diagnosis in the prior wave increases the likelihood of moving by only a small nonsignificant amount. A non-recent diagnosis of stroke, hypertension, lung disease, and psychiatric or emotional disorder is associated with a significantly greater likelihood of moving than no such diagnoses. For the most part, recent diagnoses of these disease conditions show much smaller and nonsignificant differences than nonrecent diagnoses. The one exception is psychiatric disorders, for which a recent diagnosis is even more strongly related to moving than is a nonrecent diagnosis.

Table 2. Descriptive Statistics for Lagged Health Variables

Health condition	Year of entry (<i>n</i> = 19,686) ^a	Entire study period (<i>n</i> = 59,721 person-years)
Heart disease		
Never diagnosed	82.8	79.6
Nonrecent diagnosis	14.5	17.2
Recent diagnosis	2.7	3.1
Stroke		
Never diagnosed	94.8	94.0
Nonrecent diagnosis	4.1	4.8
Recent diagnosis	1.0	1.2
Hypertension		
Never diagnosed	57.0	50.9
Nonrecent diagnosis	38.1	44.1
Recent diagnosis	4.9	5.1
Diabetes		
Never diagnosed	87.0	84.6
Nonrecent diagnosis	10.9	13.0
Recent diagnosis	2.1	2.4
Cancer		
Never diagnosed	90.8	88.1
Nonrecent diagnosis	7.5	10.0
Recent diagnosis	1.7	1.9
Lung disease		
Never diagnosed	93.6	92.6
Nonrecent diagnosis	5.1	6.0
Recent diagnosis	1.2	1.4
Psychiatric problems		
Never diagnosed	87.8	86.7
Nonrecent diagnosis	10.3	11.4
Recent diagnosis	1.9	1.9
Falls		
No falls	73.8	70.6
One fall	13.7	14.3
Frequent falls	12.5	15.1
ADLs		
No ADLs	83.0	82.9
Change from 0 to 1+	5.9	6.0
Change from 1+ to 0	4.4	4.5
ADLs both waves	6.7	6.6
IADLs		
No IADLs	91.5	91.7
Change from 0 to 1+	3.4	3.5
Change from 1+ to 0	2.8	2.5
IADLs both waves	2.3	2.3
Cognitive status		
No cognitive impairment	78.4	78.1
Nonrecent onset of cognitive impairment	13.7	14.1
Recent onset of cognitive impairment	7.9	7.8

Note: Weighted using HRS survey weights. ADL = activities of daily living; HRS = Health and Retirement Study; IADL = instrumental activities of daily living.
^aFalls subsample, sample size is 9,170 people; 35,435 person-years. Recent diagnosis indicates a diagnosis at *w*-1 but not at *w*-2; nonrecent diagnosis indicates a diagnosis at both *w*-1 and *w*-2.

Table 3. Predicted Probabilities and Marginal Effects of Community-based Move for Seven Diagnosed Health Conditions ($n = 19,686$)

	Adjusted for sociodemographic characteristics only		Fully adjusted	
	Probability of community-based move	Marginal probability	Probability of community-based move	Marginal probability
Heart disease				
Never diagnosed	.100	—	.101	—
Nonrecent diagnosis		.013** (.004)		.007† (.004)
Recent diagnosis		.004 (.008)		.000 (.008)
Stroke				
Never diagnosed	.101	—	.101	—
Nonrecent diagnosis		.021** (.007)		.013† (.007)
Recent diagnosis		.014 (.013)		.012 (.013)
Hypertension				
Never diagnosed	.098	—	.100	—
Nonrecent diagnosis		.007* (.003)		.004 (.003)
Recent diagnosis		.011 (.007)		.010 (.007)
Diabetes				
Never diagnosed	.101	—	.101	—
Nonrecent diagnosis		.007 (.005)		.002 (.004)
Recent diagnosis		.010 (.011)		.008 (.010)
Cancer				
Never diagnosed	.101	—	.101	—
Nonrecent diagnosis		.005 (.005)		.006 (.005)
Recent diagnosis		.0211† (.012)		.024* (.012)
Lung disease				
Never diagnosed	.100	—	.101	—
Nonrecent diagnosis		.026** (.007)		.013* (.007)
Recent diagnosis		-.005 (.013)		-.012 (.012)
Psychiatric/emotional				
Never diagnosed	.098	—	.099	—
Nonrecent diagnosis		.026** (.006)		.014** (.005)
Recent diagnosis		.040** (.013)		.035** (.013)

Note: Standard errors are given in parentheses. Coefficients depicted represent discrete change from the base level (no condition). Results are from separate models, with each model adjusting for only one health condition. Recent diagnosis indicates a diagnosis at $w-1$ but not at $w-2$; nonrecent diagnosis indicates a diagnosis at both $w-1$ and $w-2$. Sociodemographic models control for age dummies, wave, race/ethnicity, sex, and education. Fully adjusted model additionally controls for marital status, number of children (lagged two waves), homeownership status, and wealth categories.

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

Adjusting for additional covariates greatly reduced these effects, with most conditions losing statistical significance in the fully adjusted models. Exceptions are diagnosed lung disease and psychiatric disorders.

Having an ADL during the study period is associated with a significantly greater likelihood of moving (Table 4). It does not matter when the change occurred or whether recovery was reported. IADLs show a similar pattern to

Table 4. Predicted Probabilities and Marginal Effects of Community-based Move for ADLs and IADLs and Probable Dementia and Cognitive Impairment ($n = 19,686$)

	Adjusted for sociodemographic characteristics only		Fully adjusted	
	Probability of community-based move	Marginal probability	Probability of community-based move	Marginal probability
ADLs				
No change, 0 limitation	.100	—	.101	—
Change from 0 to 1+ limitation		.013* (.007)		.005 (.006)
Change from 1+ limitations to 0		.020* (.008)		.011 (.007)
No change, 1+ limitation		.020** (.007)		.003 (.006)
IADLs				
No change, 0 limitation	.100	—	.101	—
Change from 0 to 1+ limitation		.012 (.009)		.004 (.008)
Change from 1+ limitations to 0		.035** (.011)		.020* (.010)
No change, 1+ limitation		.022* (.011)		.006 (.009)
Cognitive status				
No cognitive impairment or dementia	.100		.100	
Nonrecent cognitive impairment		.022** (.005)		.012* (.005)
Recent cognitive impairment		.002 (.005)		-.003 (.005)

Note: Standard errors are given in parentheses. Results are from separate models, with each model adjusting for only one health condition. Recent cognitive impairment indicates a diagnosis at $w-1$ but not at $w-2$; nonrecent cognitive impairment indicates a diagnosis at both $w-1$ and $w-2$. Coefficients depicted represent discrete change from the base level (no condition). Sociodemographic models control for age dummies, wave, race/ethnicity, sex, and education. Fully adjusted model additionally controls for marital status, number of children, homeownership status, and wealth categories. ADL = activities of daily living; IADL = instrumental activities of daily living.

* $p < .05$. ** $p < .01$.

Table 5. Predicted Probabilities and Marginal Effects of Community-based Move for Falls

	Adjusted for sociodemographic characteristics only		Fully adjusted	
	Probability of community-based move	Marginal probability	Probability of community-based move	Marginal Probability
No falls	.089	—	.087	—
One fall		.009† (.005)		.008 (.005)
Frequent falls		.020** (.005)		.018** (.005)

Note: Standard errors are given in parentheses. Coefficients depicted represent discrete change from the base level (no condition). Results are from separate models, with each model adjusting for only one health condition. Sociodemographic models control for age dummies, wave, race/ethnicity, sex, and education. Fully adjusted model additionally controls for marital status, number of children, homeownership status, and wealth categories.

† $p < .10$. ** $p < .01$.

ADLs although a recent increase (i.e., from zero to one or more IADLs) is not statically associated with the likelihood of moving in the next wave. Upon adjusting for the larger set of covariates, the relationship between ADLs and IADLs and moving is no longer statistically significant. Nonrecent

diagnoses of cognitive impairment are also related to a significantly greater likelihood of moving than having no such diagnoses. Recent diagnoses of cognitive impairment are not. These associations are reduced to nonsignificance after adjusting for additional covariates.

Table 5 shows that frequent falling is associated with a significantly greater likelihood of moving in the subsequent wave. Falling once in the prior wave is only marginally associated with moving. The finding for frequent falls persists even in the fully adjusted model.

In [Supplementary Appendix A](#), we assess associations between changes in health status and the likelihood of moving, distinguishing between local and long-distance moves. The marginal probabilities for health conditions (see [Supplementary Appendix A-1](#)) are mostly similar for local and long-distance moves, although the relationship between diagnosed conditions and moving is somewhat stronger for local moves than long-distance ones. Diabetes diagnosis is significantly related to a *greater* likelihood of moving locally, but is associated with a (nonsignificant) *lower* likelihood of making a long-distance move. The opposing direction of the relationship between diabetes and local versus long-distance moves may be the reason we do not observe a statistically significant relationship between this condition and all moves in [Table 3](#). Reported ADL and IADL limitations are more strongly related to a local move than a long-distance move ([Supplementary Appendix A-2](#)). Nonrecent cognitive impairment is significant for both local and long-distance moves. Patterns for frequent falls are similar for local and long-distance moves ([Supplementary Appendix A-3](#)). Falling once is only significant for long-distance moves.

Discussion

This study provides a comprehensive assessment of the relationship between health and older life migration that covers 11 different health measures across three distinct domains of health conditions, functioning, and cognition. We find that most health factors examined are significantly associated with the likelihood of community-based migration during older adulthood. This is not surprising as the majority of these disease conditions require at least some amount of personal assistance or care, which may prompt a move to be nearer to family and other such resources.

Nonrecent diagnoses of heart disease, stroke, hypertension, lung disease, psychiatric/emotional problems, and falls were all associated with an increased likelihood of moving. Consistent with other work ([Longino, Jackson, Zimmerman, & Bradsher, 1991](#); [Miller et al., 1999](#)), we also found that developing an ADL or IADL limitation was related to a greater likelihood of moving. We did not find that recovery from an ADL or IADL is related to a lower likelihood of moving, as others have shown (see [Longino et al., 1991](#); [Miller et al., 1999](#)). This study was the first, to our knowledge, to investigate the role of cognitive status on moving. We found a positive significant association between cognitive impairment and the likelihood of moving.

Cancer and diabetes were the only health conditions not related to overall moves, although diabetes was associated with an increased likelihood of local moves.

Diabetes may show a weaker relationship with migration than other conditions due to the fact that it can be better controlled through diet and medication and may not require the same level of assistance as say, a stroke, which may leave older adults disabled for some time. Cancer was the one factor not related to either local or nonlocal moves, likely because certain cancers and certain stages of the disease might be managed through medication or may require proximity to a local doctor or hospital. In addition, it is possible that the heterogeneity of this broadly defined group of cancers makes it difficult to identify significant effects.

We were surprised to find that psychiatric/emotional conditions were the most strongly related to the likelihood of moving, with recent diagnoses showing even stronger relationships to moving than nonrecent ones. This may suggest that mental health problems may be more consequential for moving than physical health conditions. Even in the fully adjusted models, individuals with recent psychiatric/emotional diagnoses were 3.5% more likely to move than like individuals with no such condition. To put this in context, there is a 5% difference between those in the lowest and highest wealth categories in these same models. Although more work is needed on this topic to address causality, it is possible that policies aimed at improving the emotional well-being of older adults may be particularly impactful for helping older adults age in place. This finding is also consistent with SOC theory. Depression and mental health issues at older ages are difficult to compensate for and moving may be a necessary compensatory strategy to ensure access to social support, kin, and other resources needed to maintain well-being.

We expected to find stronger associations for recent conditions than longstanding conditions; however, with only one exception (i.e., psychiatric disorders), it is the nonrecent diagnoses that are significantly related to moving. This could be because it takes time to move, or that conditions worsen over time and it is only once a certain threshold is reached that moves occur. Another explanation may be that we do not have a sufficient number of people developing these conditions in each wave to detect an effect of a recent change in health (about 1–5% develop these conditions), or this could be because our “recent” measures are captured at least 2 years before moves occur, and we may be missing truly recent changes.

It is worth noting that once we control for marital status, home ownership, number of children, and wealth—factors linked to resources and ability to move—the associations between health and moving are, for the most part, reduced to nonsignificance. Exceptions to this are falls, lung disease, psychiatric disorders, and cognitive impairment for which the associations with moving persist even after including controls for resources and sociodemographic characteristics. Among the characteristics we considered, we found that adjustment for wealth prior to any observed health status changes was particularly important in explaining

the loss of statistical significance of health factors in the fully adjusted models. These findings suggest that the role of poor health on later life migration may be fundamentally structured by the experience of material disadvantage. Further work is needed to better understand the precursors and intervening mechanisms that explain the relationship between health and migration and why some groups may be more likely to move after a change in health status than are others.

There are several limitations to this study that should be noted. First, our analytical approach requires some trade-offs in order to improve our inferences about the direction and strength of the relationship between health and migration, including restricting the sample to respondents for whom at least three waves of data are available. In addition, the biennial nature of the survey combined with the absence of data on the exact date of health and migration events means that changes in health may have occurred as much as 4 years before the moves (although they may have occurred immediately before the move).

Another limitation is moves between census tracts do not capture moves of shorter distances—those in which the respondent moved within a census tract. Unfortunately, more refined geographic detail is not available, even from the restricted-use HRS Geofile. Although the HRS survey instrument includes questions about whether respondents moved between waves, the self-reported measures were inconsistent with the objective census move measure used in this study. We can only speculate as to why self-reported data may be poorly aligned with the residential address histories tracked by the HRS survey administrators, including differences in the perceptions of when or whether migration has occurred, particularly among people in the early stages of moving or those who temporarily retain two homes.

We may be missing moves that occur after the last observed wave but before a censoring event among respondents who are censored from the community-based sample (i.e., due to entry into a nursing home, death, or loss to follow-up). Moves to nursing homes are excluded from our analyses (even if they occur between census tracts). Censoring moves to nursing homes likely underrepresents the full extent of health-related moves older adults make in later years. An examination of moves to nursing homes is beyond the scope of this investigation but could be addressed with these data in future work. We also do not assess why respondents are moving. They could be moving to be closer to kin (van Diepen & Mulder, 2009; Choi, Schoeni, Langa, & Heisler, 2014; Lovegreen, Kahana, & Kahana, 2010; Zhang et al., 2013), as theorized by Litwak and Longino (1987), but moves could occur for a variety of other reasons as well.

Recent work suggests that aging in place is not always optimal and may render some older adults, particularly those in poor health and with lower incomes, homebound or semi-homebound and despondent (Ornstein et al.,

2015). Although moving to be nearer to new communities may be one solution for keeping older adults connected to family and others, moves in later life come with their own challenges. Although some moves bring older adults closer to family members who could provide care and support (Choi, Schoeni, Langa, & Heisler, 2015) moving at older ages may also sever longstanding community ties (Keene, Bader, & Ailshire, 2013), potentially leaving older adults isolated and without the social support they need. In addition, the stress imposed by moves may be deleterious to mental health, at least in the short run (Bradley & Van Willigen, 2010). The present study shows that health-related moves are not uncommon at older ages and that many different types of health conditions precipitate these moves. Future work is needed to better understand the consequences of both aging in place and moving in later life for individuals, families, and neighborhoods.

Supplementary Material

Please visit the article online at <http://gerontologist.oxfordjournals.org/> to view supplementary material.

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