RELOCATION AND CO-RESIDENCE:

EXAMINING HOUSEHOLD STRUCTURES THAT ENABLE OLDER ADULT LONG-TERM CARE IN THE COMMUNITY

by

SAMARA SCHECKLER

(Under the Direction of Amanda Abraham)

ABSTRACT

As the American population ages, policymakers must address a rapid expansion of demand for long-term care services to support older adults with functional limitations. Long-term care describes resources designed to compensate for functional disabilities and keep an older adult healthy and safe for an extended period. Most American long-term care is provided informally by family members, and most Americans express a preference to receive this care in a community setting rather than in an institution. Given that long-term care is resource intensive, it often requires relocation. About 20 percent of older adults co-reside with their informal caregiver in a shared household to receive long-term care. This dissertation examines drivers of and barriers to relocation between community environments, and particularly the facilitators of co-residence for long-term care support. Using a model of healthcare access, findings demonstrate three drivers of co-residence. Community health describes the physical capacity for younger adults to provide care. The second chapter of the dissertation observes changes in older adult household structure in communities with high opioid use. Individual economic resources

impact relocation and co-residence decisions. The third dissertation chapter demonstrates a contraction of co-residence with macro-economic recession and recommends housing market changes as a possible mechanism driving this relationship between the macro economy and older adult household structures. Finally, paid services will also change older adult household structures, as the fourth chapter demonstrates with an examination of Medicare home health services substituting for informal co-resident caregiving. The decision to relocate and the decision to co-reside each bear specific economic and health implications, and long-term care policy must consider both the advantages of disadvantages of policies that rely on relocation to access informal co-resident care to accomplish the long-term personal care of America's aging population.

INDEX WORDS: public policy; long-term care; housing; co-residence; relocation

© 2019

Samara Scheckler

All Rights Reserved

RELOCATION AND CO-RESIDENCE:

HOUSEHOLDS STRUCTURED TO PROVIDE OLDER ADULTS WITH LONG-TERM CARE

by

SAMARA SCHECKLER

Major Professor:	Amanda Abraham
Committee:	W. David Bradford
	Laurence O'Toole
	Andrew Whitford

Electronic Version Approved:

Suzanne Barbour
Dean of the Graduate School
The University of Georgia
May 2019

DEDICATION

This dissertation is dedicated to the people who first taught me about the wisdom that comes with age; Ruth and Karl Richter, Jack and Molly Honig, and Margaret Edmiston.

ACKNOWLEDGEMENTS

I happily recognize my academic mentors. My advisor and newest to my committee, Amanda Abraham, introduced theoretical rigor to this final year of my writing. Her immeasurable support and calm, grounded approach helped me to ride the swells of a demanding year. Amanda demonstrated to me that it is possible to cultivate knowledge and children at the very same time. I spent much of my doctoral studentship in the office of David Bradford, where I learned a systematic approach to knowledge production and the value of tackling a problem head-first instead of heart-first. Under David's guidance, I studied academics as a profession, and with his generous support I rubbed elbows with the cutting edge of knowledge production. Laurence O'Toole weighted my studies with a broad perspective and inspired my deep respect for context. Larry demonstrated how an encompassing viewpoint can illuminate the minute details of a problem. He also demonstrated the value of bagels and cream cheese. Andrew Whitford's door has been open to me since the earliest days of my graduate studies. Over the years, Andy has offered me guidance on topics ranging from leveraging my practice experience on the job market to raising a child who loves technology. When I sat across the conference room table from these four academics as they prepared me for the interview that would become my fellowship, the phrase "standing on the shoulders of giants" passed through my mind, and I understood that my view was magnificent.

I am deeply grateful to Nathaniel Scheckler who stir fried the vegetables when we got hungry, took us to the mountains when we needed to trade ceiling for sky, and drove hundreds of miles to visit the people we love best. Nat ground coffee when I felt tired and held my hand quietly. I revolve around Nat. Nat revolves around me. Simon Kol, my red-headed baby who took every step of this adventure with me and Elias Oren, who first arrived on campus tucked in an Ergo carrier and has never known his mama as anything but a student; I thank these boys for their hours spent in after school care or playing soccer at the YMCA so that I could study and learn. I am overwhelmed by their bravery as I watch them prepare for our family's next adventure. With their inquisitive minds, fabulous senses of humor and strong orientation towards justice, I know that they will each leave the world a tiny bit better than they found it. I acknowledge Rudina and David Richter, who joyfully stoked my desire to read every book in the world. I could have written one hundred pages on the existential nature of pond scum and they would meet me at the end with a standing ovation. Rudina and David drove eight hours to spend weekends babysitting when Nat and I were overwhelmed by finals. Their Sunday phone calls and doors always open for our visits over humid summers kept me human. I hope someday I show such patience and generosity when my boys embark on their own wild adventures. Finally, I must recognize my Ph.D. women role models, Rebecca Scheckler, Sabrina Mark, Shira Chess, Jill Anderson, Katie Shank, Grace Adams, Courtney Yarbrough, Megen LePere-Schloop and Brittany Bramlett (among so many wonderful others). You read my materials, took me on long walks and told me stories and told me stories and told me stories.

TABLE OF CONTENTS

Page

ACKNOWLEDGEMENTS ..... *v*

LIST OF TABLES ..... *ix*

LIST OF FIGURES ..... *xi*

CHAPTER

1 INTRODUCTION 1

References 10

2 GRANDPARENTS GETTING LESS CARE, GIVING MORE: A SPILLOVER OF OPIOID ABUSE IN THE UNITED STATES 11

Introduction 11

Theory 17

Analysis 18

Results 22

Discussion 27

Limitations 30

Conclusion 32

References 34

3 DOWN, OUT AND ALONE: RECESSION-RELATED SHIFTS IN THE CO-RESIDENCE OF OLDER ADULTS 38

Introduction 38

Background and Theory....40
Hypotheses....46
Data....47
Methods and Measures....48
Results....51
Discussion....57
Limitations....61
Conclusion....62
References....63
4 HOME HEALTH AND LATE-LIFE HOUSEHOLD STRUCTURES....68
Background....69
Data and Model....75
Results....78
Discussion....85
Limitations....88
Conclusion....89
References....90
Appendices....98
5 CONCLUSION: MOVING FORWARD....68

LIST OF TABLES

Page

Table 1: Models of Opioid Use, Caregiving and Co-Residence.....22

Table 2: Summary Statistics for Caregiving and Co-Residing Grandparents 24

Table 3: Summary Statistics for Public Use Microdata Areas 25

Table 4: Logistic Regression Marginal Effects on Grandparent Caregiving.....26

Table 5: Probability of Individuals 50 or Older Being Caregiver or Co-Resident in Communities with High Opioid Use.....27

Table 6: Co-Residence Rates by Year 49

Table 7: Summary Statistics 51

Table 8: Logistic Marginal Effects, Co-Residence in Recession and Post-Recession 52

Table 9: Logistic Marginal Effects, Co-Residence by Race During Recession and Post-Recession 53

Table 10: Logistic Marginal Effects, Co-Residence in Recession and Post-Recession by Risk of Nursing Home Placement.....54

Table 11: Logistic Marginal Effects, Income on Co-Residence during Recession and Post-Recession: Reported in $20,000 increments.....56

Table 12: Descriptive Statistics: Individual Characteristics, Continuous 79

Table 13: Descriptive Statistics: Individual Characteristics and Service Use, Categorical

79

Table 14: Logistic Marginal Effects of Functional Ability and Geography on Household Structure 80

Table 15: Relative Risk Ratios of Living Situation by Individual Characteristics (n=39,203) 81

Table 16: Paired T-Test, Mean Incomes of Home Health Users by Geography 82

Table 17: Logistic Marginal Effects of Home Health Use by Geography on Household Structure 83

Table 18: Relative Risk Ratios of Living Situation by Behavior (n=39,203) 84

Table 19: Logistic Marginal Effects of Rural Home Health Use by ADL on Household Structure 84

Table 20: Descriptive Statistics: County Rural Urban Character 98

Table 21: Relative Risk Ratios of Living Situation by Individual Characteristics (n=39,203) 98

LIST OF FIGURES

Page

Figure 1: Enabling Characteristics of Community-Based Long-Term Care 6

CHAPTER 1

INTRODUCTION

As the American population ages, policymakers must address the rapidly expanding demand for long-term care services to support older adults who experience functional limitations. There is a rich literature to explain risk factors of older adult institutionalization into a skilled nursing facility. These range from functional dependencies to falls and number of medications prescribed (Bharucha, Pandav, Shen, Dodge, & Ganguli, 2004; Freedman, 1996; Gaugler, Duval, Anderson, & Kane, 2007a; Harris, 2007; Miller & Weissert, 2000; Tinetti & Williams, 1997). Institutional care is extremely expensive, and older adults typically express a preference to live in the community. Unpaid family or "informal" caregivers provide most of the community-based support. About 20 percent of older adults live with their caregiver in co-residence to receive this care (Taylor et al., 2011). It can be extrapolated that the older adult co-residents had to relocate to live with a caregiver. The drivers and implications of these relocations are poorly understood. Some late-life relocations, such as a move to a retirement destination, occur for the purposes of leisure and social preference. Others will be motivated by declining health and emerging long-term care needs. These community to community relocations driven by health and functional disability are the focus of this dissertation. Though little study has specifically focused on this long-term care decision, the decision to relocate due to functional limitations should be informed by the institutionalization literature which predicts relocation into nursing home care. The series

of papers in this dissertation extend our understanding of older adult relocation and resultant household structures by examining moves that occur within the community and have been initiated for the purposes of health and long-term care.

Long-term care describes a set of supports arranged to address functional disabilities and keep an older adult healthy and safe for an extended period. Depending on an individual's functional limitations, long-term care can address daily tasks such as bathing and dressing, weekly tasks such as shopping, or monthly care tasks such as financial management. These are called activities of daily living (ADLs) and instrumental activities of daily living (IADLs). When long-term care is delivered in an institutional setting, it requires relocation. Provided in the community, long-term care may or may not demand a residential move.

Older adults who do not want to relocate but who need support have the option to pay for private care. A home health aide from a licensed agency cost more than $22 per hour on average in 2017 (Genworth cost of care report, 2018). These professionals offer hands-on personal care but not medical care. For instance, the aide might assist with bathing, dressing and toileting but not with injections or catheters. While periodicity of services will depend on the individual's needs, most people do not have the economic means to privately fund their support for any extended period time, because services quickly become impossibly expensive for most Americans. Older adults with qualifying need and limited financial resources can apply for publicly funded care through their state Medicaid Home and Community Based Support (HCBS) program or another state-funded personal care service program, but these programs typically only support very low-income individuals and they operate long waiting lists which preclude timely care. Due to

the cost of private care and the availability of public care, most older adults who need long-term care rely on family to provide unpaid, or informal care. Depending on the older adult's proximity to family and the extent of care needs, relocation may be necessary to receive this informal care. If long-term care needs are unmet, an older adult risks a health crisis that can lead to hospitalization, nursing home placement or even death.

Theory for this dissertation is grounded in a model created to explain medical care access for low-income people (Andersen, Ronald & Newman, 1973; Andersen, Ronald M. et al., 2002). This dissertation frames community-based long-term care as a healthcare service and extends a model of service access to predict long-term care driven relocation decisions and household structures. The Anderson et al. model is constructed around four domains that each independently impacts access to care. These include 1) individual predisposing factors, 2) enabling factors (both individual and community), 3) the individual's needs, 4) and individual access. In the context of long-term care, the first domain, an individual's predisposition to demand care, will describe factors such as a person's age, gender, education and ethnicity as well as health status. For instance, co-residence is the more typical modality of care in minority groups and among foreign-born Americans. These individual predisposing factors must be considered before the domain of enabling factors are assessed.

The papers in this dissertation focus on the second domain, which describes the enabling variables for access to community long-term care service. Enabling characteristics are more mutable and can be influenced by policy. According to Andersen, et al., these variables provide opportunities to directly measure the impact of location on access to care (2002). Enabling characteristics help to explain why a person

with a given slate of predisposing characteristics might make a different long-term care decision than another person with identical characteristics living in another state or community. The schema of enabling characteristics is applied to long-term care and enumerated in figure 1. All relevant variation in this dissertation can be observed in this figure.

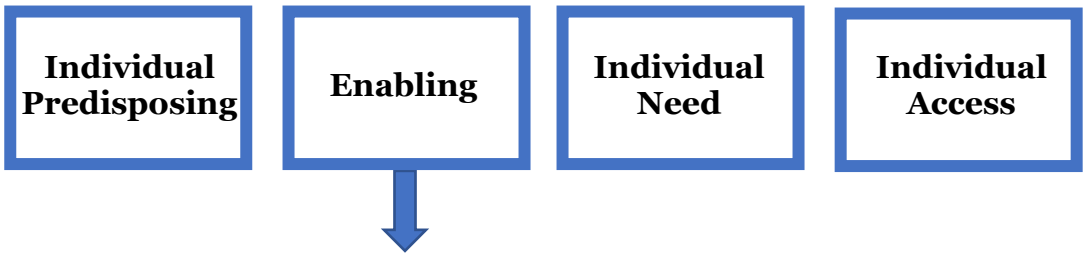
Enabling factors are divided into individual or community-level characteristics. Applied to the long-term care decision, individual enabling factors include service resources, social resources and the individual's economic resources. Service resources describe the formal, paid support options available such as Medicare home health care, service funded by long-term care insurance or the allocation of a Home and Community-based Support (HCBS) long-term care waiver. Social resources include proximity to children or membership in supportive groups such as a church that offers food delivery or a condominium that coordinates home visits. Finally, the person's individual economic resources should be considered as these can be used to directly purchase a wide variety of services and supports.

Community enabling factors are then categorized into demand, support, structure and market dynamics. These categories are each adaptable to the long-term care decision. The first set of community enabling variables for noninstitutional long-term care describe community-level demand. These variables detect abundance or scarcity of resources by gauging the proportion of the community that is likely to compete for similar services or supports. Community enabling variables then measure available supports. Since informal care is critical to the long-term care sector, measures of informal caregiver availability, such as community-level employment and health measures, will be needed. Informal

caregiving is predominantly provided by adult daughters, so these measures should particularly describe the women in the community. This category also incorporates nonprofit services that operate in the community. The domains of supports offered by nonprofit organizations will be important to consider, and the structure and shapes of networks will also be meaningful to assess when considering issues of meaningful access as well as emergent properties of multiple coordinated organizations. The community enabling variables will describe community and state allocations for long-term care. There is great heterogeneity in states' per capita allocations to support community-based care. County resources, such as service-rich public housing for older residents and transportation infrastructure, should also appear here. Finally, market dynamics will capture competition, prices and quality of long-term care insurance and services as well as the quality and availability of medical services.

The remaining two domains of the service access model include individual need, which describes the older adult's perception of her own health and need for assistance, and individual access, which catalogues the older adult's use of long-term care supports over the past year.

Figure 1



Enabling Community Long-Term Care

INDIVIDUAL
Service resources
- Private long-term care insurance plan
- Medicaid HCBS waiver slot
- Medicare home health order

Social resources
- Proximity to adult children/family

Economic resources
- Income
- Home ownership
  - Housing value/liquidity

COMMUNITY
Demand
- Percent poverty
- Percent 65 and older

Support
- Informal caregivers per capita:
  - Unemployment rate
  - Women in the workforce
  - Population health measures
- Nonprofit organizations per capita
- Median Income

Structure
- Public LTC spending/pop ratio
- HCBS vs SNF spending ratio
- Transportation infrastructure

Market Dynamics
- Private long-term care services market
- Medical care market

Enabling Characteristics of Community-Based Long-Term Care

All variables examined in this dissertation are located within these enabling factors. However, some enabling factors were not modeled in the study papers and the limitations of each paper will address particular sources of variation that should be additionally considered. Ultimately, each of these sources of variation should be examined carefully for their impact on long-term care behavior, relocation and household structure choices.

The first paper in this dissertation, "Grandparents Getting Less Care, Giving More: A spillover of opioid abuse in the United States," demonstrated how population health measures represent the availability of informal caregivers and impact older American household structures. Opioid use disorder has been particularly pervasive among Americans of child bearing age, straining social service systems and raising concern for the children and older adults who rely on their care. Grandparents often take custody of minors when their parents become unfit or unavailable, but studies have not definitively linked rates of opioid use disorder to increased rates of grandparent caregiving. The relationship between opioid use disorder and the care of older adults also remains largely unexplored. Data from the American Community Survey (2006-2016) are linked to opioid-use prevalence statistics to show that grandparents are more likely to give co-resident care in regions with high opioid use disorder and less likely to receive co-resident support. This paper explores the impacts of community-level supply of caregivers on the community-based long-term care and household structures of older adults and describes "supports" that comprise community factors which enable long-term care access.

The second paper of this dissertation demonstrated that exogenous economic conditions also impact long-term care, household structure and the relocation decision. While recessionary impacts on the housing and health behaviors of working-aged individuals have been studied worldwide, retiree behavior changes during recession are not well understood. In this paper, rates of co-residence were examined as a factor of health delivery that shifts with the macro-economy. With 20 percent of Americans aged 65 and older relying on co-residence to meet long-term care needs, an exogenous shift of

co-residential behavior will impact both public health and expenditure. This paper uses twelve years of data from the Medicare Current Beneficiary Survey to demonstrate that older American co-residence fell by two percent during recessionary years. People at highest risk of nursing home placement were more than four percent less likely to co-reside during a recession as compared with any other year. Though this paper suggests the macro-economy impacts long-term care resources, further research is needed to understand the mechanisms of effect. Three likely candidates are suggested according to the Andersen model of health care access. These should each be tested in future research and are discussed in the paper's conclusion.

Publicly provided services will also impact the long-term care decision and older adult household structure. Services increase residential stability, or when they are missing, increase the likelihood that an older adult will relocate to a new household. The third paper in this dissertation explores the relationship of Medicare home health services and household structure. If informal, community-based care and home health act as substitutes, Medicare home health services should reduce the number of relocations of older adults who live alone. People living alone who experience a new functional disability are particularly vulnerable to relocation. If Medicare-funded home health services substitute for informal care, it should be more heavily relied upon by people living alone than by people living with spouses or living in co-residence. Using the Medicare Current Beneficiary Survey from 2007-2011, older adults' home health use and household structure was compared to their functional ability as measured by the amount of support they needed with activities of daily living. Home health services act as a substitute for the informal care provided by a spouse or by a co-resident caregiver. Home

health service use is associated with household structure and relocation behavior of older adults.

These papers begin to explore the enabling factors for community-based long-term care and begin to verify the weight that these factors bring to bear on older adult household structure and long-term care relocation decisions. The Andersen model lays out an extended research agenda to better test the parameters and weight of each factor and explore additive or other interaction effects. Ultimately, a successful model that can predict the long-term care decision process for older adults according to their needs and resources will be extremely valuable for the policy analysis and program evaluation that inform public decision-making.

References

Andersen, R. M. (1995). Revisiting the behavioral model and access to medical care: Does it matter? *Journal of Health and Social Behavior,* , 1-10.

Andersen, R. M., Yu, H., Wyn, R., Davidson, P. L., Brown, E. R., & Teleki, S. (2002). Access to medical care for low-income persons: How do communities make a difference? *Medical Care Research and Review, 59*(4), 384-411.

Andersen, R., & Newman, J. F. (1973). Societal and individual determinants of medical care utilization in the united states. *The Milbank Memorial Fund Quarterly.Health and Society,* , 95-124.

Bharucha, A. J., Pandav, R., Shen, C., Dodge, H. H., & Ganguli, M. (2004). Predictors of nursing facility admission: A 12-year epidemiological study in the united states. *Journal of the American Geriatrics Society, 52*(3), 434-439.

Freedman, V. A. (1996). Family structure and the risk of nursing home admission. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 51*(2), S69.

Gaugler, J. E., Duval, S., Anderson, K. A., & Kane, R. L. (2007a). Predicting nursing home admission in the US: A meta-analysis. *BMC Geriatrics, 7*(1), 13.

Harris, Y. (2007). Depression as a risk factor for nursing home admission among older individuals. *Journal of the American Medical Directors Association, 8*(1), 14-20.

Miller, E. A., & Weissert, W. G. (2000). Predicting elderly people's risk for nursing home placement, hospitalization, functional impairment, and mortality: A synthesis. *Medical Care Research and Review, 57*(3), 259-297.

Taylor, P., Kochhar, R., D'Vera Cohn, Jeffrey S Passel, Velasco, G., Motel, S., & Patten, E. (2011). Fighting poverty in a tough economy, americans move in with their relatives. *Pew Social & Demographic Trends.Pew Research Center.Washington DC Http://Www.Pewsocialtrends.Org/Files/2011/10/Multigenerational-Households-Final1.Pdf,*

Tinetti, M. E., & Williams, C. S. (1997). Falls, injuries due to falls, and the risk of admission to a nursing home. *New England Journal of Medicine, 337*(18), 1279-1284.

CHAPTER 2

GRANDPARENTS GETTING LESS CARE, GIVING MORE: A SPILLOVER OF OPIOID ABUSE IN THE UNITED STATES

Introduction

As American communities cope with a dramatic increase in opioid use and opioid-related deaths, it is increasingly apparent that the impacts of opioid use extend beyond the user. Family members living in the network of the person with opioid use disorder can experience increased demand as the addicted user ceases to fulfill responsibilities in the home, in the workplace or in the care of others. Children and older adults who rely upon a family member with opioid use disorder must seek alternatives for their care or they will forgo needed support.

Children suffer when their caregivers become incapacitated. When parents abuse alcohol and other drugs, their children live with an increased risk of maltreatment (Besinger, Garland, Litrownik, & Landsverk, 1999; Wolock & Magura, 1996). Their risks of hospitalization related to neglect, safety issues or prolonged exposure to stress also rise (Raitasalo & Holmila, 2017). Children of parents with substance use disorder are more likely to be removed from their homes and, once removed, they are less likely to be successfully reunified (Brook & McDonald, 2009). There is good reason to believe the current opioid epidemic in America will impact many parents' ability to provide care. Past drug epidemics, such as crack cocaine in the late 1980s and methamphetamines in the early 2000s, particularly spread among people of childbearing age. In these cases,

grandparents stepped in to care for their grandchildren (Minkler & Roe, 1993) and provide them with social and emotional support (Sheridan, Haight, & Cleeland, 2011). This research anticipates that patterns of grandparent caregiving will extend into the current opioid epidemic and that grandparents will be observed, once again, taking over additional caregiving responsibilities.

As a group, older adults are also likely recipients of care. As people age, their functional disabilities increase, and their needs for assistance with tasks of daily living also rise. This assistance is called long-term care and refers to ongoing supports and assistance in daily, weekly and monthly tasks. In the United States, long-term care is most often provided by the person's adult children, especially daughters (Kaye, Harrington, & LaPlante, 2010) . The academic literature has not yet examined changes in older adult long-term care as related to the substance abuse of their adult children.

It is difficult to definitively link opioid use disorder to changes in caregiving behaviors, both because behaviors associated with opioid use disorder tend to be secreted and because caregiving is typically informal and undocumented. Only a minority of grandparent caregivers provide formal care that will appear in public administrative records. Yet even these custody arrangements do not consistently acknowledge opioid use disorder at their root. There are even fewer administrative records that will capture the co-resident care of older adults, which is unlikely to be overseen by any state entity. However, older adult care and grandparent caregiving both have serious health and welfare implications for the older adult.

This paper explores the relationship of two geographic measures of opioid use disorder, namely prescription opioid use rates and opioid-related overdose deaths to two

important caregiving behaviors: rates of grandparent-provided care and the rates of grandparents who receive co-resident care. Findings suggest that opioid use disorder leaves a deficit of the ablest caregivers in a community. When adults of childbearing age are removed from the typical system of caregiving, health and social service systems must be prepared to knit together a web of alternate supports for their dependents. Effective social services are necessary to smooth periodic changes in caregiving behavior related to epidemics of substance use disorder.

Magnitude of Opioid-Related Overdose Deaths

Opioid-related deaths in the United States increased by 345 percent between 2001 and 2016, and by 2016, 20 percent of all deaths of adults between 24 and 35 years of age were attributed to opioid use (Gomes, Tadrous, Mamdani, Paterson, & Juurlink, 2018). Between 2014 and 2015, death rates involving synthetic opioids other than methadone increased 102.3 percent for males aged 25-44 years of age. Heroin death rates, also highest for this demographic group, increasing 22 percent from 2014 to 2015 (Rudd, 2016). By age, those most likely to exhibit opioid use disorder are also likely to be caregivers for children or for older adults.

Relationship between Opioid Use Disorder and Caregiving

Substance use is related to formal out-of-home placement of children. According to the Department of Health and Human Services' Adoption and Foster Care Analysis and Reporting System (AFCARS), parental drug use disorder was associated with 34 percent of all US removals of a child from parental custody in 2016. Substance use disorder was second only to neglect in these AFCARS reporting categories which are not mutually exclusive (Bureau, 2016). States that experienced a dramatic rise in opioid use

also demonstrated larger increases in the number of children in foster care. For instance, Ohio has among the largest absolute value and percentage increases in opioid-related overdose death rates (Rudd, 2016), and rates of removal in Ohio also rose by 62 percent between 2010 and 2016 (ipacohio.org, 2017). In Florida, a relationship was demonstrated between parental opioid use disorder and children formally removed from parental custody (Quast, Storch, & Yampolskaya, 2018).

The question remains: who is entrusted with the custody of children whose parents are impacted by opioid use disorder and become unable to provide adequate care? Most states give preference to family members over unrelated foster parents and many actively recruit family members to accept custody of a child (Boots & Geen, 1999). Between 2008 and 2016, the percentage of children in foster care with relatives has risen 6 percent, reaching about 30 percent of all foster children in 2016 (Bureau, 2016). A qualitative study of parents with opioid-use disorder in Sweden identified grandparents as pivotal caregivers for children (Pihkala & Sandlund, 2015).

To date, research has not documented any relationship between the disordered substance use of adult children and their long-term care provision to their parents. Yet about 20 percent of older adults co-reside with their adult children, with grandchildren, with paid caregivers or with unrelated roommates (Cohn & Passel, 2016). This living arrangement might either be selected for its economic efficiency (Mykyta & Macartney, 2011; Mykyta & Macartney, 2012; Taylor et al., 2010) or to help the older adult with personal care and tasks of independent living. It is estimated that one out of every three long-term care recipients lives with his or her caregiver, and 60 percent of the individuals with the greatest need for care co-reside with another adult to receive that care (Weber-

Raley & Smith, 2015). The vast majority of long-term care is provided by family members (Arno, Levine, & Memmott, 1999; Kaye et al., 2010). Substance use disorder will likely impact an adult's ability to provide care for her parents or her children. This will impact the grandparents by reducing available care and increasing demands on them for care.

Long-Term Care: Challenges for the Older Adult

Most older adults prefer to receive long-term care in a community environment to maximize their privacy and independence (Degenholtz, Kane, & Kivnick, 1997). Long-term care is prohibitively expensive for many Americans, and there are very few state supports available to fund this care for people living in their homes (O'Shaughnessy, 2014). If an individual is unable to receive co-resident care from an adult child who has become incapacitated by substance use disorder, that individual might live with unmet needs that will threaten health and safety (Allen & Mor, 1997) and increase the likelihood of a hospital admission (Sands, L. P. et al., 2006).

Grandparents Giving Care: Challenges for the Older Adult

Older adults experience differential impacts of caregiving. The demands of caregiving may affect the physical health of older grandparents while younger grandparents are more likely to experience emotional strain (Conway, Jones, & Speakes-Lewis, 2011). Grandparent caregivers of all ages report higher rates of depression (Hughes, Waite, LaPierre, & Luo, 2007), particularly during transitional periods including the outset and end of the caregiving period (Baker & Silverstein, 2008). Caregiving grandparents also exhibit physical health impacts, including a decrease in exercise and increase in obesity (Hughes et al., 2007) as well as a greater difficulty

completing daily living tasks (Fuller-Thomson & Minkler, 2000). These physical health problems are predicted by a perception of caregiver burden, by a lack of familial support, by schedule changes and by financial strain (Carr, Hayslip, & Gray, 2012).

Characteristics of the child will also levy different impacts on the caregiving experience. Grandparents caring for grandchildren who exhibit abnormal emotions and hyperactivity are particularly vulnerable to emotional strain such as anxiety, stress and depression (Conway et al., 2011; Doley, Bell, Watt, & Simpson, 2015; Robinson, 1983; Sands, R. G. & Goldberg-Glen, 2000) . Some demographics of grandparent caregivers are likely to report that their own needs go unmet. Predictors of unmet needs include low education, poor health, high levels of stress and a dearth of reliable supports (Burnette, 1999).

Difficulty Demonstrating Magnitude

It is difficult to know the precise magnitude of formal grandparent caregiving that results from opioid use disorders. When children are formally placed into protective custody there is no consistent reporting protocol to identify parental substance abuse as a root precipitator. Reporting requirements particularly differ between states, but significant variation also exists in the reporting of the cause for out-of-home placement even within states (Young, 2016). Without a consistent reporting protocol, administrative data will not reveal the relationship between opioid use disorder and changes in custody of children in the household.

The relationship between grandparent caregiving and opioid use disorder grows further complex because such a large proportion of grandparent caregiving is informal. One Ohio study estimated that fully 71.5% of nonparent caregiving in that state occurred

without any direct state administrative recording or oversight (Landry-Meyer, 1999). Multigenerational household constructions can often be observed in national surveys, but the purpose of the living arrangement and the caregiving responsibilities can be difficult to discern.

The literature has not definitively linked opioid use disorder to increased rates of grandparent caregiving of grandchildren, and the author is not aware of any research that links substance use disorder and the long-term care of older adults. This paper explores implications for older adults who have an adult child impacted by opioid use disorder. Measures of regional prescription opioid use and opioid-related overdose deaths are compared to regional rates of grandparent caregiving and to rates of co-resident long-term care.

Theory

Community characteristics can help to predict the demand for health or social services. A model of access to medical care by low income population helps to explain the demand for and uptake of social services in the presence of high levels of opioid use disorder. Individual predisposing characteristics were used to predict healthcare access, enabling characteristics (according to both individual and community factors), as well as individual needs and a variable describing service uptake (Andersen et al., 2002).

A co-resident caregiving environment can be explored as a heath care service with certain facilitators and issues of access. High community-wide rates of opioid use disorder should impact enabling characteristics in two ways. On the individual level, children and older adults in a community characterized by high rates of opioid use disorder are less likely to receive supports from their typical sources of care. As a result,

in a high opioid use disorder community, demand will increase for both long-term care and for the care and support of children in the community. In the presence of higher demand for care, a scarcity of caregiving resources might be experienced.

Analysis

This research relies on yearly data from the yearly American Communities Survey (ACS) from 2006 through 2016, Small Area Income and Poverty Estimates (SAIPES) from 2006-2016, the Bureau of Labor Statistics from 2006-2016 and rural urban continuum codes from the United States Department of Agriculture (USDA). Data from the Centers for Disease Control and Prevention are also used to establish community-level prescription opioid use rates and opioid-related death rates.

Both the household and individual level ACS files were included in the analysis with 36,376,984 individual observations. This survey gathers information from one percent of the population and reports at the Public Use Microdata Area (PUMA) level. PUMAs are a geography constructed by the Census Bureau to combine very small contiguous counties into an area of at least 100,000 residents and divides very large counties so that PUMAs contain fewer than 200,000 individuals. While there are 3,141 counties and county equivalents in the data set, there are 2,071 PUMAs in the survey. Except in extreme cases of sudden migration (such as following hurricane Katrina), the boundaries of PUMAs remain consistent from year to year and are only redrawn in response to population changes detected in the decennial census. The new PUMA boundaries from the 2010 census were redrawn in 2012. All county data was analyzed at the PUMA level, using a PUMA to county FIPS code crosswalk. The Census Bureau released a crosswalk for the 2000 decennial census but not for the boundaries that followed 2010 census. The

crosswalk used for this analysis was derived from a map file on the ACS website using QGIS software to construct a table that linked county FIPS codes and associated PUMAs. Analysis was conducted on the individual level with PUMA and state-level controls.

Dependent Variables

The two key variables of interest describe grandparent co-resident caregiving and grandparent co-residence, respectively. For each household member, the survey respondent is prompted to indicate if they have a grandchild under the age of 18 living in the household. If the respondent indicates grandparent co-residence, the survey then asks, "Is this grandparent currently responsible for most of the basic needs of any grandchildren under the age of 18 who live in this house or apartment?" An affirmative response to the question suggests that a grandparent co-resides to provide care to the grandchild. A co-residence arrangement for the purposes of caregiving is identified when a grandparent lives with a grandchild in a multigenerational household but does not provide primary care to that grandchild.

Models were assessed using grandparent co-resident caregiving as the dependent variable. Co-resident caregivers were compared to all co-residents who did not indicate that they were providing primary care. Separate models were used to examine grandparent co-residence. However, there was not an easily defined comparison group for the grandparents living in a co-resident arrangement. Without the ability to identify non-co-residing grandparents, all survey respondents younger than 50 years of age have been excluded from this portion of the analysis to approximate a very rough comparison group of potential grandparents who were not co-residing.

Independent Variables

Two primary independent variables of interest were used to model a region with high rates of opioid use disorder (which will be called a "high opioid region" for the remainder of the paper). The first, county-level prescription rates collapsed to the PUMA, are used as a proxy for opioid use disorder rates (Schuchat, Houry, & Guy,Gery P.,,Jr, 2017). County level opioid prescription rates from 2006-2016 were obtained from the Centers for Disease Control and Prevention which compiled pharmacy-specific prescription fills based on a sample of 59,000 retail pharmacies. Neither hospital nor mail order pharmacy data are included in the statistic. Each instance of dispensing butran, codeine, fentayl, hydrocodone, hydromorphone, methadone, morphine, oxycodone, oxymorphone, propoxyphene, tapentadol and tramadol were counted in the data. Buprenorphine and methadone were not included, and neither were cold and cough formulations containing opioids. Data describes the number of opioid prescriptions dispensed by retail pharmacies per 100 in the county, with 87.6 to 93.4 percent of all US counties reporting. Higher levels of reporting occurred in the latter three years of the study period. Nonreporting counties may not have had retail pharmacies or pharmacies sampled, or they may have been subject to reporting errors.

The second independent variable measures county-level opioid death rates aggregated to the PUMA. These rates relied on compiled "cause of death" reports as recorded by a physician, medical examiner or coroner on the death certificate. Deaths were classified using the International Classification of Disease, Tenth Revision (ICD-10) to identify drug overdose as the underlying cause. The CDC collects these death records from state jurisdictions through the National Vital Statistics System. Data were

obtained through the CDC and a data use agreement was required to access geographic identifiers.

Model and Control Variables

This study explored eight separate models to assess the relationship between opioid use disorder and grandparent co-residence or caregiving. Independent variables were either grandparent co-residence or grandparent caregiving and dependent variables were either PUMA-level rates of opioid prescriptions or opioid overdose death rates. The basic model follows,

$$Gran_{it} = \beta_0 + \beta_1 Opioid_{pt} + \beta_2 Indv_{it} + \beta_3 PUMA_{pt} + \delta + \gamma + \varepsilon_{ipt}$$

where Gran measured either individual co-residence or grandparent caregiving and Opioid described either PUMA-level opioid prescription rates or opioid-related death rates. Individual control variables taken from the ACS included a household income variable, marriage and sex. Race was a three-category variable of white, black or other race/ethnicity. Education was also a three-category variable which identified no high school diploma, high school diploma or associates degree or higher. Age was binned into groups of children under 18, adults under 50 and adults 50 years or older. PUMA-level control variables included median income from SAIPES, unemployment rate from BLS and the rurality of a community as identified on the USDA continuum. Year and state fixed effects were also included.

The probability of grandparent caregiving was examined by regional opioid prescription rate or by regional opioid death rate. Additional models then used a binary independent variable indicating a high opioid PUMA. In high opioid PUMAs, either the opioid prescription rate or opioid overdose death rate fell at least one standard deviation

above the mean rate. Six models were assessed using this high rate PUMA independent variable. First, the probability of grandparent caregiving was examined in high opioid communities as compared with other communities. Then, the sample was limited to respondents 50 and older to approximate potential grandparents by age, and both caregiving and co-resident grandparents were observed in high rate communities as compared with other communities. Table 1 provides an overview of all models.

Table 1. Models of Opioid Use, Caregiving and Co-Residence

	Prescription Rate	**Model**	**Opioid Death Rate**	**Model**
Caregiving	All PUMAs	1	All PUMAs	2
Caregiving	High Rate PUMAs	3	High Rate PUMAs	4
Co-Residing, 50+		5		6
Caregiving, 50+		7		8

Results

Descriptive statistics are presented in Table 2. Sample-wide, 780,145 grandparents lived with grandchildren and 323,572, or 41.5 percent of these co-resident grandparents reported primary caregiving responsibilities for their grandchildren at the time of survey. Caregiving grandparents were, on average, slightly younger than co-residing grandparents, at 57 and 62 years old respectively. With a mean household income of $66,573, caregiving grandparents were also less wealthy than their co-residing counterparts. By income, co-residing grandparents, enjoyed a higher income than the sample's average household. Co-residing households earned $91,108 annually as compared with $81,878 each year average for all others. Caregiving grandparents were

much more likely to be married at 69 percent than their co-resident counterparts who were married at a rate of 57 percent. While 80 percent of the sample identified as white, 66 percent of caregiving grandparents and 64 percent of co-resident grandparents were white. With 10 percent of the sample identifying as black, 21 percent of caregiving grandparents and 14 percent of co-resident grandparents were black. Individuals who identified as another race or ethnicity comprised 15 percent of the sample, while 13 percent of caregiving grandparents and 21 percent of co-resident grandparents identified as Other race or ethnicity. While 91 percent of the sample were United States citizens, 84 percent of caregiving grandparents were citizens compared with only 66 percent of co-resident grandparents. Difficulty ambulating was explored as a potential proxy to health and 9 percent of the sample reported this challenge. Of grandparent caregivers, 19 percent identified as having difficulty ambulating and 21 percent of co-resident non-caregiving grandparents experienced these problems. A smaller proportion of caregiving grandparents (8 percent) also reported difficulty with independent living than co-residing grandparents (14 percent).

Table 2. Summary Statistics for Caregiving and Co-Residing Grandparents

	Full Sample		Co-Residence (not caregiving)		Care-giving		Co-Residence in High Script PUMAs		Care-giving in High Script PUMAs	
		%		%		%		%		%
Total	35,040,269		456,573		323,572		344,821		242,703	
Age (mean)	40		62		57		61		57	
Household Income (mean $)	81,878		91,108		66,573		89,016		65,260	
Married	15,690,770	45	262,457	57	221,922	69	199,107	58	174,324	72
White	28,142,856	80	290,253	64	214,649	66	221,798	64	164,191	68
Black	3,798,501	10	68,365	14	66,666	21	47,875	14	45,618	19
Other Race/Eth.	5,725,473	15	97,955	21	42,257	13	75,148	22	32,894	14
US Citizens	31,867,086	91	303,075	66	271,987	84	227,278	66	211,888	87
Difficulty w Ind. Living	2,012,131	7	61,928	14	26,452	8	47,180	14	20,760	9
Difficulty Ambulating	3,073,445	9	93,931	21	61,396	19	71,880	21	48,420	20

Note: These summary statistics describe a sample of adults polled in the American Communities Survey between the years of 2006 and 2016.

Since the Andersen, et al. model suggests that community characteristics can help predict the demand for health and social services, the characteristics of high opioid counties shown in Table 2 should also be considered. By indexing PUMA prescription rates, PUMAs that fall one standard deviation above the mean opioid prescription rate can be described as high use PUMAs. PUMAs are geographically constructed by the census for reporting purposes and share only state-level governments. They will have heterogeneous community-level policy environments and likely vary by population density and other important factors. However, high opioid PUMAs are somewhat poorer and experience a slightly higher unemployment rate. These factors can increase demand for social services in the high opioid PUMAs and create a scarcity of resources.

Table 3. Summary Statistics for Public Use Microdata Areas

	All PUMAs	High Script PUMAs
Median Income	$49,462.47	$43,803.00
Unemployment Rate	6.3	6.6
Poverty Rate	15.2	16.8

Note: These summary statistics describe a sample of adults polled in the American Communities Survey between the years of 2006 and 2016.

The relationship between grandparent caregiving and opioid prescription rates are shown in Table 3. Rate of opioid prescriptions dispensed within a PUMA was significantly related to the rate of grandparent caregiving in that PUMA. A co-residing grandparent was 2.6 percent more likely to be a primary caregiver in a high prescription rate PUMAs ($p<0.01$) than any other PUMA. Opioid-related overdose deaths, which are much less common than opioid prescriptions, track less closely to changes in grandparent caregiving, but changes evaluated on PUMA-level opioid-related deaths were still significant and moved in the same direction as PUMA-level opioid prescription rate. The probability of being a caregiver rose by 0.7 percent in a community with a high opioid-related death rate PUMAs ($p<0.05$).

Table 4. Logistic Regression Marginal Effects on Grandparent Caregiving

	(1) b/t	(2) b/t	(3) b/t	(4) b/t
Prescription Rate	0.00058*** (10.81)			
High Prescription Rate PUMAs		0.026*** (8.78)		
Opioid Death Rate			0.0011*** (5.74)	
High Opioid Death Rate PUMAs				0.0069*** (5.72)
Observations	389871	389875	389858	389858

* p<0.10, ** p<0.05, *** p<0.01

Note: This analysis represents four separate models. The dependent variable is individual-level grandparent caregiving. The independent variables of interest are PUMA-level opioid prescription rates and PUMA-level opioid-related death rates. High rate PUMAs are areas in which prescription or death rates fall at least one standard deviation above the mean for all PUMAs. Interpret the relationships as follows: any individual living in a high prescription rate PUMA is 2.6 percent more likely to be a caregiving grandparent.

The comparison between grandparents over 50 who are co-residing with grandchildren to grandparents over 50 who are caregiving for grandchildren is displayed in Table 5. Results revealed a 3.2 percent increase in the probability of caregiving for a grandchild ($p<0.01$) and a 0.2 percent decrease in probability of co-residence with a grandchild if an individual is living in a PUMA with a high rate of opioid prescriptions ($p<0.01$). In high death rate PUMAs, co-resident grandparents were about 0.3 percent more likely to be caregivers ($p<0.05$) and 0.05 percent less likely to co-reside ($p<0.01$).

Table 5. Probability of Individuals 50 Years or Older Being Caregiver or Co-Resident in Communities with High Opioid Use

	(1) b/t Prescription	(2) b/t Prescription	(3) b/t Death	(4) b/t Death
Caregivers	0.032***		0.0029**	
	(9.59)		(2.31)	
Co-Residents		-0.0020***		-0.00052***
		(-9.61)		(-6.36)
Observations	320648	7532328	320632	7532060

* p<0.10, ** p<0.05, *** p<0.01

Note: This analysis represents four separate models. The dependent variables are either caregiving or co-resident grandparents and the independent variables of interest are either PUMA-level opioid prescription rates or death rates. Interpret the relationship between prescription rate and caregiving as follows: any individual living in a high prescription rate PUMA is 3.2 percent more likely to be a caregiving grandparent and 0.2 percent less likely to be a co-resident grandparent.

Discussion

State policies typically favor kinship care over foster care with unrelated families (Hayduk, 2017) and this paper finds a significant and positive relationship between regional opioid use and grandparent caregiving. Grandparents who lived in high opioid PUMAs were 2.6 percent more likely to be primary caregivers, yet about 8 percent of these caregiving grandparents reported difficulty with tasks of independent living and 19 percent reported difficulty ambulating. The health of these older adults raises concern about the impacts of caregiving stress on grandparents who are already infirm. Grandparent health may also become a physical barrier that could impede the appropriate care of very young or otherwise high-need children.

Formal supports have the capacity to mitigate grandparent caregiver stress (Gerard, Landry-Meyer, & Roe, 2006). Care coordination has been a key strategy in health care to maximize the health outcomes of fragile people (Haggerty et al., 2003). Care coordinators can link grandparents to resources that will help them manage existing conditions. They can also help navigate bureaucratic systems such as schools or courts and make referrals to social service programs. In the spring of 2017, New Hampshire

passed HB 629 that, among other things, required the state health and human service department to display benefit eligibility information on their website for grandparents seeking guardianship of their grandchildren. Such legislation is low-hanging fruit that should be considered best practice for all states, with the goal of pursuing more robust systems of coordination to help grandparent caregivers identify and access resources. Financial supports are critical for some grandfamilies. The "Improving Supports for Kinship Caregivers Act of 2016" was not signed into federal law, but it would have operated through the Temporary Assistance for Needy Families (TANF) to increase financial resources available to grandparent caregivers. The "Child Welfare Oversight and Accountability Act of 2017" was also introduced at the federal level (Beltran, 2017). Had it been enacted, it would have expanded access to federal Guardian Assistance Program (GAP) funds which help states to provide payment to relatives who have assumed guardianship of eligible children. Additional research on the impact of financial resources on grandparent caregiving outcomes would support future legislation and policymaking.

The co-resident long-term care support provided to older Americans also changed in high opioid communities. A negative relationship was found between opioid use rates and co-residence. While the study does not explicitly rule out economically-driven co-residence, the mechanism driving the change of co-residence can be inferred. Co-resident households in high opioid PUMAs report a lower mean income than in other PUMAs, and high opioid PUMAs themselves demonstrate lower median household incomes than other PUMAs. If the change in co-residence was explained by economically-driven co-residence, then poorer households in poorer communities should be showing higher co-

residence. This study shows an opposite trend, suggesting that economics are not driving results.

Many older adults need assistance with personal care and medication adherence (Norman, Wade, Morris, & Slaboda, 2018). Reductions in co-residence are an important and concerning spillover of substance use disorder that have not been previously studied. Though changes are relatively small, with just a 0.2% reduction in probability of co-residing for an individual living in a high opioid community, changes were significant at the 0.01 percent level. It is also worth noting that this measure of co-residence is an undercount since the ACS only captured changes in grandparents who lived in a home with a grandchild. Other co-resident arrangements, such as an older adult living with an adult child but no minor children, are not identified. To better quantify the magnitude of changes in older adult co-residence, an analysis should be conducted using a dataset that tracks all co-residence. Co-residence is important for social welfare as members of more vulnerable groups are more likely to rely on co-resident long-term care arrangements. Only 66 percent of co-residents are citizens, as compared with 91 percent of the ACS sample as a whole. While 10 percent of the population identifies as Black, 21 percent of co-residents consider themselves Black.

Older adults who would have co-resided to receive care are more likely to select non-preferred long-term care alternatives. This shifting away from co-resident care in high opioid communities can increase the concentration of unmet long-term care needs and increase nursing home institutionalization or hospitalization community-wide (Muramatsu et al., 2007). All states operate waiver programs to provide some long-term care supports including personal care and targeted case management in a community

setting. These waiver programs have been shown to increase the welfare of recipients (Grabowski, 2006; Weaver & Roberto, 2018), and may also reduce overall Medicaid spending (Kaye, LaPlante, & Harrington, 2009).

However, most states operate a significant waiting list for services (Watts & Musumeci, 2018). Though rural communities have been intensely impacted by opioid use, rural long-term care recipients are more likely than urban-dwelling recipients to receive nursing home care and less likely to access community-based supports (Ziller, 2016). In 2011, Congress proposed the Community Living Assistance Services and Supports Act Long-Term Care Insurance Program that was designed to expand long-term care options for all Americans. It was not enacted, and other large federal programs may be out of reach at this point in time, so states should target limited resources to high opioid communities. Communities characterized by high rates of opioid use disorder need additional community-based long-term care supports as well as care coordination to reduce the negative implications of the community's missing caregivers.

Limitations

A set of assumptions undergird this analysis. First, the model uses a geographic measure of opioid use to approximate individual impacts. The data offers no direct variable to tie individual caregiving grandparents to an opioid-using parent, so the model only captures rates of custody changes that occur at the PUMA-level. A caregiving grandparent living in a low-opioid PUMA who takes custody from a child from a high opioid PUMA would be overlooked by this methodology. This would be most likely to result in an undercount of impact. Both individual and community-level control variables

are used to address potential alternate explanations, but this does not preclude the potential for nonrandom errors.

The operationalization of opioid use by the regional opioid prescription rate is also an imperfect measure. Though overall prescribing practices have changed in recent years as awareness of opioid use disorder has increased, changes in opioid use disorder and death rates are likely lagged. As prescriptions become less available and individuals with opioid use disorder replace prescription medication with black market drugs. As a result, opioid-related death rates have particularly skyrocketed in rural areas in recent years even while prescription rates have fallen. Individual deaths rates may also be an imperfect measure, since most instances of opioid use disorder do not result in death and the death rate may not provide enough regional variation to perfectly approximate other related behavior changes.

Data was not available to include an individual's access to long-term care insurance or Medicaid HCBS waiver. Proximity between the older adult and adult children is another missing factor that might help explain residential behavior and the individual data does not identify home ownership. Though state fixed-effects were included, state-level spending on long-term care, nursing care and home and community supports were not available to the beginning of the study period. Neither measures for housing market liquidity nor women in the workforce were included. Further research is needed to understand the explanatory power of these potential enabling factors of community-based long-term care.

Conclusion

This analysis provides evidence that large-scale substance use disorder in people of childbearing age will increase the demand for older adults to provide care while simultaneously reducing care resources available to them. The "Supporting Grandparents Raising Grandchildren Act" was signed into law over the summer of 2018 with bipartisan support. It empowers the US Department of Health and Human Services to identify, promote, coordinate and disseminate information about resources and best practices that assist grandparent caregiving. Given the issue salience, researchers need to produce policy effectiveness analyses that can empower advocates with tools to promote sound opioid and caregiving-related policy at all levels of government.

The significance of this measure does not allow researchers to assess population health and explain the full variation in availability of informal supports to provide long-term care. Opioids are just one substance which has been used at epidemic proportions and access to substances can be geographically bounded. Epidemic levels of substances used shift over time and between substances. To model the overall weight of substance use on the availability of informal caregivers, research might develop an index with the capacity to capture a variety of substances used by location over time.

Unfortunately, this will not be the last drug epidemic in the US. American communities are already experiencing increases in cocaine and methamphetamine use and higher rates of overdose death from these drugs. But current attention can be leveraged to construct a more robust social safety net that might ease the burden next time. Federal policies can be established to improve the economic conditions of grandfamilies and older adults who need care, and regionally-focused service systems can

fill gaps in communities in which caregivers have been made unavailable by substance use disorder. Care coordinators are needed to link older adults to federal resources and to local programs to support their own long-term care and to support their ability to care for grandchildren. Since high levels of substance use tend to geographically concentrate, caregiving pressures on older adults and reduced support for older adults will also tend to emerge geographically. Policy responses should promote regionally-focused supports that can meet the needs of children and older adults living in communities disrupted by high rates of substance use disorder.

References

Allen, S. M., & Mor, V. (1997). The prevalence and consequences of unmet need: Contrasts between older and younger adults with disability. *Medical Care, 35*(11), 1132-1148.

Andersen, R. M., Yu, H., Wyn, R., Davidson, P. L., Brown, E. R., & Teleki, S. (2002). Access to medical care for low-income persons: How do communities make a difference? *Medical Care Research and Review, 59*(4), 384-411.

Arno, P. S., Levine, C., & Memmott, M. M. (1999). The economic value of informal caregiving. *Health Affairs, 18*(2), 182-188.

Baker, L. A., & Silverstein, M. (2008). Depressive symptoms among grandparents raising grandchildren: The impact of participation in multiple roles. *Journal of Intergenerational Relationships, 6*(3), 285-304.

Beltran, A. (2017). Federal and state advances to support grandfamilies. *GrandFamilies: The Contemporary Journal of Research, Practice and Policy, 4*(2), 8.

Besinger, B. A., Garland, A. F., Litrownik, A. J., & Landsverk, J. A. (1999). Caregiver substance abuse among maltreated children placed in out-of-home care. *Child Welfare, 78*(2)

Boots, S. W., & Geen, R. (1999). Family care or foster care? how state policies affect kinship caregivers. new federalism: Issues and options for states. series A, no. A-34. assessing the new federalism: An urban institute program to assess changing social policies.

Brook, J., & McDonald, T. (2009). The impact of parental substance abuse on the stability of family reunifications from foster care. *Children and Youth Services Review, 31*(2), 193-198.

Bureau, C. (2016). The AFCARS report. *Retrieved from Acf.Hhs.Gov,*

Burnette, D. (1999). Custodial grandparents in latino families: Patterns of service use and predictors of unmet needs. *Social Work, 44*(1), 22-34.

Carr, G. F., Hayslip, B., & Gray, J. (2012). The role of caregiver burden in understanding african american custodial grandmothers. *Geriatric Nursing, 33*(5), 366-374.

Cohn, D., & Passel, J. S. (2016). A record 60.6 million americans live in multigenerational households. *Pew Research.Posted August, 11*

Conway, F., Jones, S., & Speakes-Lewis, A. (2011). Emotional strain in caregiving among african american grandmothers raising their grandchildren. *Journal of Women & Aging, 23*(2), 113-128.

Degenholtz, H., Kane, R. A., & Kivnick, H. Q. (1997). Care-related preferences and values of elderly community-based LTC consumers: Can case managers learn what's important to clients? *The Gerontologist, 37*(6), 767-776.

Doley, R., Bell, R., Watt, B., & Simpson, H. (2015). Grandparents raising grandchildren: Investigating factors associated with distress among custodial grandparent. *Journal of Family Studies, 21*(2), 101-119.

Fuller-Thomson, E., & Minkler, M. (2000). African american grandparents raising grandchildren: A national profile of demographic and health characteristics. *Health & Social Work, 25*(2), 109-118.

Gerard, J. M., Landry-Meyer, L., & Roe, J. G. (2006). Grandparents raising grandchildren: The role of social support in coping with caregiving challenges. *International Journal of Aging and Human Development, 62*(4), 359-383. Retrieved from http://proxy-remote.galib.uga.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=gnh&AN=114014&site=eds-live

Gomes, T., Tadrous, M., Mamdani, M. M., Paterson, J. M., & Juurlink, D. N. (2018). The burden of opioid-related mortality in the united states. *JAMA Network Open, 1*(2), e180217.

Grabowski, D. C. (2006). The cost-effectiveness of noninstitutional long-term care services: Review and synthesis of the most recent evidence. *Medical Care Research and Review, 63*(1), 3-28.

Haggerty, J. L., Reid, R. J., Freeman, G. K., Starfield, B. H., Adair, C. E., & McKendry, R. (2003). Continuity of care: A multidisciplinary review. *Bmj, 327*(7425), 1219-1221.

Hayduk, I. (2017). The effect of kinship placement laws on foster children's well-being. *The BE Journal of Economic Analysis & Policy, 17*(1)

Hughes, M. E., Waite, L. J., LaPierre, T. A., & Luo, Y. (2007). All in the family: The impact of caring for grandchildren on grandparents' health. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 62*(2), S119.

Kaye, H. S., Harrington, C., & LaPlante, M. P. (2010). Long-term care: Who gets it, who provides it, who pays, and how much? *Health Affairs, 29*(1), 11-21.

Kaye, H. S., LaPlante, M. P., & Harrington, C. (2009). Do noninstitutional long-term care services reduce medicaid spending? *Health Affairs, 28*(1), 262-272.

Landry-Meyer, L. (1999). Research into action: Recommended intervention strategies for grandparent caregivers. *Family Relations,* , 381-389.

Minkler, M., & Roe, K. M. (1993). *Grandmothers as caregivers: Raising children of the crack cocaine epidemic.* Sage Publications, Inc.

Muramatsu, N., Yin, H., Campbell, R. T., Hoyem, R. L., Jacob, M. A., & Ross, C. O. (2007). Risk of nursing home admission among older americans: Does states' spending on home-and community-based services matter? *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 62*(3), S178.

Mykyta, L., & Macartney, S. (2011). The effects of recession on household composition:'doubling up'and economic well-being. *US Census Bureau.Social, Economic and Household Statistics Division Working Paper, 4*

Mykyta, L., & Macartney, S. (2012). *Sharing a household: Household composition and economic well-being: 2007-2010* US Department of Commerce, Economics and Statistics Administration, US Census Bureau Washington, DC.

Norman, G. J., Wade, A. J., Morris, A. M., & Slaboda, J. C. (2018). Home and community-based services coordination for homebound older adults in home-based primary care. *BMC Geriatrics, 18*(1), 241.

O'Shaughnessy, C. (2014). National spending for long-term services and supports (LTSS), 2012.

Pihkala, H., & Sandlund, M. (2015). Parenthood and opioid dependence. *Substance Abuse and Rehabilitation, 6*, 33.

Quast, T., Storch, E. A., & Yampolskaya, S. (2018). Opioid prescription rates and child removals: Evidence from florida. *Health Affairs, 37*(1), 134-139.

Raitasalo, K., & Holmila, M. (2017). Parental substance abuse and risks to children's safety, health and psychological development. *Drugs: Education, Prevention & Policy, 24*(1), 17-22. Retrieved from http://proxy-remote.galib.uga.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=llhh&AN=20173090093&site=eds-live http://www.tandfonline.com/loi/idep20

Robinson, B. C. (1983). Validation of a caregiver strain index. *Journal of Gerontology, 38*(3), 344-348.

Rudd, R. A. (2016). Increases in drug and opioid-involved overdose deaths—United states, 2010–2015. *MMWR.Morbidity and Mortality Weekly Report, 65*

Sands, L. P., Wang, Y., McCabe, G. P., Jennings, K., Eng, C., & Covinsky, K. E. (2006). Rates of acute care admissions for frail older people living with met versus unmet activity of daily living needs. *Journal of the American Geriatrics Society, 54*(2), 339-344.

Sands, R. G., & Goldberg-Glen, R. S. (2000). Factors associated with stress among grandparents raising their grandchildren. *Family Relations, 49*(1), 97-105.

Schuchat, A., Houry, D., & Guy,Gery P.,,Jr. (2017). New data on opioid use and prescribing in the united states. *Jama, 318*(5), 425-426. doi:10.1001/jama.2017.8913

Sheridan, K., Haight, W. L., & Cleeland, L. (2011). The role of grandparents in preventing aggressive and other externalizing behavior problems in children from rural, methamphetamine-involved families. *Children and Youth Services Review, 33*(9), 1583-1591.

Taylor, P., Passel, J., Fry, R., Morin, R., Wang, W., Velasco, G., & Dockterman, D. (2010). The return of the multi-generational family household. *Pew Research Center,*

Weaver, R. H., & Roberto, K. A. (2018). Effects of long-term services and supports on survival of poor, highly vulnerable older adults. *The Gerontologist,*

Weber-Raley, L., & Smith, E. (2015). Caregiving in the US 2015. *National Alliance for Caregiving and the AARP Public Policy Institute,*

Wolock, I., & Magura, S. (1996). Parental substance abuse as a predictor of child maltreatment re-reports. *Child Abuse & Neglect, 20*(12), 1183-1193.

Young, N.No title. *Examining the Impact of the Opioid Epidemic.Testimony before the US Senate Committee on Homeland Security and Governmental Affairs.April 22, 2016.Cleveland: Children and Family Futures,*

Ziller, E. C. Are rural older adults benefiting from increased state spending on medicaid home and community-based services?

CHAPTER 3

DOWN, OUT AND ALONE:

RECESSION-RELATED SHIFTS IN THE CO-RESIDENCE OF OLDER AMERICANS

Introduction

The health economic literature has developed a provocative finding of population health improvements and mortality decreases during weak economic periods (Ruhm, 2000). These countercyclical trends have been observed worldwide and attributed to a variety of factors such as reductions in smoking and obesity, decreased road congestion as well as increases in time spent in leisure and exercise activities (Chay & Greenstone, 2003; Gerdtham & Ruhm, 2006; Granados, 2005; Lin, S., 2009; Neumayer, 2004). With an increasingly nuanced understanding of the relationship between mortality and economic recession, it has become clear that individual mortality factors respond in different ways. For instance, cardiovascular disease rates shift with the business cycle while cancer incidence does not respond to macro-economic factors (Ruhm, 2015). Mortality trends can also be procyclical. With some mixed results, suicide and homicide rates generally rise during recession (Neumayer, 2004; Stuckler, Basu, Suhrcke, Coutts, & McKee, 2009). It is ultimately important to differentiate recession-related health impacts by health condition and by demographic group.

This research examines the recession-related behavior of Americans aged 65 and older, a group that is under-represented in the recession and health literature, but a group

that comprises an increasingly prominent segment of worldwide populations (Wiener & Tilly, 2002). Older Americans have demonstrated some distinct recession-related shifts in health. For instance, older individuals, as a group much more sensitive to air quality, had a greater reduction in mortality during recession from causes such as coronary heart disease (Ruhm, 2007). While many recessionary health impacts for younger Americans operate through time allocation decisions and reduction of employment-related environmental risk, retiree health behaviors remain relatively static during economic recession (McInerney & Mellor, 2012).

However, household structure is a factor of older adult health that is plausibly sensitive to economic recession as economic resources contract along with market values and liquidity. Co-residential arrangements are a critical housing option to support the long-term care of older Americans. In 2015, 10 percent of American men and 19 percent of women over age 65 co-resided in households without their spouses, while 32 percent of black women, 27 percent of Asian women and 37 percent of Hispanic women lived in co-resident households without their spouses (Stats, 2006). Structural and economic factors drive adult children to live with their parents (Keene & Batson, 2010), but older adults are likely to move in with adult children to receive informal care and support.

Since adult children co-reside with parents for financial reasons (Mykyta & Macartney, 2011; Mykyta & Macartney, 2012; Taylor et al., 2011), these types of co-resident arrangements should increase with economic recession. Studies of younger adults show counter-cyclical co-residence trajectories with rates of combined or "doubled up" households increasing during recession (Mykyta & Macartney, 2011). Long-term care-related co-residence has not been addressed in the recession literature and this paper

seeks to fill that gap. Analysis of older-adult behavior during recession uses the Medicare Current Beneficiary Survey, a panel dataset gathered from a representative sample of Medicare beneficiaries. Older Americans who are at high risk of nursing home institutionalization are most sensitive to economic conditions, with a 4.3 percent reduction in co-residence during recession by individuals who demonstrate the greatest need for care. Effects are observed into the year following a recession. While the poorest older Americans were 4.2 percent less likely to co-reside in this post-recession year, wealthy older Americans were 8.6 percent more likely to co-reside as compared to their household structure in any other year. These reductions in co-residence of the most vulnerable individuals as compared with the co-occurring increase by their better resourced counterparts raise concern for unmet personal care needs and resultant health impacts for low-income older adults during and following periods of recession.

Background and Theory

Pew Research reports that in 2014, 19 percent of all Americans, or 60.6 million individuals lived in a multi-generational family home. Multi-generational homes include two or more adult generations (25 years or older) and could describe older adults living with children, grandchildren or unrelated roommates. Rates of multi-generational residence are higher among Americans 65 years and older, in which 21 percent select this arrangement (Cohn & Passel, 2016). Co-residence includes multigenerational households but also encompasses a variety of circumstances in which an older person lives with a similar-aged relative, a paying roommate or with hired help. Co-residence can also describe unmarried individuals of the same generation living together for social reasons (think “Golden Girls”). Co-residence can be theoretically distinguished from co-

habitation, which has increased in recent decades (Brown, S. L. & Wright, 2015) and describes an intimate and sexual relationship between unmarried co-residing individuals. However, cohabitation will not be explicitly differentiable from co-residence in this analysis.

Once common in American homes, which typically included lodgers, apprentices and live-in servants (Modell & Hareven, 1973) co-residence declined significantly over a century and a half following the trend of trimming all but the closest kin from the family unit (Elman & Uhlenberg, 1995; Ruggles, 2007). However, in 1980, when just 12% of Americans lived in a multi-generational household, increased immigration to America as well as delayed age of first marriage bolstered the rates of multigenerational households to some degree (Taylor et al., 2010).

For reasons of independence and autonomy, modern older Americans are assumed to prefer living alone or with a spouse exclusively (Bianchi, Hotz, & McGarry, 2008). This assumption might be relaxed for some demographic groups as household construction preferences trend along generational lines and according to race and ethnicity. Since Baby Boomers are less likely to be married (Lin, I. & Brown, 2012), and unmarried individuals are more likely to move into a co-resident living situation (Cohen & Casper, 2002), the generation of aging Baby Boomers may be more likely than their parents to co-reside. Cultural and social preferences also dictate norms and expectations of household construction and some racial and ethnic minorities as well as foreign born Americans are more likely to form extended family living arrangements (Kamo, 2000; Tienda & Angel, 1982). Co-residence in America is higher among those who identify as

Hispanic, Black or who are foreign-born (Bianchi et al., 2008; Compton & Pollak, 2015), even after accounting for economic factors.

While social circumstances prime certain populations to select co-residence, this discussion focuses on co-residence driven by functional disability and need for care. The theoretical conception of the long-term care and relocation decision is drawn from a behavioral model of medical care (Andersen, Ronald M., 1995), in which a set of characteristics (such as demographics) predispose an individual to co-residence. The person is then enabled with resources (such as family members who are willing to co-reside) and there is a perceived need for personal care support, around which the entire decision will turn. Using this model, a macro-economic recession might shift co-residence choices by changing community resources as demands for community services rise and by changing individual resources as housing markets become less liquid.

Health Shock and Co-Residence

As people age, they become increasingly likely to need personal care assistance. Personal care needs can be categorized as either help with Activities of Daily Living (ADLs) or Instrumental Activities of Daily Living (IADLs). ADLs comprise the six foundational daily routines of eating, dressing, bathing, walking, continence and using the toilet while other personal care needs can be classified as IADLs. Examples of IADLS include periodic activities such as shopping and medication management. IADLs are less fundamental to health and safety than ADLs, but they still factor into an individual's ability to live alone. Three or more ADL dependencies is a strong predictor of nursing home admission (Gaugler, Duval, Anderson, & Kane, 2007b). In 2002, about 26.5 percent of Americans 65 and older living at home, or 8.7 million individuals, were

limited in their ability to perform basic personal care activities (Johnson & Wiener, 2006a). Broadly defined, roughly 11 million Americans need help with one or more ADL or IADL (Kaye, Harrington, & LaPlante, 2010) and needs may arise gradually or abruptly, associated with a health event such as a stroke, surgery or injury.

A misalignment between an individual's need for assistance and available supports will impact her health and safety (Allen & Mor, 1997) as well as the overall likelihood of her admission to a hospital (Sands et al., 2006). When long-term healthcare needs arise, either gradually or from a sudden health event, individuals have three discrete avenues of choice which will be briefly addressed. They might move into a full time, formal congregate care environment such as in an assisted living facility or nursing home, they might receive episodic supports at home, or they might receive full-time support in the community through a co-residential arrangement. Though co-residence is the focus of this paper, shifts of behavior in one area should impact proportional reliance on at least one of the other two living arrangements.

Congregate care environments range across a broad spectrum from relatively informal board and care homes to highly institutional and heavily regulated nursing homes. Features and definitions of facilities will vary according to each state's regulatory environment, but all will offer staff 24 hours each day (with level of training dependent on the type of facility and the state laws). Moving into any dedicated care facility is the most disruptive of the three long-term care options since an individual must leave her home and become subject to institution-level rules and requirements that will impact her lifestyle and independence. For many Americans, a move into residential care will be the last resort option to meeting long-term care needs. However, institutional nursing care is

the only entitlement through which qualified indigent individuals can certainly and indefinitely receive publicly paid long-term care through state Medicaid funds.

In the second avenue of choice, an individual may live at home while coordinating episodic care events. A small minority might receive publicly funded long-term care through state Medicaid waiver services. Though states have increasingly adopted these Home and Community Based Support (HCBS) service programs (Grabowski et al. 2010), most state HCBS programs operate significant wait lists. Those paying privately for care paid more than $20 for each hour of support in 2016. Ultimately, formal care at home is atypical, with only 13 percent of those with long-term care needs using any paid supports, publicly or privately funded (Kaye et al., 2010). Some supports, typically for IADL activities, may be provided by community organizations. For instance, Federal Older American Act-funded programs provide transportation to medical appointments to income-qualified seniors. However, in the United States, episodic home care that assists with ADLs is primarily provided by informal supports (usually family) who are not professional healthcare workers (Kaye et al., 2010).

Home-based, episodic care maximizes both privacy and independence without the demand of disruptive residential change. This informal, episodic care reduces the use of nursing home care (Charles & Sevak, 2005; Lo Sasso & Johnson, 2002), however it is not always an adequate substitute for paid in-home or institutional care for individuals with more complex or comprehensive care needs (Bonsang, 2009). Episodic care is less tenable when is demanded at unpredictable times throughout the entire day or demands

are of high frequency. Informal episodic care will also be less tenable when an individual needs nursing-level care.

Older adults combine households with a caregiver when episodic care is inadequate, but a move into a formal residential environment is unnecessary or is not preferred (Fenge et al., 2012). Combined households represent a middle path between episodic home care and residential placement for an older adult who needs support (Compton & Pollak, 2015). Co-residence can offer more comprehensive and consistent support than episodic care without subjecting the individual to the institutional rules and regulations as well as the costs associated with institutional congregate care. It is estimated that more than one out of every three long-term care recipients lives with a caregiver. As demands for care increase (by number of hours), co-residence rates rise to 60% of the population with functional disability (Weber-Raley and Smith 2015).

Economic Factors and Co-Residence

Health shocks occur throughout the business cycle and increase medical, personal care or medication costs for individuals while economic contractions can simultaneously reduce the household budget or asset profile of an individual or of family members supporting that individual. If families have fewer resources to purchase personal care during a recessionary period, co-residence might increase under macro-economic pressure. While a labor market downturn could impact long-term care decisions by reducing the opportunity costs of care, making family more available (Ettner, 1996) and increasing co-resident care, episodic care at home might also be decreased by economic recession if safety net resources or private organizations that typically support co-resident households contract or are diverted to support other demographic groups.

While incomes are impacted by recession, household incomes are closely linked to co-residence. American co-residence decreased between the turn of the twentieth century and the 1980s, perhaps due to increases in economic security of older adults (Costa, 1999) or due to the increased affluence of adult children (Compton & Pollak, 2015; Ruggles, 2007). However, in either case, signs of economic power, such as adult children earning college degrees, shift families away from co-residence by increasing the opportunity cost of care and generating options to purchase alternative long-term care arrangements (Compton & Pollak, 2015). In general, education can buffer the impact of recession on income (Zakrevskaya & Mastracci, 2013), so higher income should protect home-based living arrangements by generating alternative options for long-term care (Bishop, 1986; Mykyta & Macartney, 2012).

Co-resident households of all age groups increased during the Great Recession by as much as 12 percent (Mykyta & Macartney, 2011). This shift is driven by younger Americans who were less likely to form their own, independent households (Lee & Painter, 2013; Qian, 2012) and an increase of multigenerational households which include children (Dunifon, Ziol-Guest, & Kopko, 2014). Though some of this behavior was certainly driven by economic efficiency, demand for long-term care has not been explored as a driver of recessionary shifts in household construction.

Hypotheses

This paper asks whether an individual 65 or older will change co-residence behavior during a period of economic recession. When factors such as housing liquidity, availability of informal caregivers and community reliance on safety net resources shift during recession, some older Americans may choose a different long-term care

arrangement. Long-term care options expand with income, so recession-related behavior changes should be related to an individual's economic situation. Since older Americans often combine households to receive personal care, individuals who need more care but who have less income are most likely to combine households.

H1: Co-residence of Americans 65 and older will shift during periods of economic recession.

H2: Individual financial resources will be related to recession-related shifts in co-residential behavior.

H3: An individual who needs more personal care will be more likely to co-reside.

Data

To examine these hypotheses, this paper relies on data from the Medicare Current Beneficiary Survey (MCBS) from 2000 to 2011. This data was chosen for its ability to provide health and household information for individuals as well as geographic identification for the community in which they reside. Living arrangements and characteristics of older Americans are compared between non-recessionary years and two distinct periods of recession that occur within this period.

The MCBS is a longitudinal rotating panel sampled from of all aged, disabled and institutionalized Medicare beneficiaries. It is conducted by the Center for Medicare and Medicaid's office of Enterprise and Data Analytics. All American adults aged 65 and older receive Medicare. Roughly 15,000 of these Medicare beneficiaries are sampled and interviewed three to four times yearly for this survey and participants are typically

followed for three consecutive years. Interviews are conducted in both community and institutional environments and oversampling is used to increase precision.

The MCBS data used includes roughly 10,000 individual observations each year for a total of 144,521 individuals across 12 years. A total of 24,781 individuals younger than 65 years of age were dropped from the data. An additional 12 participants were dropped for suspected coding errors in at least one year, leaving 111,214 individual person year observations for the final analysis.

Methods and Measures

This paper defines an individual as co-residing if he or she shares a residence with someone other than a spouse (24,225). These co-residing individuals might be married (8,088) or unmarried (16,122). In this binary model, an individual is not co-residing when living alone or exclusively with a spouse. This definition of co-residence captures economic or health related co-residence, but it does not exclude romantic but unmarried cohabitation or those who co-reside for other social reasons. Between the years 2000 and 2011, about 24 percent of older Americans were co-residing. Models utilized binomial logistic regression to observe the relationship between co-residence and other measures.

Macro-economic variation is of great interest to this study. Recessionary periods are operationalized as the year in which a recession occurred. The data set includes three total years of recession: 2001 and 2008-2009. In all, 25,475 participants were observed during at least one of these recessionary years. Post-recessionary periods were operationalized as the single year immediately following the recession year. The data includes two post-recessionary years, 2002 and 2010, which captured an additional 16,802 individual participant observations. Both variables “recession” and “post-

recession" are treated as binary. An observation either falls within the time period of interest or it does not. Yearly co-residence averages are presented in Table 6.

Table Six. Co-Residence Rates by Year

Year	Mean Co-Residence
2000	0.23120
	(0.2315)
2001	0.22477
	(0.2274)
2002	0.22056
	(0.2219)
2003	0.23009
	(0.2332)
2004	0.23772
	(.2394)
2005	0.23493
	(0.2400)
2006	0.23402
	(0.2378)
2007	0.23820
	(0.2425)
2008	0.23960
	(0.2420)
2009	0.24314
	(0.2442)
2010	0.24270
	(0.2461)
2011	0.25332
	(0.2564)
Observations	111,217

* p<0.10, ** p<0.05, *** p<0.01

Notes: Recession years include 2001, 2008 and 2009. Post-Recession years are 2002 and 2010. Co-residence is defined as living in a home with any individual other than or in addition to a spouse. This table reports yearly rates of co-residence along with their standard errors in parentheses.

The following model has been developed with measures as defined:

$$Co_{it} = \beta_1 Re_{it} + \beta_2 PRe_{it} + \beta_3 (Re*InstRisk)_{it} + \beta_4 (PRe*InstRisk)_{it} +$$

$$\beta_5 InstRisk_{it} + B_6 (Re*Inc)_{it} + B_7 (PRe*Inc)_{it} + \beta_8 Indvl_{it} + \beta_9 County_t + \delta + \gamma + \varepsilon_{cit}$$

Co describes the two-part dependent variable indicating a co-resident living arrangement. Re is a dummy, indicating that the observation of individual *i* at time *t* occurred in a recessionary period, while PRe similarly shows that the observation occurred during a post-recessionary year. The four interaction terms separately interact both the recession

and post-recession variables with a binary variable identifying individuals at risk of institutionalization as well as a continuous income variable.

All models incorporate a vector of demographic variables across which long-term care arrangements are known to vary. These include the number of children (Aquilino, 1990; Checkovich & Stern, 2002; Compton & Pollak, 2015), race/ethnicity (Compton & Pollak, 2015; Kamo, 2000), marriage status (Wolff et al., 2017), income and education (Keene & Batson, 2010; Levy, 2015; Macartney & Mykyta, 2012), assistance required with ADLs (Johnson & Wiener, 2006b), age and sex (HENNING-SMITH, 2017). Race/ethnicity is a three-part categorical variable that indicates white, black or other. The last category includes respondents who identified with multiple categories as well as Asian and Hispanic individuals. Finally, the binary education variable identifies individuals with any post high school degree.

The ADL and institutional risk variables rely on a series of five survey questions that ask whether a respondent has any difficulty with each of five ADL categories. The ADL variable counts the total number of ADLs that an individual reports difficulty completing. There are five ADLs, so this variable ranges from zero to five. The institutional level of care variable uses the ADL count variable to describes a respondent who reports assistance needed with three or more ADLs. In addition to cognitive impairment and prior nursing home use, the presence of three or more ADL dependencies is an accepted predictor of risk for institutional nursing home admission (Gaugler et al., 2007b). Summary statistics are presented in Table 7.

Table Seven. Summary Statistics

	Count	Percent	Mean	Std. Dev.
Co-Residence	24,225	23.54		
Recession	27,704	24.91		
Post-Recession	18,134	16.31		
Married	54,723	49.37		
College	44,340	39.70		
Female	64,458	58.10		
White	96,569	86.97		
Black	9,684	8.72		
Other Race/Ethnicity	4,785	4.31		
High Risk Nursing Home	6,734	6.05		
Income			3,752.78	57,815.84
Age			77.94	7.69
Children			2.96	2.12

Notes: Statistics were drawn from the Medicare Current Beneficiary Survey, years 2000-2011. Participants under age 65 were excluded from the analysis. All variables were binary except income, age and number of living children. State indicator variables are not shown in this table.

County-level characteristics modeled included median household income, county unemployment rate, median home price per square foot, total population, and proportion of the population 65 and older. State characteristics and policies are captured by δ, and changes over time are addressed by year effects, γ. Four separate models were analyzed, each with a different dependent variable, including all co-residents, parents co-residing with children, parents co-residing with others and the final model looked for recession-related changes in the rate of nursing home institutionalization.

Results

During both recessionary and post-recessionary years, Table 8 shows that overall co-residence of Americans aged 65 and older dropped by 2.1 percent as compared with rates in any other year. Reductions of co-residence rates were significant at the one percent level and were particularly associated with vulnerable groups. Significant changes in co-residence were not observed for parents living with children and there were no significant changes in recessionary nursing home residence. Parents living with others reduced their co-residence by 1.5 percent during the recessionary year ($p<0.05$). This

category could include unmarried individuals cohabiting in a sexual relationship, people living together collegially, paying roommates or older individuals who live with hired help.

Table 8. Logistic Regression Marginal Effects, Co-Residence in Recession and Post-Recession

	(1) Rec b/t	(2) Post-Rec b/t	(3) Rec b/t	(4) Post-Rec b/t	(5) Rec b/t	(6) Post-Rec b/t	(7) Rec b/t	(8) Post-Rec b/t
All Co-Residents								
	-0.021***	-0.021***						
	(-2.63)	(-2.68)						
Parents Co-Residing with Children								
			-0.0037	-0.0070				
			(-0.72)	(-1.37)				
Parents Co-Residing with Others								
					-0.015**	0.0014		
					(-2.05)	(0.80)		
All Nursing Home Residents								
							-0.0024	-0.00055
							(-0.57)	(-0.13)
Observations	70083	70083	74974	74974	67467	67467	74955	74955

* p<0.10, ** p<0.05, *** p<0.01

Notes: Each bolded heading represents a separate regression. Columns identify the marginal effects of either recession or post-recession, each operationalized as a binary variable. Co-residence means that someone other than or in addition to the respondent's spouse lived in the home. The marginal effects explain the change in probability of co-residence depending on the time period in which the observation occurs. For instance, in the category of all co-residents, observations during both recession and post-recession years are 2.1% less likely to be living in co-residence than observations made during any other year.

Race and ethnicity only slightly increased sensitivity of co-residence to recession. As shown in Table 9, in the category of "all co-residents," white individuals reduced co-residence in the recessionary year by 2.0 percent ($p<0.01$), black individuals co-resided 2.7 percent less during a recession than during any other year ($p<0.05$) and individuals identifying as multi-race or other ethnicity reduced co-residence by 2.6 percent ($p<0.05$). In the year following recession, however, white co-residents were 1.9 percent less likely to co-reside ($p<0.05$) while black and other race/ethnicity individuals are respectively 3.6 and 3.5 percent less likely to co-reside ($p<0.01$). White parents were 1.5 percent less

likely to live with others during recession ($p<0.05$), while parents identifying as black, multi-racial or other ethnicity reduced co-residence by 1.9 percent in this year ($p<0.10$). However, the literature doesn't establish whether different race and ethnic groups systematically use co-residence in different ways, so future research will need to interpret these differences in co-residence behavior by demographic characteristic. Overall, racial and ethnic minorities are much more susceptible to a reduction of co-residence in the post-recessionary year than older Americans who identify as white.

Table Nine. Logistic Regression Marginal Effects, Co-Residence by Race During Recession and Post-Recession

	(Rec) All	(Post-Rec) All	(Rec) Parents w Children	(Post-Rec) Parents w Children	(Rec) Parents w Others	(Post-Rec) Parents w Others	(Rec) Nursing Home	(Post-Rec) Nursing Home
	b/t	b/t	b/t	b/t	b/t	b/t	b/t	b/t
White	-0.020***	-0.019**	-0.0033	-0.0058	-0.015**	-0.0090	-0.0027	-0.00073
	(-2.66)	(-2.54)	(-0.70)	(-1.25)	(-2.17)	(-1.31)	(-0.64)	(-0.18)
Black	-0.027**	-0.036***	-0.0060	-0.015*	-0.019*	-0.018*	-0.0032	-0.00087
	(-2.47)	(-3.30)	(-0.71)	(-1.74)	(-1.84)	(-1.79)	(-0.64)	(-0.18)
Other	-0.026**	-0.035***	-0.0054	-0.014*	-0.019*	-0.019*	-0.0023	-0.00063
	(-2.48)	(-3.29)	(-0.73)	(-1.83)	(-1.85)	(-1.81)	(-0.64)	(-0.18)
Obs	70083	70083	74974	74974	67467	67467	74955	74955

* p<0.10, ** p<0.05, *** p<0.01

Notes: This table represents four separate regressions. Columns identify the marginal effects of economic conditions, either recession or post-recession, with each treated as a binary variable. Co-residence means that there is someone other than or in addition to the spouse living in the home. Marginal effects explain the change in probability of co-residence depending on the year in which the observation occurs and its associated economic conditions. For instance, in the category of all co-residents, white individuals observed during a recession year 2 percent less likely to live in a co-resident household than white individuals observed during any other year.

Table 10 describes the behavior of individuals who co-reside to meet personal and health care needs. When individuals are differentiated according to risk for institutionalization, those at high risk were much less likely to co-reside during a recession than in any other year. While those at low risk were 1.9 percent less likely to co-reside in a recessionary year ($p<0.05$), individuals at high risk were 4.3 percent less likely ($p<0.05$). Only the co-resident behavior of individuals at low-risk of nursing home placement was responsive to the post-recessionary period ($p<0.01$). The subgroup of

parents co-residing with others explained a large proportion of the changes with their likelihood of recessionary co-residence dropping by 1.5 percent in the low-risk category ($p<0.05$) and 2.9 percent for those at high risk for nursing home placement (0.10). There were no significant risk-related behavior changes in the post-recessionary year for parents residing with children or individuals living in a nursing home.

Table Ten. Logistic Regression Marginal Effects, Co-residence in Recession and Post-Recession by Risk of Nursing Home Placement

	(Rec) All	(Post-Rec) All	(Rec) Parents w Children	(Post-Rec) Parents w Children	(Rec) Parents w Others	(Post-Rec) Parents w Others	(Rec) Nursing Home	(Post-Rec) Nursing Home
	b/t	b/t	b/t	b/t	b/t	b/t	b/t	b/t
Low Risk	-0.019**	-0.020***	-0.0029	-0.0065	-0.015**	-0.010	-0.0027	-0.00075
	(-2.46)	(-2.61)	(-0.58)	(-1.30)	(-1.98)	(-1.40)	(-0.64)	(-0.18)
High Risk	-0.043**	-0.032	-0.017	-0.016	-0.029*	-0.0082	-0.0019	-0.00052
	(-2.28)	(-1.50)	(-1.11)	(-0.92)	(-1.93)	(-0.49)	(-0.64)	(-0.18)
Obs	70083	70083	74974	74974	67467	67467	74955	74955

* p<0.10, ** p<0.05, *** p<0.01

Notes: Each pair of columns represent a separate regression. Sub-columns explain the marginal effects of economic conditions, either recession or post-recession. Co-residence means that there is someone other than or in addition to the spouse living in the home and the risk of nursing home placement is a binary variable indicating whether someone needed help with 2 or fewer ADLs or 3or more ADLs. Marginal effects explain the change in probability of co-residence depending on the year in which the observation occurred and the associated economic conditions. For instance, in the category of all co-residents, individuals observed during a recession year at high risk of nursing home placement was 4.3% less likely to live in a co-resident household than individuals with high risk of nursing home placement observed during any other year.

Table 11 demonstrates a bimodal relationship between income and co-residence in the post recessionary year. There are separate income-related drivers of co-residence: at the lower end of the income spectrum, older Americans rely on informal care or nursing home care paid by Medicaid while at the upper end of the income spectrum, individuals who prefer to age in place have the capacity to hire caregivers or to purchase long-term care insurance to pay for care at home. Throughout the year of recession, reductions in co-residence grew slightly more pronounced with rising income. While Americans earning less than $20,000 were 1.8 less likely to co-reside ($p<0.01$), with rising income, individuals gradually showed less co-residence until the highest income

bracket where individuals are earning $160,000 each year and recessionary co-residence was 2.9 percent less likely than in any other year ($p<0.10$). Beyond this point, greater income was not associated with any change in co-resident behavior during the year of recession.

During the year following a recession, co-residence behavior is distinctly bimodal. The poorest Americans were 4.2 percent less likely to co-reside than in any other year ($p<0.01$). These changes in co-residence gradually flatten with rising income and lose significance in the second income bracket. However, in the third income bracket, at around $85,000 yearly, co-residence in the post-recessionary year becomes 1.5 percent more likely ($p<0.10$). This increased likelihood rises steadily with income until it peaks in the top income bracket, at which point those earning $360,000 each year are fully 8.6 percent more likely to co-reside.

Table 11 presents the marginal effects of income broken into six brackets. The ceiling of the lowest bracket, $24,120, was 200 percent of federal poverty level for a family of one in 2017. This is a limit often used by states to determine Medicaid eligibility. The rest of the brackets were defined by the income levels used to establish Medicare premiums for a single person filing taxes individually in 2017. The second bracket ran from $24,121 to $84,999, the third bracket from $85,000 through $106,999, the fourth from $107,000 to $133,499, the fifth ranging from $133,500 through $159,999 and the highest income bracket described individuals with an annual income of at least $160,000.

Table Eleven. Logistic Marginal Effects Income on Co-Residence during Recession and Post-Recession: Reported in $20,000 increments

	(Rec) b/t	(Post-Rec) b/t
$0	-0.018*	-0.042***
	(-1.85)	(-4.44)
$20,000	-0.020**	-0.027***
	(-2.45)	(-3.28)
Income level 2		
$24,121	-0.021**	-0.024***
	(-2.55)	(-2.97)
$44,121	-0.023***	-0.0099
	(-2.81)	(-1.28)
$64,121	-0.024***	0.0030
	(-2.72)	(0.37)
$84,121	-0.026**	0.015
	(-2.49)	(1.64)
Income level 3		
$85,000	-0.026**	0.015*
	(-2.48)	(1.69)
$105,000	-0.027**	0.026***
	(2.25)	(2.58)
Income level 4		
$107,000	-0.027**	0.027***
	(-2.23)	(2.65)
$127,000	-0.028**	0.037***
	(-2.04)	(3.25)
Income level 5		
$133,500	-0.028**	0.040***
	(-1.98)	(3.40)
$153,500	-0.029*	0.048***
	(-1.85)	(3.79)
Income level 6 in $100,000 increments		
$160,000	-0.029*	0.050***
	(-1.81)	(3.90)
$260,000	-0.030	0.076***
	(-1.44)	(4.76)
$360,000	-0.028	0.086***
	(-1.27)	(4.88)
$460,000	-0.026	0.086***
	(-1.17)	(4.58)
$560,000	-0.023	0.083***
	(-1.10)	(4.06)
$660,000	-0.021	0.079***
	(-1.06)	(3.50)
Observations	70083	70083

* p<0.10, ** p<0.05, *** p<0.01

Note: Co-residence means that someone other than or in addition to the respondent's spouse lived in the home. Columns identify the marginal effects of either recession or post-recession on co-residence, each operationalized as a binary variable. Though income was a continuous variable, the marginal effects were assessed according to 6 brackets. The marginal effects explain the change in probability of co-residence in a given time period. For instance, those living with $160,000 yearly income were 5 percent more likely to co-reside in the year following a recession.

Discussion

Hypothesis One, which expected co-residence rates to respond to economic recession was supported. Co-residence of all older Americans reduced during recession and increased for highest income adults during the year following a recession. Hypothesis Two, which anticipated that income would be related to recessionary behavior change was also supported by these findings. Finally, Hypothesis Three, which expected that greater personal care need would be correlated with greater co-residence during recession, is not supported. The individuals with greater need for care were more likely to reduce co-residence during a recessionary period.

The prevalence of multi-generational households in the United States has risen since 1980, with a spike during the Great Recession of an additional 4.9 million individuals. In general, Americans behave as if combined households are more efficient and in nonrecessionary years, about 20 percent of Americans choose co-residence (Taylor et al., 2010). However, this research finds that during recession, older adult co-residence rates fall, particularly for individuals who need more personal care support or who have fewer financial resources. If older American co-residence mirrored the co-residence of younger adults, they would increase co-residence due to low income, and the high risk of institutionalization should also drive rates up. These findings raise concern about unmet personal care needs for older Americans during recessionary periods.

To understand the implications of reduced co-residence, it is instructive to revisit the remaining options for the marginal individuals who need personal assistance but who do not co-reside in a post-recessionary year. Long-term care needs could still be met through periodic care at home (paid or informal), an individual could live with unmet

personal needs, or a combination of these two scenarios. The severity and periodicity of an individual's needs will factor into the viability of periodic care at home. Personal care needs that require continuous monitoring will be extremely difficult to address with a periodic, informal care arrangement and the people with this type of functional disability will be very vulnerable to institutionalization.

Individuals whose needs can be addressed with periodic care can consider privately paid professional care or informal support from friends, neighbors or organizations. Periodic care at home is a resource-intensive option. Paid care can be prohibitively expensive, with a full-time home health aide costing roughly $46,000 annually, depending on individual needs and market factors (Colello, 2017). For Medicaid-qualified individuals, the group most likely to reduce co-residence following a recession, privately paid care is likely out of reach. While Medicaid does provide community-based paid support through HCBS long-term care waiver programs, most states operate an extensive waiting list for this service and turn-over is extremely low. Additionally, disadvantaged communities may experience higher demand for supports during recession, and scarcities may arise.

Some individuals will use periodic care to address functional limitations, leaving certain care needs unmanaged. For instance, it may be easier to find supports to assist with medication and housekeeping, but much more difficult to cope with mobility issues that remain unmet until a more effective long-term care arrangement is established. Without relocation to a nursing home, which is the only Medicaid reimbursed long-term care environment that is always available to very low-income Americans, a reduction in

co-residence likely means that some older people are living at home with unmet needs during or immediately following a recession.

Living alone is, itself, a predictor of nursing home admission for older adults (Rudberg, Sager, & Zhang, 1996). Living at home with unmet needs for an extended period puts an older adult in danger of hospitalization (Sands et al., 2006). Medicare hospital expenditure amounted to $256,998,000 in 2015, or 40 percent of total Medicare cost (CMS National Health Expenditure, 2016) and unmet ADL support could increase Medicare hospital costs. Those living with the need for help with multiple ADLs are more likely to enter a nursing home, which is the most expensive long-term care environment. The possibility that recessions make people more vulnerable to nursing home admission is particularly notable since individuals are unlikely to leave a long-term care facility once the arrangement has been selected (Coe & Boyle, 2013). While co-residence is often provided informally and does not require direct public expenditure, nursing home care, the only long-term care option that is always available to a very low income American, costs an average of $82,000 annually for a semi-private room (Colello, 2017). As the largest payer of long-term care in the US, Medicaid covered 42.5 percent of 2015 costs, with long-term care representing over 30 percent of total Medicaid expenses (Colello, 2017). Ultimately and most gravely, those living with one to two unmet ADL needs face an increased likelihood of mortality (He et al., 2015).

This paper sheds light on the vulnerability of co-residence behavior to the macro economic cycle. Co-residence rates should be considered as a measure of the material hardship of older Americans, particularly under exogenous conditions such as a recession. Using this measure, recession-related behaviors of older Americans diverge

from better-studied younger adults with anticipated health impacts. While younger Americans are more likely to make choices that increase household economic efficiency during recession (Mykyta & Macartney, 2011), the neediest and most economically disadvantaged older adults seem to choose less efficient housing structures following a recession.

Since most Americans prefer home-based care to care in an institution (Keenan, 2010), the recession-related reduction of co-residence suggests that there are recession-related barriers to co-residence. Speculation on these barriers demand more detailed treatment than this analysis will allow, but the Andersen model suggests three avenues to explore. The first option is that household construction changes with home valuations and market liquidity (Gordon & Sommers, 2016). Under the category of individual-level factors that enable long-term care access, home values describe economic resources which can be leveraged to purchase long-term care. As more than 80 percent of independent-living older Americans own their home (Coe and Boyle 2013), a depressed housing market that makes it more difficult for homeowners to relocate in the short-term could change short-term housing choices.

The second possibility suggested by the Andersen model is an increase in the supply of community services. Resources typically increase during recessions in service-poor areas, both from public and nonprofit organizations. These increases could extend ability of an older adult to live safely at home in the short-term. In the Andersen model, this mechanism would be located under the community factors which enable long-term care access. Research should examine this potential mechanism to identify targeted

services that especially enhance the independence of older adults with functional limitations.

The final mechanism suggested by the adaptation of the Andersen model is an increase in available informal supports. If women in the community exit the workforce with the economic recession, the supply of informal caregivers available to provide periodic supports might increase. While co-resident care is likely more comprehensive, periodic care leverages transaction costs such as travel time which may become prohibitive for a caregiver who works fulltime. With lower employment, increased availability of informal caregivers could reduce reliance on co-resident care in the short-run.

Limitations

This study suggested a relationship between co-residence and macro-economic recession. However, it did not provide a mechanism of causal linkages. Additional research will be needed to pinpoint the pathways through which the macro-economy impacted older American household structure.

Data was not available to address individual access to long-term care insurance or people who have state Medicaid HCBS waivers. Proximity between the older adult and adult children is also not addressed. Individual home ownership and housing market liquidity are additional variables that could impact household structure and relocation but do not appear in this paper. Though state fixed-effects were included, state-level spending on long-term care, nursing care and home and community supports were not specifically available to the beginning of the study period. Future research should examine these

variables, as well as a measure of women in the workforce, to better assess their necessity to fully explain enabling factors of community-based long-term care.

Conclusion

Public policies impact long-term care. The United States Social Security Program, for instance, may be the single greatest contributor to the 20th century reduction in co-residence (Ruggles, 2007). Public policies also have spillover effects. An infusion of public benefits for one household member attracts other vulnerable family members to join the household (Ardington, Case, & Hosegood, 2009; Hamoudi & Thomas, 2014; Posel, Fairburn, & Lund, 2006). This research shows that policies may be needed to ensure long-term care of vulnerable older Americans during economic recession. It is particularly concerning that poorer older adults with greater functional disability are most likely to reduce co-residence. Local and state-level analyses must be conducted identify unmet care needs associated with recession that result from the changes of household structure. A variety of policies could ensure that personal care needs are met during recession for those most vulnerable. Levers to explore include HCBS waiver service distribution, cash transfers and increasing access to transportation, meals on wheels and other Older American Act programs. Alternately, if unmet needs are not increasing during and following a recession, changes in the service-environment should be carefully studied to identify policies that effectively increase older adults' capacity to safely live alone with functional disabilities.

References

Andersen, Ronald M. 1995. "Revisiting the Behavioral Model and Access to Medical Care: Does it Matter?" *Journal of Health and Social Behavior*: 1-10.

Ardington, Cally, Anne Case, and Victoria Hosegood. 2009. "Labor Supply Responses to Large Social Transfers: Longitudinal Evidence from South Africa." *American Economic Journal: Applied Economics* 1 (1): 22-48.

Bianchi, M. S., V. J. Hotz, and K. McGarry. 2008. "Intergenerational Ties: Alternative Theories, Empirical Findings and Trends, and Remaining Challenges, in 'Caring and Exchange within and Across Generations', Booth A. and Crouter AC and Bianchi SM and Seltzer JA Edn." *Washington, DC: Urban Institute*: 1-43.

Bishop, C. E. 1986. "Living Arrangement Choices of Elderly Singles: Effects of Income and Disability." *Health Care Financing Review* 7 (3): 65-73.

Bonsang, Eric. 2009. "Does Informal Care from Children to their Elderly Parents Substitute for Formal Care in Europe?" *Journal of Health Economics* 28 (1): 143-154.

Brown, Susan L. and Matthew R. Wright. 2015. "Older Adults' Attitudes Toward Cohabitation: Two Decades of Change." *Journals of Gerontology Series B: Psychological Sciences and Social Sciences* 71 (4): 755-764.

Centers for Medicare and Medicaid Services. *National Health Expenditure Fact Sheet*. https://www.cms.gov/research-statistics-data-and-systems/statistics-trends-and-reports/nationalhealthexpenddata/nhe-fact-sheet.html

Charles, Kerwin Kofi and Purvi Sevak. 2005. "Can Family Caregiving Substitute for Nursing Home Care?" *Journal of Health Economics* 24 (6): 1174-1190.

Chay, Kenneth Y. and Michael Greenstone. 2003. "The Impact of Air Pollution on Infant Mortality: Evidence from Geographic Variation in Pollution Shocks Induced by a Recession." *The Quarterly Journal of Economics* 118 (3): 1121-1167.

Checkovich, Tennille J. and Steven Stern. 2002. "Shared Caregiving Responsibilities of Adult Siblings with Elderly Parents." *Journal of Human Resources*: 441-478.

Coe, Norma B. and Melissa A. Boyle. 2013. "The Asset and Income Profiles of Residents in Seniors Housing and Care Communities: What can be Learned from Existing Data Sets." *Research on Aging*35 (1): 50-77.

Cohen, Philip N. and Lynne M. Casper. 2002. "In Whose Home? Multigenerational Families in the United States, 1998–2000." *Sociological Perspectives* 45 (1): 1-20.

Cohn, D. and J. S. Passel. 2016. "A Record 60.6 Million Americans Live in Multigenerational Households." *Pew Research. Posted August* 11.

Colello, Kirsten J. 2017. "Medicaid Financial Eligibility for Long-Term Services and Supports." *Congressional Research Service: Report*: 1-15. http://proxy-

remote.galib.uga.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=tsh&AN=121709556&site=eds-live.

Compton, Janice and Robert A. Pollak. 2015. "Proximity and Co-Residence of Adult Children and their Parents in the United States: Descriptions and Correlates." *Annals of Economics and Statistics/Annales D'Économie Et De Statistique* (117-118): 91-114.

Costa, Dora L. 1999. "A House of Her Own: Old Age Assistance and the Living Arrangements of Older Nonmarried Women." *Journal of Public Economics* 72 (1): 39-59.

Dunifon, Rachel E., Kathleen M. Ziol-Guest, and Kimberly Kopko. 2014. "Grandparent Coresidence and Family Well-being: Implications for Research and Policy." *The Annals of the American Academy of Political and Social Science* 654 (1): 110-126.

Elman, Cheryl and Peter Uhlenberg. 1995. "Co-Residence in the Early Twentieth Century: Elderly Women in the United States and their Children." *Population Studies* 49 (3): 501-517.

Ettner, Susan L. 1996. "The Opportunity Costs of Elder Care." *Journal of Human Resources*: 189-205.

Fenge, Lee-Ann, Sarah Hean, Louise Worswick, Charlie Wilkinson, Stella Fearnley, and Steve Ersser. 2012. "The Impact of the Economic Recession on Well-being and Quality of Life of Older People." *Health & Social Care in the Community* 20 (6): 617-624.

Gaugler, Joseph E., Sue Duval, Keith A. Anderson, and Robert L. Kane. 2007. "Predicting Nursing Home Admission in the US: A Meta-Analysis." *BMC Geriatrics* 7 (1): 13.

Gerdtham, Ulf-G and Christopher J. Ruhm. 2006. "Deaths Rise in Good Economic Times: Evidence from the OECD." *Economics & Human Biology* 4 (3): 298-316.

Gordon, Sarah H. and Benjamin D. Sommers. 2016. "Recessions, Poverty, and Mortality in the United States: 1993–2012." *American Journal of Health Economics*.

Grabowski, David C., Rebecca Orfaly Cadigan, Edward Alan Miller, David G. Stevenson, Melissa Clark, and Vincent Mor. 2010. "Supporting Home-and Community-Based Care: Views of Long-Term Care Specialists." *Medical Care Research and Review* 67 (4_suppl): 101S.

Granados, José A. Tapia. 2005. "Increasing Mortality during the Expansions of the US Economy, 1900–1996." *International Journal of Epidemiology* 34 (6): 1194-1202.

Gubernskaya, Zoya and Zequn Tang. 2017. "Just Like in their Home Country? A Multinational Perspective on Living Arrangements of Older Immigrants in the United States." *Demography* 54 (5): 1973-1998.

Hamoudi, Amar and Duncan Thomas. 2014. "Endogenous Coresidence and Program Incidence: South Africa's Old Age Pension." *Journal of Development Economics* 109: 30-37.

He, Shuang, Bruce A. Craig, Huiping Xu, Kenneth E. Covinsky, Eric Stallard, Joseph Thomas III, Zach Hass, and Laura P. Sands. 2015. "Unmet Need for ADL Assistance is Associated with Mortality among Older Adults with Mild Disability." *Journals of Gerontology Series A: Biomedical Sciences and Medical Sciences* 70 (9): 1128-1132.

Johnson, Richard W. and Joshua M. Wiener. 2006. *A Profile of Frail Older Americans and their Caregivers* Urban Institute Washington, DC.

Kamo, Yoshinori. 2000. "Racial and Ethnic Differences in Extended Family Households." *Sociological Perspectives* 43 (2): 211-229.

Kaye, H. S., C. Harrington, and M. P. LaPlante. 2010. "Long-Term Care: Who Gets it, Who Provides it, Who Pays, and how Much?" *Health Affairs (Project Hope)* 29 (1): 11-21.

Keenan, Teresa A. 2010. *Home and Community Preferences of the 45 Population* AARP Research & Strategic Analysis.

Keene, Jennifer Reid and Christie D. Batson. 2010. "Under One Roof: A Review of Research on Intergenerational Coresidence and Multigenerational Households in the United States." *Sociology Compass* 4 (8): 642-657.

Lee, Kwan Ok and Gary Painter. 2013. "What Happens to Household Formation in a Recession?" *Journal of Urban Economics* 76: 93-109.

Lin, I-Fen and Susan L. Brown. 2012. "Unmarried Boomers Confront Old Age: A National Portrait." *The Gerontologist* 52 (2): 153-165.

Lin, Shin-Jong. 2009. "Economic Fluctuations and Health Outcome: A Panel Analysis of Asia-Pacific Countries." *Applied Economics* 41 (4): 519-530.

Lo Sasso, Anthony T. and Richard W. Johnson. 2002. "Does Informal Care from Adult Children Reduce Nursing Home Admissions for the Elderly?" *INQUIRY: The Journal of Health Care Organization, Provision, and Financing* 39 (3): 279-297.

McInerney, Melissa and Jennifer M. Mellor. 2012. "Recessions and Seniors' Health, Health Behaviors, and Healthcare use: Analysis of the Medicare Current Beneficiary Survey." *Journal of Health Economics* 31 (5): 744-751.

Mentzakis, Emmanouil, Paul McNamee, and Mandy Ryan. 2009. "Who Cares and how Much: Exploring the Determinants of Co-Residential Informal Care." *Review of Economics of the Household* 7 (3): 283-303.

Modell, John and Tamara K. Hareven. 1973. "Urbanization and the Malleable Household: An Examination of Boarding and Lodging in American Families." *Journal of Marriage and Family* 35 (3): 467-479.

Mykyta, Laryssa and Suzanne Macartney. 2011. "The Effects of Recession on Household Composition:'doubling Up'and Economic Well-Being." *US Census Bureau. Social, Economic and Household Statistics Division Working Paper* 4.

———. 2012. *Sharing a Household: Household Composition and Economic Well-being: 2007-2010* US Department of Commerce, Economics and Statistics Administration, US Census Bureau Washington, DC.

Neumayer, Eric. 2004. "Recessions Lower (some) Mortality Rates: Evidence from Germany." *Social Science & Medicine* 58 (6): 1037-1047.

Posel, Dorrit, James A. Fairburn, and Frances Lund. 2006. "Labour Migration and Households: A Reconsideration of the Effects of the Social Pension on Labour Supply in South Africa." *Economic Modelling* 23 (5): 836-853.

Qian, Zhenchao. 2012. "During the Great Recession, More Young Adults Lived with Parents." *Census Brief Prepared for Project US2010, Http://Www.S4.Brown.Edu/us2010/Data/Report/report08012012.Pdf*.

Rudberg, Mark A., Mark A. Sager, and Jie Zhang. 1996. "Risk Factors for Nursing Home use After Hospitalization for Medical Illness." *The Journals of Gerontology Series A: Biological Sciences and Medical Sciences* 51 (5): M194.

Ruggles, Steven. 2007. "The Decline of Intergenerational Coresidence in the United States, 1850 to 2000." *American Sociological Review* 72 (6): 964-989.

Ruhm, Christopher J. 2000. "Are Recessions Good for Your Health?" *The Quarterly Journal of Economics* 115 (2): 617-650.

———. 2003. "Good Times make You Sick." *Journal of Health Economics* 22 (4): 637-658.

———. 2007. "A Healthy Economy can Break Your Heart." *Demography* 44 (4): 829-848.

———. 2015. "Recessions, Healthy no More?" *Journal of Health Economics* 42: 17-28.

Sands, Laura P., Yun Wang, George P. McCabe, Kristofer Jennings, Catherine Eng, and Kenneth E. Covinsky. 2006. "Rates of Acute Care Admissions for Frail Older People Living with Met Versus Unmet Activity of Daily Living Needs." *Journal of the American Geriatrics Society* 54 (2): 339-344.

Stats, Aging. 2016. "Federal Interagency Forum on Aging Related Statistics." Federal Interagency Forum on Aging-Related Statistics. Washington, DC: U.S. Government Printing Office.

Stuckler, David, Sanjay Basu, Marc Suhrcke, Adam Coutts, and Martin McKee. 2009. "The Public Health Effect of Economic Crises and Alternative Policy Responses in Europe: An Empirical Analysis." *The Lancet* 374 (9686): 315-323.

Taylor, Paul, Rakesh Kochhar, D'Vera Cohn, Jeffrey S Passel, Gabriel Velasco, Seth Motel, and Eileen Patten. 2011. "Fighting Poverty in a Tough Economy, Americans

Move in with their Relatives." *Pew Social & Demographic Trends.Pew Research Center.Washington DC Http://Www.Pewsocialtrends.Org/Files/2011/10/Multigenerational-Households-Final1.Pdf*.

Taylor, Paul, Jeffrey Passel, Richard Fry, Richard Morin, Wendy Wang, Gabriel Velasco, and Daniel Dockterman. 2010. "The Return of the Multi-Generational Family Household." *Pew Research Center*.

Tienda, Marta and Ronald Angel. 1982. "Headship and Household Composition among Blacks, Hispanics, and Other Whites." *Social Forces* 61 (2): 508-531.

Weber-Raley, L. and E. Smith. 2015. "Caregiving in the US 2015." *National Alliance for Caregiving and the AARP Public Policy Institute*.

Wiener, Joshua M. and Jane Tilly. 2002. "Population Ageing in the United States of America: Implications for Public Programmes." *International Journal of Epidemiology* 31 (4): 776-781.

Zakrevskaya, Olga and Sharon Mastracci. 2013. "Differential Effects of the Great Recession by Household Type: Evidence from a Longitudinal Survey." *Challenge* 56 (6): 87-114.

CHAPTER 4

HOME HEALTH AND LATE-LIFE HOUSEHOLD STRUCTURES

Many people will require some support and assistance with self-care as they age. Functional limitations, even if temporary, can put people who live alone at greater risk for relocation and nursing home placement (Rudberg et al., 1996; Worobey & Angel, 1990). To meet basic care needs, an older adult with means may hire help or, if qualified, may rely on public or private insurance for some components of care. Many older adults will reach out to friends and family for assistance. In some cases, the need for assistance will lead to a change of residence as the older adults seeks care providers. This residential change endangers an older adult's health and wellbeing, especially when the move was initiated under duress (Wilmoth, 2010). While functional independence may increase over time, relocation decisions are not as mutable.

Home-based care is a critical component of long-term care (LTC) for older adults who have experienced a health shock. Medicare home health, the primary source of publicly-funded community-based personal care, is designed to reduce reliance on expensive and restrictive institutional environments such as hospitals and nursing homes. Though home health supports are intended to be temporary and to facilitate community-based care over institutional services in the short-term, they may also impact the selection between community-based residences. Since home health services are designed to manage the changes in health and ability that can prompt a residential move drive by the need for long-term care, home health services may substitute for natural supports and

impact household structures beyond the decision to move into a nursing home. This paper will explore whether the decision to live alone or relocate into a new community environment is related to home health service provision.

Background

From its outset in 1965, Medicare has offered home health services to shorten inpatient hospital stays and reduce institutional care (Fishman, Penrod, & Vladeck, 2003). In fact, before 1980, home health was only available to recipients who had recently experienced a hospital discharge. Though hospitalization is no longer a necessary qualification for services, recipients must both require skilled nursing care or specific therapies and also be homebound. Additional criteria state that services must be intermittent, meaning that they occur fewer than seven days each week or eight hours each day over a 21-day period, and the period of care must be time-limited. Eligibility for home health is determined by a physician and the blend of services ordered by the physician will be intended to ensure health while rebuilding independence and increasing self-sufficiency, usually after an adverse health event. The range of provided services could include skilled nursing care, home health aide services, physical and occupational therapy, speech-language therapy and medical social services. However, to receive any services, the recipient must qualify for at least one nursing or therapy-level service. This means that home health services cannot provide personal care exclusively. Though services are authorized in discrete blocks, or episodes of care, episodes are indefinitely renewable according to the discretion of a physician.

Take-Up and Incentives for Individuals to use Home Health Services

Home health recipients pay no out of pocket cost and program expenses have fluctuated in conjunction with rule changes over the years (Fishman et al., 2003). For recipients with Original Medicare, the home health agency directly receives full payment for each 60-day episode of care. Medicare shifted to this prospective payment system from a cost-based structure in 2000 in attempt to manage costs. A base payment is calculated according to the patient case mix, or the typical care needed by an average person with a similar profile and payments are then adjusted for abbreviated episodes of care, low utilization or significant changes in the patient's condition. As with other Medicare services, rates are differentiated by geographic wages (Centers for Medicare & Medicaid Services, 2019). For those with a Medicare Managed Care Plan, the reimbursement system is the same as original Medicare, but choice of provider may be limited according to the contract. If a case mix and adjustment payment for a diagnosis isn't well calibrated to service needs, services may be underprovided to Medicare recipients with that diagnosis.

Home health services have long been geographically dependent. Uptake of services varied according to both state of residence and the Medicare recipient's community of residence. Supply factors, presence of alternative sources of care as well as referral sources all impacted access (Benjamin, 1986; Dansky, Brannon, Shea, Vasey, & Dirani, 1998). State policies also impacted service use, with an inverse relationship between Medicare home health use and the number of long-term care and skilled nursing facilities beds per capita (Kenney & Dubay, 1992). Great strides in service access measures have been made in recent years. In 2013, over 99 percent of Medicare

beneficiaries lived in a zip code with at least one Medicare home health agency and 97 percent of these zip codes had two or more agencies (Centers for Medicare & Medicaid Services, 2019).

Home Health Care: Magnitude and Cost

Long-term care is a resource-intensive business. In 2013, around the period observed in this study, about 3.5 million Medicare beneficiaries received home health services, costing the program 17.9 billion dollars and paying 12,613 service providers. The program continued to grow, adding 302 new agencies in that same year (Centers for Medicare and & Medicaid Services, 2014). Evidence of a relationship between publicly funded support and informal care remains thin. In general, research has found them to be substitutes, though the degree of substitution is unclear (Pezzin, Kemper, & Reschovsky, 1996). If they act as direct substitutes, then professional home health services should reduce residential relocations which would have been initiated to receive.

The literature on economic costs of institutional and community-based care is better developed. The selection between long-term care environments is influenced by the older person's needs, preferences, and especially by the resources available to meet those needs and preferences. Home health services expand the options of individuals whose decision between community-based options are sharply limited by access to resources.

Community-Based Care Environments: Magnitude and Health Implications

While older adults can lead healthy and satisfying lives in a variety of environments, there are costs associated with both relocation and co-residence. Living alone is not ideal for every older adult as there is not a single best environment for healthy aging, but each older adult must experience a good fit between each older adult

and her residence (Nahemow & Lawton, 1973; Parmelee & Lawton, 1990). This means that her preferences, her needs and her resources must align. Environments should offer some challenge but should not demand more than the resident has the capacity to give. For instance, an individual with mobility impairments may live alone safely with some basic home modifications but could find a live-in caregiver demeaning or depressing. On the other hand, a person who requires frequent monitoring due to dementia may need to share a residence to remain healthy and safe.

About 60 percent of relocations are precipitated by a health event or the health decline or death of a spouse (Choi, 1996; Wilmoth, 2010). The move itself can be a stressful time, often associated with increased depression and increased social support needs (Brown, J. W. et al., 2002; Choi, 1996). A residential change is associated with diminished self-care capacity, though these losses may not be permanent (Chen & Wilmoth, 2004; Hong & Chen, 2009). The physical and mental health implications of relocation are compounded if the older adult feels that she is making the move under duress or that the move isn't voluntary. An older adult living alone who experienced a health event that precipitated her relocation may be particularly vulnerable to the negative implications of relocation.

A move into a new living environment can carry economic implications and social welfare concerns. Informal caregivers, who largely facilitate a co-resident living arrangement, have been called the "invisible" sector of health care. In 2009, there were an estimated 42.1 million caregivers providing an average of 18.4 hours of weekly support for older adults and adding up to 450 billion dollars in uncompensated care over that year (Feinberg, Reinhard, Houser, & Choula, 2011). This estimate of uncompensated

care had more than doubled over a period of twenty years as American demography trended older and sicker between 1999 and 2009 (Arno, Levine, & Memmott, 1999). Costing of informal care using a human capital approach assumes that informal caregivers have quit working, reduced work hours, are unemployed, retired or are using leisure time to provide care (Andersson, Levin, & Emtinger, 2002). Informal caregivers engage in a wide range of functions from companionship and emotional support to nursing procedures delivered in the home (Feinberg et al., 2011).

This heavy reliance on informal care externalizes costs that would be otherwise paid by the older adult or by public or private insurance through the purchase of long-term care services. Costs of informal care to the caregiver include out of pocket expenditures, uncompensated labor/lost personal time and unrealized employment opportunities Women provide a disproportionate amount of this care, with adult daughters comprising about two thirds of this unpaid workforce (Houser, Gibson, & Redfoot, 2010). The caregiving role especially impacts the labor participation of these caregivers, as well as their mental health and social lives (Coe & Van Houtven, 2009; Pinquart & Sörensen, 2007; Van Houtven, Coe, & Skira, 2013). One reason the locus of community-based long-term care matters is that free care is not costless care.

Functional Disability, Home Health and Living Arrangement

Relocation is not always a necessary response to a decline in functional ability. Functional disability is a dynamic process that often ebbs and flows with waves of recovery and reoccurrence (Hardy & Gill, 2004). Though functional disability is likely to be higher during the period following a health event, this increased need for care may not be static. During this period, an older adult is vulnerable to institutionalization or a

relocation which may become unnecessary over the long run. Yet moves are often permanent and the risk of a move is compounded by a limited social support network (Mahoney, Eisner, Havighurst, Gray, & Palta, 2000; Watkins, Hall, & Kring, 2012). A slate of challenges follow a hospitalization or health event, ranging from continuity of care to service and resource access (Naylor et al., 1999) and an increase in functional dependence is likely, even if temporary. Unmet needs during this period often result in hospital readmission within the year of discharge (DePalma et al., 2012).

If functional dependencies have left an individual homebound and a nursing level of care is required, Medicare home health services are available. Medicare considers people homebound who cannot leave the home without support of another person or equipment or when a doctor considers their leaving home to be a health risk. Homebound older adults must find it so difficult to leave the home that they typically remain at home for any but a few excepted reasons, such as religious attendance (Homebound requirement.). Homebound individuals who live alone can move into institutional care such as a nursing home or rehabilitation facility, they can move into the home of a family member or friend to receive care, or they can stay home and hire professional care or arrange for periodic care from family members or friends.

These home health services provide nursing-level care to older adults who are homebound, and they also target functional capacities following a health event. Access to robust home health supports might reduce the health implications of living alone and reduce the urgency to relocate for care-seeking older adults. If these formal/paid services substitute for informal care in the short run, they have the capacity to delay a relocation during a period of low functional capacity.

Home health service use has not been examined as a driver of household structure or the decision to relocate from one community residence to another. This paper examines whether home health service use was significantly related to household structure; particularly whether an older adult lived alone or in a co-residential arrangement. It is expected that living with a spouse will not respond strongly to the use of home health services, but that living alone will be strongly associated with home health use, particularly if the Medicare recipient has more functional disability or had experienced a hospital stay that year.

A model for healthcare access promoted by Andersen, et al. (2002) can be extended to explain long-term care access. Home health services would be an enabling factor in this schema. By increasing individual access to services, older adults who are able to use Medicare funded home health have additional options to meet their person care needs when they have a functional disability but live alone.

Data and Model

All individual-level data was gathered from the 2007-2011 Medicare Current Beneficiary Survey (MCBS). The MCBS is a continuous, longitudinal survey conducted by the Center for Medicare and Medicaid's office of Enterprise and Data Analytics. Roughly 15,000 Medicare beneficiaries are sampled and interviewed over three to four periods each year. Interviewees are followed between community and institutional environments. Medicare beneficiaries under the age of 65 were excluded from the analysis. The multinomial dependent variable describes an older adult living in one of three environments. Either the person lives in her home alone (13,899), the person lives at home with a spouse (18,286) or the older adult co-resides with at least one individual

who is not a spouse, though a spouse may also be present in the home (10,352). Individual respondents are collapsed into a single value per year, so only the first environment is recorded if an individual relocates that year. The model follows:

$$hsld_{it} = \beta_0 + \beta_1 hh_{it} + \beta_2 Inp_{it} + \beta_3 ADL_{it} + \beta_4 Move + \beta_5 Indv_{it} + \beta_6 Cnty_t +$$

$$\beta_7 State_t + \delta + \gamma + \varepsilon_{cit}$$

The primary independent variable of interest was a binary indictor of home health services use. The binary inpatient discharge variable identifies all respondents who had experienced an inpatient hospital stay that year. Functional disability was operationalized using inpatient hospital stays and a separate count variable of Activities of Daily Living (ADLs). A binary variable described whether the respondent had an inpatient hospital discharge that year. An ordered categorical variable counted ADL care needs. These describe the areas in which someone needs support to complete six basic self-care tasks such as bathing, dressing or transferring. This variable ranges from zero for those who need no assistance to three or more ADLs for those needing help with three, four, five or six types of tasks. The cutoff was established at three ADLs since need for assistance with three or more ADLs is a predictor for increased likelihood of skilled nursing facility use (Gaugler et al., 2007a) and there were relatively few individuals who needed help with five or six ADLs. A count variable also captured relocation behavior. MCBS respondents were sorted into one of six categories that ranged from one living situation up to six or more living situations in a year. This variable was used to create a three-category indicator for all respondents who had moved in a given year and those who had moved into a skilled nursing facility that year.

A slate of individual demographic characteristics was assessed, including the natural log of that person's total yearly Medicare spending and the number of living children modeled in categories of zero, one to four children or more than four. Additional individual controls include sex and age. Income was used as a continuous variable, however those making more than 500,000 dollars each year were not included in the analysis, given concerns that their behavior would not be sensitive to factors relevant to the analysis. This dropped 52 observations over the period of study and left 39,203 observations for analysis. Race was measured in three categories. Either the respondent identified as white, black, or other/multiple races or ethnicities. The analysis included four categories of education starting with no degree, moving to high school diploma, some education beyond high school but no additional diploma, and any bachelors or higher education degree.

The analysis also addressed community and state-level variation. The Medicare county file supplied the percent of Medicare recipients receiving home health services in a county as well as the county's average Hierarchical Conditioning Category (HCC) score. The HCC is a risk adjusted score used to calculate capitated beneficiary payments. County-level skilled nursing facility beds per capita were drawn from the Area Health Resource File (AHRF). Census data provided county median household income and total population 65 and older. The USDA rural urban continuum was used to create a three-category variable to describe areas with a rural character, urban or metropolitan character. The state's per capital long-term care spending and the proportional balance between institutional care and home and community-based services was compiled from a report

sponsored by Mathematica, CMS and Truven Analytics (Wenzlow, Eiken, & Sredl, 2016). State fixed effects are addressed by δ and year fixed effects by γ.

A multinomial logistic regression was used to assess the impact of receiving home health services on the likelihood of living in each of three community-based residential arrangements. Living with a spouse was set as the base category, as that category is least likely to respond to other circumstances. Individual level data was used for respondents who were surveyed for up to three consecutive years. Yearly time trends and state fixed effects were employed for this longitudinal analysis.

Results

Tables 12 and 13 describe the sample. In the final data, 8.5 percent of respondents, or 3,919 individuals moved. For those who lived in the community, 13,899 people, or 33 percent of the sample lived alone. An additional 18,899, or 43 percent lived with a spouse, and 10,352, representing the final 24 percent lived in a co-resident arrangement.

Just over 17 percent of the sample had experienced at least one inpatient stay and almost six percent had an admission into a skilled nursing facility (SNF) that year, accounting for 2,611 individuals. About nine percent of respondents, or 3,933 individuals had used home health services at least once. Roughly 73 percent of the sample needed no assistance with activities of daily living, 13 percent needed assistance with one activity, six percent, or 2,788 individuals reported two ADL dependencies, and the remaining eight percent needed help with three to six activities of daily living. The sample was 57 percent female and the mean age was 77 years with a mean yearly income of $36,302. Nearly 87 percent of the sample identified as white, about nine percent of respondents

called themselves black and four percent, or 2,021 respondents, considered themselves to be multiple races or another race or ethnicity.

Table Twelve. Descriptive Statistics: Individual Characteristics, Continuous

	Obs.	Mean	Std. Deviation	Minimum	Maximum
Age	45,621	77.39	8.02	65	107
Income	45,621	36,302	67,084	0	5,000,000

This table describes the ages and mean incomes of all Medicare beneficiaries in the MCBS sample from 2007-2011 who appeared in the analysis.

Table Thirteen. Descriptive Statistics: Individual Characteristics and Service Use, Categorical

			HOME HEALTH		RELOCATED	
	Obs.	Percent of Sample	Obs.	Percent of Category	Obs.	Percent of Category
Relocated	3,919	9	1,341	34		
Lives Alone	13,899	33	1,491	11	1,259	9
Lives with Spouse	18,286	43	1,049	6	993	5
Lives with a Co-Resident	10,352	24	1,103	11	824	8
No ADL assistance	33,143	73	1,733	5	2,506	8
Help with 1 ADL	5,967	13	679	11	459	8
Help with 2 ADLs	2,789	6	464	16	335	12
Help with 3 or more ADLs	3,722	8	1,057	28	619	17
White	39,594	87	3,348	8	3,438	9
Black	3,943	9	404	10	346	9
Other Race/Ethnicity	2,023	4	169	8	130	6
Male	19,548	43	2,529	13	1,489	8
Female	26,073	57	1,404	5	2,430	9
Home Health	3,933	9				
Inpatient Hospital Stay	7,840	17	2,784	36	2,547	32

This table describes all Medicare beneficiaries in the 2007-2011 MCBS sample who were kept in the analysis.

Table 14 shows household structures by geography. Household structures were most related to functional disability in rural communities, where Medicare recipients were less likely to live alone and more likely to co-reside as their functional disabilities

increased. Rural residents who needed help with three to six ADLs were 7.9 percent less likely to live alone and 9.7 percent more likely to live in co-residence.

Table Fourteen. Logistic Marginal Effects of Functional Ability and Geography on Household Structure

	(1) Alone b/t	(2) Spouse b/t	(3) Co-Resident b/t
1 ADL			
Urban	0.011	-0.053*	0.041
	(0.36)	(-1.67)	(0.91)
Metropolitan	0.016	-0.053	0.037
	(0.34)	(-1.18)	(0.52)
Rural	0.020***	-0.052***	0.032***
	(2.63)	(-5.97)	(5.80)
2 ADLs			
Urban	-0.040	-0.039	0.079
	(-0.79)	(-0.58)	(1.23)
Metropolitan	-0.034	-0.036	0.070
	(-0.36)	(-0.33)	(0.64)
Rural	-0.026***	-0.032**	0.058***
	(-2.66)	(-2.57)	(6.95)
3-6 ADLs			
Urban	-0.099	-0.034	0.13
	(-0.94)	(-0.28)	(1.42)
Metropolitan	-0.091	-0.025	0.12
	(-0.44)	(-0.13)	(0.67)
Rural	-0.079***	-0.017	0.097***
	(-9.06)	(-1.45)	(10.67)
Observations	39203	39203	39203

* p<0.10, ** p<0.05, *** p<0.01

Note: Results are from a multinomial logistic regression of three categories of living situations. Each column represents a separate marginal effects analysis. Results should be interpreted as the probability of living in a given situation according to the identified level of functional ability and geography. For example, rural residents with three or more functional disabilities were 7.9 percent less likely to live alone.

Relative risk ratios were used to describe the individual characteristics and service use of Medicare recipients according to household structure in Table 15. Compared with living with a spouse, women were 2.09 times more likely to live in co-residence and 3.25 times more likely to live alone (p<0.01). Neither income nor age predicted the community-based living arrangement, but family structure was related to the community-

based household structure as people with children were less likely to be living alone. People with between one and four living children were 0.45 times less likely to live alone than in co-residence and were 0.3 times less likely to live alone than with spouse ($p<0.01$). Those with five children or more had a 0.27 times lower risk of living alone than living in co-residence and were at 0.25 times lower risk of living alone than with a spouse ($p<0.01$). ADL dependencies were also associated with community-based household structure, with co-residence being the most typical living arrangement for people with ADL dependencies.

Table Fifteen. Relative Risk Ratios of Living Situation by Individual Characteristics (*n*= 39,203)

	Living Alone vs. Living with Spouse			Living Alone vs. Living w Co-Resident			Living with Co-Resident vs. Living with Spouse		
	RRR	[95% CI]	*p*	RRR	[95% CI]	*p*	RRR	[95% CI]	*p*
Female	3.25	3.08-3.43	0.00	1.55	1.46-1.65	0.00	2.09	1.98-2.21	0.00
Income	1.00	1.00-1.00	0.00	1.00	1.00-1.00	0.00	1.00	1.00-1.00	0.00
Age	1.06	1.06-1.06	0.00	1.03	1.03-1.04	0.00	1.02	1.02-1.03	0.00
1-4 Child	0.30	0.27-0.34	0.00	0.45	0.40-0.50	0.00	0.68	0.60-0.76	0.00
5+ Child	0.25	0.22-0.28	0.00	0.27	0.24-0.30	0.00	0.93	0.81-1.06	0.26
1 ADL	1.20	1.11-1.30	0.00	0.88	0.81-0.95	0.00	1.36	1.24-1.48	0.00
2 ADL	0.97	0.86-1.09	0.61	0.66	0.59-0.73	0.00	1.55	1.38-1.74	0.00
3+ ADL	0.75	0.67-0.84	0.00	0.45	0.41-0.50	0.00	1.75	1.57-1.95	0.00
Metro	1.00	0.91-1.09	0.93	1.11	1.01-1.22	0.03	0.90	0.82-0.98	0.02
Rural	0.84	0.70-1.00	0.05	1.21	0.98-1.48	0.07	0.69	0.57-0.85	0.00

Those who needed help with three or more ADLs were 1.75 times more likely to live in co-residence than with a spouse, and older adults with this level of functional dependence were also 0.75 times less likely to live alone than to live with a spouse ($p<0.01$). Across geographies, older adults who needed help with ADLs were least likely to live alone, and the association between ADL dependency and co-residence was particularly pronounced in rural places. In rural areas, older adults were 1.21 times more likely to live alone than in a co-resident arrangement ($p<0.01$) and were 0.84 times less likely to live alone than with a spouse ($p<0.05$).

There were also gradations of both wealth and service use by geography. Table 16 describes the distribution of home health users by income. Urban residents enjoyed the highest incomes and rural residents reported the lowest average yearly income. However, across geographies, home health users tended to be less wealthy than non-home health users. A paired t-test was used to examine the difference of mean incomes of home health users and nonusers and to confirm that that home health recipients were, indeed, consistently less wealthy than those who did not use the service.

Table Sixteen. Paired T-Test, Mean Incomes of Home Health Users by Geography

	(1) Urban b/t	Obs.	(2) Metro b/t	Obs.	(3) Rural b/t	Obs.
No Home Health	$38,558.4	31,433	$32,980.52	9,018	$30,708.39	1,237
Home Health	$29,217.82	2,903	$23,929.01	892	$18,761.85	138
t Statistic	6.5163***		6.3537***		5.1065***	
Observations		34,336		9,910		1,375

* p<0.10, ** p<0.05, *** p<0.01

Rural residents using home health services were most likely to live alone. As shown in Table 17, home health users in a rural community were 6.6 percent more likely to live alone (p<0.01) and 2.3 percent more likely to live in co-residence (p<0.05). Across geographies, people using home health were almost 9 percent less likely to live with a spouse (p<0.01).

Table Seventeen. Logistic Marginal Effects of Home Health Use by Geography on Household Structure

	(1) Alone b/t	(2) Spouse b/t	(3) Co-Residence b/t
Urban	0.062	-0.088***	0.026
	(1.07)	(-2.89)	(0.47)
Metropolitan	0.064	-0.089***	0.025
	(0.70)	(-3.19)	(0.29)
Rural	0.066***	-0.089***	0.023**
	(4.79)	(-5.20)	(2.48)
Observations	39203	39203	39203

* p<0.10, ** p<0.05, *** p<0.01

Note: Results are from a multinomial logistic regression of three categories of living situations. Each column represents a separate marginal effects analysis. Results should be interpreted as the probability of living in a given situation according to the level of functional ability and geography. For example, rural residents who used home health services were 6.6 percent more likely to live alone. T-statistics in parentheses.

Table 18 shows that inpatient hospital use varied between living environments and people with at least one hospital stay were 1.23 times more likely to live in co-residence than with a spouse (p<0.01). Older adults who relocated and were also admitted to a skilled nursing facility in the same year were 1.55 times more likely to have lived alone than with a spouse that year, and 1.3 times more likely to have lived in co-residence (p<0.01) than with a spouse. Relocation to a noninstitutional community-based residence was not related to household structure in any category.

Older adults who used home health services were more likely to live alone or in co-residence than with a spouse. Medicare recipients who received home health were 1.63 times more likely to live alone than with a spouse (p<0.00), and 1.65 times more likely to live in co-residence than a spouse (p<0.01).

Table Eighteen. Relative Risk Ratios of Living Situation by Behavior (*n*= 39,203)

	Living Alone vs. Living with Spouse			Living Alone vs. Living w Co-Resident			Living with Co-Resident vs. Living with Spouse		
	RRR	[95% CI]	*p*	RRR	[95% CI]	*p*	RRR	[95% CI]	*P*
Home Health	1.63	1.32-2.01	0.00	0.99	0.81-1.21	0.92	1.65	1.32-2.06	0.00
Inpatient Stay	1.06	0.96-1.17	0.27	0.86	0.78-0.96	0.01	1.23	1.10-1.36	0.00
Relocate	0.86	0.74-1.00	0.06	0.91	0.78-1.08	0.28	0.95	0.81-1.12	0.55
Relocate, SNF	1.55	1.34-1.79	0.00	1.19	1.04-1.37	0.01	1.30	1.11-1.51	0.00

Note: Results are from a multinomial logistic regression of three categories of living situations. Each column represents one model. Rows were constructed by shifting the base category of analysis. Results should be interpreted such that results with a significant p value and a RRR greater than one show the relative increased likelihood of living in that situation and results which are less than one show the relative reduced likelihood of living in that situation. For example, those who receive home health services are 1.63 times more likely to live alone than with a spouse.

In rural areas, home health users with more functional dependence were 6.7 percent more likely to be living alone and 7.1 percent less likely to live with a spouse, as described by Table 19. There was no relationship between home health and co-residence for people who needed this level of care.

Table Nineteen. Logistic Marginal Effects of Rural Home Health Use by ADL on Household Structure

	(1) Alone b/t	(2) Spouse b/t	(3) Co-Residence b/t
1. home health			
0 ADL	0.069	-0.11***	0.045
	(0.98)	(-4.22)	(0.68)
1 ADL	0.028	-0.055	0.027
	(0.46)	(-0.68)	(0.30)
2 ADLs	0.073	-0.048	-0.025
	(0.33)	(-0.16)	(-0.10)
3+ ADLs	0.067***	-0.071***	0.0040
	(3.47)	(-3.24)	(0.20)
Observations	39203	39203	39203

* p<0.10, ** p<0.05, *** p<0.01

Note: Results are from a multinomial logistic regression of three categories of living situations. Each column represents one model. Significant results should be interpreted as the likelihood of a person in a given ADL category to be living in a given residential structure. For example, those who have three or more ADL needs are 6.7 percent more likely to live alone. T-statistics in parentheses.

Discussion

This paper explored whether home health supports act as a substitute for informal long-term care to predict the residential structure of older adults with functional dependencies. Support was offered for a substitution effect between home health and informal care, suggesting that home health services have the potential to moderate community-based residential decisions in the presence of functional disability. Results also differentiated household structures by describing typologies of residents in each structure.

People who live with their spouses tend to be the youngest and healthiest of the three household structures. They very typically have children, and men are most likely to be found in this arrangement. Co-residents can be expected to need care and support. They report the greatest amount of functional disability and also the highest rates of hospitalization. Women were much more likely than men to live alone. People living alone had the highest rate of transfer to a SNF.

Though functional dependencies were highest among people living in co-residence, people in rural areas with three or more functional dependencies who used home health services were more likely to live alone. There was no significant relationship between home health use and co-residence. When taken alone, ADL dependencies predicted co-residence, but home health use combined with ADL dependency was associated with living alone. This suggests that people who lived in co-residence with ADL dependence relied on their live-in caregiver for assistance while people living alone turned to home health services. This finding provides evidence for a substitution between home health services and co-residence that may allow a person living alone to receive

assistance that reduces the pressure to relocate to access supports. A higher ADL count demonstrates greater functional dependency and identifies individuals who are more likely to relocate into a more supportive environment (either formal or informal). The observation that people who needed more care and were using home health at a higher rate were living alone suggests that home health services may have a moderating effect on the relocation decision. This means that home health intervenes and influences the household structure of a rural older adult experiencing higher functional dependence while living alone.

It is resource intensive to live with a functional disability. Wealthier people may purchase support that substitutes for informal care or supplements it. But homebound older adults without the financial wherewithal to privately fund services have limited options to meet their emerging dependencies. It is typical for older adults to experience a decline in functional ability, and those who live alone who cannot pay for care may have fewer options to meet their emergent needs aside from relocating to a SNF, which will be paid by Medicaid once their personal resources have been spent. These older adults who live alone and cannot purchase enough care may turn to home health to provide assistance in the short-term while they rebuild capacity to live alone with existing resources. While a health event may create a new functional disability, in the long run, many older adults can regain some or all of their capacity. Though home health services are temporary, they have the potential to facilitate a home-based recovery for lower-income people who live alone and might have otherwise considered moving to access care.

This analysis shows that home health is predominately used by older adults living alone or in co-residence and is particularly relied upon in rural areas. Without informal supports in service-poor environments that have few transportation alternatives and diffuse community supports, functional disabilities increase the risk of becoming homebound. Individuals living alone who become homebound must either arrange for care or relocate. Along with a qualifying diagnosis, these homebound people may also receive Medicare's home health services. Across geographies, the primary users of home health live on the lower end of the income spectrum and are less likely to purchase private care. In this analysis, people living alone were more likely to be using home health or moving into skilled nursing facilities. These findings align with prior research that low-income older adults trade paid home health services for informal care (Golberstein, Grabowski, Langa, & Chernew, 2009) and contextualizes this relationship by showing home health as a substitute for both spousal care and co-resident care. Findings also suggest that home health services may moderate the impact of functional decline to increase residential stability.

The selection between living alone and co-residing is a meaningful frame to apply when evaluating the implication of long-term care services because each environment brings a predictable set of benefits and costs, and the process of moving from one residence to another can, itself, risk an older adult's health and independence (Chen & Wilmoth, 2004; Saito, Lee, & Kai, 2007). Medicare home health services are designed to help older adults maintain a community-based residence. However, they also have the capacity to impact choices between community-based residences of different characters, and with additional research, those relationships need to be elucidated.

Limitations

There are three important limitations to the data used for this paper which need to be addressed in future work. First, the major limitation of this paper is the inability to make a causal statement. There is an excellent opportunity to exploit an exogenous change in rates of home health service delivery in the year 2000 to observe relocation behavior changes. Unfortunately, the MCBS is missing key information in the years prior to this change which preclude such an analysis using this data. This research will be greatly strengthened by an analysis that uses a new data set with the capacity to observe behavior before 2000 to identify relocation changes that coincide with changes in service allocation.

Second, there are missing variables in this data set that could help explain the relationship between home health services and community residence. The MCBS used in this paper does not identify home ownership. People who own their own homes may be less flexible in their ability to move when a health shock occurs. They also have a large capital sum that they can leverage through home equity lines of credit or reverse mortgages to purchase in-home care or sell to buy a home in a service-rich retirement community. Housing market liquidity might also matter for this question. Also missing is a measure for the distance the respondent lives from family. People who live far from family will be much less likely to receive their unpaid care without relocating. Controls do not include individual access to long-term care insurance or Medicaid HCBS waiver services. A variable for women in the workforce should also be added.

Finally, MCBS data could be analyzed by person and year, but was not identified by date of service, so ordinal progression of illness and service use was not observable.

This analysis could not discern whether hospitalization preceded home health or occurred simultaneously. A person who received home health, was hospitalized and then moved into a SNF would appear identical to a person who was hospitalized, went into a SNF and then returned home with home health care support. Access to actual dates of service would allow an event study that greatly increase the explanatory power of this work to reveal causal relationships.

Conclusion

This paper finds that people in co-resident care have the greatest functional disability but that Medicare home health service users are typically less wealthy and more likely to live alone. People living alone with fewer financial resources are vulnerable to relocation when functional disabilities arise. Home health services appear to be an important component of safe and stable long-term care for older Americans who live alone and have fewer financial resources at their disposal. The relocation decisions of rural older adults who have three or more functional dependencies and live alone may be particularly responsive to home health service provision.

References

Allen, S. M., & Mor, V. (1997). The prevalence and consequences of unmet need: Contrasts between older and younger adults with disability. *Medical Care, 35*(11), 1132-1148.

Andersen, R. M. (1995). Revisiting the behavioral model and access to medical care: Does it matter? *Journal of Health and Social Behavior, ,* 1-10.

Andersen, R. M., Yu, H., Wyn, R., Davidson, P. L., Brown, E. R., & Teleki, S. (2002). Access to medical care for low-income persons: How do communities make a difference? *Medical Care Research and Review, 59*(4), 384-411.

Andersen, R., & Newman, J. F. (1973). Societal and individual determinants of medical care utilization in the united states. *The Milbank Memorial Fund Quarterly.Health and Society, ,* 95-124.

Andersson, A., Levin, L., & Emtinger, B. G. (2002). The economic burden of informal care. *International Journal of Technology Assessment in Health Care, 18*(1), 46-54.

Aquilino, W. S. (1990). The likelihood of parent-adult child coresidence: Effects of family structure and parental characteristics. *Journal of Marriage and the Family, ,* 405-419.

Ardington, C., Case, A., & Hosegood, V. (2009). Labor supply responses to large social transfers: Longitudinal evidence from south africa. *American Economic Journal: Applied Economics, 1*(1), 22-48.

Arno, P. S., Levine, C., & Memmott, M. M. (1999). The economic value of informal caregiving: President clinton's proposal to provide relief to family caregivers opens a long-overdue discussion of this “invisible” health care sector. *Health Affairs, 18*(2), 182-188.

Benjamin, A. E. (1986). Determinants of state variations in home health utilization and expenditures under medicare. *Medical Care, ,* 535-547.

Bharucha, A. J., Pandav, R., Shen, C., Dodge, H. H., & Ganguli, M. (2004). Predictors of nursing facility admission: A 12-year epidemiological study in the united states. *Journal of the American Geriatrics Society, 52*(3), 434-439.

Bianchi, M. S., Hotz, V. J., & McGarry, K. (2008). Intergenerational ties: Alternative theories, empirical findings and trends, and remaining challenges, in ‘Caring and exchange within and across generations’, booth A. and crouter AC and bianchi SM and seltzer JA edn. *Washington, DC: Urban Institute, ,* 1-43.

Bishop, C. E. (1986). Living arrangement choices of elderly singles: Effects of income and disability. *Health Care Financing Review, 7*(3), 65-73.

Bonsang, E. (2009). Does informal care from children to their elderly parents substitute for formal care in europe? *Journal of Health Economics, 28*(1), 143-154.

Brown, J. W., Liang, J., Krause, N., Akiyama, H., Sugisawa, H., & Fukaya, T. (2002). Transitions in living arrangements among elders in japan: Does health make a difference? *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 57*(4), S220.

Brown, S. L., & Wright, M. R. (2015). Older adults' attitudes toward cohabitation: Two decades of change. *Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 71*(4), 755-764.

Centers for Medicare & Medicaid Services. (2019). Home health prospective payment system. Retrieved from https://www.cms.gov/Medicare/Medicare-Fee-for-Service-Payment/HomeHealthPPS/index.html

Centers for Medicare and, & Medicaid Services. (2014). Cost reports by fiscal year. Retrieved from https://www.cms.gov/Research-Statistics-Data-and-Systems/Downloadable-Public-Use-Files/Cost-Reports/Cost-Reports-by-Fiscal-Year.html#

Charles, K. K., & Sevak, P. (2005). Can family caregiving substitute for nursing home care? *Journal of Health Economics, 24*(6), 1174-1190.

Chay, K. Y., & Greenstone, M. (2003). The impact of air pollution on infant mortality: Evidence from geographic variation in pollution shocks induced by a recession. *The Quarterly Journal of Economics, 118*(3), 1121-1167.

Checkovich, T. J., & Stern, S. (2002). Shared caregiving responsibilities of adult siblings with elderly parents. *Journal of Human Resources,* , 441-478.

Chen, P., & Wilmoth, J. M. (2004). The effects of residential mobility on ADL and IADL limitations among the very old living in the community. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 59*(3), S172.

Choi, N. G. (1996). Older persons who move: Reasons and health consequences. *Journal of Applied Gerontology, 15*(3), 325-344.

Coe, N. B., & Van Houtven, C. H. (2009). Caring for mom and neglecting yourself? the health effects of caring for an elderly parent. *Health Economics, 18*(9), 991-1010.

Cohen, P. N., & Casper, L. M. (2002). In whose home? multigenerational families in the united states, 1998–2000. *Sociological Perspectives, 45*(1), 1-20.

Cohn, D., & Passel, J. S. (2016). A record 60.6 million americans live in multigenerational households. *Pew Research.Posted August, 11*

Colello, K. J. (2017). Medicaid financial eligibility for long-term services and supports. *Congressional Research Service: Report*, , 1-15. Retrieved from http://proxy-remote.galib.uga.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=tsh&AN=121709556&site=eds-live

Compton, J., & Pollak, R. A. (2015). Proximity and co-residence of adult children and their parents in the united states: Descriptions and correlates. *Annals of Economics and Statistics/Annales D'Économie Et De Statistique*, (117-118), 91-114.

Cost of long term care | 2018 cost of care report | genworth. Retrieved from https://www.genworth.com/aging-and-you/finances/cost-of-care.html

Costa, D. L. (1999). A house of her own: Old age assistance and the living arrangements of older nonmarried women. *Journal of Public Economics, 72*(1), 39-59.

Dansky, K. H., Brannon, D., Shea, D. G., Vasey, J., & Dirani, R. (1998). Profiles of hospital, physician, and home health service use by older persons in rural areas. *The Gerontologist, 38*(3), 320-330.

DePalma, G., Xu, H., Covinsky, K. E., Craig, B. A., Stallard, E., Thomas III, J., & Sands, L. P. (2012). Hospital readmission among older adults who return home with unmet need for ADL disability. *The Gerontologist, 53*(3), 454-461.

Dunifon, R. E., Ziol-Guest, K. M., & Kopko, K. (2014). Grandparent coresidence and family well-being: Implications for research and policy. *The Annals of the American Academy of Political and Social Science, 654*(1), 110-126.

Elman, C., & Uhlenberg, P. (1995). Co-residence in the early twentieth century: Elderly women in the united states and their children. *Population Studies, 49*(3), 501-517.

Ettner, S. L. (1996). The opportunity costs of elder care. *Journal of Human Resources*, , 189-205.

Feinberg, L., Reinhard, S. C., Houser, A., & Choula, R. (2011). Valuing the invaluable: 2011 update, the growing contributions and costs of family caregiving. *Washington, DC: AARP Public Policy Institute, 32*

Fenge, L., Hean, S., Worswick, L., Wilkinson, C., Fearnley, S., & Ersser, S. (2012). The impact of the economic recession on well-being and quality of life of older people. *Health & Social Care in the Community, 20*(6), 617-624.

Fishman, E. Z., Penrod, J. D., & Vladeck, B. C. (2003). Commentary: Medicare home health utilization in context. *Health Services Research, 38*(1 Pt 1), 107.

Freedman, V. A. (1996). Family structure and the risk of nursing home admission. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 51*(2), S69.

Gaugler, J. E., Duval, S., Anderson, K. A., & Kane, R. L. (2007a). Predicting nursing home admission in the US: A meta-analysis. *BMC Geriatrics, 7*(1), 13.

Gaugler, J. E., Duval, S., Anderson, K. A., & Kane, R. L. (2007b). Predicting nursing home admission in the US: A meta-analysis. *BMC Geriatrics, 7*(1), 13.

Gerdtham, U., & Ruhm, C. J. (2006). Deaths rise in good economic times: Evidence from the OECD. *Economics & Human Biology, 4*(3), 298-316.

Golberstein, E., Grabowski, D. C., Langa, K. M., & Chernew, M. E. (2009). Effect of medicare home health care payment on informal care. *INQUIRY: The Journal of Health Care Organization, Provision, and Financing, 46*(1), 58-71.

Gordon, S. H., & Sommers, B. D. (2016). Recessions, poverty, and mortality in the united states: 1993–2012. *American Journal of Health Economics,*

Granados, J. A. T. (2005). Increasing mortality during the expansions of the US economy, 1900–1996. *International Journal of Epidemiology, 34*(6), 1194-1202.

Hamoudi, A., & Thomas, D. (2014). Endogenous coresidence and program incidence: South africa's old age pension. *Journal of Development Economics, 109*, 30-37.

Hardy, S. E., & Gill, T. M. (2004). Recovery from disability among community-dwelling older persons. *Jama, 291*(13), 1596-1602.

Harris, Y. (2007). Depression as a risk factor for nursing home admission among older individuals. *Journal of the American Medical Directors Association, 8*(1), 14-20.

He, S., Craig, B. A., Xu, H., Covinsky, K. E., Stallard, E., Thomas III, J., . . . Sands, L. P. (2015). Unmet need for ADL assistance is associated with mortality among older adults with mild disability. *Journals of Gerontology Series A: Biomedical Sciences and Medical Sciences, 70*(9), 1128-1132.

HENNING-SMITH, C. (2017). Where do community-dwelling older adults with disabilities live? distribution of disability in the united states of america by household composition and housing type. *Ageing & Society, 37*(6), 1227-1248.

Homebound requirement. (). Retrieved from https://www.medicareinteractive.org/get-answers/medicare-covered-services/home-health-services/the-homebound-requirement

Hong, S., & Chen, L. (2009). Contribution of residential relocation and lifestyle to the structure of health trajectories. *Journal of Aging and Health, 21*(2), 244-265.

Houser, A., Gibson, M. J., & Redfoot, D. L. (2010). Trends in family caregiving and paid home care for older people with disabilities in the community: Data from the national long-term care survey. *AARP Public Policy Institute,*

Iwarsson, S. (2005). A long-term perspective on person–environment fit and ADL dependence among older swedish adults. *The Gerontologist, 45*(3), 327-336.

Johnson, R. W., & Wiener, J. M. (2006a). *A profile of frail older americans and their caregivers* Urban Institute Washington, DC.

Johnson, R. W., & Wiener, J. M. (2006b). *A profile of frail older americans and their caregivers* Urban Institute Washington, DC.

Kamo, Y. (2000). Racial and ethnic differences in extended family households. *Sociological Perspectives, 43*(2), 211-229.

Kaye, H. S., Harrington, C., & LaPlante, M. P. (2010). Long-term care: Who gets it, who provides it, who pays, and how much? *Health Affairs (Project Hope), 29*(1), 11-21. doi:10.1377/hlthaff.2009.0535 [doi]

Keenan, T. A. (2010). *Home and community preferences of the 45 population* AARP Research & Strategic Analysis.

Keene, J. R., & Batson, C. D. (2010). Under one roof: A review of research on intergenerational coresidence and multigenerational households in the united states. *Sociology Compass, 4*(8), 642-657.

Kenney, G. M., & Dubay, L. C. (1992). Explaining area variation in the use of medicare home health services. *Medical Care,* , 43-57.

Lee, K. O., & Painter, G. (2013). What happens to household formation in a recession? *Journal of Urban Economics, 76*, 93-109.

Levy, H. (2015). Income, poverty, and material hardship among older americans. *Rsf,*

Lin, I., & Brown, S. L. (2012). Unmarried boomers confront old age: A national portrait. *The Gerontologist, 52*(2), 153-165.

Lin, S. (2009). Economic fluctuations and health outcome: A panel analysis of asia-pacific countries. *Applied Economics, 41*(4), 519-530.

Lo Sasso, A. T., & Johnson, R. W. (2002). Does informal care from adult children reduce nursing home admissions for the elderly? *INQUIRY: The Journal of Health Care Organization, Provision, and Financing, 39*(3), 279-297.

Macartney, S., & Mykyta, L. (2012). Poverty and shared households by state: 2011. *US Census Bureau,*

Mahoney, J. E., Eisner, J., Havighurst, T., Gray, S., & Palta, M. (2000). Problems of older adults living alone after hospitalization. *Journal of General Internal Medicine, 15*(9), 611-619.

McInerney, M., & Mellor, J. M. (2012). Recessions and seniors' health, health behaviors, and healthcare use: Analysis of the medicare current beneficiary survey. *Journal of Health Economics, 31*(5), 744-751.

Miller, E. A., & Weissert, W. G. (2000). Predicting elderly people's risk for nursing home placement, hospitalization, functional impairment, and mortality: A synthesis. *Medical Care Research and Review, 57*(3), 259-297.

Modell, J., & Hareven, T. K. (1973). Urbanization and the malleable household: An examination of boarding and lodging in american families. *Journal of Marriage and Family, 35*(3), 467-479.

Mykyta, L., & Macartney, S. (2011). The effects of recession on household composition:'doubling up'and economic well-being. *US Census Bureau.Social, Economic and Household Statistics Division Working Paper, 4*

Mykyta, L., & Macartney, S. (2012). *Sharing a household: Household composition and economic well-being: 2007-2010* US Department of Commerce, Economics and Statistics Administration, US Census Bureau Washington, DC.

Nahemow, L., & Lawton, M. P. (1973). Toward an ecological theory of adaptation and aging. *Environmental Design Research, 1*, 24-32.

Naylor, M. D., Brooten, D., Campbell, R., Jacobsen, B. S., Mezey, M. D., Pauly, M. V., & Schwartz, J. S. (1999). Comprehensive discharge planning and home follow-up of hospitalized elders: A randomized clinical trial. *Jama, 281*(7), 613-620.

Neumayer, E. (2004). Recessions lower (some) mortality rates:: Evidence from germany. *Social Science & Medicine, 58*(6), 1037-1047.

Parmelee, P. A., & Lawton, M. P. (1990). The design of special environments for the aged. *Handbook of the Psychology of Aging, 3*, 464-488.

Pezzin, L. E., Kemper, P., & Reschovsky, J. (1996). Does publicly provided home care substitute for family care? experimental evidence with endogenous living arrangements. *Journal of Human Resources*, , 650-676.

Pinquart, M., & Sörensen, S. (2007). Correlates of physical health of informal caregivers: A meta-analysis. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 62*(2), P137.

Posel, D., Fairburn, J. A., & Lund, F. (2006). Labour migration and households: A reconsideration of the effects of the social pension on labour supply in south africa. *Economic Modelling, 23*(5), 836-853.

Qian, Z. (2012). During the great recession, more young adults lived with parents. *Census Brief Prepared for Project US2010, Http://Www.S4.Brown.Edu/us2010/Data/Report/report08012012.Pdf*,

Rudberg, M. A., Sager, M. A., & Zhang, J. (1996). Risk factors for nursing home use after hospitalization for medical illness. *The Journals of Gerontology Series A: Biological Sciences and Medical Sciences, 51*(5), M194.

Ruggles, S. (2007). The decline of intergenerational coresidence in the united states, 1850 to 2000. *American Sociological Review, 72*(6), 964-989.

Ruhm, C. J. (2000). Are recessions good for your health? *The Quarterly Journal of Economics, 115*(2), 617-650.

Ruhm, C. J. (2007). A healthy economy can break your heart. *Demography, 44*(4), 829-848.

Ruhm, C. J. (2015). Recessions, healthy no more? *Journal of Health Economics, 42*, 17-28.

Saito, T., Lee, H., & Kai, I. (2007). Health and motivation of elderly relocating to a suburban area in japan. *Archives of Gerontology and Geriatrics, 45*(2), 217-232.

Sands, L. P., Wang, Y., McCabe, G. P., Jennings, K., Eng, C., & Covinsky, K. E. (2006). Rates of acute care admissions for frail older people living with met versus unmet activity of daily living needs. *Journal of the American Geriatrics Society, 54*(2), 339-344.

Stats, A. (2006). Federal interagency forum on aging related statistics. *Retrieved Online April, 22*, 2009.

Stuckler, D., Basu, S., Suhrcke, M., Coutts, A., & McKee, M. (2009). The public health effect of economic crises and alternative policy responses in europe: An empirical analysis. *The Lancet, 374*(9686), 315-323.

Taylor, P., Kochhar, R., D'Vera Cohn, Jeffrey S Passel, Velasco, G., Motel, S., & Patten, E. (2011). Fighting poverty in a tough economy, americans move in with their relatives. *Pew Social & Demographic Trends.Pew Research Center.Washington DC Http://Www.Pewsocialtrends.Org/Files/2011/10/Multigenerational-Households-Final1.Pdf,*

Taylor, P., Passel, J., Fry, R., Morin, R., Wang, W., Velasco, G., & Dockterman, D. (2010). The return of the multi-generational family household. *Pew Research Center,*

Tienda, M., & Angel, R. (1982). Headship and household composition among blacks, hispanics, and other whites. *Social Forces, 61*(2), 508-531.

Tinetti, M. E., & Williams, C. S. (1997). Falls, injuries due to falls, and the risk of admission to a nursing home. *New England Journal of Medicine, 337*(18), 1279-1284.

Van Houtven, C. H., Coe, N. B., & Skira, M. M. (2013). The effect of informal care on work and wages. *Journal of Health Economics, 32*(1), 240-252.

Watkins, L., Hall, C., & Kring, D. (2012). Hospital to home: A transition program for frail older adults. *Professional Case Management, 17*(3), 117-123.

Wenzlow, A., Eiken, S., & Sredl, K. (2016). Improving the balance: The evolution of medicaid expenditures for long-term services and supports (LTSS), FY 1981-2014. *Truven Health Analytics,*

Wiener, J. M., & Tilly, J. (2002). Population ageing in the united states of america: Implications for public programmes. *International Journal of Epidemiology, 31*(4), 776-781.

Wilmoth, J. M. (2010). Health trajectories among older movers. *Journal of Aging and Health, 22*(7), 862-881.

Wolff, J. L., Mulcahy, J., Huang, J., Roth, D. L., Covinsky, K., & Kasper, J. D. (2017). Family caregivers of older adults, 1999–2015: Trends in characteristics, circumstances, and role-related appraisal. *The Gerontologist,*

Worobey, J. L., & Angel, R. J. (1990). Functional capacity and living arrangements of unmarried elderly persons. *Journal of Gerontology, 45*(3), S101.

Zakrevskaya, O., & Mastracci, S. (2013). Differential effects of the great recession by household type: Evidence from a longitudinal survey. *Challenge, 56*(6), 87-114.

Appendices

Table Twenty. Descriptive Statistics: County Rural Urban Character

	Obs.	Home Health	Home Health Recipients
Nonmetropolitan, Urban			
>1 million	20,636	1,862	
250,000-1 million	9,265	640	
<250,000	4,446	404	
TOTAL	34,327	2,897	8%
Metropolitan			
>20,000 metro adjacent	2,545	214	
>20,000 not metro adjacent	1,855	156	
2,500-19,999 metro adjacent	3,340	342	
2,500-19,999 not metro adjacent	2,172	181	
TOTAL	9,909	891	9%
Rural			
<2,500 urban, metro adjacent	461	41	
<2,500 urban, not metro adjacent	915	97	
TOTAL	1,375	138	10%

Table Twenty-One. Relative Risk Ratios of Living Situation by Individual Characteristics (*n*= 39,203)

	Living Alone vs. Living with Spouse			Living Alone vs. Living w Co-Resident			Living with Co-Resident vs. Living with Spouse		
	RRR	[95% CI]	*p*	RRR	[95% CI]	*p*	RRR	[95% CI]	*p*
Cty HH %	0.99	0.97-1.01	0.31	1.02	1.00-1.04	0.02	0.97	0.95-0.99	0.00
HCC Score	3.51	1.94-6.34	0.00	0.10	0.05-0.19	0.00	34.6	18.5-64.8	0.00
Ste LTC %	1.00	0.99-1.01	0.92	1.00	0.99-1.01	0.79	1.00	0.99-1.01	0.87
Ste HCBS %	1.00	0.99-1.01	0.87	1.00	0.99-1.01	0.83	1.00	0.99-1.01	0.95
Cty Mdn Inc.	1.00	1.00-1.00	0.00	1.00	1.00-1.00	0.72	1.00	1.00-1.00	0.00

Note: Results are from a multinomial logistic regression of three categories of living situations. Each column represents one model. Rows were constructed by shifting the base category of analysis. Results should be interpreted such that results with a significant p value and a RRR greater than one show the relative increased likelihood of living in that situation and results which are less than one show the relative reduced likelihood of living in that situation. For example, those living in a county with a higher HCC score are 3.51 times more likely to live alone than with a spouse.

CHAPTER 5

CONCLUSION: MOVING FORWARD

The Andersen model of healthcare access has organized an analysis of long-term care household structures and relocation decisions. This dissertation specifically focuses on a set of enabling factors and observes the impacts of opioid use, economic recession and Medicare services on long-term care and housing structures. Following the Andersen model, the choice to enter co-resident long-term care begins with a set of preferences (described in the healthcare access model as individual predisposing characteristics). These might include factors such as ethnicity and country of origin which enhance a preference for multigenerational households. The Andersen model then explains the role of individual need in the decision to access support. In the case of long-term care, individual needs describe the emergence of functional disabilities (or an intention to address anticipated future functional disabilities) that trigger the development of a long-term care plan. Every individual will then apply a slate of individual resources and community resources to this long-term care plan. In the Andersen model, these individual and community resources are called "Enabling Characteristics," and they comprise the focus of this dissertation.

Individual enabling characteristics include the "service resources," or the paid services an individual can access. These services may be privately purchased by the individual or may have been allotted to a qualified older adult by a public agency. A Medicaid Home and Community Based Support waiver provides an example of a

publicly paid service resource that was not examined by this dissertation. A person who has been allotted an HCBS waiver slot has access to some amount of publicly paid long-term care service at home. To receive one of these waivers, a person must be deemed eligible, access the system through some bureaucratic process, be deemed eligible by a bureaucratic and medical process, and, when a waiver slot becomes available, the person must be triaged and moved to the top of a waiting list. Once received, this waiver provides resources that reduce reliance on informal care and HCBS supports may make relocation less pressing. As explored in the fourth chapter of this dissertation, Medicare home health services also fit neatly into the category of an individual's service resources. Medicare home health is publicly provided and is available only to qualified Medicare recipients. As predicted by the model of access to care, having this service resource will reduce the reliance on informal care. Service resources impact the long-term care and relocation plan by providing alternative to relocation options for older adults that need care and support to cope with a functional disability.

The remaining two individual enabling characteristics are social resources described by proximity to family, and a person's economic resources, including home ownership. Home valuation is a mechanism that demands additional examination as a driver of co-residence change in recession. The house provides a lump sum of resources that can be traded for entry into a privately-funded care environment, or that can be borrowed against to pay for some amount of care without relocation. Home valuation may be a mechanism that drives the effects observed in the third chapter of this dissertation. If home values fall during economic recession, or if the housing markets become less liquid, then older adults may put off a planned relocation into co-residence

for the short-term in the hopes that they can leverage a higher price for their home. This may be especially the case for lower-income individuals whose home represents a large portion of the financial resources available to fund retirement and long-term care,

In the Andersen healthcare access model, community-level enabling factors describe community-level features that impact access to services. The first two factors are community-level demand for services as well as the supports offered by the community. High community demand for long-term care services could be a detriment for individuals if supports are under-supplied and rationed. However, pockets of high service demand can also lead to innovations in service delivery and inspire models such as Villages and Naturally Occurring Retirement Communities (NORCs). In the Village model, neighbors band together and create a co-housing community in which they contractually agree to pay into a fund to share services such as housekeeping or transportation. NORCs occur when service providers identify an area in which a large number of older adults reside and target that area for service provision. High demand for services can create barriers to long-term care supports and force relocations but may also create opportunities which must be studied to elucidate their impacts.

Since a large proportion of American long-term care is delivered informally, the availability of informal caregivers in the community may explain changes in older adult household structures identified in communities with high opioid use in chapter two. A high level of opioid use in a community can incapacitate a proportion of the community's caregivers. With fewer younger adult caregivers available in the community, older adults step in to care for young children, and older adults also have fewer resources to receive personal care and support for themselves. Community supports may also have played a

role in chapter three, in which macro-economic recessionary periods were associated with reduced co-residence. This is an important finding, since epidemics of substance use have not yet been linked to long-term care and resources to support older adults do not get targeted to geographic areas that experience high levels of substance use disorder. Workforce changes that result from an economic contraction will lower the opportunity costs for periodic caregiving. Periodic care can be more resource intensive than co-resident care, since it demands coordination with the independent older adult and time to travel to her residence. Unemployed caregivers may be more available to provide unpaid periodic supports. Finally, community-level support also describes the sector of nonprofit service organizations in a community. Relevant nonprofits will range from senior centers and meal delivery to churches that build ramps or organize home visitation programs. This variable demands careful treatment and future examination for the many ways that access to different types of resources might facilitate community-based long-term care and change the relocation decision.

Finally, in the Andersen model, community enabling factors also describe both structural features and market dynamics. In long-term care access, relevant structural features will include state-level long-term care programs as well as community, neighborhood and transportation infrastructure. These variables were not closely examined in this dissertation, but they deserve careful treatment for the potential roles they play in the community long-term care decision. The dynamics of key markets, including access to hospital and medical infrastructure as well as private long-term care and hospice services will all contribute to this community-based long-term care decision.

These factors should also be considered for their potential ability to shift the long-term care decision.

The decision to live alone, move into co-residence or move into congregate or institutional care carries economic and health implications for both the older adult and her care providers. The relocation itself may also carry welfare implications. The Andersen model delineates and organizes a research agenda that can articulate the selection of long-term care arrangements. Each of the key variables explored in this dissertation demands additional study to explain the mechanisms and magnitudes of observed effects, as well as their welfare implications. An ability to articulate the decision structures of older adults seeking community-based long-term care will allow public policy alternatives to offer meaningful choice to older Americans experiencing functional dependencies.