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ABSTRACT

Title: Advance Care Planning and Family Structure in Late Life

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Background: Currently, 10 – 15% of individuals over age 65 have no living biological or stepchildren, and 41% are unmarried. By 2030, the proportion of those without partners or surviving children will likely exceed 30%. With no close relatives to participate in advance care planning, older persons may be vulnerable to unwanted medical procedures. Only half of those over age 50 have an advance directive.

Methods: Data were drawn from the 2012 Health and Retirement Study (HRS) (N = 18,613), and exit interviews from 2000 – 2012 with proxies of HRS decedents (N = 8,658). Multinomial logistic regression was used to predict the odds of advance care planning by parental status, adjusting for covariates, and testing for interaction by marital status and gender.

Results: Overall, 14.4% of respondents over age 50 were biologically childless (13.71%), or had outlived all their children (0.69%). If biologically childless, 4.85% had living stepchildren. 15.54% of men and 13.43% of women were childless ($p < 0.01$). Childlessness was highest among never married men, 80.12% ($p < 0.0001$).

Nearly 53% of childless women lived in a nursing home/long-term-care setting at the time of final illness, compared with 39.93% of women with living children, 37.38% of childless men, and 28.50% of men with children living ($p < 0.0001$).

In the unadjusted model, childless persons were 28% less likely to engage in end-of-life discussion only, OR = 0.782 ($p < 0.05$), than those with living children. Advance care planning was not related to childlessness in the adjusted model.

Never married childless men were least likely of all family status groups to engage in end-of-life discussion only, OR = 0.358 ($p < 0.05$); advance directive completion only, OR = 0.613 ($p < 0.10$, non-significant); or both, OR = 0.537 ($p < 0.05$). Divorced men with living children were less likely to engage in end-of-life discussion only, OR = 0.733 ($p < 0.05$).

Significance: Never married childless men and divorced men with living children are at risk of failing to discuss end-of-life issues. These findings point toward a need for new approaches to advance care planning relative to gender and family structure.

Advance Care Planning and Family Structure in Late Life

by

Lynn Miescier

Dissertation submitted to the Faculty of the Graduate School of the
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Doctor of Philosophy
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DEDICATION

To my sons

Matthew Howard Keimig

and

Allen John Keimig

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LIST OF ABBREVIATIONS

ACHE – American College of Health Care Executives

ACP – Advance Care Planning

ADL – Activities of Daily Living

AD – Advance Directive

CPI – Consumer Price Index

DPAHC – Durable Power of Attorney for Health Care

EOL – End-of-Life

GED – General Educational Development Test

HHID – Household Identifier (HRS)

HRS – Health and Retirement Study

IRB – Institutional Review Board (IRB)

IADL – Instrumental Activities of Daily Living

IQR – Interquartile Range

LW – Living Will

NH – Nursing Home

NIA – National Institute on Aging

PN – Person Number (HRS)

POLST – Physician Orders for Life-Sustaining Treatment

SE – Standard Error

UMB – University of Maryland, Baltimore

CHAPTER 1—INTRODUCTION

Medical decisions near the end of life can be especially difficult to make on behalf of older patients who cannot give consent (Berlinger, Jennings, & Wolf, 2013; Mitty & Ramsey, 2008). When invoked, preferences identified through advance care planning serve to clarify and guide treatment choices (ACHE, 2014; NIA, 2015). Advance care planning involves open discussion of values and priorities with potential decision-makers, and completion of an advance directive (OBRA, 1990; Sudore & Fried, 2010; Wenger, N. et al., 2008). Typically, two documents are prepared: a living will (LW), which specifies the care an individual would want to receive under certain conditions; and a durable power of attorney for health care (DPAHC), which assigns an agent to uphold the person's wishes. Treatment-limiting advance directives can protect individuals from aggressive intervention at the end of life (Silveira, Kim, & Langa, 2010). Without an adult child or partner to participate in the planning process, however, older persons may be vulnerable to unwanted medical procedures. Adult sons and daughters often serve as health care proxies for their aging parents (Boerner, Carr, & Moorman, 2013). The extent to which other relatives and non-kin can substitute for close kin remains unclear in matters as personal as advance care planning.

Unprecedented social change over the last 50 years has led to broad diversity in American family structure, fewer children per couple, and increased childlessness (Teachman, Tedrow, & Crowder, 2000). As a result, a growing proportion of older adults lack the support traditionally provided by adult children (Kinsella & Wan, 2009) and marital partners (Wang & Parker, 2014). Currently, 10 – 15 percent of the U.S. population over age 50 is childless, with significant variation by age cohort (Kirmeyer &

Hamilton, 2011; Koropeckyj-Cox & Call, 2007). Nearly 20 percent of women now age 40 – 44 do not have children, and the trend toward older age at first birth, smaller family size, and increased childlessness is expected to continue (Kinsella & Wan, 2009; U.N., 2013; U.S. Census Bureau, 2010).

These demographic changes reflect growing acceptance of personal autonomy and the decision to live child-free (Klineberg, 2012; Koropeckyj-Cox & Pendell, 2007; Lesthaeghe, 1995; 2010), as well as involuntary childlessness (Hagestad & Call, 2007; Lundquist, Budig, & Curtis, 2009) resulting from infertility, postponed childbearing, delayed marriage (Pew, 2014) and divorce (Cherlin, 1992; 2010). Additionally, 1 – 3 percent of individuals become childless in late life by outliving all of their children (Uhlenberg, 1996; Dykstra & Hagestad, 2007). By 2030, the proportion of older adults without partners or surviving children is projected to exceed 30 percent (Johnson, Toohey, & Wiener, 2007; Wachter, 1997). Given the role of adult children as a source of instrumental and emotional support for aging parents, this demographic shift could have a substantial effect on advance care planning.

1.1. Statement of the Problem

Although the prevalence of advance care planning has increased over recent decades, barriers persist within subgroups of older adults. In 1990, fewer than 17 percent of U.S. adults over age 50 had an advance directive (Pew, 2006), whereas around 50 percent have one now (Pew, 2013). Among decedents, 72 percent of those age 60 years and older at death were reported to have had an advance directive, (Silveira, Wiitala & Piette, 2014). When discussion of end-of-life care preferences is also counted, more than 76 percent of Medicare fee-for-service decedents (Bischoff, Sudore, Miao, Boscardin, &

Smith, 2013) and 75 percent of adults currently age 50 (Pew, 2013) had either talked about or documented their choices. End-of-life care discussions, although not legally binding, help to clarify and communicate individual values and treatment preferences (Doukas & Hardwig, 2003).

Barriers to preparing a formal written directive include uncertainty about end-of-life care options, anxiety around death and dying, and denial (Kubler-Ross, 1969; Russac, Gatliff, Reece, & Spottswood, 2007; Zimmerman, 2007). Additional obstacles exist when there is no one to designate as a health care agent, or to participate in end-of-life conversations (Schickedanz et al., 2009). Recognition of this problem may lead older persons without children or partners to prioritize planning and engage close associates or professionals in completing an advance directive. For others, childlessness may serve as a deterrent to planning.

The effect of childlessness on advance care planning may be especially salient in the context of marital status and gender. It is possible that childlessness has little negative effect on married couples, and greater effect on those who are single. Widowed women may be particularly vulnerable to poor planning if they are also childless, compared with childless women who never married (Dykstra, 2007; Dykstra & Hagestad, 2007). And because unmarried childless men tend to have relatively small social networks with limited support potential (Dykstra & Keizer, 2009), advance care planning may be least prevalent among this group. In the current body of research, however, almost nothing has been reported concerning the effect of family structure on the likelihood of end-of-life care discussion or advance directive completion. The research conducted for this dissertation was designed to fill that void.

1.2. Specific Aims and Research Questions

This study investigated the role of family structure in the patterns and predictors of advance care planning over age 50. Engagement in end-of-life care discussion and advance directive completion were explored with respect to childlessness, defined as the absence of living children, biological or step; as well as marital status and gender.

Three specific aims were pursued, together with six research questions (RQ):

Aim 1. Describe childlessness by gender and marital status in the U.S. population over age 50.

RQ.1.1. How does the prevalence of childlessness over age 50 differ by gender and marital status?

RQ.1.2. What demographic, health, and social factors are associated with childlessness over age 50?

Aim 2. Determine whether childlessness is a predictor of advance care planning over age 50, considering demographic, health, and social factors.

RQ.2.1. What is the effect of childlessness on the likelihood of advance care planning over age 50? (Unadjusted model)

RQ.2.2. What is the effect of childlessness on the likelihood of advance care planning over age 50, after controlling for demographic, health, and social covariates? (Adjusted model)

Aim 3. Examine any differences in the effect of childlessness on advance care planning over age 50 by marital status and gender.

RQ.3.1. How does marital status modify the effect of childlessness on advance care planning over age 50?

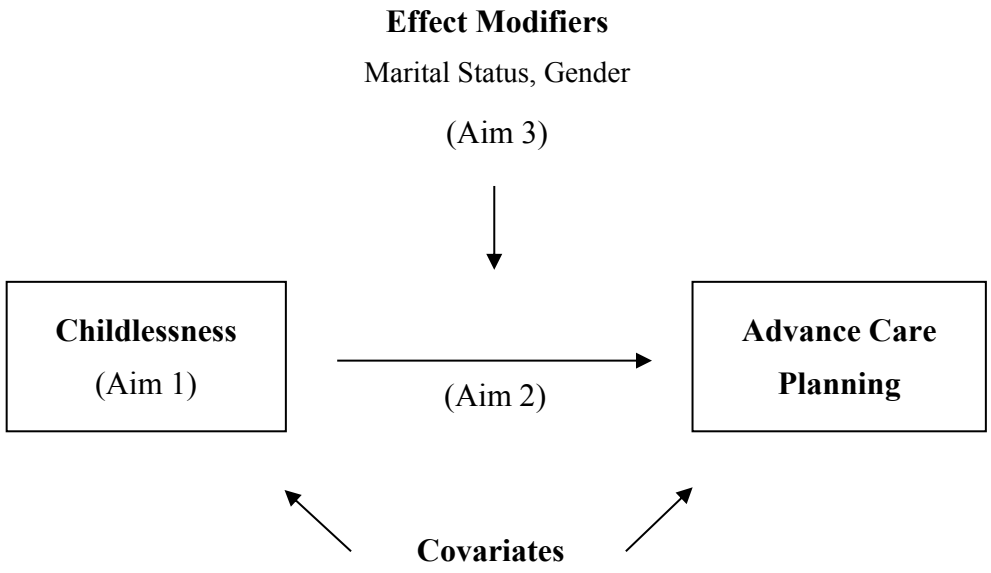
RQ.3.2. How do marital status and gender together modify the effect of childlessness on advance care planning over age 50?

1.3. Study Design

This research involved a retrospective analysis of data from the Health and Retirement Study (HRS), a longitudinal biennial survey of a nationally representative sample of U.S. adults over age 50 (Juster & Suzman, 1995). Data on the family structure of respondents from the 2012 HRS (N = 18,613) were examined together with data on the end-of-life circumstances of HRS decedents, collected during exit interviews with knowledgeable proxy informants from 2000 – 2012 (N = 8,658).

The conceptual model shown in Figure 1.1 depicts the relationship between the dependent variable, advance care planning; the predictor variable, childlessness; and relevant covariates. As shown, advance care planning consists of engagement in end-of-life (EOL) care discussion, advance directive completion (LW and/or DPAHC), or both. Childlessness refers to the absence of biological and step children at the time of final illness. Potential confounders include demographic, health, and social covariates. Gender and marital status are considered as possible effect modifiers.

To identify factors associated with childlessness in late life, bivariate associations were examined for significance using χ^2 tests (Aim 1). Multinomial logistic regression was used to predict the odds of advance care planning by parental status (Aim 2.1), adjusting for covariates (Aim 2.2), and testing for interaction by marital status and gender (Aim 3).



Key. Childlessness, the main predictor variable, refers to the absence of biological and step children at the time of final illness. Covariates, as confounders, may distort the magnitude of the relationship between the predictor and the dependent variable, advance care planning. Gender and marital status act as possible effect modifiers.

EOL = End-of-life. AD = Advance directive.

Figure 1.1. Conceptual Model: Advance Care Planning and Family Structure in Late Life.

1.4. Significance

This study adds to the body of research exploring the predictors of and barriers to advance care planning. Considered a marker of quality care at the end of life (Teno, Gruneir, Schwartz, Nanda, Wetle, 2007; Walling et al., 2010; Wenger, N. et al., 2008), advance care planning is associated with less in-hospital death and increased use of hospice (Bischoff et al., 2013). Patients who do not complete an advance directive are more likely to be over treated than undertreated, resulting in care that is unwanted, futile, and costly (Lambert et al., 2005). Advance directives have the potential to reduce aggressive medical treatment at the end of life in favor of comfort care, when that is in line with patient preferences (Zhang, Wright, Huskamp et al., 2009).

This study is unique in exploring end-of-life issues in the context of family structure, using a large national sample of older adults. These results provide the first evidence of childlessness in current cohorts of the U.S. population over age 50, including baby boomers born prior to 1960, in the HRS. Elucidating how childlessness, marital status, and gender interact with respect to advance care planning may suggest new approaches for improving patient and family involvement in end-of-life care discussion and advance directive completion.

1.5. Definition of Terms

The following definitions refer to the main concepts and terms used in this research study. Definitions are provided to ensure uniformity throughout this work and to clarify the meaning of important concepts. All definitions have been developed by the researcher unless otherwise cited.

Activities of daily living (ADL). ADLs measure disability (i.e., inability to complete expected social roles). The ADL summary in the RAND HRS includes five tasks needed for basic functioning: bathing, eating, dressing, walking across a room, and getting out of bed (Chien et al., 2014). See also Instrumental Activities of Daily Living (IADL).

Advance care planning (ACP). The process of identifying, discussing, and documenting end-of-life care preferences. Advance care planning typically leads to the completion of a living will (LW) and/or durable power of attorney for health care (DPAHC). Ongoing dialogue with family, loved ones, and physicians can help ensure that wishes are carried out (NHPCO, 2014a; Omnibus Budget Reconciliation Act (OBRA), 1990; Sudore & Fried, 2010).

Advance directive (AD). A legal document that specifies the conditions under which an individual wishes to receive particular types of medical care or refuse life-sustaining treatment, if legally incompetent to make such decisions. An advance directive may take the form of a LW or DPAHC (OBRA, 1990; Wenger, N. et al., 2008).

Agent. An individual named in an advance directive to serve as a substitute decision maker in the event that a patient loses the capacity to give informed consent. An agent may also be referred to as a proxy or surrogate (see definitions below for these terms) (Wenger, N. et al., 2008).

Allow natural death (AND). An approach focused on patient preferences, in contrast with Do Not Resuscitate (DNR), which implies that the patient is giving up something. Using AND terminology helps clarify the option to avoid aggressive treatment, which may only prolong death in terminal cases (Schlairet & Cohen, 2013).

Cardiopulmonary resuscitation (CPR). An emergency procedure involving chest compressions and external ventilation, undertaken on a person who is in cardiac arrest in order to preserve brain function until blood circulation and breathing can be restored, if possible, through medical treatment (Medline Plus, 2014).

Childlessness. The absence of living biological children based on a voluntary decision to remain child-free; or involuntary reasons such as infertility, the lack of a partner with whom to start a family, or outliving all biological children.

Consumer price index (CPI). The CPI represents the average change in prices for goods and services purchased over time. Items include food, clothing, shelter, fuels and transportation fares, charges for health care services, drugs, and other goods and services needed on a regular basis. In each location measured, price changes are averaged together and weighted according to the importance of various items to that population. Local data are combined into a U.S. city average (Bureau of Labor Statistics, 2014).

Decision-making capacity. Evidence that an individual has a set of values and goals, the ability to communicate information and comprehend it, and the faculty to reason and deliberate over the available options (President's Commission, 1982). Decision-making capacity may fluctuate, particularly in older adults. Capacity is determined by a structured assessment, and if necessary, clinical consult and legal judgment (American Bar Association (ABA) & American Psychological Association (APA), 2005).

Do not resuscitate (DNR). A legal order executed by a health care facility to respect the wishes of a patient not to be revived by cardiopulmonary resuscitation (CPR) or intubation in the event of cardiac or respiratory arrest. Patients with a DNR order may

continue to receive other appropriate treatment such as chemotherapy, antibiotics, or dialysis, as specified in their advance directive. Also referred to as an AND (see definition above) (Wenger, N. et al., 2008).

Durable power of attorney for health care (DPAHC). Legal arrangement for a specific person, to make decisions about care or medical treatment, in the event that the individual could not make those decisions personally (HRS, 2010).

End-of-life care discussion. Conversation with close kin or anyone else about the treatment or care an individual would prefer to receive in the final days of life (HRS, 2010). Although not legally binding, these discussions can help clarify specific values and convey treatment preferences to the persons likely to become involved in decision-making, if it is needed (Doukas & Hardwig, 2003).

Family structure. Configuration of two or more persons who are related by birth, marriage, partnership, or adoption. Adapted from the U.S. Census Bureau definition of family as two or more individuals who are related by birth, marriage, or adoption and residing together. In this work, however, family structure is broadened to account for the fact that most adult children live apart from their older parents, individuals may not live together due to health conditions and institutionalization, and partners may live together outside of marriage.

Family status. Marital status (married/partnered, separated/divorced, widowed, never married) by parental status (living children, yes/no).

Health and Retirement Study (HRS). A longitudinal biennial survey of a nationally representative sample of U.S. adults over age 50 (Juster & Suzman, 1995). Supported by the National Institute on Aging (NIA) and the Social Security

Administration via a cooperative agreement with the University of Michigan, the HRS provides information on the health and health care, income and wealth, and family characteristics of research participants who are then followed for the rest of their lives. Currently, the HRS includes over 26,000 respondents; and nearly 38,000 individuals have participated in the study over the last two decades (HRS, 2015).

Hospice. A health care program that focuses on quality of life and patient-centered outcomes for dying persons and their families. Hospice takes a comprehensive, holistic approach to meet the patient's physical, emotional, social, and spiritual needs. Hospice care focuses on symptom control and pain management in lieu of curative treatment. Eligibility for hospice typically involves a prognosis of six months, if the disease were to run its usual course. The United States (U.S.) government established the Medicare Hospice Benefit in 1982. Hospice care typically takes place at home, but it can also be provided in free-standing hospice centers, hospitals, nursing homes, and assisted living (NHPCO, 2014b).

Informed consent. The process by which a patient receives information about his or her health and treatment options, and participates in medical decisions. Physicians have an ethical duty to involve the patient in decision-making; all treatment requires the patient's voluntary acceptance. If the patient is under age 18 or legally incompetent to make personal decisions, then consent is required from the minor's parent or guardian, an adult's designated health care agent, or the appropriate surrogate. In deciding whether or not to accept recommendations about the care needed, patients and their surrogates have the right to be informed of the benefits and risk of the treatment, and to weigh those factors before agreeing to treatment (President's Commission, 1982).

Instrumental activities of daily living (IADL). IADLs measure the more complex aspects of daily functioning. The IADL summary in the RAND HRS includes three tasks: using the phone, managing money, and taking medications. For wave 1 only, tasks include reading a map, using a calculator, and using a microwave (Chien et al., 2014). See also See also Activities of Daily Living (ADL).

Life-sustaining treatment. Medical interventions that restore and/or support vital bodily functions. Life-sustaining treatment includes but is not limited to CPR, mechanical ventilation, artificial nutrition and hydration, and dialysis (Wenger, N. et al., 2008).

Living will (LW). Written instructions provided by an individual about the treatment or care he or she would prefer to receive during the final days of life (HRS, 2010). In general, a LW applies only when the individual is legally incompetent to make decisions and is diagnosed with a terminal condition or permanent unconsciousness (Wenger, N. et al., 2008).

Nursing home (NH). A health care setting that provides long-term care services for its residents: dispensing of medication, 24-hour supervision and nursing, personal assistance, housing, and meals (HRS, 2010).

Palliative care. Care that enhances comfort and improves quality of life by easing distress and alleviating pain. Palliative care can be received concurrently with treatment for an illness. Treatment options are considered in the context of the individual's values and symptoms, and continuously re-assessed. When the focus shifts from cure to care, a transition to hospice would occur (NHPCO, 2014c).

Patient Self-Determination Act of 1990. An Act of Congress that requires hospitals, health maintenance organizations (HMOs), hospices, and extended care nursing

homes participating in Medicare or Medicaid to ask all adult patients whether they have an advance directive, in order to document their wishes in the medical record and offer information on state laws and policies related to advance care planning. This Act also renders advance directives completed in any state legal and portable, and protects patients from discrimination if they do not have an advance directive (Omnibus Budget Reconciliation Act (OBRA), 1990).

Physician order for life-sustaining treatment (POLST). An advance care planning tool designed to elicit care preferences related to the individual's condition, and to document them on a form that is portable across health care settings. (Wenger, N. et al., 2008).

Proxy. Any designated decision maker (Wenger, N. et al., 2008).

Self-rated health. A measure derived from the individual's evaluation of his or her general health, which includes disease state, physical and social functioning, as well as emotional and spiritual well-being. Self-rated health is a strong predictor of mortality, disability, and health care utilization (Burström & Fredlund, 2001; Idler & Benyamini, 1997; Mossey & Shapiro, 1982). In the HRS, the respondent rates their own health as excellent, very good, good, fair, or poor (HRS, 2010).

Surrogate. Another name for an agent or proxy decision-maker. A surrogate may be assigned by default on behalf of an individual who does not have an appointed proxy (Wenger, N. et al., 2008). A specific hierarchy of appropriate decision makers is defined by state law, based on family relationships, starting with the spouse and adult children.

Voluntary cessation of hydration and nutrition. Terminal dehydration may be chosen by competent patients in conjunction with palliative care, as a form of

withholding or withdrawing life-sustaining measures during the final stage of terminal disease (Miller & Meier, 1998).

Withholding or withdrawing life-sustaining treatment. Ethically and legally accepted provisions which permit patients to forgo or terminate life-sustaining measures such as ventilators, feeding tubes for artificial nutrition, intravenous fluids for hydration, or dialysis. Patients may also refuse aggressive treatment such as chemotherapy or radiation therapy, antibiotics, anti-inflammatory agents, or intensive care. An advance directive documents these preferences (President's Commission, 1983).

1.6. Organization

Chapter 1 provides an overview of advance care planning and family structure, a statement of the problem to be addressed, and the study rationale. Chapter 1 also includes three specific aims and research questions, a conceptual model, the significance of this research to the body of knowledge, and definitions of relevant terms and acronyms. Chapter 2 offers a review of the literature related to advance care planning, family structure, and childlessness in late life. Chapter 2 also includes a theoretical framework for the study and a rationale for each research hypothesis. Chapter 3 describes the research methodology, the dataset, study sample, and measures. An analytic plan and power calculations are provided for each specific aim.

Chapter 4 presents the results of the study. Chapter 5 offers an interpretation of the results with respect to the theoretical framework guiding this study. Findings are discussed relative to the existing literature, and implications for policy and practice are considered. Chapter 5 also explains the limitations and strengths of the study design and dataset, and opportunities for further research.

CHAPTER 2—LITERATURE REVIEW

Chapter 2 offers a review of the literature on advance care planning and family structure in late life. Specific sections include: 1) advance care planning as a concept, its evolution, and the factors that influence end-of-life care discussion and advance directive completion; 2) a theoretical framework that explains advance care planning as a social process; 3) family structure in late life, including the prevalence and meaning of childlessness over time, and the role of family in social support networks and long-term care; 4) the effect of childlessness, gender, and marital status on advance care planning in late life; and 5) a rationale for each research hypothesis by specific aim.

2.1. Advance Care Planning

Advance care planning is widely endorsed by patients, providers, and policy makers; yet only about half of Americans over age 50 have signed an advance directive (AGS, 2011; Morhaim & Pollack, 2013). Twenty-five years after the Patient Self-Determination Act of 1990 required health care facilities participating in Medicare and Medicaid to ask patients about advance directives and offer information on this topic, many individuals still do not plan, even after participating in educational programs (Jezewski, Meeker, Sessanna, & Finnell, 2007; Rubin, et al., 1994; Sachs, Stocking, & Miles, 1992). Altogether, 28 percent of home health care clients, 65 percent of long-term care residents, and 88 percent of hospice patients have an advance directive, according to data from the 2004 National Nursing Home Survey and the 2007 National Home and Hospice Care Survey (Jones, Moss, & Harris-Kojetin, 2011). Only 35 percent of adults overall, and about 50 percent of community-dwelling persons over age 50 have documented their end-of-life care preferences in writing (Pew, 2013).

Even among those who have them, advance directives alone may be of limited utility clinically (Fagerlin & Schneider, 2004; Winter, Parks, & Diamond, 2010). These documents often fail to stimulate effective physician-patient communication (Emanuel, Weinberg, Gonin, Hummel, & Emanuel, 1993; Messinger-Rapport, Baum, & Smith, 2009; Virmani, Schneiderman, & Kaplan, 1994) and may not provide the specificity needed to guide decisions under a variety of circumstances (Abbo, Sobotka, & Meltzer, 2008; Teno et al., 1997). Advance directive forms are sometimes missing when needed (Freeborne, Lynn, & Desbiens, 2000) or invalid because they have not been signed or notarized (Ho, Thiel, Rubin, & Singer, 2000). Furthermore, state laws governing who can serve as a health care agent often exclude same-sex and domestic partners (Collier, 2010), and leave few choices to socially isolated individuals who lack witnesses and potential surrogates (Castillo et al., 2011).

Additional concerns exist around the process of surrogate decision-making. One-third of the time, surrogate decision-makers fail to accurately predict the patient's wishes (McPherson, Addington-Hall, 2003; Shalowitz, Garrett-Mayer, & Wendler, 2006). Surrogates sometimes make decisions that clinicians feel are not in the patient's best interest (Dreyer, Forde, & Nortvedt, 2009; Kaldjian, Shinkunas, Bern-Klug, & Schultz, 2010). Decisions made by court-appointed surrogates can produce distress or disagreement among relatives (Doukas & Hardwig, 2003; Kramer, Boelk, & Auer, 2006). Furthermore, as their illness progresses, individuals may change their mind about the medical care they want, making it difficult at times for surrogates to follow the patient's wishes (Carmel & Mutran, 1999; Danis, Garrett, Harris, & Patrick, 1994; Ditto et al., 2003; Emanuel et al., 1999; Martin & Roberto, 2006; Wittink et al., 2008).

The extent to which an advance directive is followed, once invoked, depends on the setting. In a study using nationally-representative data from the HRS, two-thirds of the decedents who required decision-making but lacked capacity had an advance directive; and the directive was followed in 83 – 97 percent of cases in which the individual wanted limited or comfort care only (Silveira et al., 2010). Similarly, research on Physician Orders for Life-Sustaining Treatment (POLST), a form of advance care planning that is portable across health care settings, found that the POLST in nursing homes is associated with adherence to cardio pulmonary resuscitation (CPR) orders, comfort care, and lower rates of transfer for aggressive treatment (Tolle, Tilden, Nelson, & Dunn, 1998). By contrast, results from a randomized clinical trial conducted in five teaching hospitals nationwide indicate that facilitated advance care planning does not improve physician knowledge of patient preferences for CPR, the incidence of do not resuscitate (DNR) orders, or the level of pain reported by patients with advanced illness (Study to Understand Prognoses and Preferences for Outcomes and Risks of Treatment (SUPPORT), 1995; Collins, Parks, & Winter, 2006; Lynn et al., 2000).

Despite these mixed results, advance care planning is considered central to the delivery of excellent health care (AGS, 2011; Heyland et al., 2013). Personal autonomy and informed consent provide the ethical basis for advance directives (Callahan, 1996; Levinsky, 1996), and the foundation for end-of-life care planning. Advance care planning is associated with better quality of life for patients with terminal disease (Harle et al., 2008); increased patient and family satisfaction, and less anxiety and depression for caregivers (Schwartz et al., 2002; Teno, Clarridge, Casey et al., 2004; Wright et al., 2008; Wright et al., 2010) and quality care that is less resource intensive (Detering, Hancock,

Reade, & Silvester, 2010; Teno et al., 2007; Teno, Mitchell, & Gozalo, 2010). Prior research suggests that the planning process can be enhanced when physicians provide patients and their families with timely information and discuss the pros and cons of different treatment choices, particularly the utility of aggressive technology at the end of life (Heyland et al., 2010). Further improvements can be gained when families engage in effective communication about end-of-life care preferences, and address the relational issues inherent in such conversations (Scott & Caughlin, 2012).

Evolution of Advance Care Planning

Over the past 25 years, advance care planning has evolved. Best practice now calls for ongoing dialogue among the patient, physician, and potential surrogates, as well as completion of a LW and assignment of a DPAHC (AGS, 2011; Tulsky, 2005; White & Arnold, 2011). Open-ended discussion is recognized as a vital part of the process (Bischoff et al., 2013; Mack, Weeks, Wright, Block, & Prigerson, 2010; Sudore & Fried, 2010). Recommended topics include the health states that the individual would find acceptable or unacceptable at the end of life, and the latitude granted to the surrogate to make in-the-moment decisions (Hawkins, Ditto, Danks, & Smucker, 2005; McMahan, Knight, Fried, & Sudore, 2012). Prior research shows that these in-the-moment decisions create the most uncertainty for surrogate decision makers (Fried & O'Leary, 2008; Sudore & Fried, 2010; Wendler & Rid, 2011). When in doubt, surrogates tend to approve more care rather than less care (Zier et al., 2009). Surrogates feel less anxious about limiting treatment when they understand the values underlying the patient's preferences (Detering et al., 2010; Fritch, Petronio, Helft, & Torke, 2013; Schwartz et al., 2002).

Advance Care Planning within the Health Care System

An estimated 40 percent of hospital inpatients lack the capacity to make their own treatment decisions, due to cognitive impairment (Raymont et al., 2004). In the HRS, 42 percent of decedents over age 50 required healthcare decision-making at the end of life, and 70 percent of these respondents lacked the capacity to make their own decisions (Silveira et al., 2010). Over the next two decades, the need for surrogate decision-making is likely to increase due to new technology, population aging, and the prevalence of Alzheimer's disease and dementia (Brudney, 2009; Buchanan & Brock, 1990; Alzheimer's Association, 2013). In this respect, advance directives will become even more important as a means of specifying the end-of-life care individuals want their physicians and surrogate decision-makers to consider (Fritch et al., 2013; OBRA, 1990).

Older patients with advance directives generally choose comfort care and quality of life over prolonged and invasive treatment (Heyland et al., 2006; Lloyd et al., 2004; Somogyi-Zalud et al., 2002; Lynn, Teno, Phillips et al. 1997). According to data from the HRS, over 92 percent of decedents with an advance directive requested limited or comfort care only, and only 1.9 percent requested all care possible (Silveira et al., 2010). By contrast, when asked what they would do if faced with an incurable disease and in a great deal of pain, 22 – 24 percent of adults over age 50 in a national telephone survey indicated that they would ask their physicians to do everything possible to save their lives, whereas 62 – 71 percent would prefer to stop treatment so they could die (Pew, 2013). Prior research shows that less aggressive care for terminally ill patients in the last week of life leads to higher quality death and decreased health spending, as high-cost interventions are avoided (Zhang et al., 2009).

Currently, more than 25 percent of Medicare expenditures—over $125 billion—go to the 5 – 6 percent of beneficiaries who die each year (Riley & Lubitz, 2010). During the last six months of life, Medicare expenditures average around $28,000 per beneficiary (Walling et al., 2010). Between one-third (Emanuel, Ash, Yu et al., 2002) and three-fourths of these expenditures occur in the last month, mainly due to life-sustaining care such as mechanical ventilator use and resuscitation (Yu, 2006). Although there is tremendous interest in finding a way to control these costs, policy discussions on this matter pose difficult questions about access to expensive treatment at the end of life and the promises made to older adults under Medicare (Callahan, 1987; Levinsky, 1990, 1996; Reinhardt, 2011).

Advance care planning offers the potential to reduce aggressive medical treatment in favor of comfort care, when that is in line with patient preferences (Zhang et al., 2009). Even so, the actual cost savings to be achieved are much less than it might seem (Emanuel, 2002; 1996; Emanuel & Emanuel, 1994; Halpern & Emanuel, 2011). To date, advance directives have not been associated with significant cost savings (Kelley et al., 2011), except when controlling for regional and geographic variation in clinical practice (Nicholas, Langa, Iwashyna, & Weir, 2011). Strong psychological and social forces influence the delivery of end-of-life care, and opportunities for reform require system-level innovation (Lynn et al., 2000).

Engagement in Advance Care Planning

Prior research demonstrates the extent to which certain demographic, health, and social factors influence the likelihood of advance care planning. Personal temperament, as well as individual attitudes and beliefs, and experience with end-of-life issues further

shape the planning process. These items are discussed below in detail, together with other important factors.

Demographics. Age, gender, marital status, race, ethnicity, education, net worth, and income are the key factors associated with advance care planning in the research literature. Many of these items appear in Table 2.1, based on results from a study of HRS Medicare respondents who died between 1993 and 2007 (Bischoff et al., 2013). These results plus additional findings are described below for each factor.

Age. Older adults, age 65 and over, are more likely to have completed a living will or appointed a DPAHC than those at younger ages (Black, Reynolds & Osman, 2008; Elpern, Yellen, & Burton, 1993). Currently, one-third (35 percent) of all adults have documented their end-of-life care preferences in writing; from a low of 26 percent among those age 18 – 49, to a high of 61 percent among those age 65 – 74 (Pew, 2013). Prior research shows that the association between age and advance care planning exists even after controlling for health status (Moorman & Inoue, 2013). This finding suggests that with age, individuals recognize their finitude and work to put their affairs in order. By contrast, younger adults, those age 18 – 49 years, are less likely to have an advance directive, and less apt to limit treatment, even when faced with incurable disease and constant pain (Pew, 2013).

Gender. Women are more likely than men to have engaged in at least one of three types of advance care planning: LW, DPAHC, or end-of-life care discussion (Bischoff et al., 2013). By contrast, findings from the Wisconsin Longitudinal Study (WLS) suggest that men are more likely to have completed an advance directive, whereas women are more likely to have participated in informal discussion about end-of-life care (Carr &

Khodyakov, 2007a). Related research indicates that men have a higher preference for life-sustaining treatment than women, whereas women value death with dignity (Bookwala et al., 2001).

Marital status. Single persons are more likely than married or partnered couples to have engaged in advance care planning, according to the results presented in Table 2.1 (Bischoff et al., 2013) as well as other reports on this topic (Hopp, 2000; Kahana, Dan, Kahana, & Kercher, 2004). On the other hand, findings based on data from the WLS show that married couples are more likely than singles to have completed an advance directive and engaged in end-of-life care discussion (Carr & Khodyakov, 2007a). Related findings indicate that 75 percent of married older persons with a DPAHC have appointed their spouse as health care agent (Carr & Khodyakov, 2007b).

Among married couples, engagement in advance care planning also depends on relationship quality. Spousal criticism reduces the odds of naming one's spouse as a DPAHC (Boerner et al., 2013). Prior research shows that the ability to accurately report a partner's care preferences is not related to whether the couple has an end-of-life care plan (Moorman & Inoue, 2013). This finding suggests that the relational aspects of advance care planning are more influential than formal documentation. Additionally, unmarried heterosexual women and sexual minority women tend to adopt long term care planning strategies that clarify the legal status of important relationships, outside of traditional marriage (Clark, Boehmer, Rogers, & Sullivan, 2010).

Education. Education is also related to advance directive completion. Highly educated individuals with at least a high school diploma tend to complete advance

directives more frequently than those with less education (Carr & Khodyakov, 2007a b; Hopp, 2000).

Race and ethnicity. Whites are more apt to have engaged in advance care planning than any other race, as shown in Table 2.1 (Bischoff et al., 2013) and a number of other studies (Carr & Khodyakov, 2007a; Gerst & Burr, 2008; Hopp, 2000; Hopp & Duffy, 2000; Kahana et al., 2004). Blacks and Hispanics, by contrast, are much less likely to have completed an advance directive or to have discussed their end-of-life treatment preferences (Carr, 2011; Kwak & Haley, 2005). Related research demonstrates that cultural beliefs and values have a strong effect on the use of advance directives and hospice care among blacks (Johnson, Kuchibhatla, & Tulsky, 2008), as well as Hispanics and other ethnic groups (Eleazer et al., 1996), in addition to Korean American older adults (Eunjeong & Berkman, 2010).

Blacks and Hispanics are also more apt to report a strong preference for all care possible (Pew, 2013). This preference is associated with religious affiliation, and the belief that God controls the timing and nature of death (Carr, 2011). Among whites, the majority of mainline Protestants (72 percent), Catholics (65 percent), and evangelical Protestants (62 percent) report that they would stop medical treatment if they had an incurable disease and were suffering a great deal of pain (Pew, 2013). On the other hand, most black Protestants (61 percent) and Hispanic Catholics (57 percent) indicate that they would ask their physicians do everything possible to save their lives under any circumstance (Pew, 2013).

Table 2.1. *Patient Characteristics of HRS Medicare Decedents, 1993 – 2007.*

(Bischoff et al., 2013)	All Respondents	No ACP	ACP	
	N = 4,394	N = 3,230	N = 3,230	p-value
Characteristics	%	%	%	
Age at Death, Years				
Mean (SD)	82.6	81.5	83.0	<0.001
Median (IQR)	82.8	81.5	83.3	
Gender, %				
Male	45.3	49.6	43.9	0.001
Female	54.7	50.4	56.1	
Race/Ethnicity, %				
White	86.3	71.1	91.1	<0.001
Hispanic	3.7	8.1	2.2	
Black	8.9	18.8	5.8	
Other	1.1	2.1	0.8	
Married/Partnered, %	41.0	46.6	39.3	<0.001
Net Worth, %				
≤ $6000	25.1	33.8	22.4	<0.001
> $6,000-81,000	25.0	28.1	24.0	
> $81,000-239,000	24.9	22.6	25.6	
≤ $239,000	25.0	15.5	28.0	
Nursing Home Resident, %	33.8	26.6	36.1	<0.001
History of Cancer, %	25.0	21.1	26.2	0.01
History of Hypertension, %	62.2	63.5	61.8	0.43
History of Diabetes, %	24.3	26.2	23.6	0.06
History of Lung Disease, %	21.8	20.5	22.2	0.29
History of Heart Disease, %	50.6	48.3	51.3	0.15
Cognitive Impairment, %	28.3	31.8	27.2	0.01
Functl. Limits, Median (IQR)	3(0,5)	1(0,4)	3(0,5)	<0.001
Months until Proxy Interview				
Mean (SD)	13.5(9.1)	14.2(9.8)	13.3(8.9)	0.01
Median (IQR)	13 (7,19)	14 (7,19)	13 (7,18)	

ACP = advance care planning, SD = standard deviation, IQR = interquartile range.

Survey weights have been applied to reported values to account for the complex survey design.

Married/partnered status, quartile of net worth, and comorbidities are based on last HRS survey prior to death.

Functional limitations, based on questions in the exit interview, include help with dressing, walking, bathing, eating, and transferring into bed, and toileting during the last 3 months of life. Scores ranged from 0-6 depending on the number of difficulties reported (Bischoff et al., 2013).

Net worth and income. Higher socioeconomic status also influences care planning (Carr, 2012a; Carr & Khodyakov, 2007a). As depicted in Table 2.1, engagement in advance care planning is positively associated with the highest net worth ≥ $239,000; whereas lack of planning is associated with lower net worth ≤ $6,000 (Bischoff et al., 2013). Among those with higher socioeconomic status, advance directive completion typically occurs within the context of financial planning, during the execution of a will (Carr, 2012a; Su, 2008), or as part of long term care planning (Finkelstein, Reid, Kleppinger, Pillemer, Robison, 2012; Schaber & Stum, 2007).

Attitudes and beliefs. Prior research shows that both anxiety over death and the belief that physicians should control health care decisions are associated with decreased odds of advance care planning decrease (Carr & Khodyakov, 2007a). In a recent national survey, 22 percent of respondents age 75 and older had neither documented in writing nor talked with anyone about the care they would prefer to receive at the end of life (Pew, 2013). It may be that those without an advance directive would prefer all care possible, and believe that they do not need an advance directive to express this preference.

Experience. Recent experience with the painful death of a loved one is associated with increased end-of-life preparation among older adults (Carr & Khodyakov, 2007a). About half of all American adults report having had a friend or relative with a terminal illness or in a coma within the last five years; and in about half of these cases, withholding treatment became an issue (Fox, Duggan, & Purcell, 2013). This finding suggests that at least one-quarter of all American adults have had direct experience with end-of-life care decision-making.

Health. Presence of a medical condition is the most frequent reason offered by older adults for having completed an advance directive; whereas being too healthy is the most typical explanation for not having planned (Schickedanz et al., 2009). Poor health is associated with a greater likelihood of having discussed end-of-life health care treatment preferences, independent of age (Moorman & Inoue, 2013). Likewise, recent hospitalization is associated with increased end-of-life preparation (Carr & Khodyakov, 2007a). In an analysis of data from the HRS, presented in Table 2.1, history of cognitive impairment and history of cancer are two conditions positively associated with advance care planning (Bischoff et al., 2013). Having at least three impediments in activities of daily living (out of six) is also significantly associated with advance care planning, as compared with a median of just one limitation (Bischoff et al., 2013).

Nursing home residence. Residents of nursing homes prior to the last month of life are more likely than community-dwelling individuals to have engaged in advance care planning, as shown in Table 2.1 (Bischoff et al., 2013). Additionally, organizational features such as the availability of trained workers to discuss care planning (Detering et al., 2010), leadership support, and commitment of the medical staff all increase the prevalence of advance care planning among patients (Morrison, Morrison, & Glickman, 1994; Prendergast, 2001; Ramsaroop, Reid, & Adelman, 2007).

Self-rated health. Self-rated health tends to be lower among older women, unmarried persons, non-whites, and those with lower levels of education and income (McGee, Liao, Cao, & Cooper, 1999). Advance directive completion is associated with lower self-rated health status, compared with individuals who have higher self-rated health (Elpern et al., 1993). Nevertheless, results from a recent national survey indicate

that 30 percent of those who describe their health as fair or poor have not documented their end-of-life care preferences in writing, nor discussed their wishes with anyone (Pew, 2013).

Functional status. Individuals with functional limitations require help dressing, walking, bathing, eating, getting into bed, and/or toileting. Assistance may also be needed with tasks such as handling money and/or using a telephone. Basic and instrumental activities of daily living (ADLs and IADLs) scales are used to measure functional status quantitatively. Older women tend to have more difficulties with these activities than older men (Hughes & Waite, 2002). Additionally, individuals with advance care plans have an average of three functional limitations, whereas those without plans have an average of only one limitation (Bischoff et al., 2013). It may be that difficulties functioning prompt individuals and their families to plan for the inevitable.

Death expected or not. Among those who had them, the mean time from completion of an advance directive to death was 61 months, with a median of 37 months; and the mean time from assignment of a DPAHC to death was 56 months, with a median of 34 months (Bischoff et al., 2013). These results suggest that older adults prepare advance directives years ahead of death. On the other hand, the high prevalence (88 percent) of advance care planning among hospice patients suggests that there is an association between advance care planning and expected death (Jones et al., 2011).

Social factors. Concern for others and relationship quality are among the main social factors that influence older adults' advance care planning (Levi, Dellasega, Whitehead, & Green, 2010; Singer et al., 1998, 1999). Prior research shows that better overall family functioning increases the odds of advance care planning (Boerner et al.,

2013; Moorman & Inoue, 2013; Moorman, 2011). Family member awareness, participation, and cooperation all contribute to the effectiveness of care planning (Kramer et al., 2006). Having relatives and good friends nearby increases the potential for emotional support and instrumental help (Thoits, 2011), which may lead to end-of-life care discussion and advance directive completion. By contrast, lack of a relationship with family and friends was listed as a barrier to advance care planning for 22 percent of respondents who had not completed an advance directive (Schickedanz et al., 2009).

Living siblings. Today, 80 percent of individuals over age 65 have at least one living sibling (Connidis, 2010). Prior research indicates that older persons rely on their siblings for both emotional support and instrumental help (Bedford, 1998; Cicirelli, 1995; Connidis, 2010; Connidis & Campbell, 1995), particularly in the absence of a spouse and adult child (Rubinstein, Alexander, Goodman, & Luborsky, 1991; Wu & Pollard, 1998). Living siblings increase social network size and the potential for emotional support (Thoit, 2011), which may lead to advance care planning. Related research demonstrates that unmarried childless individuals typically name another relative, such as a sibling, as their DPAHC (Hopp, 2000).

Hierarchy of relationships. When a DPAHC has not been named and an individual becomes incapacitated, decision-making falls to the next-of-kin identified in the laws governing the state. In general, the law recognizes a hierarchy of decision-makers, starting with the legal guardian, then the individual given durable power of attorney for health care decisions, the spouse (or domestic partner, depending on the state), adult children of the patient (all in agreement), parents of the patient, adult siblings of the patient (all in agreement), and close relatives or friends, provided that they can

demonstrate a sustained relationship with the patient (Collier, 2010). For those who do not have close relatives or friends to serve in this role, written instructions are crucial. The term "unbefriended elderly" is used when there is no advance directive and no one to serve as a surrogate decision-maker (Karp & Wood, 2004).

Social isolation. Socially-isolated individuals often do not have the wherewithal to prepare an advance directive or appoint a surrogate decision-maker (Emanuel et al., 1993; Teno, Lynn, Wenger, G. et al., 1997; Miller, Coleman, & Cugliari, 1997). Those at greatest risk for not having an available surrogate include persons with dementia (Meier, 1997) nursing home residents (Gillick, 1995), mentally ill individuals (Miller et al., 1997), and the homeless (Kushel & Miaskowski, 2006). Prior research has found that 3 percent of nursing home residents had no surrogate or next of kin identified, and 45 percent of the surrogates listed could not be reached (Fader, Gambert, Nash, Gupta, & Escher, 1989). Findings from a more recent study indicate that 24 percent of intensive care unit (ICU) patients in a large urban hospital lacked both decision-making capacity and a surrogate for all or part of their stay (White, Curtis, Lo, & Luce, 2006). These results demonstrate that it is not rare to encounter older patients who lack decision-making capacity as well as advance directives and potential surrogates. Unbefriended patients create a dilemma for health care providers (Varma & Wendler, 2007).

The process of medical decision-making for individuals who lack capacity and do not have an advance directive or a surrogate varies by state (Miller et al., 1997; Rai, Siegler, & Lantos, 1999; Karp & Wood, 2004; IOM, 2014). Some states mandate the courts or a court-appointed public guardian to make major medical decisions. Other states delegate decision-making to ethics committees, either in the community or in the health

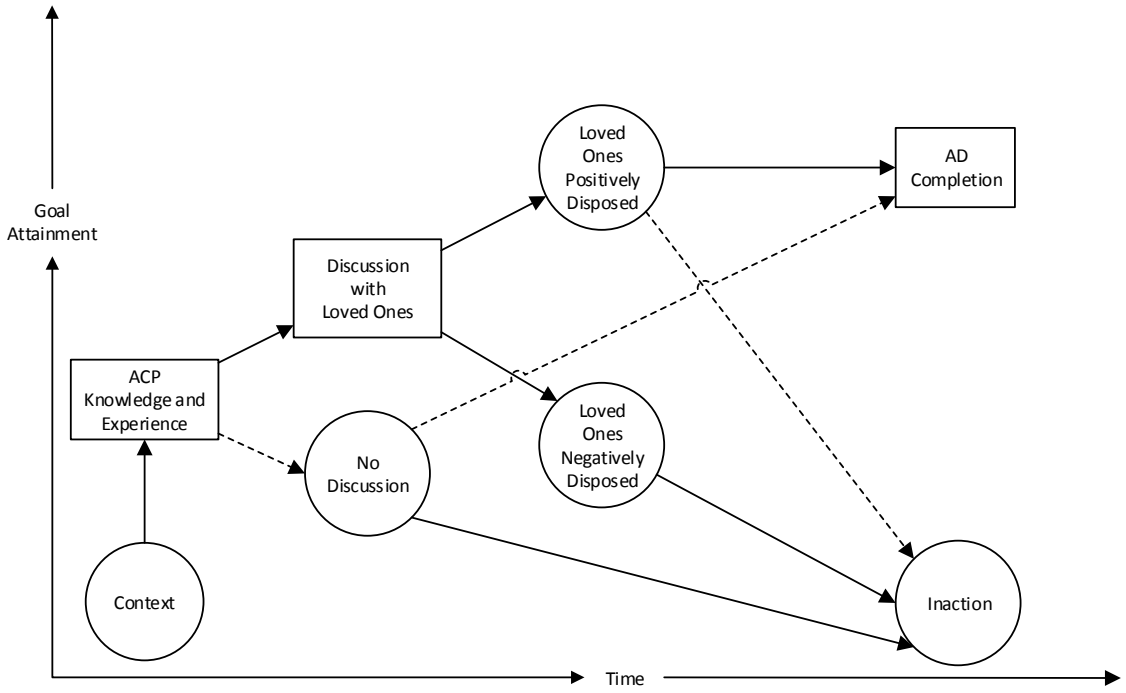
care facility. And in some jurisdictions, the physician makes treatment decisions (IOM, 2014). Being childless and unmarried puts individuals at greater risk for this type of isolation in late life, as two of the closest relationships in the social hierarchy are missing (Wu & Pollard, 1998).

2.2. Theoretical Framework

This dissertation was guided by a theoretical framework that regards advance care planning as a social process. According to patient perspectives gleaned through qualitative research, engagement in advance care planning generally occurs in the context of close personal relationships and a desire to reduce the burden on others (Singer et al., 1998; Singer, Martin, & Kelner, 1999; Winter & Parks, 2012). Traditional approaches that emphasize patient autonomy and dialogue with physicians tend to underestimate the importance of family and close personal ties (Blustein, 1993; Byock, 1997; High, 1994). By contrast, a relational approach to advance care planning relies less on legal transactions and more on open-ended communication. This practice leads to care that is more consistent with patients' wishes (Detering et al., 2010; Sabatino, 2010; Song et al., 2007; Sudore & Fried, 2010).

The framework depicted in Figure 2.1 explains how advance care planning knowledge and experience, discussion with loved ones, and specific behavioral responses result in advance directive completion. Context refers to the demographic, health, and social factors within which knowledge and experience arise. Goal attainment, shown on the Y axis, occurs over time, displayed on the X axis. Common and uncommon pathways, represented by solid and dashed lines, indicate that discussion leads more commonly to advance directive completion when loved ones are open to the conversation

and positively disposed to it. Absence of discussion typically leads to inaction. Discussion with loved ones who are negatively disposed to the topic also leads to inaction (Singer et al., 1998).



Key. Squares indicate events. Circles indicate behaviors. Solid lines represent common pathways. Dashed lines represent uncommon pathways. ACP = Advance care planning. AD = Advance directive. (Based on Singer et al., 1998).

Figure 2.1. Theoretical Framework: Advance Care Planning as a Social Process.

Knowledge and prior experience with advance care planning tend to trigger discussion with loved ones, according to this framework. Ongoing discussion with potential decision-makers is considered essential to goal attainment, as attitudes and circumstances change over time (Sudore & Fried, 2010). Similar findings have been reported by dying patients (Martin, Thiel, & Singer, 1999; Steinhauser et al., 2000; Emanuel & Emanuel, 1998) and their family members (Lynn et al., 1997; Lynn, Schuster, Wilkinson, & Simon, 2008).

2.3. Family Structure and Childlessness in Late Life

Childlessness can be defined in different ways across the life course. The U.S. Census counts individuals as childless if they have had no live births (U.S. Census, 2010); even if they have stepchildren (Noël-Miller, 2013; Umberson, Pudrovska, & Reczek, 2010), or adoptive or foster children (Fisher, 2003; Wegar, 2000). Individuals may also be considered childless if they have outlived all of their children. The proportion of those who outlive their children is small, less than 1 – 3 percent on average (Uhlenberg, 1996; Dykstra & Hagestad, 2007); however, the likelihood of outliving one's children increases with age. At age 60, less than 0.1 percent of older women (statistics not reported for men) have survived their children (Uhlenberg, 1996), compared with 5 percent of men and 12 percent of women at age 90 (Wagner et al., 1999). Older persons may also be in effect childless if they are estranged from their children through migration (Kreager, 2005), personal differences and animosity (DeOllos & Kapinus, 2002), or otherwise unable to help one another (Rowland, 2007).

Prevalence of Childlessness

Biologically childless persons now comprise 10 – 15 percent of the U.S. population age 50 and over, with significant variation by age cohort (Kirmeyer & Hamilton, 2011). More than 20 percent of individuals born during the first two decades of the twentieth century remained childless, compared with less than 10 percent of those born between 1922 and 1942 (Billari, 2005; Kinsella & Wan, 2009). In the older cohort, two World Wars and the Great Depression of the 1930s led many Americans to forgo or postpone family formation (Rindfuss, Morgan, & Swicegood, 1988). In the cohort born 1922 – 1942, relative prosperity during the midcentury postwar recovery led to earlier

marriage and larger families, with far fewer individuals remaining single or childless (Koropeckyj-Cox & Call, 2007). In the 1960 birth cohort, by contrast, 15.6 percent of women were childless at age 50 (Kirmeyer & Hamilton, 2011).

A majority of older persons currently age 70 and over are parents of boomers, the largest wave of children ever born, from 1946 – 1964. As a result, elders today are more likely than any generation in history to have at least one living adult child (Grundy, 2009; Rowland, 2007). From 1990 – 2010, the population age 80 and over increased by 62 percent, whereas the supply of potential caregivers, boomers age 45 – 64, increased by 77 percent (Redfoot, Feinberg, & Houser, 2013). It appears, however, that the high level of fertility among the parents of the boomers, the 1922 – 1942 cohort, represents an anomaly. Historical records over the past 200 years indicate that the prevalence of childlessness in the U.S. ranged between 15 – 25 percent (Morgan, 1991). Current levels of childlessness signal a return to the historical average of 20 percent. Moreover, greater life expectancy today, an average of 78.7 years compared with 47.3 in 1900 (CDC, 2013), renders childlessness a much larger issue for aging boomers and the generations to follow, than at any other point in history.

Projected Levels of Childlessness in Late Life

Population studies over the last 30 – 40 years reveal a consistent trend toward older age at first birth and increased childlessness. In 1975, 15.6 percent of women age 30 – 34 and 10.5 percent of women age 35 – 39 remained childless. These percentages grew to 28 percent and 20 percent, respectively, in 2000 (U.S. Census Bureau, 2006). Over the last few years, this trend has become even more pronounced. From 2007 to 2011, the U.S. fertility rate fell by 9 percent; and in 2011, the birth rate decreased to 63.2

births per 1,000 women ages 15 – 44 (Martin et al., 2013), the lowest point since at least 1920, when reliable records first became available (Livingston & Cohn, 2012). Declining fertility over the past five years may be related to the recession that started in 2008 (Livingston & Cohn, 2013; Taylor et al., 2010b). The latest population surveys suggest that birth rates have plateaued, due to unprecedented levels of fertility among women over 40 (Hamilton et al., 2013; Livingston & Cohn, 2013).

Smaller families continue to be the norm, with just 1.9 children on average for women near the end of their childbearing years, age 40 – 44, compared with 3.1 children in 1976 (Dye, 2010). By contrast, mid-century mothers born in 1935 gave birth to an average of 3 children, with 4 being the most likely outcome; whereas women born in 1960 gave birth to an average of 2 children, with 2 being the most likely outcome (Kirmeyer & Hamilton, 2011). Given this trend, the odds of outliving one's children in future decades will be greater than they are now. Additionally, obesity and the high prevalence of multiple chronic diseases in younger cohorts foreshadow shorter lifespan among these subgroups (Freedman et al., 2013; Lee et al., 2010; Soldo et al., 2006), compared with their aging parents.

Patterns of Childlessness in Late Life

Childlessness in late life varies by gender and marital status. Prior research shows that 17 percent of older women do not have children, compared with 11 percent of older men from the 1890 – 1930 birth cohorts of the National Survey of Families and Households (Koropeckyj-Cox & Call, 2007). The 6 percent gender difference reflects the fact that women live longer than men and have lower rates of marriage; whereas men tend to marry younger women, are more likely to remarry, and are less bound by age in

their ability to father a child (Koropeckyj-Cox & Call, 2007). Nonetheless, sources of data on men's fertility apart from their wives' remain sparse (Rowland, 2007). Nonresponse patterns also appear to be a factor. In federal surveys, male respondents may be reluctant to identify nonresident children for whom they could be required to provide child support (Bachu, 1996).

Among older women, childlessness is associated with significant gains in education and labor force participation (Koropeckyj-Cox & Pendell, 2007). Older childless women are also mostly white. Childlessness following World War II was higher among whites than blacks (Bloom & Trussell, 1984; Boyd, 1989). Since the 1970s, however, differences in parental status by race and ethnicity have flattened (Dye, 2010; Taylor et al., 2010a). Likewise, the education gap has narrowed over the last few decades as women defer rather than forgo childbearing in order to complete their education, including advanced and professional degrees (Dye, 2010; Taylor et al., 2010a).

By comparison, women in previous generations often became less "marriageable" and thus childless, after pursuing higher education and a career (Oppenheimer, 1997; Sweeney, 2002). Women in the past could be legally terminated from work if they became pregnant, resulting in a stark choice between paid work and motherhood. It was not until 1978 that legislation was enacted to protect women from losing their jobs due to pregnancy (Kelly & Dobbin, 1999). Never married older women are, therefore, more likely than any other group to include independence and self-actualization as reasons for remaining childless (Allen & Wiles, 2013; Connidis & McMullin, 1996).

Among older men, marriage and fatherhood—not childlessness—are associated with higher socioeconomic status (Koropeckyj-Cox & Call, 2007). Few sources of data

exist for parental status by race for men; however, the pattern for those who are older and married is likely to follow that of their spouses' (Rowland, 2007), with childlessness being higher among whites than blacks (Bloom & Trussell, 1984; Boyd, 1989). Regardless of parental status, married men have the highest levels of education and occupational prestige (Dykstra & Hagestad, 2007; Koropeckyj-Cox & Call, 2007). For some fathers, identity as the family breadwinner may lead to greater career success and a healthier lifestyle (Christiansen & Palkovitz, 2001; Dykstra & Keizer, 2009). Generally, however, it is the presence of a partner that signals better economic and health outcomes for men (Dykstra & Hagestad, 2007). The association with parental status may be circular: having resident children increases the probability of being in a partnership (Kohler, Behrman, & Skytthe, 2005), and men with favorable socioeconomic prospects are more likely to find partners than men with poor potential (Oppenheimer, 1994).

Never married older women and men are generally childless, due to strong social norms in the past that prohibited child bearing outside of marriage (Connidis, 2010). Overall, 96 percent of never married older men and 93 percent of never married older women do not have children (Koropeckyj-Cox & Call, 2007). Single women and men are among the groups most likely to refer to themselves as childless by choice, except when financial trouble or the obligation to care for an aging parent prevented them from marrying and starting a family, in which case childlessness is described as a matter of circumstance (Connidis & McMullin, 1996). Altogether, 25 percent of childless older adults describe themselves as never married (Koropeckyj-Cox & Call, 2007).

Among ever-married older persons, childlessness is relatively rare. Only 11 percent of married women and 6 percent of married men remain childless (Koropeckyj-

Cox & Call, 2007). Very few ever-married older persons acknowledge the preference for a child-free lifestyle as the reason for their childlessness; instead, they identify poor health, older age, and fate as the source of their infertility (Connidis & McMullin, 1996). The incidence of divorce is associated with greater childlessness (Hagestad & Call, 2007; Lundquist et al., 2009). Among the formerly married, 22 percent of divorced men are childless, compared with 19 percent of divorced women. The vast majority of childless older adults are single: 61 percent of childless older men and 75 percent of childless older women report being unmarried (Koropeckyj-Cox & Call, 2007).

Meaning of Childlessness in Late Life

The meaning of childlessness is likely to shift over time, as individuals reflect back on their lives and consider childlessness in the context of growing old (Allen & Wiles, 2013). For those who have outlived their children and are coming to terms with this loss, the meaning of childlessness may be notably different from the experience of biologically childless individuals who constructed a life without children (Dykstra & Wagner, 2007). Personal choice, pro natalist pressures, and social stigma have shaped the decisions and experience of many older childless individuals (DeOllos & Kapinus, 2002; Lisle, 1996). In this sense, the pathways to childlessness are diverse and nuanced, and carry both personal and cultural meaning (Rubinstein, 1987).

The initial decision to remain childless may be tied to personal beliefs about parenthood, education, and career (Keizer et al., 2008; Koropeckyj-Cox, Pienta, & Brown, 2007). The obligation to stay at home to care for elderly or ill relatives may have led women in particular to forgo marriage and children (Allen, 1989; Connidis & McMullin, 1996; Holden, 2005). Some individuals may deliberately choose not to pass

on genetic diseases or characteristics they find undesirable (Allen & Wiles, 2013). Alternatively, couples may decide to start a family after a long process of postponing pregnancy to pursue other goals; for example, education, financial security, or home ownership (DeOllos & Kapinus, 2002; Rindfuss et al., 1988). Others may determine that pregnancy would be okay either way, leaving the decision to fate (McQuillan, Greil, & Shreffler, 2011). Regret may follow an earlier decision to remain childless (Alexander, Rubinstein, Goodman, & Luborsky, 1992), and for those who wish to start a family, it can be devastating to find that option closed (DeLyser, 2011).

Involuntary childlessness leads to significant distress for women and men, whether it is due to the lack of a suitable partner (Connidis & McMullin, 1996), infertility (McQuillan et al., 2003; Schwerdtfeger & Shreffler, 2009), or the death of a child (Rogers et al., 2008). Infertility and impaired fecundity affect 6 – 11 percent of couples, a rate that increases with age (Chandra, Copen, & Stephen, 2013). There are accounts of educated, career-oriented women grieving when they later cannot conceive a child (Hewlett, 2002). These individuals may be criticized for having waited too long, described as "barren" (Bartlett, 1994), or admonished for failing to successfully pursue reproductive technologies (May, 1995; Letherby, 2002). To make sense of these experiences looking back, older persons tend to re-interpret decisions and circumstances in a way that restores a sense of order to their lives (Becker, 1997).

Psychosocial implications. Overall, childless persons in late life report levels of well-being similar to older parents (Bures, Koropeckyj-Cox, & Loree, 2009). Negative attitudes about childlessness, however, are associated with greater distress for women than for men (Koropeckyj-Cox, 2002; Dykstra & Hagestad, 2007). Individuals who

describe themselves as childless by circumstance report a lower sense of well-being compared with those who are childless by choice (Connidis & McMullin, 1996). Marital status and gender appear to modify this effect. Widowed and divorced persons report decreased well-being regardless of parental status (Koropeckyj-Cox, 1998); whereas never married childless older women appear to have a higher sense of well-being and engage in a greater number of social and community activities than any other group (Dykstra, 2006; Gray, 2009; Wenger, G. et al., 2007).

Unmarried childless older men, by contrast, experience higher levels of depression and loneliness than other groups, according to data from the Asset and Health Dynamics among the Oldest Old survey (Zhang & Hayward, 2001). Men are almost as likely as women to yearn for children; yet men who are involuntarily childless appear to feel more isolated, depressed, and angry than childless women (Hadley, 2013). Childless men tend to have smaller social networks than childless women (Dykstra, 2006). At midlife, unmarried childless men report being less able to turn to their families in times of need (Dykstra & Keizer, 2009). Divorce, in particular, has a long-lasting effect on men's social ties (Kaufman & Uhlenberg, 1998; Shapiro & Cooney, 2007). Divorced and never married men tend to live individualistic lives (Dykstra & Keizer, 2009). Without any connection to children and family, they display less concern for the welfare of others (Eggebeen & Uhlenberg, 1985) and less civic involvement (Dykstra et al., 2010).

Older parents draw considerable support and satisfaction from interactions with their adult children (Eggebeen, Knoester, & McDaniel, 2013; Koropeckyj-Cox, 2002; Mandemakers & Dykstra, 2008; Milkie, Bierman, & Schieman, 2008). Strain in the relationship with even one child, however, can significantly decrease well-being

(Eggebeen et al., 2013; Ryff, Schmutte, & Lee, 1996; Suitor, Pillemer, Keeton, & Robison, 1994; Ward, 2008). Having an adult child with a substance abuse problem, mental health disorder, or financial or legal troubles can lead to much lower levels of well-being in late life, especially among unmarried parents (Greenfield & Marks, 2006). Older adults without children report a sense of relief at having been spared this sort of pain (Allen & Wiles, 2013).

Grief over the loss of a child also carries lasting consequences. The death of a child from infancy through age 34 (average age, 18) is associated with lower levels of psychological and physical well-being in parents many years beyond the loss (Rogers et al., 2008). This loss may become especially acute in old age (Allen & Wiles, 2013). Older persons who outlive their adult son or daughter also feel profound sorrow (Dykstra & Wagner, 2007). Formerly married women who have survived all their children report the highest levels of depressive symptoms of all groups (Bures et al., 2009).

Financial implications. Children require considerable time and resources (Nomaguchi & Milkie, 2003). To support their families, fathers tend to work more hours per week and earn higher incomes than childless men (Eggebeen & Knoester, 2001; Keizer et al., 2010; Lundberg & Rose, 2002). Mothers tend to take on opportunity costs relative to their professional lives (Keizer et al., 2008), as the limitations inherent in combining work and childcare fall disproportionately on mothers (Hakim, 2003; Kemkes-Grottehnthaler, 2003). In the past, mothers were often forced—directly or indirectly—to leave the work force when they became pregnant (Kelly & Dobbin, 1999). Fewer options existed for balancing work and home life before the advent of e-mail, tele-work, tele-conferencing, and flexible work schedules (Avellar & Smock, 2003; Rindfuss

et al., 2003). As a result, the income and accumulated wealth of older mothers tend to be well below that of older fathers (Burkhauser & Smeeding, 1994; Estes, 2004). Widowed women typically collect reduced survivor benefits after their spouse dies; and women who are divorced or never married receive smaller pensions, based on lifetime earnings and savings that are, in general, markedly lower than men's (O'Rand & Henretta, 1999).

Never married childless older women and couples tend to be much better off financially than those with children (Dykstra & Hagestad, 2007). Although unmarried childless older men appear to have no income advantage over unmarried fathers, they have 24 to 33 percent greater wealth, presumably from not paying the costs associated with raising children (Plotnick, 2009). On the other hand, without partners, some childless men are at risk for socioeconomic instability in old age due to lower social resources overall (Dykstra & Keizer, 2009).

Childlessness among women, by contrast, is associated with greater socioeconomic position relative to mothers. In addition to higher levels of education, childless older women have had, in general, more time to invest in professional development than older mothers (Keizer et al., 2010; Keizer et al., 2008). Despite these advantages, never married childless women still earn less money than men, particularly married men (Dykstra & Hagestad, 2007). Even so, unmarried childless older women have 12 to 31 percent more income than unmarried older mothers, and about 33 percent more wealth (Plotnick, 2009). It remains to be seen whether the elevated status of never married childless women translates into a greater propensity to plan for long term care and medical decision-making at the end of life.

Family Structure and Social Support

Research has consistently identified the role of family, especially adult children, as a source of instrumental and emotional support late in life (Bengtson, Rosenthal, & Burton, 1996; Davey, Femia, & Zarit, 2005; Larsson & Silverstein, 2004; Wenger, G. et al., 2000; Wolff, Dy, Frick, & Kasper, 2007). Without close kin to help, never married and unmarried childless individuals tend to cultivate supportive relationships with neighbors and friends, as well as siblings and extended family (Rubinstein et al., 1991; Wu & Pollard, 1998). These networks often break down, however, as individuals become frail and unable to perform daily living activities (Dykstra & Hagestad, 2007; Grundy & Read, 2012; Lisle, 1996; Wenger, G., 2009; Wenger, G. et al., 2007). A large body of research demonstrates the inadequacy of non-nuclear family based social networks to meet the extended care needs of frail older adults (Albertini & Kohli, 2009; Jerrome & Wenger, G., 1999; Schröder-Butterfill & Marianti, 2006; Johnson & Catalano, 1981; Wenger, G. et al., 2007). Over the life course, close kin provide the most intimate and lasting support to the oldest old (Antonucci & Akiyama, 1987; Umberson, 2010).

Family caregiving. Family caregivers provide 70 percent of all long-term care services, according to a survey by the American College of Financial Services (Littel, 2014). Being married is the main predictor of informal long term care services and support, as spouses typically coordinate appointments and transportation, and devote considerable time to caring for their partners (Redfoot et al., 2013). Older persons tend to look first to their partners for help, but with increasing age and frailty, they rely on adult children and grandchildren (Wenger, G. et al., 2007). Those who are unmarried rely primarily on their grown children for support (McGarry, 1998; Pinquart & Sörensen,

2007). As the divorce rate has doubled between 1990 – 2010 for persons age 50 and over, one in three boomers is currently unmarried (Brown & Fen-Lin, 2012; Fen-Lin & Brown, 2012). Another 10.6 million Americans over age 65 have outlived their spouses (U.S. Census, 2012), and 73 percent of those over age 85 are widows (Redfoot et al., 2013). Women, therefore, are much more likely than men to grow old alone.

In the coming years, far fewer potential family caregivers will be available to the frail older population, defined as those over age 65 with any type of disability (Johnson et al., 2007; Szinovacz & Davey, 2007; U.S. Census, 2009). As of 2010, more than 7 family caregivers were available for every person 80 and over. By 2030, however, there will only be 4; and by 2050, there will be fewer than 3 (Redfoot et al., 2013). Among the current cohort of older adults, 12.6 percent of frail older persons have no surviving children; a proportion that is expected to rise to 21.9 percent by 2040 (Johnson et al., 2007). Another 18.4 percent of frail elders will have only one child to help in 2040, compared with 13.6 percent today with only one child (Johnson et al., 2007). The availability of family caregivers may decrease further due to rising rates of divorce (Teachman et al., 2000; Brown & Fen-Lin, 2012), which can lead to estrangement between parents and their adult children (Shapiro & Cooney, 2011). Without surviving children and partners, the oldest old may encounter challenges to independent living (Fen-Lin & Brown, 2012).

Aging alone. The prospect of aging alone can be formidable. Nearly half (48 percent) of childless older men and more than half (56 percent) of childless older women in the U.S. live by themselves, compared with just 11 percent of older fathers and 40 percent of older mothers (Koropeckyj-Cox & Call, 2007). Although independent living is

often preferred among the young old and viewed as normative (Klineberg, 2012; Bengtson et al, 1996), childless individuals worry about becoming isolated late in life (Span, 2011; 2013). Alone at home, isolation can lead to a form of "social death" in which life feels meaningless and without purpose (Norwood, 2009). Practical concerns revolve around issues of companionship and security: the availability of someone to visit regularly, drive to the doctor, take care of household repairs and maintenance, and serve as an advocate in case of hospitalization or cognitive decline (Creamer, 2012). Increasing rates of childlessness are expected to place extraordinary demands on publicly funded long-term care services (Albertini & Mencarini, 2014; Deindl & Brandt, 2011; Johnson et al., 2007; Redfoot et al., 2013).

Long-term care. Research shows that childless individuals are far more likely to require costly nursing care than older parents (Aykan, 2003; Boaz & Muller, 1994; Larsson & Silverstein, 2004; Muramatsu et al., 2007; Noël-Miller, 2010). In particular, never-married or widowed childless older adults enter long term care at younger ages and at lower levels of dependency than older parents (Wenger, G., 2009), and with fewer diagnoses of dementia (deMedeiros et al., 2013). More than two-thirds of Americans age 85 and older are women, and one in 5 needs help with daily living activities (Houser, 2007). As a result, women comprise more than 70 percent of all nursing home and assisted living residents, with an average age of 80 at admission, according to an analysis of data from the 2004 National Nursing Home Survey (Houser, 2007).

A majority of older persons report that they would prefer to be cared for at home than in an institution (Johnson et al., 2007). Relatively few individuals, however, have planned for it. Most long-term care decisions are made in crisis (Degenholtz, 2008). In

general, planning is inhibited by widespread refusal to even imagine one's vulnerability to frailty or disablement (McGrew, 2000). According to San Antonio & Rubinstein (2004), avoidance of long term care planning exists within an American cultural system that emphasizes independence over dependency, youth over decline, acute conditions over chronic disease, and expectations of familial caregiving that conflict with personal planning. This cultural system creates a particular dilemma for older women who serve disproportionately as primary caregivers (San Antonio & Rubinstein, 2004; Waid, 2013).

Long-term care insurance is considered one means of maintaining autonomy and choice; however, fewer than 10 percent of Americans have purchased this product (Johnson & Uccello, 2005; Wiener, 2006). Only 18 percent of Marylanders have a long-term care policy; and in a survey on this topic, three times the number of men as women commented that they would not live long enough to need long-term care (CHPDM, 2001). With this as the dominant mindset, women may be overlooked, even though they live on average five years longer than men and are the ones most apt to benefit from long-term care insurance (AARP, 2007). Of those widowed and over age 85, 73 percent are women (U.S. Census, 2010), many of whom served for months or years as primary caregivers to their spouses (Redfoot et al., 2013). San Antonio & Rubinstein note that the low acceptance of long-term care insurance plans implies "a subtle but real form of passive discrimination…. it is largely women we are not looking at" with respect to care at the end of life (p. 44, 2004). Similar concerns revolve around the need to plan ahead for end-of-life decision-making.

2.4. Advance Care Planning and Family Structure in Late Life

Inevitably, older persons come to rely on their adult children late in life for help making decisions about long-term care and medical treatment (Grundy & Read, 2012). In the absence of an adult child, this role generally falls to a spouse or sibling or another relative who may also be older or frail, and limited in the support they can provide. Younger relatives such as nieces and nephews and friends of the family may be available to assist, but their role in medical decision-making is not well documented. The extent to which other relatives and non-kin can substitute for close kin in matters as personal as advance care planning remains unclear.

Prior research shows that advance care planning varies by age, gender, marital status, race, education, net worth, and health (Bischoff et al., 2013; Carr & Khodyakov, 2007a,b; Elpern et al., 1993; Gerst & Burr, 2008; Hopp, 2000; Hopp & Duffy, 2000; Kahana, et al., 2004; Levin et al., 1999; Su, 2008). Few studies, however, have included childlessness as a predictor. One finding suggests that those who never had children are less likely than older parents to have an advance directive (Carr & Khodyakov, 2007b). Other results show that the childless are more likely to complete an advance directive if they are also unmarried (Hopp, 2000). In the literature on advance care plan-ning, as in many studies related to health behavior, number of children—if included at all—appears simply as a descriptive variable or covariate. Typically, childlessness has been overlooked as an independent variable of interest; this study is designed to fill that void.

There are two lines of reasoning to consider in determining the effect of childlessness on advance care planning. First, it is possible that childlessness creates a barrier to advance directive completion. Without an adult child to engage in end-of-life

care discussion or designate as a surrogate decision-maker, older persons may neglect to plan for their future care. Alternatively, childlessness and the lack of an obvious surrogate may compel older adults to prepare for future medical situations that they may not be able to navigate themselves. Marital status and gender provide further context for understanding the effect of childlessness on advance care planning.

Childlessness and Marital Status

Marital status is strongly correlated with parental status among older adults, as social norms in the past discouraged childbearing out of wedlock (Koropeckyj-Cox, et al., 2007). Whether marital status and childlessness interact to modify advance care planning remains unknown. Studies have shown that married couples are either more likely to complete an advance directive (Carr & Khodyakov, 2007a,b;), or less likely to do so (Bischoff et al., 2013; Hopp, 2000; Kahana, et al., 2004). Although some married childless couples may complete an advance directive to avoid burdening others (Winter & Parks, 2012), other couples may assume that their spouse knows their wishes and would make appropriate decisions, if needed, without an advance directive in place (Coppola, Ditto, Danks, & Smucker, 2001).

Unmarried childless older adults may be less inclined to prepare an advance directive, as a result of having a smaller or nonexistent source of potential health care surrogates. Alternatively, the absence of a marital partner could magnify the effect of childlessness, motivating advance directive completion. Childless older adults who are single may in fact be the most likely to institute an advance directive, recognizing the need to plan ahead so that their wishes will be known and followed.

Childlessness and Gender

Although the prevalence of childlessness tends to be higher among women than men in late life (Koropeckyj-Cox & Call, 2007), the combined effect of childlessness and gender on advance care planning has not been explored in studies reported to date. Research on gender alone indicates that older men are more likely than older women to engage in formal methods of advance care planning by completing a living will, for example; whereas older women are more likely to engage in informal discussions about end-of-life care (Carr & Khodyakov, 2007a,b; Hopp, 2000). It is not known, however, whether this pattern holds true for men and women who are childless.

Related research suggests that childlessness has a more profound social effect on men in late life than on women (Dykstra & Keizer, 2009), leading to greater loneliness (Zhang & Hayward, 2001) and dissatisfaction with life (Keizer et al., 2010). Loneliness may decrease motivation to engage in advance care planning. The lack of someone to name as power of attorney may further limit the odds of advance directive completion. In this way, gender may interact with childlessness to decrease advance care planning.

Childlessness, Marital Status, and Gender

Interaction by childlessness, marital status, and gender may lead to different rates of advance care planning in subgroups of married and unmarried men and women. Little is known about the effect of childlessness on advance directive completion or end-of-life discussion among widowed, divorced, married, and never married childless men and women. The likelihood of advance directive completion among divorced men who are childless, for example, may differ significantly from the likelihood of advance directive completion among married mothers, due to different levels of social integration across

subgroups. On the other hand, support for widowed mothers from their adult children (Ha, 2008; Ha, Carr, Utz, & Nesse, 2006) may increase advance care planning relative to those who do not have this support.

As divorce has become more prevalent among older adults, affecting one in three boomers (Brown & Fen-Lin, 2012), there may be greater personal recognition of the need to plan ahead. Alternatively, social isolation may lead to avoidance and a lack of motivation to complete an advance directive. Divorce and widowhood have, in general, a more negative effect on social integration for men than for women, especially when combined with childlessness (Keizer et al., 2008). Men tend to have smaller networks of extended family and friends than women (Dykstra & Hagestad, 2007; Koc, 2012; Wenger, G. et al., 2007). Elucidating how childlessness, gender, and marital status interact with respect to advance care planning is a major objective of this study.

Health conditions. Certain diseases vary by parental status as well as gender and marital status. Heart disease, for example, is more prevalent among childless men over age 50, than it is among women with or without children (Crimmins, Kim, & Solé –Auró, 2010) and men with two or more children (Eisenberg, Park, Hollenbeck, Lipshultz, Schatzkin, & Pletcher, 2011). After controlling for age and educational level, childless older men are more likely than older fathers to engage in unhealthy behaviors like smoking and drinking alcohol to excess, and are less likely to exercise and eat well (Kendig, Dykstra, van Gaalen, & Melkas, 2007; Kohli & Albertini, 2009). Marriage and parenthood appear to have a protective effect on health (House, Landis, & Umberson, 1988; Tucker, 2002; Umberson, 1987).

Among older women, chronic conditions such as arthritis, depression, and difficulties with instrumental activities of daily living (IADLs) are more common (Crimmins et al., 2010). Women over age 75 are 60 percent more likely than men of the same age to need help with one or more daily living activities such as eating, bathing, dressing, or moving around the home, according to data from the National Health Interview Survey (Houser, 2007). Unmarried older women with children report worse depressive symptoms, lower self-rated health, and more chronic disease than married women and men with or without children (Hughes & Waite, 2002). These conditions may be related to difficult life experiences, given that unmarried mothers are exposed to high levels of stress across multiple domains such as caregiving, finances, and balancing work and family life for many years (Avison, Ali, & Walters, 2007).

It stands to reason that the presence of health conditions like heart disease, cancer, or frailty could have an effect on advance care planning by prompting discussion of health care needs. Health decisions are frequently made within the context of the family (Fitzpatrick, 1990). Over the life course, men and women tend to have different levels of involvement in these discussions, based on traditional gender roles within the family. Prior research indicates that women serve disproportionately as caregivers for ill and older relatives (Neal, Ingersoll-Dayton, & Starrels, 1997; Pinquart & Sörensen, 2006; Stone, Cafferata, & Sangl, 1987) and may, therefore, be more apt to participate in health care discussions than men. On the other hand, the extent to which these conversations extend to the caregiver's own health status is not known. Denial and anxiety related to declining health tend to decrease the likelihood of advance directive completion (Carr, 2012b; Zimmerman, 2007).

Health care utilization. Research based on the National Long-Term Care Survey (NLTCS) indicates that childless Medicare beneficiaries have similar expenditure patterns to beneficiaries with children, except in one service category—physician long-term care visits to patients living at home or in a long-term care setting (Wolf & Laditka, 2006). This finding suggests that childless beneficiaries lack family support; they may not have anyone to accompany them to medical appointments. The same study also found that older parents have higher utilization and expenditures for hospice than individuals without children (Wolf & Laditka, 2006). This disparity suggests that childless individuals lack the caregiving support necessary to support hospice services in the home, where a family member typically serves as the primary caregiver (NHPCO, 2013). Given that 88 percent of hospice patients have an advance directive (Jones et al., 2011); the same barriers that limit hospice participation among childless individuals may affect their inclination to engage in advance care planning.

Never-married women and men without children have up to three times the mortality of those who are married with two or more children (Kravdal, Grundy, Lyngstad, & Wiik, 2012). Further research is needed to ascertain the effect of mediating covariates on this association, such as socioeconomic status (Grundy & Kravdal, 2008; Mirowsky, 2005; Spence, 2008), as well as selection effects in which infertility or sub fecundity could be a sign of poor health (Kendig et al., 2007). Even so, the evidence of higher mortality related to childlessness and being single (Ben-Shlomo, Smith, Shipley, & Marmot, 1993; Kravdal et al., 2012) suggests that these individuals have a potentially large need for health care decision-making before death. In this respect, advance care

planning is especially important for childless older persons, to ensure that they have a voice in end-of-life treatment decisions if they lose the capacity to give informed consent.

2.5. Hypotheses and Rationale

Hypotheses to be tested in this study are listed below, by specific aim. A rationale for each hypothesis (H) is also presented.

Aim 1. Describe childlessness by gender and marital status in the U.S. population over age 50.

H.1.1. The prevalence of childlessness will be higher among women than among men over age 50, and highest among never married women.

H.1.2. Older age, unmarried status, white race, and non-Hispanic ethnicity will be positively associated with childlessness in both women and men. Higher levels of education, net worth, and income will be positively associated with childlessness in women, not men. *Health*: Nursing home residence, low self-rated health, and low functional status, and death expected will be positively associated with childlessness in women and men. *Social*: Live alone will be positively associated with childlessness among women and men. Living siblings will not be associated with childlessness in either women or men. Relatives near will be negatively associated with childlessness among women and men. Good friends near and social contact will be positively associated with childlessness among women, but negatively associated with childlessness among men.

Rationale H.1.1. Prior research indicates that the prevalence of childlessness is higher among women, at 17 percent, than among men, at 11 percent; and highest among never married women, based on a study of the 1890 – 1930 birth cohorts from the

National Survey of Families and Households (Koropeckyj-Cox & Call, 2007). In the past, relatively few unmarried women had children out of wedlock, and few married couples remained childless (Connidis, 2010). These patterns are expected to continue in current cohorts of older adults.

Rationale H.1.2. *Age*. The oldest birth cohort has the greatest proportion of childlessness: 1910 (19.7 percent); 1935 (11.4 percent); and 1960 (15.6 percent), due to differences in the social, political, and economic experiences of these cohorts during their childbearing years (Kirmeyer & Hamilton, 2011; Koropeckyj-Cox & Call, 2007; Rindfuss et al., 1988). The oldest old are also the most likely to have outlived all of their children (Dykstra & Hagestad, 2007; Wagner et al., 1999). *Race*. In the past, white women were more apt to remain childless than black women (Bloom & Trussell, 1984; Boyd, 1989), and men's fertility pattern is likely to follow their wives' (Rowland, 2007). *Ethnicity*. Hispanic ethnicity is expected to follow the same pattern as race, given that current levels of childlessness are the same, 17 percent, among older blacks and Hispanics (Taylor et al., 2010a). *Education*. Older women today came of age at a time when highly educated women were less likely to marry and have children (Oppenheimer, 1997; Sweeney, 2002). *Net worth* and *income*. Childless older women tend to have higher net worth and income compared with older mothers (Keizer et al., 2010; Keizer et al., 2008; Plotnick, 2009).

Health. *Nursing home residence* is associated with childlessness (Akyan, 2003; Freedman, 1996; Nöel-Miller, 2010). *Self-rated health* and *functional status*. Heart disease strikes childless older men disproportionately (Crimmins et al., 2010; Eisenberg et al., 2011). Unmarried older women with children report lower self-rated health and

lower functional status than married women and men with or without children (Hughes & Waite, 2002). Among men, the lack of a partner is associated with poor diet, little exercise, smoking, and excessive alcohol use (House et al., 1988; Kendig et al., 2007; Tucker, 2002; Umberson, 1987).

Social. *Live alone*. Half of all childless persons live alone (Koropeckyj-Cox & Call, 2007; Wenger, G. et al., 2007). *Living siblings*. There is no biological or social basis for an association between childlessness and the presence or absence of a living sibling in late life. *Relatives near*. Childless persons also tend to have fewer relatives overall, by definition (Wenger, G. et al., 2007). *Good friends near* and *social contact* are higher among never married childless older women (Koropeckyj-Cox & Call, 2007; Wenger G., 2009; Wenger, G. et al., 2007), and lower among unmarried childless older men (Keizer et al., 2008). Widowed, divorced, and never married childless older men have fewer good friends and fewer social contacts than older women in each subgroup (Dykstra & Hagestad, 2007; Kaufman & Uhlenberg, 1998; Koc, 2012; Shapiro & Cooney, 2007).

Aim 2. Determine whether childlessness is a predictor of advance care planning over age 50, considering demographic, health, and social factors.

H.2.1. Childless persons over age 50 will have a decreased likelihood of advance care planning, compared with those who had living children.

H.2.2. Childless persons who were closer to age 50 (younger), male, married, non-white, Hispanic, and who had lower levels of education, net worth, and total income will have a decreased likelihood of advance care planning. *Health*: Childless persons who lived in the community (not a nursing home or long-term care facility), had high self-rated health, no difficulties with functional status, and did not expect to die soon will

have a lower likelihood of advance care planning. *Social*: Childless persons who did not live alone, did not have living siblings, did not have relatives and good friends near, and did not have social contact regularly will have a lower likelihood of advance care planning.

Rationale H.2.1. Individuals without adult children lack a key source of social support in old age (Kinsella & Wan, 2009). Childless older adults generally have fewer opportunities than older parents to discuss end-of-life care preferences with someone close, and fewer options for naming a DPAHC, which may limit advance directive completion (Schickedanz et al., 2009).

Rationale H.2.2. Controlling for the following demographic, health, and social covariates, which are associated with both the dependent variable (advance care planning) and the independent variable (childlessness), should reduce the negative effect of childlessness on advance care planning. *Age.* Older age is associated with advance care planning (Elpern et al., 1993; Moorman & Inoue, 2013; Pew, 2013) and childlessness (Dykstra & Hagestad, 2007; Kirmeyer & Hamilton, 2011; Koropeckyj-Cox & Call, 2007). *Gender*. The prevalence of both end-of-life care discussion and advance directive completion is higher among women than men (Bischoff et al., 2013); and the prevalence of childlessness appears to be higher among women than men (Koropeckyj-Cox & Call, 2007). *Marital status*. Unmarried status is associated with advance care planning (Bischoff et al., 2013). Never married status is associated with childlessness, due to social norms in the past against having children outside of marriage (Connidis, 2010).

Race and ethnicity. Among whites, advance care planning is more prevalent (Bischoff et al., 2013; Carr, 2011; Gerst & Burr, 2008; Hopp & Duffy, 2000); Taylor et

al., 2010a); and childlessness is more prevalent (Bloom & Trussell, 1984; Boyd, 1989). Higher levels of *education* are associated with increased advance directive completion (Carr & Khodyakov, 2007a); as well as increased childlessness among subgroups of women (Oppenheimer, 1997; Sweeney, 2002). Higher *net worth* and *income* are associated with increased advance care planning (Carr, 2011; Carr & Khodyakov, 2007a; Carr, 2012a; Su, 2008); and increased childlessness among subgroups of women; yet, increased fatherhood among subgroups of men (Keizer et al., 2010; Keizer et al., 2008; Plotnick, 2009).

Health. *Nursing home residence* is positively associated with both advance directive completion (Bischoff et al., 2013) and childlessness (Aykan, 2003; Freedman, 1996; Koropeckyj-Cox & Call, 2007; Levin et al., 1999). Lower s*elf-rated health* and lower *functional status* are positively associated with advance care planning (Bischoff et al., 2013; Elpern et al., 1993) and potentially, childlessness (Kendig et al., 2007). *Death expected* is high among individuals in hospice, where the prevalence of advance care planning is 88 percent (Jones et al., 2011). *Death expected* may also be associated with childlessness, in that childless individuals appear to have a higher mortality rate than those who have had biological children (Ben-Shlomo et al., 1993; Kravdal et al., 2012).

Social. *Live alone* decreases the likelihood of having someone available to provide instrumental and emotional support (Thoits, 2011), such as participation in advance care planning (Schickedanz et al., 2009). Childless older persons are more likely to live alone (Koropeckyj-Cox & Call, 2007). *Living siblings*. Siblings offer emotional support and instrumental help in the absence of a partner or adult child (Cicirelli, 1995; Connidis, 2010). This support may increase the likelihood of advance care planning.

Individuals who are single or childless tend to designate a sibling as their (Hopp, 2000). *Relatives near* increases the likelihood of instrumental and emotional support and, the possibility of advance care planning (Kramer et al., 2006). *Good friends near* and *social contact* signify engagement with friends and family, which increases the potential for instrumental and emotional support (Thoits, 2011), and, therefore, the potential for advance care planning.

Aim 3. Examine any differences in the effect of childlessness on advance care planning over age 50 by marital status and gender.

H.3.1. Unmarried childless persons over age 50 will be less likely to engage in advance care planning than married persons with or without living children, after controlling for demographic, health, and social covariates.

H.3.2. Unmarried childless men over age 50 will be less likely to engage in advance care planning than unmarried childless women over age 50, after controlling for demographic, health, and social covariates. Divorced childless men over age 50 will be least likely to plan, and never married childless women over age 50 will be most likely to plan, compared with the reference category, married women with living children.

Rationale H.3.1. Unmarried childless persons are twice disadvantaged in advance care planning in that they lack two key sources of social support in old age: adult children (Kinsella & Wan, 2009), and a spouse or partner (Fen-Lin & Brown, 2012). Married persons are more likely to discuss end-of-life care preferences (Carr & Khoryokov, 2007a) and more likely to complete an advance directive (Carr & Khoryokov, 2007b), although unmarried status is associated with advance care planning in other studies (Bischoff et al., 2013). Moreover, childless persons generally have fewer opportunities

than those with living children to discuss end-of-life care preferences with someone close, and fewer options for naming a DPAHC, which may limit advance directive completion, especially if they are single (Schickedanz et al., 2009).

Rationale H.3.2. Women over age 50 are more likely than men to complete an advance directive (Bischoff et al., 2013). With a longer life expectancy than men, women are more vulnerable to outliving potential surrogates (e.g., marital partners and siblings), and have, therefore, an even greater imperative than men to complete an advance directive (AARP, 2007). Relative to older men without children, childless older women tend to have wider social networks and more social contact (Wenger, G. et al., 2007). These contacts may be associated with increased advance directive completion due to greater instrumental and emotional support (Thoits, 2011) and a larger number of potential surrogates to name as DPAHC.

Married persons are more likely to engage in end-of-life care discussion than those who are unmarried (Carr & Khorydokov, 2007a), but less likely to complete an advance directive (Boerner et al., 2013). Adult children offer an additional resource for end-of-life conversations; therefore, unmarried childless older women and men will be less likely to engage in end-of-life care discussion. Without an adult child or partner, they have fewer potential options for having this conversation compared with those who do have living children and spouses or partners. Divorced childless men over age 50 will be the least likely to discuss end-of-life care, due to generally poor social integration relative to other subgroups, with and without children (Dykstra & Keizer, 2009).

Higher levels of education (Koropeckyj-Cox & Call, 2007; Oppenheimer, 1997; Sweeney, 2002) increase the likelihood that never married childless older women will

complete an advance directive (Carr & Khorydokov, 2007a). Compared with women who are divorced or widowed, never married childless older women have had, potentially, more life experience planning for their own future financial and health care needs, and more experience in developing social networks outside of their families to obtain instrumental support (Dykstra, 2007; Dykstra & Hagestad, 2007).

CHAPTER 3—METHODOLOGY

Chapter 3 describes the study design in detail. The dataset, sample, and measures are presented, followed by a discussion of the analytic techniques used to test each hypothesis. Power calculations demonstrate the adequacy of the sample size to detect statistically significant differences in advance care planning.

3.1. Overview

This study explored the role of family structure in the patterns and predictors of advance care planning in late life. Data were drawn from the 2012 HRS, a nationally representative survey of U.S. adults over age 50 (N = 18,613). Exit interviews conducted from 2000 – 2012 with knowledgeable proxy informants provided data on the end-of-life circumstances of HRS decedents (N = 8,658).

The dependent variable, advance care planning, consisted of end-of-life care discussion, advance directive completion (LW, and/or DPAHC), or both. The predictor variable, childlessness, referred to the absence of adult children whether biological or step, at the time of final illness. Covariates included demographic (age, cohort, gender, marital status, race, ethnicity, education, net worth, and income), health (nursing home residence, self-rated health, functional status, and death expected), and social characteristics (live alone, living siblings, relatives and good friends near, and social contact).

To identify the significant factors associated with childlessness, descriptive statistics were calculated and analyzed using χ^2 tests (Aim 1). Multinomial logistic regression was used to determine the odds of advance care planning related to childlessness in late life (Aim 2.1), controlling for covariates (Aim 2.2), and testing for effect modification by marital status and gender (Aim 3).

3.2. Dataset

The HRS provides detailed information on the health and health care, income and wealth, and family characteristics of a nationally representative sample of U.S. adults over age 50 (Juster & Suzman, 1995). With support from the National Institute on Aging (NIA), the University of Michigan Institute for Social Research plans, conducts, and administers this longitudinal survey. Currently, the HRS includes over 20,000 respondents; and more than 37,000 have participated over the past two decades (Weir, 2015). The original cohort, born 1931 – 1941, has been interviewed 11 times since the study began in 1992. The HRS also includes respondents from another NIA study, the Asset and Health Dynamics among the Oldest Old (AHEAD), which became part of the HRS in the mid-1990s. Since then, new age cohorts have been added every six years. The latest dataset available from the 2012 wave includes baby boomers born before 1960.

For the research questions posed in this dissertation, the HRS is the best dataset available. It provides a rich source of information on family structure, as well as the necessary detail on advance care planning and health status. The data are nationally representative. Blacks and Hispanics have been over-sampled to ensure their inclusion. Data files are publicly available to registered users on the HRS website, http://hrsonline.isr.umich.edu/index.php?p=data. By masking records, the HRS ensures strict confidentiality for items such as income, date of birth, and health care utilization.

Institutional Review Board

Current Institutional Review Board (IRB) approval for the HRS protocol appears in Appendix A, in a memo from the University of Michigan IRB (Weir, 2015). Additionally, the University of Maryland, Baltimore (UMB) IRB reviewed the research

design for this dissertation and determined that it meets the definition of *Not Human Subjects Research*. Oversight by the UMB IRB is not required. No further IRB actions are necessary, according to correspondence received and included in Appendix B.

HRS Structure

Selection into the HRS occurs primarily through a multi-stage, clustered area probability frame of housing units (Chien et al., 2014). Those in the oldest cohort, AHEAD, were identified through a sampling frame of Medicare enrollment files (HRS, 2011). Once in the study, participants respond to follow-up surveys every two years. The HRS uses computer assisted personal interview (CAPI) technology to facilitate data collection over the telephone and at times, face-to-face. Spouses are surveyed and re-interviewed, as well, and new partners reported at the time of a biennial interview are added to the sample and followed. Questions about siblings, children, stepchildren, and grandchildren are also included. Participation is voluntary, and nominal incentives are provided amounting to $20 – $80, depending on the number of survey modules completed per wave (Weir, 2015). The baseline response rate ranges from 68.7 percent to 81.6 percent across cohorts; while the follow-up response rate for biennial interviews ranges from 85 percent to a high of 93 percent (HRS, *Sample Sizes and Response Rates*, 2011).

New respondents enter the study as part of an age cohort, at six year intervals. In addition to the original HRS cohort (born 1931 – 1941), the study includes AHEAD (Aging and Health Dynamics, born before 1923), War Babies (born 1942 – 1947), CODA (Children of the Depression, born 1923 – 1930), Early Boomers (born 1948 – 1953) added in 2004, and Mid Boomers (born 1954 – 1959) added in 2010. The Late Boomers

(born 1960 – 1965) will be added in 2016. The HRS now contains 37,319 records, comprised of 16,346 men and 20,973 women across all 11 waves (Chien et al., 2014).

Withdrawals over the course of the study have amounted to 1,763 respondents (5.7 percent of the sample) as of 2011 (HRS *Sample Sizes and Response Rates*, 2011). Decedents number 1,200 – 1,500 per wave. Deaths are typically reported to the HRS by families prior to or at the time of the next biennial survey. Individuals lost to follow-up are tracked using the Social Security Death Index (HRS, 2011). When respondents die, exit interviews are conducted with proxy informants—usually a surviving spouse, adult child, or other close associate—within 24 months of death. Deaths are confirmed by linkages to the National Death Index (NDI). NDI records, medical claims, and certain financial records are restricted, and can be accessed only by researchers working on studies approved by the HRS (Chien et al., 2014).

The same or similar items reappear in the HRS over time. An online concordance enables researchers to identify and match specific questions across waves, http://hrsonline.isr.umich.edu/index.php?p=concord. Records for each question remain linked. Typically, similar questions have the same base variable name, keywords in common, or appear in the same modules of the HRS over multiple waves. Not all questions are asked during each wave, however. Certain questions are only asked every second, third, or fourth wave, and the wording or response categories have changed somewhat across waves. Special topics are addressed periodically, such as the Consumption and Activities Mail Survey (CAMS), the HRS Prescription Drug Study, and the Aging, Demographics, and Memory Study (ADAMS). Beginning in 2004, new questions about psycho-social functioning were added to the HRS, and these questions

now appear every other wave. A vast array of information has been amassed over the past two decades; however, the size and complexity of the HRS can make it difficult to use (Chien et al., 2014).

RAND HRS

With support from NIA and the Social Security Administration, the RAND Corporation has developed a more accessible version of the HRS to facilitate its use. The RAND HRS contains a subset of cleaned and processed variables organized by categories such as demographics, health, and family structure. The unit of observation is the individual. Respondent-level variables have been derived from household-level measures in the raw HRS data files. The entire RAND HRS is available in a single file containing records from all 11 waves. Uniform naming conventions and standard imputation methods enable measures to be compared across survey waves (Chien et al., 2014).

Version N of the RAND HRS, released in October 2014, provides early results from 2012 and final HRS survey results from 2010, including the Mid Baby Boomer cohort, current cross wave tracker, and region and mobility files (Chien et al., 2014). Version N also incorporates new variables and makes adjustments and corrections to previous releases (N = 37,319). For this dissertation, the predictor variable (childlessness) and covariates (age, gender, marital status, race, ethnicity, education, net worth, income, nursing home residence, self-rated health, functional status, household size (live alone), and number of living siblings) were drawn from the RAND HRS version N.

Exit Interviews

The RAND HRS does not include exit interview data; therefore, information on the end-of-life circumstances of decedents (discussion of care preferences, advance

directive completion, nursing home residence at death, cause of death, and death expected or not) were extracted directly from seven waves of exit interviews, 2000 – 2012. The final version of the HRS 2012 exit survey, released in March, 2015, contains both respondent and household-level variables. Covariates that remain constant over time (age, gender) and items that were not asked in a consistent way across waves (marital status, number of children ever born, race, ethnicity, education, net worth, income, functional status, household size (lived alone), and number of living siblings) were drawn for this study from the RAND HRS in order to benefit from the data checking, imputation, and cleaning already performed.

Core Interviews

Measures of social network size and social engagement (relatives near, good friends near, and social contact) appear only in the core HRS interviews. Because they are not available in version N of the RAND HRS, the most recent data points for these measures were extracted from the RAND-enhanced fat files from 1992 – 2012. The fat files contain nearly all of the unrestricted HRS variables. In the fat files, RAND has assigned household-level variables to member records, re-assigned spousal information collected from one partner or the other to the correct record, and performed data integrity checks that facilitate merging by household identifier (HHID) and person number (PN) (Chien et al., 2014).

RAND HRS Family Data Files

Cross-generational family linkages for 10 waves of the HRS appear in the RAND HRS family data files, version C, which was released in June 2014. Data from these files were used in this study to validate family relationship assignments and to fill in data

points missing in the RAND HRS version N. In the family files, HRS records are linked according to parental, marital, and sibling relationship status. For each HRS respondent, RAND has derived a measure of the number of children ever born and the number of children of their spouses (step children of the respondent) based on the relationship listed in the respondent – kid file. This information is reported only when a valid longitudinal linkage exists. The RAND HRS family data codebook indicates that 1,774 (4.8 percent) of records have issues with their linkages, out of a total of 36,986 (Campbell et al., 2014).

Table 3.1 summarizes the sources of data for each measure included in this study, by specific aim. Further explanation is provided in section 3.3, in the narrative description of each measure.

Table 3.1. *Data Sources and Values by Aim. HRS, 1992 – 2012.*

	Dependent Variable: Advance Care Planning			
Description	Name	Source	Values	Aim
Advance Care Planning (Composite)	xrEOLacp	Computed: Exit	1 = EOL care discussion only 2 = Advance directive only 3 = Both 4 = Neither	2,3
	Predictor Variable: Childlessness			
Description	Name	Source	Values	Aim
Parental Status: (Composite)	rxPSTAT	Computed: RAND HRS	1 = No child ever born 2 = Outlived all children 3 = Step child only, no biol. 4 = Child living, biological and/or any step (rxlivch)	1,2,3
	Covariates: Demographic			
Description	Name	Source	Values	Aim
Age/Cohort	rxEOLage rxCOHORT	Exit Computed: RAND HRS	Continuous Categorical 1 = Civic (born prior to 1931) 2 = Silent (born 1931 – 1947) 3 = Boomer (born 1948 – 1959)	1,2,3
Gender	raGENDER	RAND HRS	1 = Male 2 = Female	1,2,3
Race	rxRACEM	RAND HRS	1 = White 0 = non-White	1,2,3
Ethnicity	rxHISPAN	RAND HRS	1 = Hispanic 0 = Non-Hispanic	1,2,3
Marital Status	rxMSTAT	RAND HRS	1 = Married 2 = Partnered 3 = Divorced/separated 4 = Widowed 5 = Never married	1,2,3
Education	raEDUC	RAND HRS	1 = Less than high school 2 = GED 3 = High school diploma 4 = Some college 5 = ≥ College degree	1,2,3
Education	rxEDUC	RAND HRS	1 = ≥ High school graduate 0 = No high school diploma	1,2,3
Net Worth	rxTOTAJ	RAND HRS	1 = High 0 = Low (< $13,000;) 0 = Low (< $6,057)	1,2,3 1 2,3
Total Income	rxITOTJ	RAND HRS	1 = High 0 = Low (< $16,365) 0 = Low (< $14,563)	1,2,3 1 2,3

(continued)

Table 3.1. *Data Sources and Values by Aim. HRS, 1992 – 2012. (cont.)*

	Covariates: Health			
Description	Name	Source	Values	Aim
Nursing Home Residence	xrxNHLTC	RAND HRS Exit	1 = Resident 0 = Not a resident	1 2,3
Self-rated Health	rxSHLT	RAND HRS	1 = High (excellent, very good, and good) 0 = Low (fair or poor)	1,2,3
Functional Status: Basic (ADL[1])	rxADLA	RAND HRS	1 = Any difficulties 0 = No difficulties	1,2,3
Functional Status: Instrumental (IADL[2])	rxIADLA	RAND HRS	1 = Any difficulties 0 = No difficulties	1,2,3
Death Expected or Not	xrxEOLexp	Exit	1 = Expected 0 = Unexpected	2,3

	Covariates: Social			
Description	Name	Source	Values	Aim
Live Alone	rxHHRES2	RAND HRS	1 = Live alone 0 = Live with others	1,2,3
Living Siblings	rxLIVSIB	RAND HRS	1 = Living siblings 0 = No living siblings	1,2,3
Relatives Near	rxNEARRL	RAND HRS Fat Files	1 = Relative(s) near 0 = No relative(s) near	1,2,3
Good Friends Near	rxNEARGF	RAND HRS Fat Files	1 = Good friend(s) near 0 = No good friend(s) near	1,2,3
Social Contact	rxSOCIAL	RAND HRS Fat Files	1 = Frequently (daily, weekly, monthly) 0 = Rarely (yearly, almost never)	1,2,3

[1] ADL = Activities of daily living.

[2] IADL = Instrumental activities of daily living.

3.3. Study Sample

The target sample for Aim 1 included respondents from the HRS 2012 survey, fielded April 2012 – April 2013 (N = 20,554). For Aims 2 and 3, the target sample included HRS decedents with an exit interview from 2000 – 2012 (N = 9,349). Items related to advance care planning appear only in the exit interviews. To gain sufficient power for the subgroup analysis, data collected from the exit interviews were pooled across multiple waves. The 2000 wave was used as the starting point because HRS questions about advance care planning have been asked in a consistent and comparable format since 2000. Table 3.2 displays the relationship of the proxies to HRS decedents. As shown, an adult child served as proxy for over 50 percent of respondents, and a spouse/partner served as proxy for nearly one-third.

Table 3.2. *Proxy Relationships. HRS Exit Interviews, 2000 – 2012*.

	Frequency	Proportion
Relationship	N	%
Spouse/partner	3,063	32.76
Adult Child	4,699	50.26
Biological[1]	(4,124)	(44.11)
Step	(109)	(1.17)
Child-in-law	(236)	(2.52)
Grandchild/in-law	(230)	(2.46)
Sibling	447	4.79
Other Relative	682	7.30
Other Individual/Friend	394	4.21
Paid Helper	17	0.18
Professional	47	0.50
Total	9,349	100%

[1] In the HRS 2000 wave, biological and step children were counted together; therefore, the frequency is adjusted by 10, the average number of step children serving as proxies across all waves.

Eligibility Criteria

Aim 1. HRS 2012 respondents were eligible for inclusion in this study if they had provided complete information on the key variables of interest: number of children, gender, and marital status. Respondents born in 1960 or later were excluded to ensure that the sample remained representative of the U.S. population over age 50. (Younger participants appear in the dataset as spouses or partners of HRS respondents.)

Aims 2 and 3. HRS decedents were eligible for inclusion in this study if they had been the subject of an exit interview from 2000 – 2012 with a proxy who had provided complete information on items related to advance care planning. Complete information must also have been provided in earlier HRS surveys regarding number of children, gender, and marital status. Decedents who died under age 50 were excluded to preserve the integrity of the sample.

Table 3.3 summarizes the inclusion and exclusion criteria.

Table 3.3. *Inclusion and Exclusion Criteria by Aim. HRS, 1992 – 2012.*

	Inclusion	Exclusion
Criterion	Aim	Aim
Complete information on:		
Number of children born	1, 2, 3	
Number of living children	1, 2, 3	
Marital status	1, 2, 3	
Gender	1, 2, 3	
End-of-life care discussion	2, 3	
Advance directive completion	2, 3	
Age < 50 years (born in 1960 or later)		1
Age < 50 years at death		2, 3

Final Sample

After applying the inclusion and exclusion criteria and HRS sample weights, and eliminating records with missing values for any covariates, the final study sample consisted of 18,613 HRS respondents for Aim 1, and 8,658 decedents for Aims 2 and 3. The composition of the final study sample is summarized in Table 3.4, which enumerates the excluded data points.

Table 3.4. *Final Sample by Aim. HRS, 1992 – 2012.*

	Aim 1	Aims 2, 3
Criterion	N	N
HRS respondents in latest wave, 2012	20,554	--
HRS decedents with an exit interview, 2000 -2012	--	9,349
Born in 1960 or later[1]	(1,228)	--
Age < 50 years at death	--	(18)
Missing parental status	(3)	(19)
Missing marital status	(0)	(1)
Missing gender	(0)	(0)
Missing EOL discussion, LW or DPAHC	--	(309)
Nursing home resident[2]	(475)	--
Missing other covariates	(235)	(344)
Total	18,613	8,658

[1,2] Removed by zero sample weights applied in Aim 1 analyses.

Aim 1. Applying the HRS sample weights reduced the number of observations by 1,228 (5.97 percent) for respondents born in 1960 or later, and by 475 (2.46 percent) for otherwise eligible participants living in a nursing home/long-term-care facility, as shown in Table 3.4. HRS sample weights derive from the U.S. Current Population Survey of individuals dwelling in the community; therefore zero weights are assigned to nursing home/long-term-care residents.

Missing values for the following covariates further reduced the sample for Aim 1 by: 48 (0.25 percent) for race; 27 (0.14 percent) for ethnicity; 3 (0.02 percent) for education; 0 for net worth and total income; 0 for self-rated health; 2 (0.01 percent) for functional status (ADLs and IADLs); 6 for live alone; 155 (0.82 percent) for living siblings; 2 (0.01 percent) for relatives live nearby; 4 (0.02 percent) for good friends live nearby; and 14 (0.07 percent) for social engagement. In all, 235 (1.25 percent) covariate values were missing from the dataset. The final study sample, N = 18,613, represents 98.75 percent of the eligible weighted sample.

Aims 2 and 3. The total number of decedents with an exit interview from 2000 – 2012 was 9,349, which represents 93 percent of HRS decedents who died over this period (HRS, 2011). The mean time to interview was 12.3 months. Of decedents with an exit interview, 16 (0.17 percent) were younger than age 50 at death, and 2 were missing age data. Another 19 (0.20 percent) lacked information concerning number of children ever born and number of living children. Additionally, 19 (0.20 percent) were missing data on gender; 20 (0.21 percent) were missing values for marital status; and 309 (3.31 percent) decedents lack responses to questions concerning end-of-life care discussion, LW, or DPAHC. Therefore, the eligible sample was 9,002, which represents 96.29 percent of the target sample.

Missing values for the following covariates further reduced the sample size for Aims 2 and 3: 23 (0.26 percent) for primary cause of death; 56 (0.62 percent) for death expected or not; and 0 (0 percent) for nursing home residence at the time of death. Additionally, 2 (0.02 percent) for HRS birth cohort; 5 (0.06 percent) for race; 7 (0.08 percent) for ethnicity; 3 (0.03 percent) for education; 0 (0 percent) for net worth and total

income; 0 (0 percent) for self-rated health; 2 (0.02 percent) for functional status ADLs; 3 (0.03 percent) for functional status IADLs; 1 (0.01 percent) for live alone; 54 (0.61 percent) for living siblings; 162 (1.8 percent) for relatives live nearby and good friends live nearby; and 235 (2.61 percent) for social engagement. In all, 344 (3.37 percent) covariate values were missing. The final study sample, 8,658, represents 96.12 percent of the eligible sample.

Merged Dataset

HRS household identifier (HHID) and person number (PN) were used to merge data across datasets and across waves. RAND HRS data files had adjusted for the overlap cases from 1992 – 1998, assigning new identification numbers as needed, so that files could be accurately merged with other RAND HRS data products (Campbell et al., 2014). Power analyses presented below in section 3.5 demonstrate the adequacy of the sample size overall and by subgroup.

3.4. Measures

Specific HRS measures used in this dissertation to operationalize the dependent variable, advance care planning; the predictor variable, childlessness; and covariates are described below and summarized in Table 3.1. All measures included in the HRS are selected by study directors at the University of Michigan to ensure reliability and validity (Weir, 2015). Reliability refers to the ability of the measure to produce results that are consistent across respondents and waves. Validity means that the item captures the information it is intended to measure.

The RAND HRS follows specific naming conventions, and this format has been extended to variables used in this study. An initial R represents the respondent, S denotes

spouse, and H stands for household. The second character (1-11) in each variable name signifies the wave from which the information was drawn. An A in that position rather than a number indicates that the information applies to all waves, such as gender and race. Information collected during an exit interview is designated by the letter X in the second position. The rest of the variable name indicates the item measured. For example, RXEOL stands for Respondent – Exit Interview – End-of-Life (EOL) module, followed by an abbreviation of the item measured such as age.

Dependent Variable: Advance Care Planning

Advance care planning, the dependent variable, involves discussion of end-of-life care preferences with loved ones and health care providers, and/or completion of an advance directive (LW and/or DPAHC). End-of-life care discussion, in particular, is considered an integral part of advance care planning (NHPCO, 2013; Sudore & Fried, 2010). Discussion has been shown to improve the accuracy of surrogate decision-making in most cases (Suhl, Simons, Reedy, & Garrick, 1994; Sulmasy et al., 1998), although not all (Shalowitz et al., 2006), and to increase understanding and comfort level within patient-surrogate pairs (Ditto et al., 2001).

Formal documentation of end-of-life care preferences in an advance directive such as a LW is especially important for childless older adults, who may be less likely than those with children to have someone available to designate as a DPAHC. Without an adult child or a spouse, end-of-life care decisions fall to the proxy dictated by state law. Written instructions can help prevent any discrepancies that may arise among decision-makers, such as siblings, who must by law agree unanimously when making end-of-life care decisions (Collier, 2010).

Advance care planning was operationalized for this study as a single categorical variable based on three measures from the HRS exit interview regarding: 1) end-of-life care discussion, 2) written instructions such as a LW, and 3) legal arrangements such as a DPAHC for assigning a health care agent. A single binary variable for advance directive completion was created by combining measures for the presence or absence of a LW and/or a DPAHC, with responses of 1 = yes, and 0 = no.

Rather than analyzing engagement in end-of-life care discussion and advance directive completion as separate outcomes, a composite measure was constructed. Because these two outcomes are highly correlated, odds ratio (OR) = 3.516 (95% confidence interval (CI), 3.210 – 3.850), it made sense to analyze them together. The high odds ratio suggests that individuals who engage in end-of-life care discussion are more likely to complete an advance directive than those who do not engage in discussion. Combining the two binary measures for end-of-life care discussion and advance directive completion resulted in a new measure with four discrete response categories: 1) end-of-life care discussion only; 2) advance directive completion only (LW and/or DPAHC); 3) both end-of-life care discussion and advance directive completion; and 4) neither end-of-life care discussion nor advance directive completion.

Responses to the following question measured engagement in end-of-life care discussion in HRS exit interviews from 2000 – 2012:

> Did [the decedent] ever discuss with you or anyone else the treatment or care [she/he] wanted to receive in the final days of [her/his] life?

Likewise, responses to these two questions measured advance directive completion in HRS exit interviews from 2000 – 2012:

> Did [the decedent] provide written instructions [LW] about the treatment or care (he/she) wanted to receive during the final days of (his/her) life?
>
> Did [the decedent] (also) make any legal arrangements for a specific person or persons to make decisions about (his/her) care or medical treatment if (he/she) could not make those decision (himself/herself)? This is sometimes called a Durable Power of Attorney for Health Care (DPAHC).

Response categories included: 1 = yes; 5 = no; 8 = don't know; and 9 = refused. Because distant or non-relatives may be less familiar with the decedent's end-of-life care plans than close kin, response bias was a concern in this study. A sensitivity analysis was performed to determine whether distant proxies were more likely than close relatives to provide *don't know* or *refused* as a response to survey items related to advance care planning. The distribution shown in Table 3.5 reveals the differences in proxy relationship type for decedents with and without living children, as well as responses to the survey items at issue.

Significant differences appear across the relationship categories listed in Table 3.5: spouse/partner, adult child, sibling/other relative, other individual, and professional/paid helper. For example, an adult child (who could be a stepchild, a son or daughter in-law, or a grandchild, given changes in the wording of this item in the HRS over time) served as a proxy informant for 56.57 percent of decedents who had living children. By contrast, a sibling or other relative served as proxy for 44.92 percent of childless decedents, compared with only 5.91 percent of decedents who had living children. Notably, 185 proxies representing 15.42 percent of childless decedents are designated as an adult child in Table 3.5, including 102 children, 26 step children, 14 children-in-law, and 43 grandchildren. The 102 coded as children are probably not

actually biological children, but may be mis-coded step children or children-in-law. The HRS questionnaire did not consistently provide all of the various sub-categories (such as in-law) in all survey waves. Other individuals and professional or paid helpers served as proxy for 13.92 percent and 2.50 percent of childless decedents, respectively; compared with just 2 percent and 0.31 percent of decedents who, at the time they died, had living adult children ($p < 0.0001$).

The analysis presented in the lower section of Table 3.5 depicts the extent to which *don't know* and *refused* occurred as responses for childless decedents, compared with those who had living children. Essentially, no significant differences were observed in the frequency of *don't know*: 0.58 percent and 0.50 percent for childless decedents, compared with 0.51 percent and 0.60 percent for those with children. Furthermore, only one informant in the study sample refused to answer. Items coded as *don't know* and *refused* were, therefore, treated as missing and excluded from the dataset for this study. Similarly, childless persons were no more likely to be missing an exit interview than those with living children.

Items related to advance care planning were recoded as binary variables to facilitate analysis: 1 = end-of-life care discussion, 0 = none; and 1 = advance directive completion (LW and/or DPAHC), 0 = none. The new categorical variable for advance care planning was coded as 1 = end-of-life care discussion only; 2 = advance directive completion only (LW and/or DPAHC); 3 = both; and 4 = neither. Finally, a binary variable was constructed for advance care planning in which 1 = yes (responses 1 – 3), and 0 = no (response 4).

Table 3.5. *Proxy Relationship Type and Responses by Parental Status. HRS Exit Interviews, 2000 – 2012*.

	Parental Status		
	Childless‡	Child Living	Total
Proxy Relationship****	N (%)	N (%)	N (%)
Spouse/partner	279 (23.25)	2,626 (35.21)	2,905 (33.55)
Adult child[1]	185 (15.42)	4,219 (56.57)	4,404 (50.87)
Sibling, other relative	539 (44.92)	441 (5.91)	980 (11.32)
Other individual	167 (13.91)	149 (2.00)	316 (3.65)
Professional, paid helper	30 (2.50)	23 (0.31)	53 (0.61)
Total	1,200 (100%)	7,458 (100%)	8,658 (100%)
Proxy Responses			
EOL Care Discussion**			
Don't know	0	0	0
Refused	0	0	0
Total	1,200 (100%)	7,458 (100%)	8,658 (100%)
Advance Directive: LW[2]			
Don't know	7 (0.58)	38 (0.51)	45 (0.52)
Refused	0	0	0
Total	1,200 (100%)	7,458 (100%)	8,658 (100%)
Advance Directive: DPAHC[2]			
Don't know	6 (0.50)	45 (0.60)	51 (0.59)
Refused	0	1 (0.01)	1 (0.01)
Total	1,200 (100%)	7,458 (100%)	8,658 (100%)

^ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; **** $p < 0.0001$ by χ^2 test.

N = 8,658 = 1,200 (13.86% childless) + 7,458 (86.14%)

‡ Childless refers to no living children: no child ever born or outlived all children, biological and/or step.

[1] Includes biological and step children, children in-law, and grandchildren.

[2] Association between childlessness and response categories is not statistically significant, by χ^2 test.

Predictor Variable: Childlessness in Late Life

Childlessness is defined in this work as the absence of adult children, whether biological or step. Individuals may be childless if they have neither given birth to nor fathered a child, or if they have outlived all their children. Biologically childless individuals may have step children—sons or daughters of a spouse—or adoptive children. Adoptive children and their parents, however, are not identified as such in the HRS.

Childlessness was operationalized in this study as a composite variable, created by comparing two measures from the RAND HRS: *number of children ever born* and *number of children living*. The new parental status variable accounted for three distinct types of childlessness: 1) no child ever born, no living step child; 2) outlived all biological and any step children; and 3) living step child only, no biological child. The reference category included respondents who had biological children and at least one living child, either biological or step, as shown in Table 3.6.

Number of children ever born, a respondent-level variable drawn from the RAND HRS, included co-resident children and children living elsewhere, identified in initial and subsequent HRS interviews (Chien et al., 2014). This measure did not include adoptive or step children, or in-laws (spouses of adult children). Also, this measure did not explain the reason for biological childlessness—whether it was voluntary or involuntary. Nor did it track miscarriages or indicate whether a child had died (Chien et al., 2014).

Number of children living, by contrast, included the number of living children of both the HRS respondent and spouse or partner. To be included in this measure, children must have been alive and in contact with their parents, so that the linkage to the child could be independently verified by HRS staff. *Number of children living* had been

processed by RAND into a respondent-level variable, combining all biological and step children together into one measure. Over time, new children were added to the count if respondents divorced and remarried. This measure could include adoptive sons and daughters; however, there is no flag in the RAND HRS to identify children who were adopted.

Based on the available data, the category in Table 3.6 for *living step child only* refers to step parents who never had biological children. Respondents who had outlived their biological children, but had living step children, appear in the reference category, *living children, biological and/or step*. Subgroups could not be further delineated because the HRS does not include a measure to reliably distinguish between living biological children and living step children. The actual effect of this limitation, however, is likely to be negligible. Only 1 – 3 percent of older parents are predeceased by all of their adult children (Uhlenberg, 1996; Dykstra & Hagestad, 2007).

Number of children ever born and *number of children living* were validated by RAND for consistency across waves. These items had been self-reported and therefore deemed to be more accurate than proxy reports from the exit interviews. Furthermore, in the exit interviews, parental status was measured inconsistently across survey waves. Using the RAND HRS measure, however, means that if an adult child died between the date of the respondent's last interview and the respondent's date of death, then that event was not captured in the dataset used for this study. The likelihood of the last child having died during this two year interval, however, is extremely low, so the actual effect of this limitation was considered to be slight (Uhlenberg, 1996; Dykstra & Hagestad, 2007).

Missing values. Data points missing in the RAND HRS for *number of children ever born* and *number of children living* were replaced, wherever possible, with values from the RAND HRS family data files version C. RAND derived these values from the relationship listed in the HRS respondent – kid file. Nevertheless, the variables *own kids* and *step kids* still had to be compared against *number of children living*, as illustrated in Table 3.6, in order to determine whether the child was alive or not.

Summary. The process used to construct the categorical variable for parental status is summarized in Table 3.6. Essentially, each measure was dichotomized as a binary variable with 1 = one child or more; 0 = no child. When compared, four categories resulted: 1) no child ever born, no living step child (value = 0 for *number of children ever born*, and 0 for *number of children living*); 2) outlived all biological and any step children (value = 1 for *number of children ever born*, and value = 0 for *number of children living*); and 3) living step child only, no child ever born (value = 0 for *number of children ever born,* and value = 1 for *number of children living*). Table 3.6 displays the reference category, living child, biological or step (value = 1 for *number of children ever born*, and value = 1 for *number of children living*).

Table 3.6. *Childlessness Typology. HRS, 1992 – 2012.*

Type	Number of Children Ever Born[1]	Number of Children Living[2]	Description
1	0	0	No child ever born
2	1	0	Outlived all biological and step children
3	0	1	Step only, no biological child
Reference	1	1	Child living, biological and any step

[1] Respondent-level variable. Includes biological children, whether or not alive.

[2] Household-level variable. Includes living biological children of both partners.

Covariates

Covariates analyzed in this work include demographic characteristics (age, cohort, gender, marital status, race, ethnicity, education, net worth, and income), health measures (nursing home residence, self-rated health, functional status, and death expected or not), and social factors (live alone, living siblings, relatives near, good friends near, and social contact). A justification is provided below for each covariate in the study, as well as an explanation of how each variable was operationalized.

Demographics

Demographic characteristics were used to describe the study population with respect to both childlessness and advance care planning. Potential confounders were controlled for in the regression model. Values for each measure were extracted from the RAND HRS. Items were checked for consistency across waves, and any discrepancies flagged. Complete information on the construction of these variables can be found in the RAND HRS data documentation for version N (Chien et al., 2014).

Age. Rates of childlessness differ significantly in the U.S. by age and age cohort (Kirmeyer & Hamilton, 2011). With ages ranging from 50 to over 100 years, persons included in the sample for this study were young adults across very different periods of time: the Great Depression, World War II, the post-war boom, and the women's rights movement. Distinct social and cultural influences in each era could have had a bearing on the decision to start a family. According to the research literature, childlessness is more prevalent among those who came of age in the 1930s during the economic constraints of the Great Depression than it is among those who experienced their childbearing years during the post-war expansion of the 1950s (Koropeckyj-Cox & Call, 2007; Rindfuss et

al., 1988). Older age is also associated with the likelihood of having outlived all children (Dykstra & Wagner, 2007; Wagner et al., 1999). And older persons are more likely than younger persons to have an advance directive (Moorman & Inoue, 2013; Elpern et al, 1993; Pew, 2013).

Age was operationalized in this study as a continuous variable measured by number of years from birth. Birth year was self-reported during the initial respondent interview. For Aim 1, current age as of 2012, the year of the most recent HRS wave, was based on birth year drawn from the RAND HRS. For Aims 2 and 3, age at death was extracted from the exit interviews. Based on the birth year on record with the HRS, proxy informants were asked to confirm the age at which the decedent died. Deaths were independently verified by the HRS against the National Death Index (HRS, 2011).

Cohort. A generational cohort is defined at the population-level as a group of individuals who experience an event within the same time interval (Porta, 2008). The timing of these experiences relative to certain developmental periods in life can have lasting effects. Common traits and perspectives tend to develop among members of a generational cohort, shaping individual behaviors and decisions across the life course (Alwin, 2012; Costa & McCrae, 1982; Dannefer, Uhlenberg, Foner, Abeles, 2005; Glenn, 1976; Riley, 1973). The current U.S. population over age 50 includes civic (born prior to 1928), silent (born 1928 – 1945), and boomer (born 1946 – 1964) cohorts, according to the terms and birth years defined in most national surveys and research on generational history (Pew, 2014; Strauss & Howe, 1991).

In the HRS, six age-defined cohorts reflect the birth years of new respondents who entered the HRS together during particular waves every six years. Respondents with

birth years before 1924 appear in the Assets and Health Dynamics Among the Oldest Old (AHEAD) cohort; 1924 – 1930 in the Children of Depression (CODA) cohort; 1931 – 1941 in the original HRS cohort; 1942 – 1947 in the War Baby (WB) cohort; 1948 – 1953 in the Early Baby Boomer (EBB) cohort, and 1954 – 1959 in the Mid Baby Boomer (MBB) cohort. If birth year is missing, then the HRS cohort variable is set to missing in the RAND HRS. If birth year is after 1959, then the HRS cohort is zero. Categories include: 1 = AHEAD, 2 = CODA, 3 = HRS, 4 = WB, 5 = EBB, and 6 = MBB.

To facilitate analysis, HRS cohorts were collapsed into three distinct generational cohorts relevant to this study. The AHEAD and CODA cohorts correspond most closely to the civic generation; the HRS and WB cohorts represent mainly the silent generation, and the EBB and MBB comprise the boomer generation through birth year 1959. The three variables representing generational cohort were re-coded as 1 = civic (born prior to 1931), 2 = silent (1931 – 1947), and 3 = boomer (1948 – 1959). *Age* and *generational cohort* are used in this dissertation to describe the dataset and results. Regression models for Aims 2 and 3 included age in years because it is a more precise measure than cohort.

Gender. Prior research shows that the prevalence of childlessness among men is 6 percent lower than it is among women (Koropeckyj-Cox & Call, 2007). Furthermore, studies demonstrate that women and men experience childlessness differently across the life course (Keizer et al., 2009). For men, in particular, childlessness over time may lead to less community involvement, fewer sources of emotional and instrumental support, and greater dissatisfaction with life (Dykstra & Keizer, 2009). Studies also indicate that gender is associated with differences in advance care planning, as more men than women have advance directives, and more women than men engage in end-of-life care discussion

(Carr & Khodyakov, 2007a,b; Hopp, 2000). Gender may, therefore, interact with childlessness to modify the likelihood of advance directive completion.

Gender was operationalized in this study as a binary variable. Gender was self-reported during the respondent's initial HRS interview. The measure reported in the RAND HRS was used in this dissertation because the data had been cleaned and validated by RAND. In the raw HRS files, there were a number of cases in which gender changed from wave to wave, due to coding errors. To identify the correct gender for some of the cases with coding errors, gender-specific health questions elsewhere in the HRS were examined. For example, if prostate exam = yes, then the respondent was coded as male, and if mammogram, pap smear, or checking for breast lumps = yes, then the respondent was coded as female (Chien et al., 2014). Categories for this study were coded as 1 = male; 2 = female.

Marital status. Marital status is strongly correlated with childlessness in that few men and women in the older cohorts represented by the HRS had children out of wedlock, and few married couples in these cohorts remained childless (Connidis, 2010). The relationship between marital status and advance care planning remains less clear. Research shows that married persons are more likely to engage in advance care planning (e.g., Carr & Khodyakov, 2007a,b using the Wisconsin Longitudinal Study (WLS)); yet, other studies have demonstrated that advance care planning is more common among unmarried persons (Bischoff et al., 2013; Hopp, 2000; Kahana, et al, 2004). Determining whether marital status and childlessness interact to modify advance care planning is a major objective of this dissertation.

Marital status was operationalized as a categorical variable in this study. Because marital status can change over time as couples marry, become partnered, divorce, re-marry, or become widowed, status at the time of the most recent interview was extracted from the RAND HRS for Aim 1. For Aims 2 and 3, marital status at the time of final illness was used, as recorded in the exit interview. For consistency, marital status was re-coded for this study into categories in which a value of 1 = married; 2 = partnered; 3 = divorced or separated; 4 = widowed; and 5 = never married.

Race. Among older women, white race is positively associated with childlessness (Bloom & Trussell, 1984; Boyd, 1989). The same pattern is expected to hold true for older married men, whose fertility pattern is likely to follow their wives' (Rowland, 2007). Race is also related to advance directive completion. Blacks tend to have significantly lower levels of advance directive completion than whites (Bischoff et al., 2013; Gerst & Burr, 2008; Hopp, 2000a b). In analyzing the effect of childlessness on advance directive completion, therefore, it is necessary to control for race.

Race was operationalized in this study as a categorical variable. During the respondent's initial interview, race was self-reported. For this study, the RAND HRS measure was used because it had been cleaned and validated. In the RAND HRS, race was constructed by examining data from all survey waves and the tracker file. The first non-missing value for race was the one reported. In some cases, ethnicity was used to establish race. For example, if the respondent was Hispanic, then the respondent was categorized as white, and a flag was set to identify these cases (Chien et al., 2014).

Modification of the HRS survey instrument over the past two decades has resulted in collapsed or expanded categories for race in different waves. In the RAND HRS, race

has been consolidated across all waves into three categories: white, black, and other. Starting in wave 8, all respondents were given the opportunity to self-identify with up to three races, and to designate a primary race, which was the one recorded in the RAND HRS (Chien et al., 2014). Because only 1.1 percent of the study population is identified as other, a binary variable was constructed for race for this study such that a value of 1 = white, and 0 = non-white.

Ethnicity. Little is known about the association between Hispanic ethnicity and childlessness in late life. Among younger and middle age adults, Hispanic women have a similar rate of childlessness as blacks, around 17 percent, compared with nearly 20 percent for white women (Taylor et al., 2010a; U.S. Census, 2010). Advance care planning is less common among Hispanics than any other race or ethnicity in the HRS (Bischoff et al., 2013). Additionally, the high proportion of Roman Catholics who are Hispanic appears to have a bearing on care choices. A majority of Hispanic Catholics (57 percent) report that they would ask their physicians to do everything possible to save their lives under any circumstance (Pew, 2013). Hispanic ethnicity, therefore, is controlled for in analyzing the effect of childlessness on advance directive completion.

Hispanic ethnicity was operationalized as a binary variable in this study. Ethnicity was self-reported during the respondent's initial interview. The RAND HRS variable for ethnicity was used because the data had been cleaned and validated. Hispanic ethnicity was constructed by examining data from all survey waves and the tracker file. The first non-missing value was used and coded as a binary variable in which 1 = Hispanic, and 0 = non-Hispanic. Mexican-American and other Hispanic were set to a value of 1 for Hispanic (Chien et al., 2014).

Education. Education is associated with childlessness among never married older women, but not men (Keizer et al., 2008; Dykstra & Hagestad, 2007). Education is also related to advance directive completion. Highly educated individuals with at least a high school diploma tend to complete advance directives more frequently than those with less education (Carr & Khodyakov, 2007a b; Hopp, 2000).

Education was operationalized as a categorical variable in this study. Education was self-reported by the respondent during the initial HRS interview. The RAND HRS categorical summary for education was used because it had been cleaned and validated by comparing years of education and highest degree earned from all survey waves and the tracker file. The first non-missing value was used and coded as a categorical variable in which 1 = less than high school; 2 = general education development (GED) test; 3= high school graduate; 4 = some college; and 5 = college and above.

To be consistent, education was re-coded by RAND into categories that were available across all waves. For example, the wording for degrees less than a Bachelor's degree changed over time. In waves 1 and 2, it was "Associate's." In later waves, there were separate categories, such as "Advanced degree/non-professional" and "Advanced degree/professional." The categorical summary provided by RAND accounted for these differences. For this study, responses were re-coded using a value of 1 = high (combining the categories for college and above, some college, GED, and high school graduate); and 0 = low (less than a high school degree).

Net worth. Net worth provides a measure of economic status. Prior research suggests that higher socio-economic status increases the likelihood of end-of-life discussion and advance directive completion (Carr, 2012a; Carr & Khodyakov, 2007a).

In particular, engagement in advance care planning is positively associated with high net worth ≥ $239,000; whereas lack of planning is associated with low worth ≤ $6,000 (Bischoff et al., 2013). Advance directive completion typically occurs within the context of financial planning, during the execution of a will (Carr, 2012a; Su, 2008), or as part of long term care planning (Finkelstein, Reid, Kleppinger, Pillemer, Robison, 2012; Schaber & Stum, 2007). Individuals with higher net worth tend to engage more often in financial planning than those with lower net worth (Su, 2008). Whether estate planning is linked to the presence or absence of children remains unclear; there is a dearth of research on this aspect of childlessness. It is well documented, however, that childless older women have higher net worth than older mothers (Koropeckyj-Cox & Call, 2007; Plotnick, 2009).

Net worth was operationalized in this study as a continuous variable representing the dollar value of all wealth components less all debt for the respondent and spouse or partner, and as a binary variable using the lowest quartile in 2012 dollars as the cut-point: $13,000 for Aim 1, and $6,057 for Aims 2 and 3. The summary measure, *total wealth*, drawn from the RAND HRS, included the value of real estate, including primary residence; vehicles; businesses; individual retirement (IRA) and Keogh accounts; stocks, mutual funds, and investment trusts; checking, savings, and money market accounts; certificates of deposit, government savings bonds, and treasury bills; bonds and bond funds; and all other savings. Liabilities included all mortgages/land contracts, home loans for primary residence; and other debt. Secondary residence was excluded from the measurement of net value used in this dissertation because it was not measured in wave 3 (Chien et al., 2014).

RAND performs asset verification for HRS values above a certain threshold (Chien et al., 2013), and reports wealth in nominal dollars. To account for inflation across survey waves, all values used in this study were converted to 2012 dollars, to match the most recent version of the HRS. Historical data for this adjustment were extracted from the Consumer Price Index, All Urban - (CPI-U), (Table 24), published by the U.S. Department of Labor (Bureau of Labor Statistics, 2014).

Values for missing wealth components were imputed by RAND using a consistent method across all waves that accounted for differences in bracket amounts, entry points, and possible responses to survey questions. Detailed discussions and examples of the wealth and income imputations appear in the RAND HRS documentation and related articles (Chien et al., 2014; Hurd, Meijer, Moldoff, & Rohwedder, 2014; Moldoff, Chien, Campbell, Hayden, Hurd, Main et al., 2014).

Net worth was re-coded for this study as a binary variable with a value of 1 = high or medium, and 0 = low, equivalent to the lowest quartile in 2012 dollars. Because net worth is based on asset value, which is subject to market volatility including the U.S. recession that started in 2008, total income was also included in this study.

Income. Income is a measure of economic status. In prior research, high socio-economic status has been shown to increase the likelihood of advance care planning (Carr, 2012a; Carr & Khodyakov, 2007a). Typically, advance directive completion occurs within the context of legal or financial planning, during the execution of a will (Carr, 2012a; Su, 2008), for example, or in long term care planning (Finkelstein et al., 2012; Schaber & Stum, 2007). At higher income levels, individuals tend to engage more often in financial planning than those at lower income levels (Black et al., 2008; Su,

2008). Family structure is also associated with income. Older men who are fathers have higher average incomes than childless men (Dykstra & Hagestad, 2007). Older women without children, by contrast, have higher individual incomes than older mothers (Koropeckyj-Cox & Call, 2007; Plotnick, 2009).

Income was operationalized in this study as a continuous variable representing the dollar value of all sources of household income for the respondent and spouse or partner; and as a binary variable using the lowest quartile in 2012 dollars as the cut-point: $16,365 for Aim 1, and $14,563 for Aims 2 and 3. The summary measure *total income*, drawn from the RAND HRS, included individual earnings, household capital income, pensions or annuities, Social Security payments, unemployment or workers compensation, government transfers, and all other household income. To account for inflation across survey waves over the last two decades, all values were converted to 2012 dollars using the Consumer Price Index, All Urban (CPI-U) to match the year of the HRS survey. The CPI represents the average change in prices for goods and services purchased over time. Local data are combined into a U.S. city average (Bureau of Labor Statistics, 2014).

Values for missing income data were imputed by RAND using a consistent method across all waves that accounted for differences in bracket amounts, entry points, and possible responses to survey questions. Detailed discussions and examples of the income imputations appear in the RAND HRS documentation and related articles (Chien et al., 2014; Hurd et al., 2014; Moldoff et al., 2014). For respondents in wave 2H, specific questions related to total household income were not asked, and were therefore missing from the RAND HRS. In order to include these respondents in the present study, total

income for wave 2H was imputed by averaging the respondent-level incomes reported in waves 1 and 3, after adjusting for inflation as discussed above using the CPI.

Income was re-coded for this study as a binary variable with a value of 1 = high or medium income; and 0 = low income, equivalent to the lowest quartile in 2012 dollars.

Health Measures

Health measures were included in this work to describe the study population and to control for conditions associated with advance care planning and/or childlessness. Measures related to the end-of-life circumstances of HRS decedents were extracted from the exit interviews. Other measures, including nursing home/long-term care residence, self-rated health, and functional status were drawn from the RAND HRS.

Nursing home/long-term care residence. Childless older adults and those who are unmarried are more likely to reside in a nursing home or long term care setting than older persons with children (Akyan, 2003; Freedman, 1996; Nöel-Miller, 2010). Although nursing home and long term care residents are not legally required to complete an advance directive and cannot be denied admission for refusing or failing to do so, nursing homes that participate in Medicare and Medicaid are expected to provide information and education about advance directives to their residents and families (Levin et al., 1999; OBRA, 1990). Residents of these settings, therefore, may have higher rates of advance care planning than nonresidents.

Nursing home/long-term care residence was operationalized in this study as a binary variable. For Aim 1, residence at the time of interview was drawn from the RAND HRS. This measure included values for waves 3 forward because no respondents lived in a nursing home or long term care setting at the time they were first interviewed for waves

1 and 2A. In wave 2H, six respondents resided in a nursing home or long term care setting at the time of interview (Chien et al., 2014). These cases were extracted from the HRS core data using the flag w109=21, and merged into the dataset for this dissertation.

For Aims 2 and 3, nursing home/long term care residence was operationalized as a binary variable based on yes/no responses to the following question asked of proxies during exit interviews from 2000 – 2012:

> Was [decedent's first name] living in a nursing home or other health care facility *at the time (he/she) died*?
>
> Definition: A nursing home or other health facility provides all of the following services for its residents: dispensing of medication, 24-hour nursing assistance and supervision, personal assistance, and room & meals.

Residence was re-coded as a binary variable for which a value of 1 = nursing home or long term care resident; 0 = not a nursing home or long term care resident.

Self-rated health. As a measure of the respondent's general health and well-being, self-rated health is a strong predictor of mortality, disability, and health care utilization (Burström & Fredlund, 2001; Idler & Benyamini, 1997; Mossey & Shapiro, 1982). Advance directive completion is higher among those with low self-rated health status, compared with individuals who have high self-rated health (Elpern et al., 1993), and may be associated with childlessness based on higher morbidity among older men without children (Crimmins et al., 2010; Eisenberg et al., 2011). Conversely, self-rated health is higher among unmarried women with children (Hughes & Waite, 2002).

Self-rated health was operationalized in this study as a categorical variable based on responses given during the most recently completed biennial HRS survey. Values were extracted from the RAND HRS as self-report of health, and the most recent measure

was used in analyses for Aim 1. For Aims 2 and 3, self-report of health was extracted from the survey wave closest to the decedent's death. Response categories include 1 = excellent; 2 = very good; 3 = good; 4 = fair; 5 = poor. If missing, values for self-reported health were imputed by RAND for wave 1.

Self-rated health was re-coded for this dissertation as a binary variable with a value of 1 = high (excellent, very good, or good), and 0 = low (fair or poor).

Functional status. Functional status refers to the ability to perform basic activities such as eating and dressing, and more complex activities such as handling money and taking medication (Lawton & Brody, 1969; Mack & Patterson, 2006). Functional status is an indicator of disablement and decline (Barberger-Gateau, Rainville, Letenneur, et al., 2000; Peres, Helmer, Amieva, et al., 2008). According to published reports, advance care planning appears to be higher among those with functional limitations, compared with individuals who have no limitations (Bischoff et al., 2013). Although lower functional status is associated with advance care planning, it remains unknown whether a relationship exists between functional status and childlessness. Associations have been reported between low functional status and childlessness among women (Hughes & Waite, 2002), although it is not clear whether these results reflect biological differences or confounders such as older age based on the longer life span of women.

Functional status was operationalized by two different indices in the RAND HRS, one for Activities of Daily Living (ADL) and another for Instrumental Activities of Daily Living (IADL). The ADL and IADL indices were selected for their applicability to advance care planning, which involves tasks that are functionally complex. The ADL

summary in the RAND HRS included five tasks needed for basic functioning: bathing, eating, dressing, walking across a room, and getting out of bed. The IADL summary included three tasks: using the phone, managing money, and taking medications, for waves 2 – 11. For wave 1 only, the tasks measured included reading a map, using a calculator, and using a microwave (Chien et al., 2014). While these tasks are not identical to the ones used in later waves, they do measure similarly complex functions relevant to advance care planning, so it makes sense to group them together for the purposes of this study. Discarding all the records from an entire wave could make the sample less representative, and bias the results.

Difficulties with ADLs and IADLs could affect advance care planning in two ways. First, functional limitations generally lead to dependency (Hughes, Chang Bilt, Snitz, Ganguli, 2013). An individual with low functional status probably lacks the physical stamina and/or cognitive capacity to plan ahead and complete an advance directive (IOM, 2014). On the other hand, becoming reliant on others for daily functioning could motivate advance care planning, particularly among those who have close relatives and associates to help establish a plan.

The ADL and IADL indices used in this study reflect difficulties in performing a functional task: 1 = any difficulty; 0 = no difficulty. The ADL index is the sum of the number of difficulties reported in bathing, dressing, eating, getting out of bed, and walking across the room. The IADL index is the sum of the number of difficulties reported in using the phone, managing money, and taking medications (or, in wave 1 only, using a map, using a calculator, and using the microwave). ADL summary

responses for this dissertation ranged from 0 – 5. IADL summary responses ranged from 0 – 3.

Cognitive status. Cognitive status refers to mental abilities such as memory, language, and problem-solving. Measures include immediate and delayed word recall, the serial 7's test, counting backwards, naming tasks (e.g., date-naming, object naming), and vocabulary questions. Individuals with cognitive impairment usually have significant problems with basic and instrumental functioning (Aretouli & Brandt, 2010; Burton, Strauss, Bunce et al., 2009; Gauthier, Reisberg, Zaudig et al., 2006; Hughes et al., 2013). These limitations may have either a positive or negative effect on advance care planning, depending on social support available to the individual.

Cognitive status was not actually used as a covariate in this dissertation because of the large number of missing values for *total cognition* in version N of the RAND HRS. Cognitive tests of mental status are absent in waves 1 and 2H; therefore, scores for total cognition appear only in wave 2A and waves 3 through 10. Moreover, cognitive imputations for wave 11 have yet to be released (Chien et al., 2014). Instead, measures for cause of death (which may reflect underlying neurological disease) and measures of functional status were considered in this study as indicators of probable cognitive impairment.

IADLs tend to be problematic for individuals experiencing cognitive decline in the early stages of dementia (Peres, Chrysostome, Fabrigoule, et al., 2006); whereas basic ADLs are preserved until much later in the course of disease (Wilms, Kanowski & Baltes, 2000). A growing number of research studies suggest that limited IADL functioning can help predict the risk of developing dementia (Cromwell, Eagar & Poulos,

2003; Sikkes, Visser, Knol, de Lange-de Klerk, Tsolaki et al., 2011). IADL measures (e.g., using the phone, managing money, and using a calculator) are also more representative of the actual functional tasks involved in advance care planning than conventional measures of cognitive status (e.g., naming tasks and counting in series).

Death expected or not. Expected death may be associated with advance directive completion when the prognosis of a certain number of months to live allows sufficient time to engage in advance care planning. There is, for example, a demonstrated association between hospice care and advance directive completion (Bischoff et al., 2013). According to data from the 2007 National Home and Hospice Care Survey, 88 percent of patients in hospice have an advance directive (Jones et al., 2011).

Death expected or not was operationalized in this study as a binary variable taken directly from the HRS exit interviews. Each proxy informant was asked, across all exit interviews from 2000-2012: "Was the death expected at about the time it occurred, or was it unexpected?" Response categories included 1 = expected; 2 = unexpected; 7 = other; 8 = don't Know; and 9 = other. For this dissertation, responses were re-coded as a binary variable with a value of 1 = expected; 0 = unexpected.

Cause of death. Cause of death describes the range of conditions recognized by the proxy as leading to the decedent's death, and is useful as a descriptive variable. Moreover, cause of death may be associated with advance care planning in the event of a terminal diagnosis such as cancer, as time allows for end-of-life care discussions and advance directive completion.

Cause of death was operationalized in this study as a categorical variable based on responses to the exit interview question: "What was the major illness that led to [his/her]

death?" Cause of death appears as a masked variable in the HRS public use file; therefore disease categories have been collapsed to protect respondent confidentiality. The restricted HRS dataset includes cause of death documented in the National Death Index. The unrestricted dataset used in this dissertation relies instead on proxy reports collected during the exit interview. For the purposes of this research, it is preferable to know what the proxy understood to be the cause of death. It is the patient's and family's knowledge of a particular health condition that may stimulate end-of-life care discussion and advance directive completion. Limitations of proxy reports, including response bias and social desirability, are discussed in Chapter 5.

For cause of death, response categories have been collapsed into the following groups in the HRS public dataset: a value of 101-103 = cancers and tumors, skin conditions; 111-119 = musculoskeletal system and connective tissue; 121-129 = heart, circulatory and blood conditions; 131-139 = allergies; hay fever; sinusitis; tonsillitis; 141-149 = endocrine, metabolic, and nutritional conditions; 151-159 = digestive system (stomach, liver, gallbladder, kidney, bladder); 161-169 = neurological and sensory conditions; 171-179 = reproductive system and prostate conditions; 181-189 = emotional and psychological conditions; 191-196 = miscellaneous; 595-597 = other symptoms; 601-607 = not a health condition; 996 = none; 997 = other health condition; 998 = don't know, or not ascertained; and 999 = refused.

Cause of death in this dissertation was constructed as a binary variable: a value of 1 = presence of the condition; 0 = absence of the condition.

Social Factors

Social factors considered in this study include two measures of social network size and one measure of social contact frequency. These measures were expected to vary by parental status, and to influence the likelihood of end-of-life care discussion and advance directive completion. *Live alone* and *living siblings* were drawn from the RAND HRS. The items *relatives near, good friends near, and social contact* appear only in the HRS core interviews. The most recent values for these measures were extracted from the core interview that occurred within two years of death.

Live alone. Half of all childless persons live alone, according to prior research (Koropeckyj-Cox & Call, 2007; Wenger, G. et al., 2007). Living alone decreases the likelihood of having someone available to provide instrumental and emotional support (Thoits, 2011); for example, to discuss end-of-life care preferences, or to designate as health care proxy in an advance directive (Schickedanz et al., 2009). Loneliness and lack of social support over time may diminish motivation to engage in advance care planning.

Live alone was operationalized as a categorical variable using a measure of household size from the RAND HRS. Based on this count, a binary variable was created with a value of 1 = live alone, and 0 = live with others.

Living siblings. Today, 80 percent of individuals over age 65 have at least one living sibling (Connidis, 2010). Prior research suggests that older persons rely on their siblings for both emotional support and instrumental care (Bedford et al., 1998; Cicirelli, 1995; Connidis, 2010; Connidis & Campbell, 1995), particularly in the absence of a spouse or adult children (Rubinstein et al., 1991; Wu & Pollard, 1998). Among childless older adults, the presence of a living sibling generally increases social network size and

potential social support (Thoits, 2011) and may be associated with advance directive completion. Prior research shows that, when engaged in advance care planning, unmarried childless individuals typically designate another relative, such as a sibling, as their DPAHC (Hopp, 2000). In this dissertation, therefore, the presence of living siblings was included as a covariate in regression models analyzing childlessness and advance directive completion.

Living siblings was operationalized in this study as a continuous variable. Number of living siblings was drawn from the RAND HRS as the sum of the counts of living sisters and brothers based on responses to initial and follow-up interview questions about the number of living sisters and brothers. Inconsistencies across waves were adjusted for in the RAND HRS. In waves 1 – 5, for example, the family respondent, who may be a spouse, answered this item for all members of the household and the relationship codes were switched in some cases. From wave 6 to the present, sibling data were collected directly from individual respondents. For consistency across waves, step-siblings were subtracted from the total number of living siblings. Sibling counts were checked against family rosters to resolve inconsistencies and missing values. Number of living siblings was re-coded for this study as a binary variable with a value of 1 = living siblings, and 0 = no living siblings.

Relatives near. Older adults without children are less likely than older parents to have relatives who live nearby. By definition, childlessness reduces family size overall. Prior research demonstrates that reduced family size is associated with decreased social network size (Dykstra & Hagestad, 2007; Grundy & Read, 2012), which could result in

fewer choices for designating a surrogate decision maker. Loneliness and lack of social support may diminish motivation to complete an advance directive.

Relatives near was operationalized as a categorical variable measured by the following question: "Do you have any relatives in or near the facility where you are living?" or "[Besides the people living (here/there) with you,] do you have any relatives in your neighborhood?" Response categories included yes, no, or don't know/refused. The most recent value for relatives near was extracted from the HRS core interviews, and re-coded for this study as a binary variable with a value of 1 = relatives near, and 0 = no relatives near.

Good friends near. According to the research literature, older adults without children tend to make up for having fewer relatives by building networks of friends (Rubinstein et al., 1991; Wu & Pollard, 1998). Having good friends near enlarges social network size, which may increase advance directive completion by adding to the number of potential surrogate decision-makers. Very few individuals, however, choose non-relatives as surrogates even in the absence of an adult child or the lack of a partner (Hopp, 2000; Carr & Khodyakov, 2007a,b).

Good friends near was operationalized in this study as a categorical variable, and measured by the following question: "Do you have any good friends in or near the facility? / Do you have any good friends living in your neighborhood?" Response categories included yes, no, or don't know/refused. The most recent value for good friends near was extracted from the HRS core interviews, and re-coded as a binary variable with a value of 1 = good friends near, and 0 = no good friends near.

Social contact. Measures of social contact serve as an indicator of the size and strength of social networks, from which emotional support and instrumental help may be obtained (Berkman, Glass, Brissette, & Seeman, 2000). Having a source of support in late life may increase the likelihood of advance directive completion. Conversely, lack of social contact may be a sign of loneliness or depression, which may decrease motivation to complete an advance directive. Related research indicates that childless older adults, regardless of marital status and gender, are as likely to be active in the community as those with children; however, their social networks are less likely to provide the support necessary to ensure independent living in case of frailty (Dykstra & Hagestad, 2007; Grundy & Read, 2012; Wenger, G. et al., 2007). The extent to which this is true as well for advance care planning remains unknown.

Social contact was operationalized in this study as an ordinal variable based on responses to the HRS item that asked respondents: "How often do you get together with [people in or near the facility/any of your neighbors] just to chat or for a social visit?" Responses included 1 = daily or almost every day; 2 = several times a week, 3 = several times a month, 4 = several times a year, 5 = hardly ever or never, 8 = don't know, 9 = not ascertained. The most recent value for social contact was extracted from the HRS and re-coded for this study as a binary variable with a value of 1 = frequently get together with people (every day, week, bi-weekly, or monthly); or 0 = rarely get together with people (every year, or almost never).

3.5. Power Analysis

The power analysis presented below demonstrates that the final weighted study sample for Aim 1, N = 18,613, including 2,207 (14.40 percent) childless, is adequate to

describe family structure in the U.S. population over age 50 by parental status, marital status, and gender. Likewise, the final sample for Aims 2 and 3, N = 8,658, including 1,200 (13.86 percent) childless, is adequate to detect small differences in advance care planning among decedents with and without living children, and differences in effect by marital status and gender. Tables 3.7 and 3.8 display descriptive data and cell sizes by marital status and gender for Aims 1, 2, and 3.

Table 3.7. *Marital Status by Gender*. *HRS 2012 and Exit Interviews, 2000 – 2012*.

	Women	Men	Total
Marital Status, HRS 2012	N (%)[+]	N (%)[+]	N (%)[+]
Married[1]	5,188 (53.24)	5,612 (69.89)	10,800 (60.87)
Partnered	**405** (3.18)	462 (4.73)	867 (3.89)
Unmarried	5,052 (43.58)	1,894 (25.38)	6,946 (35.24)
Divorced/separated	(1,788 (16.36))	874 (12.28)	2,662 (14.49)
Widowed	(2,699 (20.77))	626 (5.84)	3,325 (13.93)
Never married	(565 (6.45))	**394** (7.26)	959 (6.82)
Total, Aim 1, N (%)[2]	10,645 (54.15)[+]	7,968 (45.85)[+]	18,613 (100)[+]
Marital Status, Exit Interviews, 2000 – 2012			
Married[1]	1,235 (26.82)	2,561 (63.19)	3,796 (43.84)
Partnered	**52** (1.13)	122 (3.01)	174 (2.01)
Unmarried	3,318 (72.05)	1,370 (33.80)	4,688 (54.15)
Divorced/separated	421 (9.14)	390 (9.62)	811 (9.37)
Widowed	2,724 (59.15)	861 (21.24)	3,585 (41.41)
Never married	173 (3.76)	**119** (2.94)	292 (3.37)
Total, Aims 2 and 3, N (%)[2]	4,605 (53.19)	4,053 (46.81)	8,658 (100)

[+] Percentages shown for Aim 1 are based on sample weights applied to the 2012 HRS.

[1] Percent married/unmarried is based on column total.

[2] Percent gender is weighted based on total N.

Smallest cell sizes are bolded.

Table 3.8. *Percent Childless*[ǂ] *within Strata of Sample Subgroups by Marital Status and Gender. HRS 2012 and Exit Interviews, 2000 – 2012.*

	Women	Men	Total
Marital Status, HRS 2012	Childless N (%)	Childless N (%)	Childless N (%)
Married[1]	459 (9.45)	471 (9.15)	930 (9.29)
Partnered	**63** (16.90)	82 (21.99)	145 (19.74)
Unmarried[2]	663 (30.73)	469 (54.43)	1,132 (40.15)
Divorced/separated	181(11.99)	106 (12.21)	287 (12.07)
Widowed	221 (9.15)	**73** (13.66)	294 (10.02)
Never married	261 (62.01)	290 (80.12)	551 (70.86)
Total, Aim 1, N (%)[3]	1,185 (13.43)[+]	1,022 (15.54)[+]	2,207 (14.40)[+]
Marital Status, Exit Interviews 2000 – 2012			
Married[1]	132 (10.69)	244 (9.53)	376 (9.91)
Partnered	**9** (17.31)	**20** (16.39)	29 (16.67)
Unmarried (subtotal)[2]	532 (28.53)	263 (40.11)	795 (32.29)
Divorced/separated	46 (10.93)	43 (11.03)	89 (10.97)
Widowed	354(13.00)	120 (13.94)	474 (13.22)
Never married	132 (76.30)	100 (84.03)	232 (79.45)
Total, Aims 2 & 3, N (%)[3]	673 (14.61)	527 (13.00)	1,200 (13.86)

ǂ Includes those who are both biologically childless and those who have outlived their children.

[+] Percentages shown for Aim 1 are based on sample weights applied to the 2012 HRS.

[1] Percent childless by marital status is based on the number in each subgroup from Table 3.7.

[2] Percent childless for unmarried (subtotal) is based on a weighted average of the prevalence of childlessness among the divorced/separated, widowed, and never married.

[3] Percent childless overall is based on column totals from Table 3.7, for the number of women, men, and overall N. Smallest cell sizes are bolded.

Parental Status

Aim 1. Tables 3.9 and 3.10 present the effect size for childlessness, the minimum detectable difference, and the odds ratio at 80 percent, 90 percent, and 95 percent power, comparing women and men over age 50. Power calculations summarized in Table 3.9 demonstrate that this study has greater than 80 percent power to detect a minimum effect size of 0.04, a 1.4 percent difference in childlessness, and an odds ratio (OR) < 0.883 or > 1.127, assuming a two-sided test with an alpha level of 0.05. Similarly, Table 3.10

presents the effect size for childlessness, minimum detectable difference, and odds ratio, comparing married women and men. Married status has been selected because it represents the smallest difference across subgroups, based on the cell sizes shown in Tables 3.7 and 3.8. In this case, the study has greater than 80 percent power to detect a minimum effect size of 0.05, a 1.5 percent difference in childlessness, and an OR < 0.823 or > 1.198, assuming a two-sided test with an alpha level of 0.05.

Aims 2 and 3. Power calculations presented in Table 3.9 demonstrate that this study has greater than 80 percent power to detect a minimum effect size of 0.06, a 2 percent difference in childlessness, and an OR < 0.830 or > 1.190, comparing women and men over age 50 and assuming a two-sided test with an alpha level of 0.05. Similarly, Table 3.10 presents the effect size, minimum detectable difference, and odds ratio at various thresholds of power for childlessness, comparing married women and married men. These values have been selected for comparison because they represent the smallest difference in the dataset for subgroups based on marital status and gender. In this case, the study has greater than 80 percent power to detect a minimum effect size of 0.1, a 2.7 percent difference in childlessness, and an OR < 0.701 or > 1.364, assuming a two-sided test with an alpha level of 0.05.

Advance Care Planning

For Aims 2 and 3, Table 3.11 presents descriptive data on percent advance care planning (end-of-life care discussion and advance directive completion) by parental status, based on exit interviews with proxies from 2000 – 2012.

Table 3.9. *Detectable Effect Size for Childlessness by Gender*. *HRS 2012 and Exit Interviews, 2000 – 2012.*

Assumptions, HRS 2012:
Percent childless, women: 0.1343 (Table 3.8)
Sample size (N) = 18,613; women = 10,645; men = 7,968 (Table 3.7)

		α (two-sided), 0.05		
Power	β	Effect Size	Minimum Difference	Odds Ratio
80%	0.20	0.042	< - 0.014; > 0.014	< 0.883; > 1.127
90%	0.10	0.048	< - 0.016; > 0.017	< 0.865; > 1.147
95%	0.05	0.053	< - 0.018; > 0.019	< 0.851; > 1.165

Assumptions, HRS Exit Interviews, 2000 – 2012:
Percent childless, men: 0.1300 (Table 3.8)
Sample size (N) = 8,658; women = 4,605; men = 4,053 (Table 3.7)

		α (two-sided), 0.05		
Power	β	Effect Size	Minimum Difference	Odds Ratio
80%	0.20	0.060	< - 0.020; > 0.021	< 0.830; > 1.190
90%	0.10	0.070	< - 0.023; > 0.024	< 0.806; > 1.222
95%	0.05	0.078	< - 0.025; > 0.027	< 0.785; > 1.248

Table 3.10. *Detectable Effect Size for Childlessness by Marital Status and Gender. HRS 2012 and Exit Interviews, 2000 – 2012.*

Assumptions, HRS 2012:
Percent childless, married men = 0.0915 (Table 3.8)
Sample size (N) = 10,800; married women = 5,188; married men = 5,612 (Table 3.7)

		α (two-sided), 0.05		
Power	β	Effect Size	Minimum Difference	Odds Ratio
80%	0.20	0.054	< - 0.015; > 0.016	< 0.823; > 1.198
90%	0.10	0.062	< - 0.017; > 0.019	< 0.797; > 1.231
95%	0.05	0.069	< - 0.019; > 0.021	< 0.776; > 1.258

Assumptions, HRS Exit Interviews, 2000 – 2012:
Percent childless, married men = 0.0953 (Table 3.8)
Sample size (N) = 3,796; married women = 1,235; married men = 2,561 (Table 3.7)

		α (two-sided), 0.05		
Power	β	Effect Size	Minimum Difference	Odds Ratio
80%	0.20	0.097	< - 0.027; > 0.030	< 0.701; > 1.364
90%	0.10	0.112	< - 0.030; > 0.035	< 0.659; > 1.428
95%	0.05	0.125	< - 0.033; > 0.040	< 0.626; > 1.482

Table 3.11. *Percent Advance Care Planning (ACP) by Parental Status. HRS Exit Interviews, 2000 – 2012*.

	Childless‡	Child Living	Total
Category	ACP, N (%)	ACP, N (%)	ACP, N (%)
EOL care discussion only	**143** (11.92)	1,072 (14.37)	1,215 (14.03)
AD[1] completion only	272 (22.66)	1,484 (19.90)	1,756 (20.29)
Both discussion and AD[1]	482 (40.17)	3,126 (41.92)	3,608 (41.67)
Neither discussion nor AD[1]	303 (25.25)	1,776 (23.81)	2,079 (24.01)
Overall, N (%)[2]	1,200 (74.75)[2]	7,458 (76.19)[2]	8,658 (75.99)[2]

‡ No child ever born, or outlived all children.

[1] AD = Advance directive: Living will (LW) and/or durable power of attorney for health care (DPAHC).

[2] Percent advance care planning in any category, compared with no advance care planning.

The smallest cell size is bolded.

Aim 2. Table 3.12 presents the effect size for advance care planning, the minimum detectable difference, and the odds ratio at 80 percent, 90 percent, and 95 percent power, comparing decedents with and without living children. Power calculations demonstrate that this study has greater than 80 percent power to detect a minimum effect size of 0.09, a 2.7 percent difference in the first category, *end-of-life care discussion only*, and an OR < 0.753 or > 1.292, assuming a two-sided test with an alpha level of 0.05.

Table 3.12. *Detectable Effect Size for Advance Care Planning by Parental Status*. *HRS Exit Interviews, 2000-2012*.

Assumptions

Proportion *EOL discussion only*, childless = 0.1192 (Table 3.11)

Sample size (N) = 8,658; childless = 1,200; parents = 7,458 (Tables 3.7 and 3.8)

		α (two-sided), 0.05		
Power	β	Effect Size	Minimum Difference	Odds Ratio
80%	0.20	0.087	< - 0.027; > 0.030	< 0.753; > 1.292
90%	0.10	0.101	< - 0.031; > 0.035	< 0.718; > 1.342
95%	0.05	0.112	< - 0.034; > 0.039	< 0.689; > 1.385

Table 3.13. *Detectable Effect Size for Advance Care Planning by Parental Status and Gender*. *HRS Exit Interviews, 2000-2012*.

Assumptions
Proportion *EOL discussion only*, childless = 0.1192 (Table 3.11)
Sample size (N) = 1,200; childless women = 673; childless men = 527 (Table 3.8)

		α (two-sided), 0.05		
Power	β	Effect Size	Minimum Difference	Odds Ratio
80%	0.20	0.163	< - 0.047; > 0.058	< 0.570; > 1.588
90%	0.10	0.189	< - 0.054; > 0.067	< 0.515; > 1.697
95%	0.05	0.210	< - 0.059; > 0.076	< 0.472; > 1.791

Aim 3. Table 3.13 presents the effect size for advance care planning, the minimum detectable difference, and the odds ratio at 80 percent, 90 percent, and 95 percent power. Power calculations demonstrate that the study has greater than 80 percent power to detect a minimum effect size of 0.16, a 4.7 percent difference in advance care planning for the smallest of the four categories, *end-of-life care discussion only*, and an OR < 0.570 or > 1.588, comparing childless married women and men, assuming a two-sided test with an alpha level of 0.05. Cell sizes are too small; however, to compare partnered childless women and men, divorced childless women and men, never married childless women and never married mothers, and never married childless men and never married fathers. Results for these subgroups must be interpreted cautiously.

A rule of thumb for regression is to have at least 5 – 10 observations per predictor (Motulsky, 1995). In this study, *a priori*, there are 19 predictors to be tested in the maximum model (see Figure 1.1), so the required number of observations is at least 95 – 190 per cell. Table 3.8 shows that the smallest cell size for married and unmarried women and men contains 459 observations (married women) from the HRS 2012 for Aim 1, and 132 observations (married women) from the HRS exit interviews, 2000 –

2012, for Aims 2 and 3. These numbers suggest that the study is adequately powered to test all of the predictors in all three aims for hypotheses comparing married and unmarried women and men.

According to this rule of thumb, therefore, the smallest cell sizes for the subgroups shown in Tables 3.7, 3.8, and 3.11 are adequately powered to detect differences in reduced regression models, depending on the number of predictors used. For example, a subgroup sample of 43 (e.g., childless divorced men) is adequately powered to test a regression model with as many as 8 predictors (8 x 5 = 40). The number of observations in the partnered category in the decedent study sample, however, appears to be too small to test in a regression model: 9 (childless partnered women) and 20 (childless partnered men). For Aims 2 and 3, therefore, the partnered category will be combined with married.

3.6. Analytic Techniques

Analytic techniques used in this dissertation are described below for each specific aim and research question. Hypotheses and a rationale for the expected direction of effect appear at the end of Chapter 2, following the literature review. SAS 9.3 was used to conduct all analyses.

Aim 1. Describe childlessness by gender and marital status in the U.S. population over age 50.

RQ.1.1. How does the prevalence of childlessness over age 50 differ by gender and marital status?

RQ.1.2. What demographic, health, and social factors are associated with childlessness over age 50?

Analytic Approach, Aim 1. The prevalence of childlessness was calculated for the sample overall, and for subgroups by gender and marital status. To identify patterns of childlessness in the study sample, frequencies for each variable and covariate were examined. Depending on whether the variable was continuous or categorical, descriptive statistics included the mean, median, standard deviation, data range, or proportions. Values were compared across subgroups by parental status, gender, and marital status.

Bivariate analysis. Chi-square (χ^2) tests determined the statistical significance of binary or categorical factors related to childlessness ($p < 0.05$). For continuous variables, two-tailed t-tests were conducted to see whether the value differed significantly from normal, in either direction. Results were stratified to reveal patterns across groups of respondents who never had biological children, those who outlived their biological children, and those who never had biological children, but did have living step children.

Missing values. Frequencies of all variables used in Aim 1 were calculated and the data checked for accuracy. No clear patterns by wave or any other factor that would suggest bias appeared in the frequency distributions of the measures used in in this study. The final analytic sample was restricted, therefore, to records that did not have missing values for any of the study variables or covariates.

Weighting. Respondent-level sample weights were applied to Aim 1 analyses to adjust for the complex survey design. The HRS oversamples blacks, Hispanics, and residents of Florida to ensure that the study is representative of the U.S. population of adults over age 50. Sample weights reflect the characteristics reported in the Current Population Survey (CPS). Because the CPS includes community-dwelling persons only, the HRS assigns zero weights to respondents in a nursing home or other long-term care

setting (Ofstedal, Weir, Kuang-Tsung, Wagner, 2011). Prior research suggests that individuals without adult children are disproportionately represented in long-term care settings (Aykan, 2003; Noël-Miller, 2010; Wenger, G., 2009). Therefore, an analysis without sample weights was conducted to examine any association between childlessness and nursing home/long-term-care residence.

Aim 2. Determine whether childlessness is a predictor of advance care planning over age 50, considering demographic, health, and social factors.

RQ.2.1. What is the effect of childlessness on the likelihood of advance care planning over age 50? (Unadjusted model)

RQ.2.2. What is the effect of childlessness on the likelihood of advance care planning over age 50, after controlling for demographic, health, and social covariates? (Adjusted model)

Analytic Approach, Aim 2. Initial differences between groups were identified by comparing the distribution and frequencies of the dependent variable, the predictor variable, and covariates. Depending on whether the variable was continuous or categorical, descriptive statistics included the mean, median, standard deviation, data range, or proportions. Values were compared across groups with and without children living ($p < 0.05$).

Exploratory analysis. Each covariate was examined individually, using a χ^2 test for binary variables, or a t-test for continuous variables. If the bivariate analysis showed that a factor was significantly associated with advance care planning ($p < 0.10$), then that factor was considered for inclusion in the regression model.

Multinomial logistic regression analysis. To analyze the direct effect of childlessness on advance care planning, a simple logistic regression model was constructed for Aim 2.1. Successive regression models were built to adjust for potential confounders in Aim 2.2, and effect modifiers in Aim 3. To include the categorical response variable for advance care planning as the dependent variable, a generalized link logit was specified in SAS using *Proc Logistic* (Elkin, 2012; Kleinbaum et al., 2008). The logistic regression model for Aim 2 was:

$$\text{g-link logit } [\text{pr}(Y_{ACP=1,\ ACP=2,\ ACP=3})] = \beta_0 + \beta_1 X_1 + \beta_2 X_2 \ldots + \beta_p X_p + e$$

where Y_{ACP} denoted advance care planning across four categories: 1 = end-of-life care discussion only; 2 = advance directive completion; and 3 = both. The fourth category, *neither end-of-life discussion nor advance directive completion*, served as the reference category. Other terms in the regression model included: β_0 = intercept or constant term; β = parameter to be estimated; e = error term; X_1 = childless, $X_1 = 1$ if yes, 0 if otherwise; X_2 = age (continuous measure); and so on for each covariate in the model.

Predictors leading to collinearity were excluded from the model at the outset because they would add little variability to the model and could distort the results (Kleinbaum et al., 2008). Total income, for example, was excluded while net worth remained as a measure of accumulated wealth. Covariates were tested in the model sequentially, starting with gender, marital status, gender and marital status together, and then the rest of the demographic, health, and social covariates identified in the exploratory analysis as potentially significant. The cut-off p-value < 0.10 was small enough to ensure that all variables were fully assessed. The likelihood ratio (LR) statistic for comparing models was:

$$LR = -2 \log L_{REDUCED} - (-2 \log L_{FULL})$$

with degrees of freedom (df) = number of parameters under H_0

Missing values. Frequencies of all variables used in Aim 2 were calculated and the data checked for accuracy. Missing values were examined to determine whether there were any clear patterns by wave or any other factor that would suggest bias. The pattern appeared to be random across the dataset; therefore, the potential for bias was minimal. The analytic sample was restricted to records that did not have missing values for any of the study variables.

Weighting. Weights were not used in Aim 2 because the study sample consisted of HRS decedents. The decedent sample was not intended to be representative of an existing population, so there was little or no value to be gained by applying weights from past waves to the univariate analysis. Regression-based analyses in Aim 2 inherently controlled for the variables that were oversampled.

Aim 3. Examine any differences in the effect of childlessness on advance care planning over age 50 by marital status and gender.

RQ.3.1. How does marital status modify the effect of childlessness on advance care planning over age 50?

RQ.3.2. How do marital status and gender together modify the effect of childlessness on advance care planning over age 50?

Analytic Approach, Aim 3. Descriptive statistics were examined for the study population by parental status, gender, and marital status. The prevalence of childlessness in the decedent sample was calculated for women and men by marital status. Likewise, the prevalence of advance care planning was calculated for each subgroup.

Multinomial logistic regression analysis. To test for effect modification, interaction terms for childlessness, marital status, and gender were added to the final logistic regression model from Aim 2. The regression formula for Aim 3 was:

$$\text{g-link logit } [\text{pr}(Y_{ACP=1,\ ACP=2,\ ACP=3})] = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 \ldots + \beta_p X_p + \beta_3 X_3 * \beta_{(q=2\text{-}8)} X_{(q=2\text{-}8)} + e$$

where Y_{ACP} denoted advance care planning across four categories: 1 = end-of-life care discussion only; 2 = advance directive completion; 3 = both. The fourth, *neither end-of-life discussion nor advance directive completion,* served as the reference category. Other elements of this formula included: β_0 = intercept or constant term; β = parameter to be estimated; e = error term; β_1 = childless, $X_1 = 1$ if yes, 0 if otherwise; β_2 = age, X_2 = continuous measure; β_3 = gender, $X_3 = 1$ if male, 0 if female.

Indicator variables representing the interaction of four marital statuses and two parental statuses include: 1) married, child living (reference), 2) married, childless, 3) divorced, child living, 4) divorced childless, 5) widowed, child living, 6) widowed childless, 7) never married, child living, and 8) never married childless. These indicator variables were used to facilitate analysis of the output produced by the multinomial logistic regression model, which included an outcome variable with four categories. Groups with $n \leq 5$ were deleted due to sparse data.

A multiplicative interaction term was created to examine the effect of childlessness and marital status (represented by an indicator variable) within the context of gender:

$$\beta_3 X_3 * \beta_{(q=2\text{-}8)} X_{(q=2\text{-}8)}$$

Variables were entered into the regression model in two groups: 1) marital/ parental status indicators (Aim 3.1); and 2) the multiplicative interaction term for marital/parental status X gender (Aim 3.2). Successive models were evaluated using the likelihood ratio (LR) statistic:

$$LR = -2 \log L_{REDUCED} - (-2 \log L_{FULL})$$

with degrees of freedom (df) = number of parameters under H_0

Missing values. No additional covariates were introduced into the analysis for Aim 3. Interaction terms for childlessness, marital status, and gender were created from values that had already been checked in Aim 2.

Weighting. Weights were not used in Aim 3 because, like Aim 2, the study sample consisted of HRS decedents. The decedent sample was not intended to be representative of an existing population, so there was little or no value to be gained by applying weights from past waves to the univariate analysis. Regression-based analyses in Aim 3 inherently controlled for the variables that were oversampled.

Table 3.14. *Summary of Analytic Approach by Research Question and Aim.*

Aim	Research Question	Description	Purpose		Method	Tables
1	RQ 1.1	Prevalence of childlessness by gender and marital status?	Describe predictor variable.	Compare results with findings from other research studies.	Descriptive statistics.	4.1 4.2
	RQ 1.2	Demographic, health, and social factors associated with childlessness?	Identify bivariates of predictor variable.	Determine factors associated with childlessness by gender and marital status.	Chi-square tests.	4.3 4.4 4.5 4.6
2	RQ 2.1	Effect of childlessness on ACP?	Test direct effect of predictor variable on dependent variable.	Check for crude association between childlessness and ACP.	Descriptive statistics. Logistic regression.	4.7 4.8 4.9 4.10
	RQ 2.2	Effect of childlessness on ACP, controlling for covariates?	Identify bivariates of dependent variable. Test adjusted model.	Determine association between childlessness and ACP and all significant covariates.	Chi-square tests. Multinomial logistic regression.	4.11 4.12 4.13 4.14
3	RQ 3.1	Effect modification by marital status?	Define a typology of subgroups by childlessness and marital status (married, widowed, divorced, never married).	Determine association between childlessness and ACP, by marital status. Stratify results by childlessness and marital status.	Descriptive statistics. Multinomial logistic regression with indicator variables.	4.15 4.16 4.17
	RQ 3.2	Effect modification by marital status and gender together?	Test for interaction between childlessness, marital status, and gender.	Stratify results by childlessness, marital status, and gender. Subgroup analysis.	Descriptive statistics. Multinomial logistic regression with two-way interaction term.	4.18 4.19 4.20 Fig. 4.1 Fig. 4.2 Fig. 4.3

CHAPTER 4—RESULTS

Chapter 4 presents the study results by specific aim. Results for Aim 1 describe the prevalence of childlessness in the U.S. population over age 50, by gender and marital status. Significant factors associated with childlessness are identified. Results for Aim 2 reveal the extent to which childlessness predicts advance care planning over age 50 in the unadjusted model, and after controlling for demographic, health, and social covariates. Results for Aim 3 describe the differences in advance care planning over age 50 due to interaction among childlessness, marital status, and gender.

4.1. Results for Aim 1

The final study sample for Aim 1 included HRS 2012 respondents over age 50 (born before 1960), with complete data for parental status, marital status, and gender (N = 18,613). A total of 235 records, 1.25 percent, were excluded from the eligible weighted sample due to missing data for one or more covariates. Eliminating this relatively small proportion of records allowed the same records to be used in all analyses and their interpretation, with little risk of selection bias.

Aim 1. Describe childlessness by gender and marital status in the U.S. population over age 50.

Childlessness was defined in this study as the absence of adult children, biological or step. Parental status and other characteristics of the study participants appear in Table 4.1. As shown, 14.40 percent of respondents were childless—they had neither given birth to nor fathered a child, or they had outlived all their children. Although biologically childless, 4.85 percent of respondents had at least one living step child.

Parents in the study had an average of 2.85 living children per household, and a median of 1.99 children. Individual respondents had given birth to or fathered an average of 2.30 children, and a median of 1.71. In all, 22.69 percent of respondents had living step children, and 5.71 percent had experienced the death of at least one child. All percentages are based on weighted sample data.

Participant Characteristics by Gender

Women comprised 54.15 percent of the weighted sample, as shown in Table 4.1. Overall, 56.42 percent of women in the study were married/partnered, compared with 74.62 percent of men ($p < 0.0001$). Also, 20.77 percent of women were widowed, compared with 5.84 percent of men ($p < 0.0001$). With respect to education, 24.70 percent of women had a college degree or above, compared with 31 percent of men ($p < 0.0001$). Measures of financial status reflected these differences. Adjusted to 2012 dollars, median net worth for women, $153,965, was significantly lower than that of men, $183,098 ($p < 0.001$). Likewise, median income for women, $37,740, was significantly lower than median income for men, $50,271 ($p < 0.0001$).

Similar proportions of women and men reported low self-rated health, 25.42 percent, and difficulties with instrumental activities of daily living, 8.52 percent (p-values non-significant). Over 16 percent of women reported difficulties with at least one of five basic activities of daily living, compared with 13.4 percent of men ($p < 0.0001$). Additionally, a higher proportion of women lived alone, 28.48 percent, compared with 19.28 percent of men ($p < 0.0001$). A higher proportion of women, 31.57 percent, engaged in social activities rarely, defined as less than once per year or almost never, compared with 25.75 percent of men in the study sample ($p < 0.0001$).

Table 4.1. *Participant Characteristics by Gender*. *HRS 2012*.

	Respondents		
	Women	Men	Total
Characteristic	%	%	%
Overall, N (row %)	10,645 (54.15)	7,968 (45.85)	18,613 (100)
Age, in years, N (range),	53 – 103	53 – 101	53 – 103
Mean, N (SE)	66.77 (0.12)	65.59 (0.12)	66.23 (0.09)
Median, N (SE)	64.06 (0.16)	63.04 (0.17)	63.60 (0.12)
Generational Cohort****			
Civic (born prior to 1931)	11.54	8.05	9.94
Silent (born 1931 – 1947)	38.68	38.41	38.56
Boomer (born 1948 – 1959)	49.78	53.54	51.50
Total	100%	100%	100%
Marital Status****			
Married	53.24	69.89	60.87
Partnered	3.18	4.73	3.89
Unmarried, subtotal	43.58	25.38	35.22
Divorced/separated	(16.36)	(12.28)	(14.48)
Widowed	(20.77)	(5.84)	(13.92)
Never married	(6.45)	(7.26)	(6.82)
Total	100%	100%	100%
Race, non-White	17.33	16.37	16.89
Ethnicity, Hispanic	8.55	8.22	8.40
Education****			
< High school diploma	14.33	13.49	13.95
≥ College degree	24.70	31.00	27.59
Net Worth,[1] $***			
Mean	$424,261	$512,717	$464,815
Median	$153,965	$183,098	$166,968
Total Income,[1] $****			
Mean	$66,558	$85,104	$75,061
Median	$37,740	$50,271	$43,498

^ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; **** $p < 0.0001$ by Rao-Scott χ^2 test or t-test. *(continued)*

[1] Adjusted to 2012 $. SE = standard error.

All percentages are based on weighted sample data.

Table 4.1. *Participant Characteristics by Gender. HRS, 2012. (continued)*

	Respondents		
	Women	Men	Total
Characteristic	%	%	%
Parental Status			
Childless****	13.43	15.55	14.40
No child ever born	(8.30)	(9.53)	(8.86)
Outlived all children	(0.70)	(0.67)	(0.69)
Step child only, no child ever born	(4.43)	(5.35)	(4.85)
Child living ~	86.57	84.45	85.60
Total	100%	100%	100%
Child ever born, N, range****	0 – 20	0 – 20	0 – 20
Mean	2.45	2.34	2.39
Median	1.74	1.67	1.71
Living child, N, range**	0 – 20	0 – 20	0 – 20
Mean	2.87	2.83	2.85
Median	2.01	1.98	1.99
Stepchild,[2] %	22.43	23.00	22.69
Child ever died[3]	6.47	4.80	5.71
Self-rated Health, Low[4]	25.86	24.91	25.42
Functional Status: Basic, Any difficulties[5] ****	16.05	13.40	14.83
Functional Status: Instrumental, Any difficulties[5]	8.58	8.44	8.52
Living Siblings, N, range	0 – 21	0 – 20	0 – 21
Mean	2.88	2.83	2.86
Median	1.83	1.81	1.82
Live Alone****	28.48	19.28	24.26
Social Contact, Rarely[6] ****	31.57	25.75	28.90

^ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; **** $p < 0.0001$ by Rao-Scott χ^2 test or t-test. N = 18,316.

~ Living biological child, or living step child if outlived all biological children.

[2] Missing N = 678, RAND family data file.

[3] Missing N = 657, RAND family data file.

[4] Self-rated health: low = fair or poor (compared with high = excellent, very good, or good).

[5] Basic and instrumental functional status = any difficulty reported (compared with no difficulties at all).

[6] Social contact: rarely = yearly or almost never (compared with frequently = daily, weekly, or monthly).

All percentages are based on weighted sample data.

Prevalence of Childlessness in Late Life

RQ.1.1. How does the prevalence of childlessness over age 50 differ by gender and marital status?

H.1.1. The prevalence of childlessness will be higher among women than among men over age 50, and highest among never married women.

Results 1.1. The prevalence of childlessness in the U.S. population over age 50 was 14.40 percent in the nationally representative HRS 2012. Overall, 13.71 percent of respondents in the weighted sample had no biological children, and 0.69 percent had outlived all of their biological and any step children, as shown in Tables 4.1 and 4.2. Although biologically childless, 4.85 percent of respondents had at least one living step child. By contrast, 85.60 percent of those over age 50 had at least one living biological child, or one living step child if predeceased by all biological children.

Gender. Contrary to hypothesis H.1.1, childlessness was more prevalent among men, 15.54 percent, than among women, 13.43 percent ($p < 0.01$), as shown in Table 4.2.

Marital status. Contrary to hypothesis H.1.1, childlessness was more prevalent among never married men, 80.12 percent, than among never married women, 62.01 percent ($p < 0.0001$). As shown in Table 4.2, childlessness was also more prevalent among partnered men, 21.99 percent, and widowed men, 13.66 percent, than among partnered or widowed women; and similar among married women and men, 9.29 percent overall; and divorced/separated women and men, 12.07 percent ($p < 0.0001$).

Prevalence of childlessness, measured as percent childless within the strata of sample subgroups, is presented in Table 4.2.

Table 4.2. *Percent Childless*[ǂ] *within Strata of Sample Subgroups. HRS, 2012.*

	Respondents		
	Women	Men	Total
Subgroup	% Childless	% Childless	% Childless
Overall, N (row %)	1,185 (13.43) [**]	1,022 (15.54) [**]	2,207 (14.40) [**]
Generational Cohort[****]			
Civic (born prior to 1931)	12.41	11.41	12.04
Silent (born 1931 – 1947)	10.86	11.03	10.94
Boomer (born 1948 – 1959)	15.67	19.41	17.45
Marital Status[****]			
Married	9.45	9.15	9.29
Partnered	16.90	21.99	19.74
Divorced/separated	11.99	12.21	12.07
Widowed	9.15	13.66	10.02
Never married	62.01	80.12	70.86
Race			
non-White	12.10	12.67[**]	12.35[**]
White	13.72	16.11[**]	14.82[**]
Ethnicity[****]			
Hispanic	7.91[****]	11.85[*]	9.68[****]
Non-Hispanic	13.95[****]	15.88[*]	14.84[****]
Education			
< High school diploma	7.21[****]	13.78[*]	10.12[****]
≥ College degree	22.74[****]	17.37[*]	19.98[****]
Net Worth			
< $13,000	12.14	20.84[****]	15.86[*]
≥ $13,000	13.77	14.39[****]	14.06[*]
Total Income			
< $16,365	15.16[*]	26.99[****]	19.63[****]
≥ $16,365	12.95[*]	13.43[****]	13.18[****]
Live Alone[****]	22.82[****]	34.42[****]	27.04[****]

[^] $p < 0.10$; [*] $p < 0.05$; [**] $p < 0.01$; [***] $p < 0.001$; [****] $p < 0.0001$ by Rao-Scott χ^2 test, by parental status

N = 18,316

[ǂ] No biological child ever born or outlived all children

All percentages are based on weighted sample data

Factors Associated with Childlessness in Late Life

RQ.1.2. What demographic, health, and social factors are associated with childlessness over age 50?

H.1.2. Older age, unmarried status, white race, and non-Hispanic ethnicity will be positively associated with childlessness in both women and men. Higher levels of education, net worth, and income will be positively associated with childlessness in women, not men. *Health*: Nursing home residence, low self-rated health, and low functional status, and death expected will be positively associated with childlessness in women and men. *Social*: Live alone will be positively associated with childlessness among women and men. Living siblings will not be associated with childlessness in either women or men. Relatives near will be negatively associated with childlessness among women and men. Good friends near and social contact will be positively associated with childlessness among women, but negatively associated with childlessness among men.

Results 1.2. Demographic, health, and social factors associated with childlessness are presented in Tables 4.3 – 4.6, based on a series of bivariate analyses using the Rao-Scott χ^2 test for weighted samples. Results were stratified to reveal differences by parental status comparing those who 1) never had biological children; 2) outlived all their biological and any step children; 3) never had biological children, but had living step children; and 4) had living biological children, or living step children if predeceased by their biological children.

Age and generational cohort. Contrary to hypothesis H.1.2, younger, not older age was positively associated with childlessness in the HRS 2012. Childlessness was

more prevalent among the youngest respondents in the dataset, the boomer cohort, born 1948 – 1959, than the two older cohorts. As shown in Table 4.2, 15.67 percent of boomer women and 19.41 percent of boomer men were childless; compared with 10.86 percent of silent women and 11.03 percent of silent men, born 1931 – 1947; and 12.41 percent of civic women and 11.41 percent of civic men, born prior to 1931 ($p < 0.0001$).

More than 50 percent of all respondents in the HRS 2012 were boomers. According to Table 4.3, a higher proportion of childless women over age 50 were boomers, 58.07 percent, compared with silent, 31.27 percent; and civic, 10.66 percent. Moreover, 66.84 percent of childless men were boomers; compared with silent, 27.25 percent; and civic, 5.91 percent ($p < 0.0001$).

Different cohort patterns by gender were also evident across the categories of childlessness shown in Table 4.3. Among women who had outlived all their children, 24.69 percent were in the civic cohort—the oldest generation in the study—compared with 4.79 percent of men who had outlived their children ($p < 0.0001$). Significant cohort differences also existed among men with living children: 51.09 percent were boomers; compared with silent, 40.46 percent; and civic, 8.45 percent. By contrast, among childless men without biological or step children, 68.57 percent were boomers; compared with silent, 25.14 percent; and civic, 6.29 percent ($p < 0.0001$).

Marital status. Consistent with hypothesis H.1.2, unmarried status was positively associated with childlessness. As stated above with respect to hypothesis H.1.1, childlessness was more prevalent among the unmarried, particularly never married men, 80.12 percent, and never married women, 62.01 percent ($p < 0.0001$). Additionally, as shown in Table 4.3, a higher proportion of childless women were unmarried, 58.53

percent, compared with 41.26 percent of women with living children, ($p < 0.0001$); unmarried childless men, 52.20 percent; and unmarried men with children living, 20.44 percent ($p < 0.0001$).

Marital status varied widely across the categories of childlessness shown in Table 4.3. Among childless women who never had biological or step children (no child ever born), only 25.79 percent were married/partnered; compared with 32.96 percent who had outlived all their children; 72.22 percent who never had biological children but had living step children; and 58.74 percent who had living biological and/or step children ($p < 0.0001$). This pattern also occurred among men, with an even higher proportion of married/partnered among those with living step children only, 82.93 percent; and living biological and/or step children, 79.56 percent ($p < 0.0001$).

Race and ethnicity. Consistent with hypothesis H.1.2, white race and non-Hispanic ethnicity were positively associated with childlessness. Childlessness was more prevalent among whites, 14.82 percent, than among non-whites, 12.35 percent ($p < 0.01$). And the prevalence of childlessness among Hispanic women, 7.91 percent, was the lowest of all the subgroups displayed in Table 4.2 ($p < 0.0001$).

Additionally, as shown in Table 4.3, only 15.60 percent of childless women and 17.60 percent of women with living children were non-white (p-value non-significant); compared with and 13.35 percent of childless men and 16.93 percent of men with living children ($p < 0.01$). A lower proportion of childless respondents were Hispanic, 5.04 percent of women and 6.26 percent of men; compared with 9.10 percent of women with living children ($p < 0.0001$), and 8.58 percent of men with living children ($p< 0.05$).

Education. Consistent with hypothesis H.1.2, higher levels of education among respondents over age 50 were positively associated with childlessness, a pattern that was even more pronounced among women. Childlessness was more prevalent among educated women, as shown in Table 4.2. Among those who held a college degree or above, 22.74 percent were childless women, and 17.37 percent were childless men ($p < 0.0001$). And among those with the lowest level of education, no high school diploma, 7.21 percent were childless women, and 13.78 percent were childless men ($p < 0.0001$).

Additionally, a higher proportion of childless women over age 50 held a college degree or above, 41.82 percent, as shown in Table 4.3, compared with 22.05 percent of mothers with children living ($p < 0.0001$). A much smaller proportion of childless women had no high school diploma, 7.69 percent, compared with 15.36 percent of mothers ($p < 0.0001$). By contrast, 34.65 percent of childless men had a college degree or above compared with 30.33 ($p < 0.05$) percent of fathers with living children; and 11.96 percent of childless men had no high school diploma, compared with13.78 percent of fathers ($p < 0.05$).

Different patterns by gender were also evident across the categories of childlessness shown in Table 4.3. Among women without biological or step children (no child ever born), 44.91 percent held a college degree or above; compared with 39.92 percent who had living step children only, but no biological children; 17.29 percent of mothers who had outlived all their children, and 22.05 percent of mothers with children living ($p < 0.0001$). Among men without biological or step children (no child ever born), 37.86 percent held a college degree or above; compared with 30.80 percent who had

living step children only but no biological children; 19.43 percent of fathers who had outlived all their children, and 30.32 percent of fathers with living children ($p < 0.05$).

Financial status. Contrary to hypothesis H.1.2, low levels of net worth and total income were associated with childlessness among both women and men. Fatherhood was associated with significantly higher financial status for men.

Net worth. Net worth in this dataset ranged from a low of negative $1,510,000 to a high of $29,748,000, adjusted to 2012 dollars. Mean net worth was $464,315. Median net worth was $166,968. Lowest quartile was < $13,000.

For respondents in the lowest quartile of net worth in Table 4.2, the prevalence of childlessness was 12.14 percent among women, compared with an overall prevalence of childlessness in women of 13.43 percent (p-value non-significant). Among men, the prevalence of childlessness was 20.84 among those with low net worth, compared with an overall prevalence of childlessness in men of 15.54 percent ($p < 0.0001$).

Additionally, as shown in Table 4.3, 18.45 percent of childless women had low net worth, compared with 20.72 percent of women with living children; however, the result was not statistically significant (p-value non-significant). Likewise, across the categories of childlessness shown in Table 4.3, low net worth among women with no biological or step children (no child ever born), 19.74 percent, was similar to mothers with living biological children, 20.72 percent; yet, 12.93 percent of women who had living step children only, but no biological children, had low net worth ($p < 0.001$). And those who outlived their children were at particular risk for low net worth, 37.98 percent.

Among men, by contrast, the association between low net worth and childlessness was strong. As shown in Table 4.3, 24.08 percent of childless men had low net worth,

compared with16.83 percent of men with living children ($p < 0.0001$). And across the different categories of childlessness, men with no biological or step children (no child ever born), 26.03 percent, had low net worth; compared with fathers who had outlived all their children, 23.05 percent; men with living step children only but no biological children, 20.73 percent; and fathers with living children, 16.83 percent ($p < 0.0001$).

Total income. Total annual household income ranged from a low of $0 to a high of $3,664,224, adjusted to 2012 dollars. Mean total income was $75,061. Median total income was $43,398. Lowest quartile was < $16,365. Low total income was associated with childlessness among both women and men. For respondents in the lowest quartile of total income in Table 4.2, the prevalence of childlessness among women was 15.16 percent, compared with 12.95 percent in the higher income strata ($p < 0.001$). By contrast, the prevalence of childlessness was 26.99 percent among men with low income, compared with 13.43 percent in the higher income strata ($p < 0.0001$).

Additionally, as shown in Table 4.3, 24.54 percent of childless women had low income, compared with 21.31 percent of women with living children ($p < 0.05$). Across the different categories of childlessness, however, 28.37 percent of women with no biological or step children (no child ever born), and 13.93 percent of women with living step children only but no biological children had low total income, compared with 46.14 percent of mothers who had outlived all their children, and 21.31 percent of mothers with living children ($p < 0.0001$).

Across the categories of childlessness shown in Table 4.3, 31.58 percent of men with no biological or step children (no child ever born), and 40.35 percent of fathers who

outlived all their children had low income; compared with 17.43 percent of men with step children only, and 13.49 percent of fathers with living children($p < 0.0001$).

Nursing home/long-term care residence. Contrary to hypothesis H.1.2, nursing home/long-term care residence was not significantly associated with childlessness in either direction in the HRS 2012. Unweighted results are presented because the HRS assigns a zero weight to respondents living in a nursing home. As shown in Table 4.4, more women than men resided in a nursing home, yet childlessness was not a significant factor: 3.81 percent of childless women resided in a nursing home or long term care facility, compared with 3.00 percent of mothers with living children, 1.83 percent of childless men, and 1.64 percent of fathers with living children. The largest proportion of those residing in a nursing home, 5.08 percent, appeared among fathers who had outlived all their children (p-value non-significant). Potential reasons for this finding will be discussed in Chapter 5.

Self-rated health. Contrary to hypothesis H.1.2, no significant associations were observed in either direction between self-rated health and childlessness. As shown in Table 4.5, the proportion of childless women reporting low self-rated health was 23.95 percent, compared with 26.15 percent among mothers with living children, 27.05 percent of childless men, and 24.51 percent of fathers with living children (p-value non-significant). Across the different categories of childlessness shown in Table 4.5, the only significant finding was observed among mothers who had outlived all their children, 51.15 percent of whom reported low self-rated health ($p < 0.001$). Among fathers who had outlived all their children, 32.78 percent reported low self-rated health; however, this result was not statistically significant.

Functional status, basic. Contrary to hypothesis H.1.2, no significant associations were observed in either direction between basic functional status and childlessness. As shown in Table 4.5, the proportion of childless women reporting any difficulty with one of five activities of daily living was 16.63 percent, compared with mothers with living children, 15.96 percent; childless men, 13.38 percent; and fathers with living children, 13.41 percent (p-value non-significant). Additionally, across the categories of childlessness, 29.80 percent of mothers who had outlived all their children reported at least one difficulty in basic functioning ($p < 0.05$). A significant association was not evident among men.

Functional status, instrumental. Consistent with hypothesis H.1.2, there was a positive association between impaired instrumental functioning and childlessness. As shown in Table 4.4, the proportion of childless women reporting any difficulty with one of three instrumental activities of daily living was 6.81 percent, compared with mothers with living children, 8.86 percent; childless men, 10.12 percent; and fathers with living children, 8.13 percent. In women, this association was significant ($p < 0.05$), and in men there was a non-significant association ($p < 0.10$). Additionally, across the categories of childlessness, 17.73 percent of mothers who had outlived all their children reported at least one difficulty in instrumental functioning ($p < 0.01$). This pattern was not evident among men, as shown in Table 4.4.

Live alone. Consistent with hypothesis H.1.2, there was a positive association between living alone and childlessness. As shown in Table 4.6, the proportion of childless women who lived alone was 48.37 percent, compared with mothers with living children, 25.39 percent; childless men, 42.69 percent; and fathers with living children,

14.97 percent ($p < 0.0001$). Additionally, across the categories of childlessness in Table 4.6, the proportion of women who lived alone was highest among women with no biological or step children, 61.77 percent, and mothers who had outlived all their children, 60.92; compared with women with living step children but no biological children, 21.27 percent, and mothers with living children, 25.39 percent ($p < 0.0001$).

Among men, the association with childlessness showed a similar pattern, but the proportion living alone was smaller, particularly among men with living step children but no biological children, 14.34 percent, and fathers with living children, 14.97 percent ($p < 0.0001$). Among women who lived alone, the prevalence of childlessness was 22.82 percent, compared with 34.42 percent among men who lived alone ($p < 0.0001$).

Living siblings. Consistent with hypothesis H.1.2, no significant associations were observed between the presence of living siblings and childlessness. Overall, close to 11.5 percent of individuals over age 50 had no living siblings, as shown in Table 4.6. And across the categories of childlessness shown in Table 4.6, the proportion of no living siblings was highest among mothers who had outlived their children, 17.96 percent (p-value non-significant). This pattern was not observed among men.

Relatives near. Consistent with hypothesis H.1.2, there was a negative association between relatives near and childlessness, among both women and men. As shown in Table 4.6, the proportion of childless women without relatives near was 81.05 percent, compared with mothers with living children, 74.79 percent; childless men, 80.93 percent; and fathers with living children, 73.75 percent ($p < 0.0001$). Additionally, across the categories of childlessness in Table 4.6, the proportion of respondents without relatives near was highest among those who had outlived all their children, 85.61 percent for

women, and 90.59 percent for men ($p < 0.0001$). These results indicate that a large proportion of the individuals over age 50 do not live near their relatives.

Good friends near. Contrary to hypothesis H.1.2, no significant associations were observed between good friends near and childlessness. As shown in Table 4.6, the proportion of childless women without good friends near was 39.33 percent, compared with mothers with living children, 39.89 percent; childless men, 40.98 percent; and fathers with living children, 37.65 percent. Although not significantly associated with childlessness, these results indicate that nearly 40 percent of all individuals over age 50 do not live near good friends. Combined with the absence of relatives nearby, a large proportion of older adults appear to be at risk for having limited support networks.

Social contact. Consistent with hypothesis H.1.2, there was a positive association between social contact and childlessness among women; yet no association in either direction among men. As presented in Table 4.6, the proportion of childless women who reported engaging in social contact yearly or almost never, was 27.16 percent, compared with mothers with living children, 32.25 percent; childless men, 27.79 percent; and fathers with living children, 25.37 percent ($p < 0.05$). Across the categories of childlessness in Table 4.6, the highest proportion of rarely engaging in social contact was observed among respondents who had outlived their children, 35.24 percent among women, and 36.65 percent among men. It is notable that among women, mothers with living children reported less social engagement than childless women. In effect, 67.75 percent of mothers reported engaging in frequent social contact, defined as at least monthly, compared with 73.81 percent of childless women ($p < 0.05$). This difference was not observed among men.

Table 4.3. *Demographic Characteristics by Parental Status and Gender. HRS, 2012.*

	Women		Men	
	Childless‡	Child Living	Childless‡	Child Living
Characteristic	%	%	%	%
Overall, N (row %)**	1,185 (13.43)	9,460 (86.57)	1,022 (15.54)	6,946 (84.46)
Generational Cohort****				
Civic (born prior to 1931)	10.66	11.67	5.91	8.45
Silent (born 1931 – 1947)	31.27	39.83	27.25	40.46
Boomer (born 1948 – 1959)	58.07	48.50	66.84	51.09
Total	100%	100%	100%	100%
Marital Status****				
Married	37.47	55.69	41.11	75.19
Partnered	4.00	3.05	6.69	4.37
Unmarried, subtotal	58.53	41.26	52.20	20.44
Divorced/separated	(14.60)	(16.63)	(9.64)	(12.76)
Widowed	(14.15)	(21.80)	(5.13)	(5.97)
Never married	(29.78)	(2.83)	(7.43)	(1.71)
Total	100%	100%	100%	100%
Race, non-White	15.60	17.60	13.35**	16.93**
Ethnicity, Hispanic	5.04****	9.10****	6.26*	8.58*
Education**** (women) *(men)				
No high school diploma	7.69	15.36	11.96	13.78
GED[1]	2.47	4.75	4.44	5.03
High school graduate	28.88	31.32	21.83	25.59
Some college	24.14	26.52	27.12	25.27
College and above	41.82	22.05	34.65	30.33
Total	100%	100%	100%	100%
Net Worth,[2] ≤ $13,000	18.45	20.72	24.08****	16.83****
Total Income,[2] ≤ $16,365	24.54*	21.31*	27.09****	13.49****

(*continued)*

Table 4.3. *Demographic Characteristics by Parental Status. HRS, 2012. (continued)*

	Women			
	No Child Ever Born	Outlived All	Step Child Only	Child Living Biological/Step
Characteristic	%	%	%	%
Overall, N (row %)****	643 (8.30%)	84 (0.70%)	458 (4.43%)	9,460 (86.57%)
Generational Cohort****				
Civic (born prior to 1931)	10.46	24.69	8.80	11.67
Silent (born 1931 – 1947)	30.40	26.18	33.72	39.83
Boomer (born 1948 – 1959)	59.14	49.14	57.48	48.50
Marital Status****				
Married/partnered	25.79	32.96	72.22	58.74
Divorced/separated	17.32	29.62	7.13	16.63
Widowed	10.81	9.53	17.96	21.80
Never married	46.09	7.89	2.70	2.83
Total	100%	100%	100%	100%
	Men			
	No Child Ever Born	Outlived All	Step Child Only	Child Living Biological/Step
Characteristic	%	%	%	%
Overall, N (row %)****	564 (9.53%)	56 (0.67%)	402 (5.35%)	6,946 (84.45%)
Generational Cohort****				
Civic (born prior to 1931)	6.29	4.79	5.37	8.45
Silent (born 1931 – 1947)	25.14	27.35	30.99	40.46
Boomer (born 1948 – 1959)	68.57	67.86	63.64	51.09
Marital Status ****				
Married/partnered	27.95	49.14	82.93	79.56
Divorced/separated	10.81	21.03	6.13	12.76
Widowed	2.93	3.82	9.22	5.97
Never married	58.26	26.01	1.72	1.71
Total	100%	100%	100%	100%

^ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; **** $p < 0.0001$ by Rao-Scott χ^2 test. N = 18,316. (*continued)*

ǂ No biological child ever born or outlived all children. Percentages based on weighted sample data.

Table 4.3. *Demographic Characteristics by Parental Status. HRS, 2012. (continued)*

	Women			
	No Child Ever Born	Outlived All	Step Child Only	Child Living Biological/Step
Characteristic	%	%	%	%
Education****				
No high school diploma	6.16	19.59	8.65	15.36
GED[1]	1.88	6.13	3.00	4.75
High school graduate	23.06	36.51	23.42	31.32
Some college	23.99	20.48	25.01	26.52
College degree and above	44.91	17.29	39.92	22.05
Total	100%	100%	100%	100%
Race, non-White*	16.56	25.12	12.30	17.60
Ethnicity, Hispanic*	4.84	10.21	4.58	9.10
Net Worth,[2] ≤ $13,000***	19.74	37.98	12.93	20.72
Total Income,[2] ≤ $16,365****	28.37	46.14	13.93	21.31
	Men			
	No Child Ever Born	Outlived All	Step Child Only	Child Living Biological/Step
Characteristic	%	%	%	%
Education*				
No high school diploma	10.98	18.29	12.91	13.77
GED[1]	4.81	2.25	4.06	5.03
High school graduate	20.65	18.12	24.40	25.60
Some college	26.70	41.90*	27.82	25.27
College and above	37.86	19.43	30.80	30.32
Total	100%	100%	100%	100%
Race, non-White**	12.83	26.10	12.69	16.93
Ethnicity, Hispanic ^	6.19	13.73	5.46	8.58
Net Worth,[2] ≤ $13,000****	26.03	23.05	20.73	16.83
Total Income, [2] ≤ $16,365****	31.58	40.35	17.43	13.49

^ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; **** $p < 0.0001$ by Rao-Scott χ^2 test. N = 18,316.

[1] GED = General Education Development Test. [2] Standardized to 2012 $. Percentages based on weighted sample data.

Table 4.4. *Nursing Home Residence by Parental Status. HRS, 2012.*

	Women		Men	
	Childless‡	Child Living	Childless‡	Child Living
Characteristic	%	%	%	%
Overall, N (row %)**	1,185 (13.43)	9,460 (86.57)	1,022 (15.54)	6,946 (84.46)
Nursing Home Residence				
Yes	3.81	3.00	1.83	1.64
No	96.19	97.00	98.17	98.36
Total	100%	100%	100%	100%

	Women			
	No Child Ever Born	Outlived All	Step Child Only	Child Living Biological/Step
Characteristic	%	%	%	%
Overall, N (row %)****	643 (8.30%)	84 (0.70%)	458 (4.43%)	9,460 (86.57%)
Nursing Home Residence				
Yes	4.03	1.18	3.98	3.00
No	95.97	98.82	96.02	97.00
Total	100%	100%	100%	100%

	Men			
	No Child Ever Born	Outlived All	Step Child Only	Child Living Biological/Step
Characteristic	%	%	%	%
Overall, N (row %)****	564 (9.53%)	56 (0.67%)	402 (5.35%)	6,946 (84.45%)
Nursing Home Residence				
Yes	1.91	5.08	1.23	1.64
No	98.09	94.92	98.77	98.36
Total	100%	100%	100%	100%

^ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; **** $p < 0.0001$ by χ^2 test. N = 19,088: women = 10,985; men = 8,103.

‡ No biological child ever born or outlived all children. These results are not statistically significant.

Unweighted results are shown because the HRS assigns a zero weight to respondents living in a nursing home.

Table 4.5. *Health Characteristics by Parental Status. HRS, 2012.*

	Women		Men	
	Childless‡	Child Living	Childless‡	Child Living
Characteristic	%	%	%	%
Overall, N (row %)**	1,185 (13.43)	9,460 (86.57)	1,022 (15.54)	6,946 (84.46)
Self-rated Health				
Low[1]	23.95	26.15	27.05	24.51
High[2]	76.05	73.85	72.95	75.49
Total	100%	100%	100%	100%
Functional Status: Basic				
Any difficulty	16.63	15.96	13.38	13.41
No difficulty	83.37	84.04	86.62	86.59
Total	100%	100%	100%	100%
Functional Status: Instrumental * ^				
Any difficulty	6.81*	8.86	10.12^	8.13
No difficulty	93.19	91.14	89.88	91.87
Total	100%	100%	100%	100%

^ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; **** $p < 0.0001$ by Rao-Scott χ^2 test. N = 18,316. (*continued)*

‡ No biological child ever born or outlived all children.

[1] Low = Fair, poor. [2] High = Excellent, very good, good.

All percentages are based on weighted sample data.

Table 4.5. *Health Characteristics by Parental Status. HRS, 2012. (continued)*

	Women			
	No Child Ever Born	Outlived All	Step Child Only	Child Living Biological/Step
Characteristic	%	%	%	%
Overall, N (row %)****	643 (8.30%)	84 (0.70%)	458 (4.43%)	9,460 (86.57%)
Self-rated Health***				
Low[1]	22.50	51.15	22.35	26.15
High				
Total	100%	100%	100%	100%
Functional Status: Basic *				
Any difficulty	17.29	29.80	13.31	15.96
Functional Status: Instrumental**				
Any difficulty	6.35	17.73	5.94	8.86
	Men			
	No Child Ever Born	Outlived All	Step Child Only	Child Living Biological/Step
Characteristic	%	%	%	%
Overall, N (row %)****	564 (9.53%)	56 (0.67%)	402 (5.35%)	6,946 (84.45%)
Self-rated Health				
Low[1]	27.80	32.78	25.00	24.51
High				
Total	100%	100%	100%	100%
Functional Status: Basic				
Any difficulty	13.28	22.34	12.44	13.41
Functional Status: Instrumental				
Any difficulty	9.25	9.23	11.78	8.13

^ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; **** $p < 0.0001$ by Rao-Scott χ^2 test. N = 18,613.

[1] Low = Fair, poor. High = Excellent, very good, good. All percentages are based on weighted sample data.

Table 4.6. *Social Characteristics by Parental Status. HRS, 2012.*

	Women		Men	
	Childless‡	Child Living	Childless‡	Child Living
Characteristic	%	%	%	%
Overall, N (row %)**	1,185 (13.43)	9,460 (86.57)	1,022 (15.54)	6,946 (84.46)
Live Alone****				
Yes	48.37	25.39	42.69	14.97
No	51.62	74.61	57.31	85.03
Total	100%	100%	100%	100%
Living Siblings				
No	12.52	11.52	10.98	10.81
Yes	87.48	88.48	89.02	89.19
Total	100%	100%	100%	100%
Relatives Near****				
No	81.05	74.79	80.93	73.75
Yes	18.95	25.21	19.07	26.25
Total	100%	100%	100%	100%
Good Friends Near				
No	39.33	39.89	40.98	37.65
Yes	60.67	60.11	59.02	62.35
Total	100%	100%	100%	100%
Social Contact**				
Rarely[1]	27.16**	32.25**	27.79	25.37
Frequently[2]	72.84**	67.75**	72.21	74.63
Total	100%	100%	100%	100%

^ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; **** $p < 0.0001$ by Rao-Scott χ^2 test. N = 18,613. (*continued)*

‡ No biological child ever born or outlived all children.

[1] Rarely = yearly, almost never.

[2] Frequently = Daily, weekly, bi-weekly monthly.

All percentages are based on weighted sample data.

Table 4.6. *Social Characteristics by Parental Status. HRS, 2012. (continued)*

	Women			
	No Child Ever Born	Outlived All	Step Child Only	Child Living Biological/Step
Characteristic	%	%	%	%
Overall, N (row %)****	643 (8.30%)	84 (0.70%)	458 (4.43%)	9,460 (86.57%)
Live Alone****				
Yes	61.77	60.92	21.27	25.39
Living Siblings				
No	12.69	17.96	11.32	11.52
Relatives Near****				
No	79.82	85.61	82.65	74.79
Good Friends Near				
No	39.39	43.08	38.62	39.89
Social Contact *				
Rarely[1]	26.19	35.24*	27.70	32.25*

	Men			
	No Child Ever Born	Outlived All	Step Child Only	Child Living Biological/Step
Characteristic	%	%	%	%
Overall, N (row %)****	564 (9.53%)	56 (0.67%)	402 (5.35%)	6,946 (84.45%)
Live Alone****				
Yes	58.31	46.63	14.34	14.97
Living Siblings				
No	10.80	11.26	11.26	10.81
Relatives Near****				
No	78.65	90.59	83.78	73.75
Good Friends Near				
No	43.11	40.29	37.27	37.65
Social Contact				
Rarely[1]	27.51	36.65	27.18	25.37

^ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; **** $p < 0.0001$ by Rao-Scott χ^2 test. N = 18,613. All percentages are based on weighted sample data. [1] Rarely = yearly, almost never. [2] Frequently = Daily, weekly, bi-weekly monthly.

4.2. Results for Aim 2

The final study sample for Aim 2 included HRS decedents over age 50 at death, with complete data for advance care planning, parental status, gender, and marital status (N = 8,658). Data were drawn from exit interviews conducted from 2000 – 2012 with knowledgeable proxies. A total of 344 records, 3.97 percent of the sample, were excluded from the study due to missing data for one or more covariates. Eliminating this relatively small proportion of records allowed the same records to be used in all analyses and their interpretation, with little risk of selection bias.

Aim 2. Determine whether childlessness is a predictor of advance care planning over age 50, considering demographic, health, and social factors.

Advance care planning in this study was defined as end-of-life care discussion, advance directive completion, or both. Childlessness was defined as the absence of adult children, biological or step. Characteristics of the study population are described below and appear in Table 4.7.

Decedent Characteristics by Parental Status

Overall, 13.86 percent of HRS decedents in the study sample were childless at the end of life: 12.39 percent had never given birth to or fathered a child, and 1.47 percent had outlived all their children. Although biologically childless, 4.20 percent of decedents had at least one living step child at the time of final illness, as shown in Table 4.7. By contrast, 86.14 percent had living children, including living step children, if predeceased by all biological children.

Decedents had, on average, 2.93 biological children, with a median of 3. Number of children per couple averaged 3.13, with a median of 3. In all, 86.14 percent of those

over age 50 had at least one living biological child, or one living step child if predeceased by all biological children.

Mean age at death was 79.91 years (SD = 10.71). Median age at death was 81 years (IQR = 72 – 88). As shown in Table 4.7, age at death was more than two years higher among those who were childless, compared with those who had a living child ($p < 0.0001$). Over two-thirds of those who died during the study period were from the oldest age group, the civic cohort, born prior to 1931. Boomers, born 1948 – 1959, comprised only 3.23 percent of the decedent study population. Nearly 75 percent of childless decedents were in the civic cohort, compared with 67.22 percent of those with living children ($p < 0.0001$). Leading causes of death listed in Table 4.7 did not differ significantly by parental status.

Women comprised 53.19 percent of the study sample. A higher proportion of childless decedents were women, 56.08 percent, compared with men, 43.92 percent ($p < 0.05$). Unmarried status at the time of final illness was positively associated with childlessness. Only 33.75 percent of childless decedents were married; compared with 47.80 percent of those with living children ($p < 0.0001$). Nearly 20 percent of childless decedents had never married, compared with 0.80 percent of those who had living children ($p < 0.0001$). Overall, 41.41 percent of decedents had been widowed; proportions were similar for those with and without children.

Non-white race and non-Hispanic ethnicity were positively associated with childlessness. As shown in Table 4.7, 23.08 percent of childless decedents were non-white, and 4.33 percent were Hispanic; yet, 18.25 percent of those with living children were non-white ($p < 0.001$), and 7.17 percent were Hispanic ($p < 0.0001$). Education was

not significantly associated with childlessness among the decedents. Only 13.42 percent of childless decedents had a college degree or above, compared with 11.63 percent of decedents with living children (p-value non-significant). Moreover, 37.42 percent of childless decedents had no high school diploma, compared with 39.42 percent of decedents with living children (p-value non-significant).

Net worth ranged from negative $606,498 – $43,587,646. Mean net worth was $320,125 (SD = $1,055,725). Median net worth was $93,387 (IQR = $6,057 – $304,464). Lowest quartile was < $6,057. A higher proportion of childless decedents, 27.17 percent, had low net worth; compared with 24.66 percent of those with living children ($p < 0.10$, non-significant). Total income ranged from $0 – $5,728,015. Mean total income was $40,685 (SD = $87,645). Median income was $26,337 (IQR = $14,563 – $46,477). Lowest quartile was $14,563. A higher proportion of childless decedents, 29.25 percent, had low total income; compared with 24.36 percent of those with living children ($p < 0.001$).

Among decedents who resided in a nursing home/long-term care facility at the time of final illness, 45.92 percent were childless, compared with 34.53 percent who had living children ($p < 0.0001$). Regarding self-rated health and functional status, 61.42 percent of childless decedents and 62.66 percent of decedents with living children indicated that they were in poor health during their last HRS interview, which occurred within two years of death (p-value non-significant).

More than half, 54.42 percent of childless decedents and 50.62 percent of decedents with living children, reported one or more difficulties in basic functioning ($p < 0.05$); whereas 41.58 percent of childless decedents and 38.72 percent of decedents with

living children reported one or more difficulties in instrumental functioning ($p < 0.10$, non-significant). As shown in Table 4.7, proxies reported that death was expected for 61.33 percent of the childless, compared with 58.33 percent of those with living children ($p < 0.05$).

Decedents had a mean of two living siblings, and a median of one. A higher proportion of childless decedents, 33.08 percent, had no living siblings ($p < 0.05$). Similarly, 52.58 percent of childless decedents lived alone during their last HRS interview, within two years of death, compared with 34.15 percent of those who had living children ($p < 0.0001$). No relatives near ($p < 0.05$), and regular social contact were positively associated with childlessness ($p < 0.01$).

Advance Care Planning Characteristics by Parental Status

Overall, 55.71 percent of decedents in the study sample had engaged in end-of-life care discussion, and 61.95 percent had completed an advance directive (LW and/or DPAHC). As shown in Table 4.7, end-of-life care discussion differed by parental status: 52.08 percent of childless persons had engaged in these types of conversations, compared with 56.29 percent of those with at least one child living at the time of final illness ($p < 0.01$). Similar proportions of childless persons and those with living children completed an advance directive (62.83 percent vs. 61.81 percent) .

Across the four categories of advance care planning, the following proportions were observed: 1) end-of-life care discussion only, 14.03 percent of decedents; 2) advance directive completion only, 20.29 percent of decedents; 3) both discussion and advance directive completion, 41.67 percent; and 4) neither discussion nor advance directive completion, 24.01 percent of decedents, as shown in Table 4.7. Altogether,

25.24 percent of childless persons failed to engage in any form of advance care planning, whereas 23.81 percent of those with living children failed to plan ($p < 0.05$).

Parental status. Among childless older adults, the prevalence of advance care planning overall was 74.75 percent, compared with 76.19 percent among those with at least one living child at the time of final illness. Planning varied widely across sample subgroups, as shown in Table 4.9. Childless older adults who never had biological children and had no step children (no child ever born) had the lowest prevalence of *end-of-life care discussion only*, 10.30 percent, compared with 14.37 percent among those with living children, 14.96 percent among those who had outlived all children, and 14.01 percent among those with step children only ($p < 0.01$). On the other hand, childless persons had a correspondingly higher prevalence of *advance directive completion only*, 22.67 percent, compared with 19.90 percent among those with living children ($p < 0.01$). Furthermore, absence of advance care planning appeared to be highest among those in the category no child ever born *(*including no step child), as well as those who had outlived all children, both at 28.35 percent, compared with 23.81 percent among those who had living children, and 18.13 percent among who had step children only ($p < 0.01$).

Gender. Among women, the prevalence of advance care planning, 77.70 percent, was higher than among men, 74.04 percent ($p < 0.01$). As shown in Table 4.8, advance care planning differed little by parental status among women. Among men, however, the prevalence of advance care planning was 71.16 percent among childless male decedents, compared with 74.48 percent among those who had living children ($p < 0.01$).

Marital status. Advance care planning overall was highest among the widowed, 80.98 percent, as shown in Table 4.8, and lowest among never married persons 60.96

percent ($p < 0.0001$). Among those who were married/partnered at the time of their final illness, the prevalence of advance care planning was higher among the childless, 75.56 percent, compared with 73.52 percent among those who had living children. By contrast, among divorced/separated persons, advance care planning remained lower among the childless, 62.92 percent, compared with 71.33 percent of those with living children. And across all subgroups, the prevalence of advance care planning was lowest among never married persons who had living children, 45 percent ($p< 0.0001$).

Covariates. Age was positively associated with advance care planning. Within each generational cohort, planning increased from a low of 62.86 percent among the boomers, to 70.48 percent among the silent, to a high of 78.91 percent among the civic ($p < 0.0001$), as shown in Table 4.8. And within each cohort, the prevalence of advance care planning was lower among the childless than among those with living children ($p < 0.0001$). With respect to race, the prevalence of advance care planning ranged from a low of 54.89 percent among non-whites with living children to a high of 82.94 percent among childless whites ($p < 0.0001$). By ethnicity, advance care planning ranged from a low of 46.15 percent among childless Hispanics to a high of 77.97 percent among non-Hispanics with living children ($p < 0.0001$).

Higher education was positively associated with advance care planning among those with and without living children. As shown in Table 4.8, the prevalence of advance care planning increased from a low of 63.70 percent among childless older adults without a high school diploma to a high of 83.16 percent among those with a college degree and living children ($p < 0.0001$). Similar patterns were observed with respect to low net worth, low total income, nursing home/long-term care residence, death expected, and

lived alone, in that individuals with living children had a higher prevalence of advance care planning ($p < 0.0001$), as shown in Table 4.8. On the other hand, among those with higher levels of net worth and income, as well as those who did not live alone, there appeared to be no difference by childless status. Likewise, among those with relatives near, the prevalence of advance care planning, 74.13 percent, differed little with respect to parental status ($p < 0.01$), as shown in Table 4.8.

Table 4.7. *Decedent Characteristics by Parental Status. HRS Exit Interviews, 2000 – 2012.*

	Parental Status		
	Childless[ǂ]	Child Living	Total
Characteristic	%	%	%
Overall, N (row %)	1,200 (13.86)	7,458 (86.14)	8,658 (100)
Age at death, years (range)[****]	51 – 111	50 – 110	50 - 111
Mean (SD)	81.86 (11.11)	79.60 (10.61)	79.91 (10.71)
Median (IQR)	84 (75 – 90)	81 (72 – 88)	81 (72 – 88)
Generational Cohort[****]			
Civic (born prior to 1931)	74.92	67.22	68.28
Silent (born 1931 – 1947)	21.50	29.61	28.49
Boomer (born 1948 – 1959)	3.23	3.18	3.23
Total	100%	100%	100%
Gender, Women[*]	56.08	52.72	53.19
Marital Status[****]			
Married	31.33	45.86	43.84
Partnered	2.42	1.94	2.01
Unmarried	66.25	52.20	54.15
Divorced/separated	(7.42)	(9.68)	(9.37)
Widowed	(39.50)	(41.71)	(41.41)
Never married	(19.33)	(0.80)	(3.37)
Total	100%	100%	100%
Parental Status, Childless[****]			
No child ever born	8.19	--	--
Outlived all children	1.47	--	--
Step child only, no child ever born	4.20	--	--
Number of children ever born (range) [****]	0 – 14 [~]	1 – 22	0 – 22
Mean (SD)	0.164 (0.67) [~]	3.37 (2.16)	2.93 (2.31)
Median (IQR)	0 (0 – 1)	3 (2 – 4)	3 (1 – 4)
Number of children living (range)[****]	0 – 11 [+]	1 – 20	0 – 20
Mean, N (SD)	0.717 (1.42) [+]	3.51 (2.25)	3.13 (2.36)
Median, N (IQR)	0 (0 – 1)	3 (2 – 4)	3 (2 – 4)

[^] $p < 0.10$; [*] $p < 0.05$; [**] $p < 0.01$; [***] $p < 0.001$; [****] $p < 0.0001$ by χ^2 test or t-test. N = 8,658. (*continued)*

[ǂ]No child ever born, outlived all children. [~] Includes children that predeceased parents.

[+]Includes stepchildren when the decedent never had biological children.

SD = Standard Deviation. IQR = Interquartile Range.

Table 4.7. *Decedent Characteristics by Parental Status. HRS Exit Interviews, 2000 – 2012. (continued)*

	Parental Status		
	Childless‡	Child Living	Total
Characteristic	%	%	%
Advance Care Planning (category)*			
End-of-life (EOL) care discussion only	11.92	14.37	14.03
Advance directive (AD) completion only	22.67	19.90	20.29
Both EOL discussion and AD completion	40.17	41.91	41.67
Neither EOL discussion nor AD completion	25.24	23.81	24.01
Total	100%	100%	100%
Advance Care Planning (any type)	74.75	76.19	75.99
End-of-life (EOL) Care Discussion**	52.08	56.29	55.71
Advance Directive (LW and/or DPAHC)	62.83	61.81	61.95
Living Will (LW)[4]	42.58	43.53	43.40
Durable Power of Attorney for Health Care (DPAHC)[5]	56.78	54.41	54.74
Race , non-White****	23.08	18.25	18.92
Ethnicity, Hispanic***	4.33	7.17	6.78
Education, < High school diploma	37.42	39.42	39.14
Education, ≥ College degree	13.42	11.63	11.87
Net Worth,[1] Low, < $6,057 ^	27.17	24.66	25.01
Total Income,[1] Low, < $14,563***	29.25	24.36	25.04
Nursing Home Resident at Death****	45.92	34.53	36.11
Death Expected *	61.33	58.33	58.74
Self-Rated Health, Low[2]	61.42	62.66	62.49
Functional Status: Basic, Any difficulties[2] *	54.42	50.62	51.14
Functional Status: Instrumental, Any difficulties[2] ^	41.58	38.72	39.12
Living Siblings, None *	33.08	29.51	30.01
Lived Alone****	52.58	34.15	36.71
Relatives Near *	29.83	33.45	32.95
Good Friends Near	62.67	60.50	60.80
Social Contact, Rarely[3] **	33.17	37.06	36.52

^ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; **** $p < 0.0001$ by χ^2 test or t-test. N = 8,658. (*continued)*

‡ No child ever born, outlived all children. [1] Adjusted to 2012 $.

[2] Self-rated health and functional status reported in last survey completed by respondent prior to death.

[3] Socialize less than once per year or never. [4] Missing, n = 45. [5] Missing, n = 52.

Table 4.7. *Decedent Characteristics by Parental Status. HRS Exit Interviews, 2000 – 2012. (continued)*

	Parental Status		
	Childless‡	Child Living	Total
Characteristic	%	%	%
Cause of Death *			
Cancers and tumors; skin conditions	21.58	23.30	23.07
Musculoskeletal system and connective tissue	1.67	1.13	1.20
Heart, circulatory and blood conditions	33.17	35.37	35.07
Allergies; hay fever; sinusitis; tonsillitis	9.92	11.64	11.40
Endocrine, metabolic and nutritional conditions	3.83	3.38	3.44
Digestive system (stomach, liver, gallbladder, kidney, bladder)	8.17	7.16	7.30
Neurological and sensory conditions	2.08	2.16	2.15
Reproductive system and prostate conditions	0.08	0.05	0.06
Emotional and psychological conditions	0.42	0.28	0.30
Miscellaneous	4.58	2.95	3.18
Other symptoms or health condition	10.42	9.56	9.68
Not a health condition	0.92	0.88	0.89
None	0.41	0.39	0.39
Don't know, not ascertained	2.75	1.72	1.86
Refused	0.00	0.03	0.01
Total	100%	100%	100%

^ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; **** $p < 0.0001$ by χ^2 test.

‡ No child ever born, outlived all children.

Table 4.8. *Percent Advance Care Planning[§] (ACP) within Strata of Sample Subgroups, by Parental Status. HRS Exit Interviews, 2000 – 2012*.

	Parental Status		
	Childless[ǂ]	Child Living	Total
Characteristic	% ACP	% ACP	% ACP
Overall (N, row %)	897 (74.75)	5,682 (76.19)	6,579 (75.99)
Generational Cohort****			
Civic (born prior to 1931)	77.75	79.11	78.91
Silent (born 1931 – 1947)	66.67	70.92	70.48
Boomer (born 1948 – 1959)	60.47	63.29	62.86
Gender***			
Women	77.56	77.72	77.70
Men	71.16	74.48	74.04
Marital Status****			
Married/partnered	75.56	73.52	73.73
Divorced/separated^	62.92	71.33	70.41
Widowed	81.01	80.97	80.98
Never married****	65.09	45.00	60.96
Race****			
White	82.94	80.94	80.90
non-White	55.23	54.89	54.95
Ethnicity****			
Hispanic	46.15	53.08	52.47
Non-Hispanic	76.05	77.97	77.70
Education****			
< High school diploma	63.70	68.33	67.72
≥ College degree	79.50	83.16	82.59
Net Worth,[1] Lowest quartile****			
< $6,057	62.27	66.72	66.05
≥ $6,057	79.41	79.28	79.30
Total Income,[1] Lowestquartile****			
< $14,563	63.53	66.54	66.05
≥ $14,563	79.39	79.29	79.31

^ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; **** $p < 0.0001$ by χ^2 test. N = 8,658. (*continued)*

[§] Total ACP includes EOL care discussion, advance directive completion, or both.

[ǂ] No child ever born, outlived all children. [1]Adjusted to 2012 $.

Table 4.8. *Percent Advance Care Planning[§] (ACP) within Strata of Sample Subgroups, by Parental Status. HRS Exit Interviews, 2000 – 2012. (continued)*

	Parental Status		
	Childless[ǂ]	Child Living	Total
Characteristic	% ACP	% ACP	% ACP
Nursing Home/Long Term Care[****]			
Resident	79.31	83.30	82.60
Non-Resident	70.88	72.43	72.25
Death Expected[****]			
Yes	78.94	81.08	80.77
No	68.10	69.34	69.18
Lived Alone[****]			
Yes	75.12	80.41	79.36
No	74.34	74.00	74.03
Relatives Near[**]			
Yes	74.58	74.07	74.13
No	74.82	77.25	76.90

$^{\wedge}p < 0.10$; $^{*}p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$; $^{****}p < 0.0001$ by χ^2 test. N = 8,658.

[§]Total ACP includes EOL care discussion, advance directive completion, or both.

[ǂ] No child ever born, outlived all children.

Table 4.9. *Percent Advance Care Planning (ACP) within Strata of Sample Subgroups by ACP Category. HRS Exit Interviews, 2000 – 2012*.

	Advance Care Planning			
	EOL Discussion Only	AD Completion Only	Both	Neither
Subgroup	% ACP	% ACP	% ACP	% ACP
Overall (N, row %)	1,215 (14.03)	1,756 (20.29)	3,608 (41.67)	2,079 (24.01)
Generational Cohort****				
Civic (born prior to 1931)	11.84	22.75	44.32	21.09
Silent (born 1931 – 1947)	18.73	15.25	36.50	29.52
Boomer (born 1948 – 1959)	18.93	12.50	31.43	37.14
Gender****				
Women	12.88	20.59	44.23	22.30
Men	15.35	19.94	38.76	25.96
Marital Status****				
Married/partnered	17.13	18.56	38.04	26.27
Divorced/separated	13.44	18.74	38.22	29.59
Widowed	10.93	22.85	47.20	19.02
Never married	11.64	16.44	32.88	39.04
Parental Status**				
Child living$^{\sim}$	14.37	19.90	41.91	23.81
Childless, subtotal	11.92	22.67	40.17	25.25
No child ever born	10.30	22.57	38.79	28.35
Outlived all children	14.96	20.47	36.22	28.35
Step child only	14.01	23.63	44.23	18.13
Race, non-White****	13.11	21.54	46.25	19.10
Ethnicity, Hispanic****	19.59	12.95	19.93	47.53

$^{\wedge}p < 0.10$; $^{*}p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$; $^{****}p < 0.0001$ by χ^2 test. N = 8,658.

$^{\sim}$Living biological child, or living step child if outlived all biological children.

Effect of Childlessness on Advance Care Planning

RQ.2.1. What is the effect of childlessness on the likelihood of advance care planning over age 50? (Unadjusted model)

H.2.1. Childless persons over age 50 will have a decreased likelihood of advance care planning, compared with those who had living children.

Results 2.1. Consistent with hypothesis H.2.1, childless persons over age 50 had a decreased likelihood of *end-of-life care discussion only*, odds ratio (OR) = 0.782 (95% CI, 0.632 – 0.967), compared with those who had living children, as shown in Table 4.10. Essentially, childless persons were 28 percent less likely than those with living children to engage in *end-of-life care discussion only* versus *no advance care planning* ($p < 0.05$). (Calculated as the reciprocal OR: 1 / 0.782 = 1.28).

Contrary to hypothesis H.2.1., childlessness had no effect on advance directive completion. The likelihood of *advance directive completion only*, OR = 1.074 (95% CI = 0.899 – 1.283), and the likelihood of *both end-of-life care discussion and advance directive completion*, OR = 0.904 (95% CI, 0.774 – 1.055), differed little with respect to childlessness. The odds ratio for each outcome was close to one, and neither odds ratio was statistically significant, as shown in Table 4.10. In each case, the 95% CI crosses one.

Table 4.10. *Effect of Childlessness*[ǂ] *on Advance Care Planning (ACP). Multinomial Logistic Regression Results. Unadjusted Model. HRS Exit Interviews, 2000 – 2012.*

	ODDS RATIOS: No ACP[µ] (reference)		
Independent Variable	EOL Discussion Only	AD Completion Only	Both
Child Living[1] (reference)			
Childless	0.782[*]	1.074	0.904
N	1,215	1,756	3,608
-2 log-likelihood	22,613.19[****]	22,613.19[****]	22,613.19[****]

[^] $p < 0.10$; [*] $p < 0.05$; [**] $p < 0.01$; [***] $p < 0.001$; [****] $p < 0.0001$ by χ^2 test. Total N = 8,658.

[ǂ] No child living (no child ever born or outlived all children).

[µ] No ACP = Neither EOL care discussion, nor AD completion, N = 2,079.

[1] Living biological child, or living step child if outlived all biological children.

EOL = end-of-life care. AD = advance directive.

Main Effects of Childlessness on Advance Care Planning

RQ.2.2. What is the effect of childlessness on the likelihood of advance care planning over age 50, after controlling for demographic, health, and social covariates? (Adjusted model)

H.2.2. Childless persons who were closer to age 50 (younger), male, married, non-white, Hispanic, and who had lower levels of education, net worth, and total income will have a decreased likelihood of advance care planning. *Health*: Childless persons who lived in the community (not a nursing home or long-term care facility), had high self-rated health, no difficulties with functional status, and did not expect to die soon will have a lower likelihood of advance care planning. *Social*: Childless persons who did not live alone, did not have living siblings, did not have relatives and good friends near, and did not have social contact regularly will have a lower likelihood of advance care planning.

Results 2.2. Bivariate associations for the main predictor, childlessness, and the categorical outcome variable, advance care planning, are presented in Tables 4.9, 4.11, 4.12, and 4.13, together with bivariates for each of the covariates examined in this study. Potential covariates were included in the multinomial logistic regression model testing the effect of childlessness on advance care planning if they were associated with advance care planning in bivariate analysis χ^2, $p > 0.10$ shown in Tables 4.12 and 4.13. Self-rated health and social contact were excluded for this reason.

Total income was also excluded from the reduced regression model to avoid collinearity with net worth. Compared with those who had moderate or high incomes, decedents with incomes in the lowest quartile (≤ $14,563) were 6.6 times as likely to have had net worth in the lowest quartile (≤ $6,057), OR = 6.634 (95% CI, 5.953 – 7.393). Likewise, generational cohort was excluded from the reduced regression model to avoid collinearity with age. Each year of advancing age increased the odds of being in the oldest cohort, OR = 1.616 (95% CI, 1.578 – 1.656). Lived alone was excluded because of its correlation with childlessness, as shown in Table 4.7 by χ^2 ($p < 0.0001$). Childless decedents were 2 times more likely to have lived alone than those who had living children at death, OR = 2.138 (95% CI, 1.891 – 2.418).

Death expected was excluded because of its correlation with nursing home/long-term care residence. According to their proxies, decedents who were expected to die were nearly 2.5 times as likely to have lived in a nursing home or other long-term care setting than individuals living in the community, OR = 2.447 (95% CI, 2.227 – 2.689). Finally, good friends near was excluded because it was not a significant predictor of advance care planning when tested in the full regression model, with all 20 predictors.

Results of the multinomial logistic regression analysis are summarized in Table 4.14. The final model, Model 5, with 12 covariates, was preferable to all other models tested based on the log-likelihood. Model 5 is robust in that it controls for all relevant covariates, yet parsimonious in that the covariates with the potential for multicollinearity have been excluded from the model. Results are described below for the main predictor variable, childlessness, and for each of the 12 covariates in Model 5: gender, marital status, age at death, race, ethnicity, education, net worth, nursing home/long-term-care residence, functional status (ADLs and IADLs), living siblings, and relatives near.

Childlessness. Contrary to hypothesis H.2.2, childlessness had no effect on the likelihood of advance care planning in the adjusted model. Results show that childless persons were neither more nor less likely to engage in advance care planning, compared with parents who had living children, after controlling for gender, marital status, and other covariates in the final model, Model 5. Although childless persons had a significantly lower likelihood of *end-of-life care discussion only*, compared with *no advance care planning* in Model 1, OR = 0.782 ($p < 0.05$), and the effect persisted after controlling for gender in Model 2, the effect disappeared after controlling for marital status in Models 3 and 4 and other covariates in Model 5, as shown in Table 4.14.

Childless persons also had a 25 percent increased likelihood of *advance directive completion only*, compared with *no advance care planning*, after controlling for marital status in Models 3 and 4, OR = 1.252 ($p < 0.05$). This effect disappeared, however, after controlling for the additional demographic, health, and social covariates in Model 5. Finally, with respect to the third outcome tested in the multinomial logistic regression model, childless individuals had neither an increased nor decreased likelihood of *both*

end-of-life care discussion and advance directive completion, compared with *no advance care planning.* The odds ratio for childlessness remained close to 1 as gender, marital status, and the other covariates were tested in Models 2 – 5.

Gender. Controlling for gender, the odds ratios for childlessness changed little across the three outcomes presented in Table 4.14 in Model 2. Consistent with hypothesis H.2.2, gender = male predicted a 20 percent decrease in *advance directive completion only*, OR = 0.833 ($p < 0.01$), and a 33 percent decrease in *both end-of-life care discussion and advance directive completion*, OR = 0.752 ($p < 0.0001$), compared with *no advance care planning* in Model 2. Once marital status was tested in Models 4 and 5, however, the odds ratios for gender moved toward 1 for each outcome (p-values non-significant), as shown in Table 4.14.

Marital status. Controlling for marital status, the odds ratio for childlessness increased, but moved closer to 1 relative to *end-of-life care discussion only* and *both end-of-life care discussion and advance directive completion,* compared with *no advance care planning,* as shown in Table 4.14 in Model 3 (p-values non-significant). By contrast, the odds ratio for childlessness increased relative to *advance directive completion only,* OR = 1.252 ($p < 0.05$), when marital status was tested in Model 3; however, the effect disappeared in Model 5 once the other covariates were entered into the model.

Consistent with hypothesis H.2.2, unmarried persons—the divorced/separated, OR = 1.422 ($p < 0.01$), and the widowed, OR = 1.528 ($p < 0.0001$)—had increased likelihoods of *advance directive completion only* compared with *no advance care planning* in Model 5. Never married persons, however, had a 51 percent decreased likelihood of *advance directive completion only* ($p < 0.05$). Similarly, divorced/separated

and widowed persons had increased likelihoods of *both end-of-life care discussion and advance directive completion* compared with *no advance care planning* in Model 5; whereas, the effect of never married status became non-significant after controlling for other covariates.

Covariates. Inclusion of the demographic, health, and social covariates in Model 5 barely changed the odds ratios for childlessness across the three categories of advance care planning. Although in one instance, *advance directive completion only*, the odds ratio for childlessness decreased from 1.252 ($p < 0.05$) in Models 3 and 4 to 1.044 (p-value non-significant) in Model 5, the movement was toward 1 and non-significant. Across all three outcomes shown in Table 4.14, inclusion of the covariates in Model 5 appeared to have more of an effect on the odds ratios for marital status, than on childlessness. Specific results are described below by covariate.

Age. Consistent with hypothesis H.2.2, the likelihood of *advance directive completion only*, OR = 1.030 ($p < 0.0001$), and *both end-of-life-care discussion and advance directive completion*, OR = 1.020 ($p < 0.0001$), increased with age compared with *no advance care planning*. Older age at death also had a slight, but statistically significant effect on decreased likelihood of *end-of-life-care discussion only* per year, OR = 0.990 ($p < 0.05$).

Race and ethnicity. Consistent with hypothesis H.2.2, individuals who were non-white had a decreased likelihood of advance care planning. Those who were white had an increased likelihood of *end-of-life-care discussion only,* OR = 1.572 ($p < 0.0001$); *advance directive completion only,* OR = 2.591 ($p < 0.0001$); and *both end-of-life-care discussion and advance directive completion*, OR = 3.720 ($p < 0.0001$) versus *no*

advance care planning. By contrast, individuals who were Hispanic had a decreased likelihood of *end-of-life-care discussion only,* OR = 0.716 ($p < 0.0001$); *advance directive completion only* OR = 0.398 ($p < 0.0001$); and *both end-of-life-care discussion and advance directive completion*, OR = 0.303 ($p < 0.0001$) versus *no planning*.

Education. Consistent with hypothesis H.2.2, individuals without a high school diploma had a decreased likelihood of advance care planning. Those with a high school diploma or above had an increased likelihood of *end-of-life-care discussion only,* OR = 1.181 ($p < 0.05$); *advance directive completion only* OR = 1.793 ($p < 0.0001$); and *both end-of-life-care discussion and advance directive completion*, OR = 1.922 ($p < 0.0001$) versus *no planning*.

Net worth. Consistent with hypothesis H.2.2, individuals with low net worth (less than $6,057) had a decreased likelihood of advance care planning. Those with net worth in the highest quartiles, greater than $6,057 in 2012 dollars, had an increased likelihood of *end-of-life-care discussion only,* OR = 1.421 ($p < 0.001$); *advance directive completion only*, OR = 1.675 ($p < 0.0001$); and *both end-of-life-care discussion and advance directive completion*, OR = 1.873 ($p < 0.0001$) versus *no advance care planning*, as shown in Table 4.14.

Nursing home/long term care residence. Consistent with hypothesis H.2.2, individuals who lived in the community had a lower likelihood of advance care planning. Nursing home/long-term-care residents had an increased likelihood of *advance directive completion only*, OR = 2.033 ($p < 0.0001$); and *both end-of-life-care discussion and advance directive completion*, OR = 1.709 ($p < 0.0001$), versus *no advance care planning*, as shown in Table 4.14 in Model 5. By contrast, nursing home/long-term care

residence did not have a significant effect on *end-of-life-care discussion only,* OR = 0.887 (non-significant).

Functional status, basic and instrumental. Consistent with hypothesis H.2.2, individuals who had no difficulty with ADLs had a decreased likelihood of advance care planning. Those who had difficulty with at least one ADL had an increased likelihood of *both end-of-life-care discussion and advance directive completion* versus *no advance care planning*, OR = 1.176 ($p < 0.05$) as shown in Table 4.14. By contrast, individuals who had difficulty with at least one IADL had a decreased likelihood of *end-of-life-care discussion only* versus *no advance care planning*. IADL difficulty was not associated with a significant effect on *advance directive completion only* or *both end-of-life-care discussion and advance directive completion*.

Living siblings. Contrary to hypothesis H.2.2, individuals with living siblings had neither an increased nor decreased likelihood of *end-of-life-care discussion only,* OR = 1.185 ($p < 0.10$, non-significant); *advance directive completion only* OR = 1.167 ($p < 0.10$, , non-significant); and *both end-of-life-care discussion and advance directive completion*, OR = 1.071 (non-significant); versus *no advance care planning*, as shown in Table 4.14.

Relatives near. Consistent with hypothesis H.2.2, individuals without relatives near had an increased likelihood of advance care planning. Those with relatives near had a decreased likelihood of *end-of-life-care discussion only,* OR = 0.770 ($p < 0.001$); and *both end-of-life-care discussion and advance directive completion*, OR = 0.846 ($p < 0.01$). Relatives near had no effect on the likelihood of *advance directive completion only,* OR = 0.896 (non-significant), as shown in Table 4.14.

Table 4.11. *Demographic Covariates and Advance Care Planning (ACP). Bivariate Analysis. HRS Exit Interviews, 2000 – 2012.*

	Advance Care Planning			
	EOL Discussion Only	AD Completion Only	Both	Neither
Covariate	%	%	%	%
Overall, N (row %)	1,215 (14.03%)	1,756 (20.29%)	3,608 (41.67%)	2,079 (24.01%)
Age at death, years (range)****	53 – 103	50 – 109	50 – 110	50 - 111
Mean (SD)	77.87 (10.83)	83.61 (10.21)	82.69 (10.17)	78.58 (11.81)
Median (IQR)	78 (70 – 86)	85 (77 – 91)	84 (77 – 90)	79 (69 – 88)
Generational Cohort****				
Civic (born prior to 1931)	57.61	76.59	72.62	59.98
Silent (born 1931 – 1947)	38.02	21.42	24.94	35.02
Boomer (born 1948 – 1959)	4.37	1.99	2.44	5.00
Total	100%	100%	100%	100%
Gender****				
Women	48.81	53.99	56.46	49.40
Men	51.19	46.01	43.54	50.60
Total	100%	100%	100%	100%
Marital Status****				
Married/partnered	55.97	41.97	41.85	50.17
Divorced/separated$^{\wedge}$	8.97	8.66	8.59*	11.55*
Widowed	32.26	46.64	46.90	32.80
Never married****	2.80****	2.73****	2.66$^{\wedge}$	5.48$^{\wedge}$
Total	100%	100%	100%	100%
Parental Status***				
Child living $^{\sim}$	88.23	84.51	86.64	85.43
No child ever born	6.01	9.11	7.62	9.67
Outlived all children	1.56	1.48	1.27	1.73
Step only, no child ever born	4.20	4.90	4.47	3.17
Total	100%	100%	100%	100%

$^{\wedge}$ $p < 0.10$; $^{*}p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$; $^{****}p < 0.0001$ by χ^2 test. N = 8,658. (*continued*)

$^{\sim}$ Living biological child, or living step child if outlived all biological children.

Table 4.11. *Demographic Covariates and Advance Care Planning (ACP). Bivariate Analysis. HRS Exit Interviews, 2000 – 2012. (continued)*

	Advance Care Planning			
	EOL Discussion Only	AD Completion Only	Both	Neither
Covariate	%	%	%	%
Race****				
White	75.72	86.10	89.99	64.50
non-White	24.28	13.90	10.01	35.50
Total	100%	100%	100%	100%
Ethnicity, Hispanic****				
Hispanic	9.47	4.33	3.24	13.42
Non-Hispanic	90.53	95.67	96.76	86.58
Total	100%	100%	100%	100%
Education****				
No high school diploma	43.70	35.82	31.46	52.72
GED[1]	4.53	2.85	4.19	4.43
High school graduate	27.57	29.90	30.52	24.19
Some college	15.64	18.16	19.65	10.15
College degree and above	8.56	13.27	14.19	8.61
Total	100%	100%	100%	100%
Net Worth[2] ****				
< $6,057	24.12	23.69	19.98	35.35
≥ $6,057	75.88	76.31	80.02	64.65
Total	100%	100%	100%	100%
Total Income[2] ****				
< $14,563	27.57	22.55	19.43	35.40
≥ $14,563	72.43	77.45	80.57	64.60
Total	100%	100%	100%	100%

^ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; **** $p < 0.0001$ by χ^2 test. N = 8,658.

[1] GED = General education development test.

[2] Quartiles, standardized to 2012 dollars.

Table 4.12. *Health Covariates and Advance Care Planning (ACP). Bivariate Analysis. HRS Exit Interviews, 2000 – 2012.*

	Advance Care Planning			
	EOL Discussion Only	AD Completion Only	Both	Neither
Covariate	%	%	%	%
Overall, N (row %)	1,215 (14.03%)	1,756 (20.29%)	3,608 (41.67%)	2,079 (24.01%)
Nursing Home Resident****				
Yes	22.06	47.55	40.99	26.17
No	77.94	52.45	59.01	73.83
Total	100%	100%	100%	100%
Self-Rated Health				
Low[1]	64.28	60.88	62.61	62.58
High[2]	35.72	39.12	37.39	37.42
Total	100%	100%	100%	100%
Functional Status: Basic****				
Any difficulty	43.46	56.89	52.52	48.39
No difficulty	56.54	43.11	47.48	51.61
Total	100%	100%	100%	100%
Functional. Status: IADL[3]****				
Any difficulty	28.48	47.72	39.25	37.85
No difficulty	71.52	52.28	60.75	62.15
Total	100%	100%	100%	100%
Death Expected****				
Yes	53.25	62.30	65.60	47.04
No	46.75	37.70	34.40	52.96
Total	100%	100%	100%	100%

^ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; **** $p < 0.0001$ by χ^2 test. N = 8,658.

[1] Low = fair, poor.

[2] High = excellent, very good, good.

[3] Instrumental Activities of Daily Living (IADLs).

Table 4.13. *Social Covariates and Advance Care Planning (ACP). Bivariate Analysis. HRS Exit Interviews, 2000 – 2012.*

	Advance Care Planning			
	EOL Discussion Only	AD Completion Only	Both	Neither
Covariate	%	%	%	%
Overall, N (row %)	1,215 (14.03%)	1,756 (20.29%)	3,608 (41.67%)	2,079 (24.01%)
Lived Alone****				
Yes	25.19	40.89	41.52	31.55
No	74.81	59.11	58.48	68.45
Total	100%	100%	100%	100%
Living Siblings****				
Yes	76.30	67.88	67.24	72.87
No	23.70	32.12	32.76	27.13
Total	100%	100%	100%	100%
Relatives Near**				
Yes	29.79	33.94	32.07	35.50
No	70.21	66.06	67.93	64.50
Total	100%	100%	100%	100%
Good Friends Near*				
Yes	62.80	57.86	60.86	62.00
No	37.20	42.14	39.14	38.00
Total	100%	100%	100%	100%
Social Contact				
Frequently[1]	64.44	61.96	64.41	62.58
Rarely[2]	35.56	38.04	35.59	37.42
Total	100%	100%	100%	100%

^ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; **** $p < 0.0001$ by χ^2 test. N = 8,658.

[1] Frequently = Daily, weekly, bi-weekly monthly.

[2] Rarely = yearly, almost never.

Table 4.14. *Main Effects of Childlessness*[ǂ] *on Advance Care Planning (ACP). Multinomial Logistic Regression Results. Adjusted. HRS Exit Interviews, 2000 – 2012.*

	ODDS RATIOS: No ACP [Ω] (reference)					
Independent Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Full
Child living[1] (reference)						
Childless	0.782*	0.782*	0.908	0.908	0.911	0.910
	1.074	1.068	1.252*	1.252*	1.044	1.041
	0.904	0.895	1.037	1.037	0.893	0.881
Gender, Male = 1		1.020	--	0.960	0.951	0.965
		0.833**	--	1.007	1.020	1.014
		0.752****	--	0.896^	0.890^	0.884^
Married[2] (reference)						
Divorced/separated			0.697**	0.691**	0.863	1.025
			0.895	0.896	1.422**	1.612**
			0.873	1.467***	1.639***	0.892
Widowed			0.884	0.868	1.159	1.419**
			1.688****	1.693****	1.528****	1.690***
			1.712****	1.632****	1.785****	1.957****
Never married			0.489**	0.483***	0.615*	0.764
			0.509***	0.510***	0.662*	0.761
			0.567****	0.551****	0.813	0.930
Age at Death (in years)					0.990*	0.991
					1.030****	1.037****
					1.020****	1.031****
White = 1					1.572****	1.556****
					2.591****	2.467****
					3.720****	3.496****
Hispanic = 1					0.716**	0.702**
					0.398****	0.412****
					0.303****	0.315****
Education,[3] High = 1					1.181*	1.167^
					1.793****	1.679****
					1.922****	1.788****

End-of-life care discussion, Advance directive completion only, Both, None (reference). (*continued*)

Table 4.14. *Main Effects of Childlessness‡ on ACP. Multinomial Logistic Regression Results. Adjusted. HRS Exit Interviews, 2000 – 2012. (continued)*

	ODDS RATIOS: No ACP Ω (reference)					
Independent Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Full
Net worth,[4] High = 1					1.421***	1.390***
					1.675****	1.581****
					1.873****	1.714****
Total income,[4] High = 1					--	0.996
					--	1.419***
					--	1.570****
Nursing Home, Resident = 1					0.887	0.926
					2.033****	1.903****
					1.709****	1.534****
Self-Rated Health, High = 1					--	0.806**
					--	0.955
					--	0.810**
ADL, Any difficulties = 1					1.073	1.002
					1.144^	1.121
					1.176*	1.104
IADL, Any difficulties = 1					0.737***	0.703***
					1.116	1.080
					0.866^	0.826*
Death Expected = 1					--	1.327***
					--	1.462****
					--	1.815****
Lived Alone = 1					--	0.740**
					--	0.970
					--	1.031
Living Siblings = 1					1.185^	1.182^
					1.167*	1.161^
					1.071	1.059

End-of-life care discussion, Advance directive completion only, Both, None (reference). (*continued*)

Table 4.14. *Main Effects of Childlessness*[ǂ] *on Advance Care Planning (ACP). Multinomial Logistic Regression Results. Adjusted. HRS Exit Interviews, 2000 – 2012.*

Relatives Near = 1						0.770***	0.774**
						0.896	0.912
						0.846**	0.851*
Good Friends Near = 1						--	0.960
						--	0.870^
						--	0.926
Socially Active = 1						--	1.083
						--	1.064
						--	1.120
End-of-life care discussion	N	1,215	1,215	1,215	1,215	1,215	1,215
Advance directive completion	N	1,756	1,756	1,756	1,756	1,756	1,756
Both discussion and directive	N	3,608	3,608	3,608	3,608	3,608	3,608
-2 log-likelihood		22,613.19*	22,575.91****	22,413.05****	22,408.17****	20,991.57****	20,806.90****

End-of-life care discussion, Advance directive completion only, Both, None (reference). (*continued*)

^ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; **** $p < 0.0001$. ǂ No child ever born, outlived all children.

Ω No Advance Care Planning (ACP) = Neither end-of-life care discussion nor advance directive completion, n = 2,079.

[1] Living biological child and any step.

[2] Includes partnered.

[3] ≥ High school diploma.

[4] Net worth ≥ $6,057

4.3. Results for Aim 3

The final study sample from Aim 2 was used for Aim 3. The sample included HRS decedents over age 50 at death, with complete data for advance care planning, parental status, gender, and marital status (N = 8,658). Data were drawn from exit interviews conducted from 2000 – 2012 with knowledgeable proxies. A total of 344 records, 3.97 percent of the sample, were excluded from the study due to missing data for one or more covariates. Eliminating this relatively small proportion of records allowed the same records to be used in all analyses and their interpretation, with little risk of selection bias.

Aim 3. Examine any differences in the effect of childlessness on advance care planning over age 50 by marital status and gender.

Although the main effects of childlessness on advance care planning were not statistically significant in the final regression model from Aim 2, substantial differences by marital status were observed. That the effects of childlessness on advance care planning arise differently in some marital status groups than in others is the main premise underlying Aim 3.1. Childlessness was hypothesized to have negative consequences for unmarried persons because absence of an adult child and the lack of a spouse or partner, limits the social support network.

To test whether the effect of childlessness on advance care planning was conditional on marital status, indicator variables representing the eight categories of combined parental/marital status were entered into the final regression model (Model 5) from Aim 2. Effects were compared across family status subgroups (Aim 3.1).

Likewise, the main effects of gender on advance care planning were not significant in the final regression model from Aim 2. The odds ratio for gender for *both end-of-life care discussion and advance directive completion*, compared with *no advance care planning* was nearly significant OR = 0.896 ($p < 0.10$), and thus warranted further consideration. Gender was also considered important to this study because it provides context for the normative roles and identities undertaken by spouses and parents over the life course (as discussed in the literature review in Chapter 2).

To test whether the effects of childlessness on advance care planning were conditional on gender as well as marital status, an interaction term for each family status indicator by gender was included in the regression model (Aim 3.2). Characteristics of the study population by parental status, marital status, and gender appear in Table 4.15.

Decedent Characteristics by Parental Status and Gender

Overall, 14.61 percent of women and 13 percent of men in the decedent population were childless at the end of life ($p < 0.05$). Of this number, 12.75 percent of women and 11.99 percent of men had neither given birth to nor fathered any children; and 1.87 percent of women and 1.01 percent of men had outlived their children. In all, 3.39 percent of women and 5.13 percent of men had at least one living step child at the time they died, and no biological children ($p < 0.0001$), as shown in Table 4.15.

Mean age at death was 84.16 years among childless women and 80.86 years among women with children living, compared with 78.91 years among childless men and 78.19 years among men with children living ($p < 0.0001$). Median age at death was 87 years (IQR = 78 – 92) among childless women, 82 years (IQR = 73 – 89) among women with children living, 79 years (IQR = 71 – 86) among childless men, and 80 years (72 –

87) among men with children living ($p < 0.0001$). Among childless women, 80.83 percent were part of the oldest cohort, compared with 67.36 percent of childless men. This difference reflects the longer life span of women.

By marital status and gender, differences in childlessness were significant. Only 20.95 percent of childless women were married/partnered at the time of final illness, compared with 29.15 percent of women with children living, 50.09 percent of childless men, and 68.60 percent of men with children living ($p < 0.0001$). A large proportion of women had been widowed: 52.60 percent of childless women, compared with 60.27 percent of women with children living. By contrast, only 22.77 percent of childless men, and 21.02 percent of men with children living had been widowed ($p < 0.0001$). Nearly 20 percent of childless women never married, compared with 1.04 percent of women with children living, 18.09 percent of childless men, and 0.54 percent of men with children living ($p < 0.0001$).

Non-white race ($p < 0.0001$) and non-Hispanic ethnicity ($p < 0.10$, non-significant, among women; $p < 0.001$ among men) were positively associated with childlessness, as shown in Table 4.15. Similar proportions of women and men, nearly 40 percent of all decedents, had no high school diploma, regardless of parental status (p-value non-significant). A higher proportion of childless women, 11.59 percent, had a college degree or above, compared with 8.44 percent of women with children living; yet the proportion was higher among men, irrespective of parental status, 15.75 percent of childless men had a college degree or above, compared with 15.17 percent of men with children living ($p < 0.05$).

With respect to net worth, similar proportions of childless women, 30.91 percent, and women with living children, 30.80 percent, had net worth < $6,057, the lowest quartile, compared with 22.39 percent of childless men, and 17.8 percent of men with children living ($p < 0.05$). Nearly 36 percent of childless older women, the highest of any subgroup, had an income in the lowest quartile, < $14,563, compared with 32.48 percent of women with children living, 21.06 percent of childless men, and 15.31 percent of men with a child living ($p < 0.001$).

Nearly 53 percent of childless women resided in a nursing home/long-term care facility at death, compared with 39.93 percent of women with children living, 37.38 percent of childless men, and 28.50 percent of men with children living ($p < 0.0001$). A higher proportion of childless women had difficulties with basic (p-value non-significant) and instrumental ($p < 0.05$) functioning than any other group. Death expected was associated with childlessness among women ($p < 0.05$).

Lived alone was associated with childlessness among both women and men, and highest of all among childless women ($p < 0.0001$). No living siblings occurred most frequently among childless women, 39.08 percent ($p < 0.001$). Relatives near occurred least frequently among childless men ($p < 0.05$), and social contact rarely was highest among women with children living ($p < 0.001$), relative to other groups.

Advance Care Planning by Parental Status, Marital Status, and Gender

Overall, 53.34 percent of childless women in the study sample had engaged in end-of-life care discussion, compared with 57.76 percent of women with children living, 50.47 percent of childless men, and 54.65 percent of men with children living ($p < 0.05$ women; $p < 0.10$ men). Across the categories of advance care planning shown in Table

4.16, the following significant differences were observed in the prevalence of *end-of-life care discussion only*: 21.95 percent among never married women with at least one child living, and 9.85 percent among never married childless women, compared with 12.88 percent overall ($p < 0.0001$). Notably, 56.10 percent of never married women with at least one child living ($p < 0.0001$), and 51.16 percent of divorced childless men ($p < 0.05$) engaged in *neither discussion nor advance directive completion*, compared with 24.01 percent in the sample overall. Sparse data ($n \leq 5$), however, required the exclusion of these results in regression analyses for both women and men, as indicated in Table 4.16.

Small cell sizes ($n \leq 5$) also required the exclusion of additional subgroups relative to the other advance care planning categories. In particular, for *end-of-life care discussion only*, never married men with at least one child living ($n = 4$); for *advance directive completion only*, divorced childless women ($n = 1$), never married women with at least one child living ($n = 2$), and never married men with at least one child living ($n = 0$). Table 4.18 shows total cell size for each subgroup by gender regardless of advance care planning status.

Table 4.15. *Decedent Characteristics by Parental Status and Gender. HRS Exit Interviews, 2000 – 2012*.

	Women		Men	
	Childless‡	Child Living	Childless‡	Child Living
Characteristic	%	%	%	%
Overall, N (row %)*	673 (14.61)	3,932 (85.39)	527 (13.00)	3,526 (87.00)
Age at death, years (range)****	52 – 111	50 – 110	51 – 103	50 – 110
Mean (SD)	84.16 (10.52)	80.86 (10.87)	78.91 (11.15)	78.19 (10.13)
Median (IQR)	87 (78 – 92)	82 (73 – 89)	79 (71 – 86)	80 (72 – 87)
Generational Cohort**** **				
Civic (born prior to 1931)	80.83	70.19	67.36	63.90
Silent (born 1931 – 1947)	17.24	26.78	26.95	32.7
Boomer (born 1948 – 1959)	1.93	3.03	5.69	3.35
Marital Status****				
Married/partnered	20.95	29.15	50.09	68.60
Unmarried	79.05	70.85	49.02	31.40
Divorced/separated	(6.84)	(9.54)	(8.16)	(9.84)
Widowed	(52.60)	(60.27)	(22.77)	(21.02)
Never married	(19.61)	(1.04)	(18.09)	(0.54)
Parental Status, Childless****				
No child ever born	9.36	--	6.86	--
Outlived all children	1.87	--	1.01	--
Step child only, no child ever born	3.39	--	5.13	--
Race, non-White****	25.26	18.82	20.30	17.61
Ethnicity, Hispanic^ ***	4.75	6.71	3.80	7.69
< High school diploma	38.19	40.90	36.43	37.78
≥ College degree*	11.59	8.44	15.75	15.17
Net Worth,[1] < $6,057	30.91	30.80	22.39	17.8
Total Income,[1] < $14,563 ***	35.66	32.48	21.06	15.31

^ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; **** $p < 0.0001$ by χ^2 test. N = 8,658. (*continued)*

‡ No biological child ever born or outlived all children. [1] Lowest quartile standardized to 2012 $.

Table 4.15. *Decedent Characteristics by Parental Status and Gender. HRS Exit Interviews, 2000 – 2012. (continued)*

	Women		Men	
	Childless‡	Child Living	Childless‡	Child Living
Characteristic	%	%	%	%
Advance Care Planning * (women)				
End-of-life (EOL) care discussion only	10.25	13.33	14.04	15.54
Advance directive (AD) completion only	24.22	19.96	20.68	19.82
Both EOL discussion and AD completion	43.09	44.43	36.43	39.11
Neither EOL discussion nor AD completion	22.44	22.28	28.85	25.53
Total	100%	100%	100%	100%
Advance Care Planning (any type)	77.56	77.72	71.15^	74.47^
End-of-life (EOL) Care Discussion	53.34*	57.76*	50.47^	54.65^
Advance Directive (LW and/or DPAHC)	67.31	64.39	57.12	58.93
Living Will (LW)[2]	46.94	45.65	37.02^	41.16^
Durable Power of Attorney for Health Care (DPAHC)[3]	60.51^	56.99^	52.01	51.54
Nursing Home, Resident****	52.60	39.93	37.38	28.50
Self-Rated Health, Low[4]	61.07	64.32	61.86	60.81
Functional Status: Basic, Any difficulties[4]	60.62	57.40	46.49	43.05
Functional Status: Instrumental,* Any difficulties[4]	47.55	43.54	33.97	33.35
Death Expected*	65.38	60.71	56.17	55.67
Living Siblings, None***	39.08	32.25	25.43	26.46
Lived Alone****	62.85	44.96	39.47	22.09
Relatives Near*	31.35	33.95	27.89	32.90
Good Friends Near**	63.74	57.68	61.29	63.64
Social Contact, Rarely[5] ***	32.54	39.78	33.97	34.03

^ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; **** $p < 0.0001$ by χ^2 test. N = 8,658.

[2] LW = Living Will; Missing, n = 45.

[3] DPAHC = Durable Power of Attorney for Health Care; Missing, n = 52.

[4] Self-rated health and functional status, basic and instrumental reported in last respondent survey prior to death.

[5] Socialize less than once per year or never.

Table 4.16. *Percent Advance Care Planning (ACP) within Strata of Sample Subgroups by Parental, Status, Marital Status, and Gender. HRS Exit Interviews, 2000 – 2012.*

	Advance Care Planning			
	EOL Discussion Only	AD Completion Only	Both	Neither
Subgroup	N (% ACP)	N (% ACP)	N (% ACP)	N (%)
Overall, N (row %)	1,215 (14.03)	1,756 (20.28)	3,608 (41.67)	2,079 (24.01)
Marital Status X Parental Status				
Women	593 (12.88)	948 (20.59)	2,037 (44.23)	1.027 (22.30)
Married, Child Living[1]	184 (16.06)	199 (17.36)	433 (37.78)	330 (28.80)
Married, Childless	20 (14.18)	32 (22.70)	51 (36.17)	38 (26.95)
Divorced, Child Living[1]	56 (14.93)	62 (16.53)	173 (46.13)	84 (22.40)
Divorced, Childless	***5** (10.87)*	***1** (26.09)*	18 (39.13)	11 (23.91)
Widowed, Child Living[1]	275 (11.60)	522 (22.03)	1,134 (47.85)	439 (18.52)
Widowed, Childless	31 (8.76)	90 (25.42)	167 (47.18)	66 (18.64)
Never Married, Child Living[1****]	9 (21.95)	***2** (4.88)*	7 (17.07)	23 (56.10)
Never Married, Childless[****]	13 (9.85)	29 (21.97)	54 (40.91)	36 (27.27)
Men	622 (15.35)	808 (19.94)	1,571 (38.76)	1,052 (25.96)
Married, Child Living[1]	428 (17.69)	451 (18.64)	926 (38.28)	614 (25.38)
Married, Childless	48 (18.18)	55 (20.83)	100 (37.88)	61 (23.11)
Divorced, Child Living[1*]	41 (11.82)	69 (19.88)	114 (32.85)	123 (35.45)
Divorced, Childless[*]	7 (16.28)	9 (20.93)	***5** (11.63)*	22 (51.16)
Widowed, Child Living[1]	75 (10.12)	179 (24.16)	334 (45.07)	153 (20.65)
Widowed, Childless	11 (9.17)	28 (23.33)	57 (47.50)	24 (20.00)
Never Married, Child Living[1 ^]	***4** (21.05)*	***0** (0)*	***5** (26.32)*	10 (52.63)
Never Married, Childless[^]	8 (8.00)	17 (17.00)	30 (30.00)	45 (45.00)

[^] $p < 0.10$; [*] $p < 0.05$; [**] $p < 0.01$; [***] $p < 0.001$; [****] $p < 0.0001$ by χ^2 test. N = 8,658.

[1] Living biological child and any step.

Italics signify subgroups with sparse data ($n \leq 5$) deleted from final results shown in Figures 4.1, 4.2, 4.3.

Effect Modification by Marital Status

RQ.3.1. How does marital status modify the effect of childlessness on advance care planning over age 50?

H.3.1. Unmarried childless persons over age 50 will be less likely to engage in advance care planning than married persons with or without living children, after controlling for demographic, health, and social covariates.

Results 3.1. Consistent with hypothesis H.3.1, unmarried persons over age 50 were less likely to engage in advance care planning if they were never married and childless, and more likely to engage in advance care planning if they were divorced/separated or widowed with children living. Statistically significant results were obtained for divorced/child living, but not divorced/childless. Significant results were also obtained for widowed/child living, widowed/childless, and never married childless; but not never married/children living, as shown in Table 4.17. Divorced/separated individuals with children living, for example, were 46 – 59 percent more likely than married individuals with children living to engage in *advance directive completion only*, OR = 1.465 ($p < 0.01$), or *both end-of-life care discussion and advance directive completion*, OR = 1.593 ($p < 0.0001$), compared with *no advance care planning*.

Widowed persons, with or without children living, were more likely than married individuals with children living to engage in *both end-of-life care discussion and advance directive completion* ($p < 0.01$), or *advance directive completion only*, compared with *no advance care planning* ($p < 0.0001$). By contrast, never married childless persons were 2.11 times less likely than married individuals with children living to engage in *end-of-life care discussion only*, OR = 0.474 ($p < 0.01$), and 45 percent less likely to engage in

both end-of-life care discussion and advance directive completion, OR = 0.689 ($p < 0.05$) compared with *no advance care planning* (calculated as the reciprocal). As expected, married childless persons were neither more nor less likely than those with children living to engage in any type of advance care planning OR ≈ 1 (p-values non-significant).

Covariates. Covariates associated with a greater likelihood of advance care planning for all three of the outcomes presented in Table 4.17 included white race ($p < 0.0001$), non-Hispanic ethnicity ($p < 0.01$ to 0.0001), and net worth moderate to high ($p < 0.001$ to $p < 0.0001$). Covariates associated with an increased likelihood of *advance directive completion only* and *both end-of-life care discussion and advance directive completion* (but not *end-of-life care discussion only*) included age at death ($p < 0.0001$), education ($p < 0.0001$), and nursing home/long-term care residence ($p < 0.0001$).

Difficulties in basic functioning were associated with an increased likelihood of *advance directive completion* ($p < 0.10$), whereas difficulties in instrumental functioning were associated with a decreased likelihood of *end-of-life care discussion only* ($p < 0.01$). The presence of living siblings was associated with an increased likelihood of *both end-of-life care discussion and advance directive completion* ($p < 0.05$). Notably, relatives near was associated with a decreased likelihood of *end-of-life care discussion only* ($p < 0.01$) and *both end-of-life care discussion and advance directive completion* ($p < 0.01$). With odds ratios close to one, OR = 0.952, OR = 1.021, and OR = 0.890 in Table 4.17, gender appears to have had no significant effect on the likelihood of any of the three types of advance care planning.

Table 4.17. *Conditional Effects of Childlessness*[ǂ] *on Advance Care Planning, by Marital Status. Multinomial Logistic Regression Results. HRS Exit Interviews, 2000 – 2012.*

	ODDS RATIOS: No ACP[Ω] (reference)		
Independent Variable	EOL Discussion Only	AD Completion Only	Both
Married,[1] Child Living[2] (reference)			
Married,[1] Childless	1.061	1.116	0.955
Divorced,[3] Child Living[2]	0.874	1.465**	1.593****
Divorced,[3] Childless	0.700	1.255	0.713
Widowed, Child Living[2]	1.194^	1.540****	1.771****
Widowed, Childless	0.982	1.608**	1.763***
Never Married, Child Living[2]	0.919	0.296	1.090
Never Married, Childless	0.474**	0.718	0.689*
Gender, Male = 1	0.952	1.021	0.890^
Age at Death	0.993^	1.030****	1.020****
White = 1	1.568****	2.574****	3.760****
Hispanic = 1	0.715**	0.399****	0.302****
Education,[4] High = 1	1.147^	1.793****	1.919****
Net worth,[5] High = 1	1.399***	1.674****	1.879****
Nursing Home/LTC, Resident = 1	0.938	2.031****	1.707****
Functional Status Basic, Any Difficulties with ADLs[6] = 1	1.072	1.144^	1.172*
Functional Status Instrumental, Any Difficulties with IADLs[7] = 1	0.739**	1.116	0.869^
Living Siblings = 1	1.185^	1.166	1.068*
Relatives Near = 1	0.774**	0.898	0.849**
N	1,215	1,756	3,608
- 2 log-likelihood	20,978.61****	20,978.61****	20,978.61****

^ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; **** $p < 0.0001$. N = 8,658. ǂ No child ever born, outlived all children.

Ω No Advance Care Planning (ACP) = Neither end-of-life care discussion nor advance directive completion, n = 2,079.

[1] Includes partnered. [2] Living biological child and any step. [3] Includes separated.

[4] ≥ High school diploma. [5] Net worth ≥ $6,057.

[6] ADL = Activities of daily living.

[7] IADL = Instrumental activities of daily living.

Effect Modification by Gender and Marital Status

RQ.3.2. How do marital status and gender together modify the effect of childlessness on advance care planning over age 50?

H.3.2. Unmarried childless men over age 50 will be less likely to engage in advance care planning than unmarried childless women over age 50, after controlling for demographic, health, and social covariates. Divorced childless men over age 50 will be least likely to plan, and never married childless women over age 50 will be most likely to plan, compared with the reference category, married women with living children.

Results 3.2. Consistent with hypothesis H.3.2, unmarried childless men over age 50 were less likely to engage in advance care planning than unmarried childless women, as shown in Figures 4.1, 4.2, and 4.3. The odds ratios for *end-of-life care discussion only*, *advance directive completion only*, and *both* were lower for unmarried men than unmarried women (divorced, widowed, and never married), compared with *no advance care planning*. Statistically significant results were obtained for divorced/child living and divorced/childless; however, divorced/childless was eliminated from the final results due to sparse data ($n \leq 5$), as shown in Table 4.20. Significant results were also obtained for widowed/child living and never married/childless; but not widowed/childless, nor never married/children living, which also was eliminated due to sparse data ($n \leq 5$).

The odds ratios for married men with and without children living were higher than those of married women with and without children living for *end-of-life care discussion only*, and *both*, compared with *no advance care planning.* For *advance directive completion only*, the odds ratio for married childless men was slightly lower

than that of married childless women, OR = 1.266 for men, compared with 1.283 for women, as shown in Table 4.20 (p-value not statistically significant).

Contrary to hypothesis H.3.2., never married childless women appeared to be neither more nor less likely to plan, compared with the reference group married women with living children (p-value non-significant). Odds ratios across each of the three types of advance care planning for this subgroup were close to 1, compared with *no advance care planning*, as shown in Table 4.20.

Results indicate that never married childless men were least likely to plan, compared with the reference group, married women with living children, for all three types of advance care planning shown in Table 4.20: *end-of-life care discussion only*, OR = 0.358 ($p < 0.05$); *advance directive completion only*, OR = 0.613 ($p < 0.10$, non-significant); and *both end-of-life care discussion and advance directive completion*, OR = 0.537 ($p < 0.05$).

These findings are discussed in Chapter 5.

Table 4.18. *Decedent Subgroups by Parental Status, Gender, and Marital Status. HRS Exit Interviews, 2000 – 2012.*

	Decedents		
	Women	Men	Total
Subgroup	N	N	N
Overall, N (row %)	4,605 (53.19)	4,053 (46.81)	8,658 (100)
Marital Status X Parental Status			
Married,[1] Child Living[2]	1,146	2,419	3,565
Married,[1] No Child Ever Born	62	99	161
Married,[1] Outlived	19	20	39
Married,[1] Step Only	60	145	205
Divorced,[3] Child Living[2]	375	347	722
Divorced,[3] No Child Ever Born	35	24	59
Divorced,[3] Outlived	***5***	***6***	***11***
Divorced,[3] Step Only	6	13	19
Widowed, Child Living[2]	2,370	741	3,111
Widowed, No Child Ever Born	205	59	264
Widowed, Outlived	60	13	73
Widowed, Step Only	89	48	137
Never Married, Child Living[2]	41	19	60
Never Married, No Child Ever Born	129	96	225
Never Married, Outlived	***2***	***2***	***4***
Never Married, Step Only	***1***	***2***	***3***
Childless, Subtotal, N (row %)	673 (14.61)	527 (13.00)	1,200 (13.86)
Total	100%	100%	100%

[1] Includes partnered.

[2] Living biological child and any step.

[3] Includes separated.

Italics signify subgroups with sparse data (n ≤ 5).

Table 4.19. *Conditional Effects of Childlessness[ǂ] on Advance Care Planning (ACP): Marital Status and Gender. Multinomial Logistic Regression Results. Adjusted Model. HRS Exit Interviews, 2000 – 2012.*

	ODDS RATIOS: No ACP[Ω] (reference)		
Independent Variable	EOL Discussion Only	AD Completion Only	Both
Married,[1] Child Living[2] (reference)	1.000	1.000	1.000
Married,[1] Childless	0.975	1.283	0.982
Divorced,[3] Child Living[2]	1.492*	1.813**	2.583****
Divorced,[3] Childless	1.184	2.288^	2.008^
Widowed, Child Living[2]	1.581***	1.760****	2.209****
Widowed, Childless	1.280	1.893**	2.169****
Never Married, Child Living[2]	0.954	0.391	0.750
Never Married, Childless	0.865	1.054	1.102
Gender, Male = 1	1.285*	1.205	1.160
Gender X Married,[1] Child Living[2]	1.285	1.205	1.160
Gender X Married,[1] Childless	1.152	0.819	0.976
Gender X Divorced,[3] Child Living[2]	0.383***	0.709	0.413****
Gender X Divorced,[3] Childless	***0.419***	***0.348^***	***0.104*****
Gender X Widowed, Child Living[2]	0.579**	0.811	0.699*
Gender X Widowed, Childless	0.643	0.731	0.756
Gender X Never Married, Child Living[2]	***0.873***	***--***	***1.268***
Gender X Never Married, Childless	0.322*	0.483^	0.420*
Age at death	0.991*	1.028****	1.018****
White = 1	1.582****	2.597****	3.814****
Hispanic = 1	0.716**	0.396****	0.302****
Education,[4] High = 1	1.146^	1.794****	1.918****
Net Worth,[5] High = 1	1.411***	1.671****	1.892****
Nursing Home/LTC Resident = 1	0.944	2.038****	1.717****
ADL,[6] Any Difficulties = 1	1.075	1.148****	1.180****
IADL,[7] Any Difficulties = 1	0.739^	1.116^	0.869
Living Siblings = 1	1.184	1.170*	1.068
Relatives Near = 1	0.773**	0.895	0.846**
N	1,215	1,756	3,608
- 2 log-likelihood	20,932.47****	20,932.47****	20,932.47****

^p < 0.10; *p < 0.05; **p < 0.01; ***p < 0.001; ****p < 0.0001. N = 8,658. ǂNo child ever born, outlived all children. Italics = sparse data.
ΩNo ACP = No Advance care planning: n = 2,079.[1]Includes partnered.[2] Living biological child and any step. [3]Includes separated.
[4]≥High school diploma. [5]Net worth ≥ $6,057. [6]ADL = Activities of daily living. [7]IADL = Instrumental activities of daily living.

Table 4.20. *Joint Effects of Childlessness,[ǂ] Marital Status, and Gender on Advance Care Planning, Controlling for Covariates in Table 4.19. HRS Exit Interviews, 2000 – 2012.*

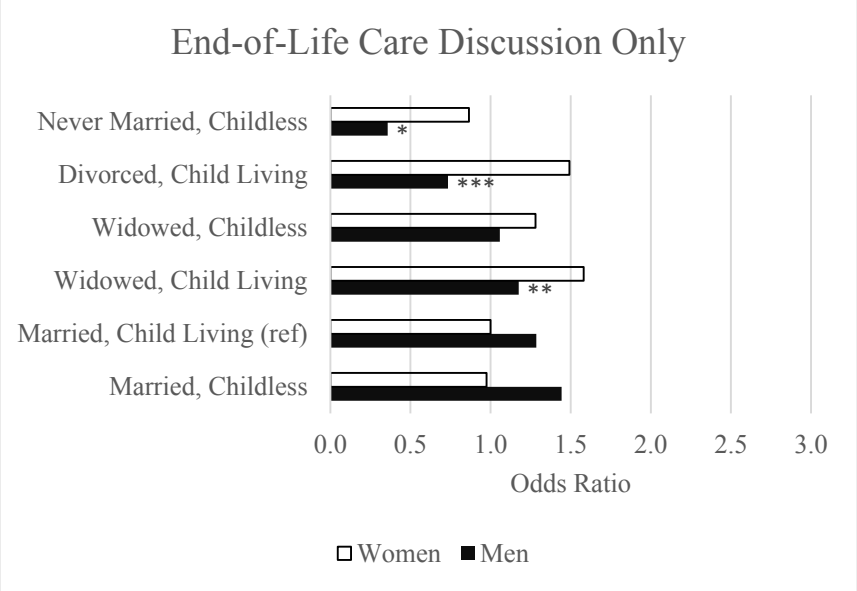
	ODDS RATIOS: No ACP[Ω] (reference)		
Independent Variable	EOL Discussion Only	AD Completion Only	Both
Women			
Married,[1] Child Living[2] (reference)	1.000	1.000	1.000
Married,[1] Childless	0.975	1.283	0.982
Divorced,[3] Child Living[2]	1.492*	1.813**	2.583****
Divorced,[3] Childless	***1.184***	***2.288^***	***2.008^***
Widowed, Child Living[2]	1.581***	1.760 ****	2.209****
Widowed, Childless	1.280	1.893**	2.169****
Never Married, Child Living[2]	***0.954***	***0.391***	***0.750***
Never Married, Childless	0.865	1.054	1.102
Men	1.285*	1.205	1.160
Married,[1] Child Living[2]	1.285	1.205	1.160
Married,[1] Childless	1.443	1.266	1.112
Divorced,[3] Child Living[2]	0.734***	1.549	1.237****
Divorced,[3] Childless	***0.637***	***0.959^***	***0.242*****
Widowed, Child Living[2]	1.176**	1.720	1.791*
Widowed, Childless	1.058	1.667	1.902
Never Married, Child Living[2]	***1.070***	***0.471***	***1.103***
Never Married, Childless	0.358*	0.613^	0.537*
Total, N	1,215	1,756	3,608

^ p < 0.10; * p < 0.05; ** p < 0.01; *** p < 0.001; **** p < 0.0001. N = 8,658. ǂ No child ever born, outlived all children.

Ω No Advance Care Planning (ACP) = Neither end-of-life care discussion nor advance directive completion, n = 2,079.

[1] Includes partnered. [2] Living biological child and any step. [3] Includes separated.

Italics signify subgroups with sparse data (n ≤ 5) deleted from final results shown in Figures 4.1, 4.2, 4.3.



^ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; **** $p < 0.0001$ by χ^2 test. N = 1,215.

Key: The joint effects of childlessness, marital status, and gender on *end-of-life care discussion only*, controlling for covariates, for decedents who died at age ≥ 50 years. The reference group was *married women/child living*.

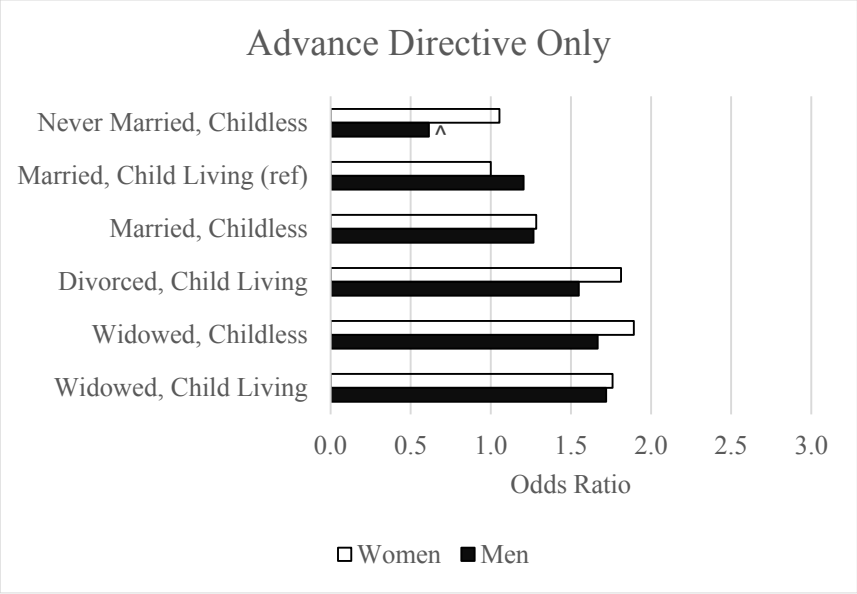
The odds ratio for any other family status by gender was estimated using the odds ratios listed in Table 4.19. For example, the odds ratio of *end-of-life care discussion only* for men in the *divorced/child living* subgroup was 1.492 x 0.383 x 1.285 = 0.734, controlling for covariates.

Asterisks signify gender differences in family status effects.

Due to sparse data (n ≤ 5), the groups *divorced/childless* and *never married/child living* were dropped for both women and men.

Data were drawn from Health and Retirement Study (HRS) Exit Interviews, 2000 – 2012.

Figure 4.1. Family Status Effects by Gender on *End-of-Life Care Discussion Only* vs. *No Advance Care Planning*.



^ p < 0.10; * p < 0.05; ** p < 0.01; *** p < 0.001; **** p < 0.0001 by χ^2 test. N = 1,756.

Key: The joint effects of childlessness, marital status, and gender on *advance directive completion only*, controlling for covariates, for decedents who died at age ≥ 50 years. The reference group was *married women/child living*.

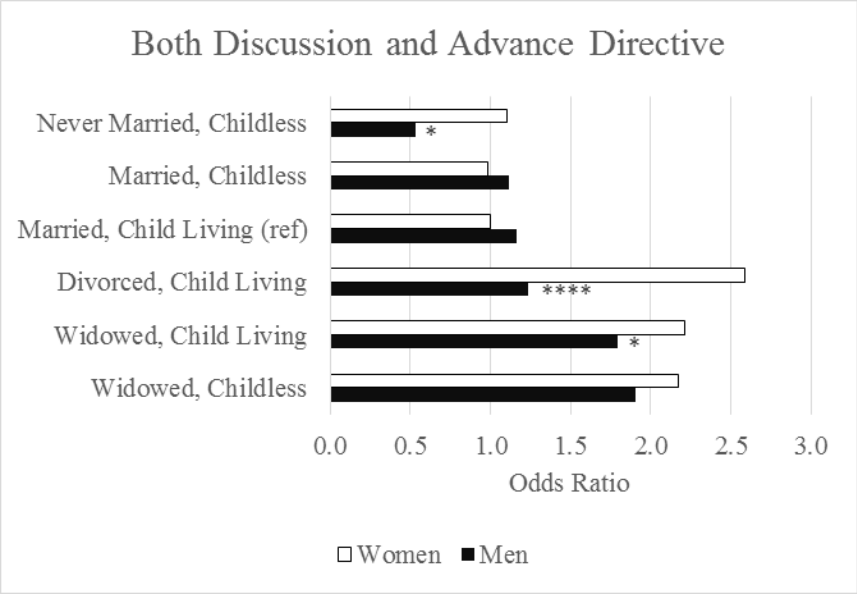
The odds ratio for any other family status by gender was estimated using the odds ratios listed in Table 4.19. For example, the odds ratio of *advance directive completion only* for men in the *divorced/child living* subgroup was 1.813 x 0.709 x 1.205 = 1.549, controlling for covariates.

Asterisks indicate significant gender differences in family status effects.

Due to sparse data (n ≤ 5), the groups *divorced/childless* and *never married/child living* were dropped for both women and men.

Data were drawn from Health and Retirement Study (HRS) Exit Interviews, 2000 – 2012.

Figure 4.2. Family Status Effects by Gender on *Advance Directive Completion Only* vs. *No Advance Care Planning*.



$^{\wedge}$ $p < 0.10$; $^{*}p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$; $^{****}p < 0.0001$ by χ^2 test. N = 3,608.

Key: The joint effects of childlessness, marital status, and gender on *both end-of-life care discussion and advance directive completion*, controlling for covariates, for decedents who died at age ≥ 50 years. The reference group was *married women/child living*.

The odds ratio for any other family status by gender was estimated using the odds ratios listed in Table 4.19. For example, the odds ratio of *both end-of-life care discussion and advance directive completion* for men in the *divorced/child living* subgroup was 2.583 x 0.413 x 1.16 = 1.237, controlling for covariates.

Asterisks signify gender differences in family status effects.

Due to sparse data (n ≤ 5), the groups *divorced/childless* and *never married/child living* were dropped for both women and men.

Data were drawn from Health and Retirement Study (HRS) Exit Interviews, 2000 – 2012.

Figure 4.3. Family Status Effects by Gender on *Both End-of-Life Care Discussion and Advance Directive Completion* vs. *No Advance Care Planning*.

CHAPTER 5—DISCUSSION

Chapter 5 provides an interpretation of the results in the context of existing literature. Findings related to childlessness and family structure are discussed with respect to the two different datasets used in this study: the HRS 2012 and HRS exit interviews from 2000 – 2012. Results are also considered within a theoretical framework that explains advance care planning as a social, rather than legal, process. Implications for policy and practice are described. Finally, limitations and strengths of the study design are presented, together with suggestions for further research.

5.1. Overview of Results by Aim

Aim 1. Describe childlessness by gender and marital status in the U.S. population over age 50.

The prevalence of childlessness over age 50 was 14.40 percent, based on nationally representative data from the HRS 2012 (N = 18,613). 13.71 percent of respondents had neither given birth to nor fathered a child, and 0.69 percent had outlived all of their children. Although biologically childless, 4.85 percent of respondents had at least one living step child.

Mean age of respondents was 66.23 years (SE = 0.09); median age was 63.60 (SE Childlessness was more prevalent among men, 15.54 percent, than women, 13.43 percent ($p < 0.01$), contrary to the hypothesis. Women, however, comprised 54.15 percent of the weighted sample; and therefore a higher proportion of the childless population overall, 53.69 percent, compared with childless men, 46.31 percent.

Never married men had the highest prevalence of childlessness, 80.12 percent, compared with 62.01 percent among never married women ($p < 0.0001$). Likewise, a

higher proportion of childless women in the sample were unmarried, 58.53 percent, compared with 41.26 percent of women with living children; unmarried childless men, 52.20 percent; and unmarried men with children living, 20.44 percent ($p < 0.0001$).

By age and cohort, childlessness was more prevalent among the youngest respondents in the dataset, and not, as hypothesized, the oldest. Within the boomer cohort (born 1948 – 1959), 15.67 percent of women and 19.41 percent of men were childless; compared with 10.86 percent of silent women and 11.03 percent of silent men (born 1931 – 1947); and 12.41 percent of civic women and 11.41 percent of civic men (born prior to 1931) ($p < 0.0001$). More than 50 percent of respondents in the HRS 2012 were boomers.

White race, non-Hispanic ethnicity, and college degree or above—particularly among women—were all associated with childlessness ($p < 0.05$). With respect to financial status, low net worth and low total income were associated with childlessness among women ($p < 0.05$), and not, as hypothesized only in men ($p < 0.0001$). Within the lowest strata of net worth, < $13,000, and income, < $16,365, the prevalence of childlessness among women was 12.14 and 15.16 percent respectively (p-vale non-significant, and $p < 0.0001$); and among men , 20.84 and 26.99 percent respectively (both $p < 0.0001$).

Nursing home/long-term care residence was not significantly associated with childlessness in the population over age 50, contrary to the hypothesis. Likewise, self-rated health and basic functional status were not associated with childlessness. Difficulties with instrumental functioning, however, were reported least frequently by childless women, 6.81 percent, compared with 8.86 percent among women with children living ($p < 0.05$); and most frequently by childless men, 10.12 percent, compared with

8.13 percent among men with children living ($p < 0.10$, non-significant). Live alone and no relatives near were associated with childlessness among women and men ($p < 0.05$). No association existed between living siblings and childlessness or good friends near and childlessness. Social contact was positively associated with childlessness among women ($p < 0.05$); yet among men, there was no association.

Aim 2. Determine whether childlessness is a predictor of advance care planning over age 50, considering demographic, health, and social factors.

Childlessness. The prevalence of childlessness in the decedent population was 13.86 percent, based on HRS exit interviews conducted from 2000 – 2012 (N = 8,658). 12.39 percent of decedents had no biological children, and 1.47 percent had outlived all of their children. Although biologically childless, 4.20 percent of respondents had at least one living step child.

Mean age at death was 79.91 years (SD = 10.71); median age at death was 81 years (IQR = 72 – 88). Age at death was, on average, 2 years higher among the childless, compared with those who had a living child ($p < 0.0001$). Women comprised 53.19 percent of the study sample. Likewise, a higher proportion of childless decedents were women, 56.08 percent, compared with men, 43.92 percent ($p < 0.05$).

Unmarried status at the time of final illness was associated with childlessness. Only 33.75 percent of childless decedents were married; compared with 47.80 percent of those with living children ($p < 0.0001$). Nearly 20 percent of childless decedents had never married, compared with 0.80 percent of those who had living children ($p < 0.0001$). Overall, 41.41 percent of decedents had been widowed; proportions were similar for those with and without children.

Non-white race ($p < 0.0001$) and non-Hispanic ethnicity ($p < 0.01$) were positively associated with childlessness among the decedent sample. Differences in education by parental status were statistically non-significant. Among childless decedents, a higher proportion, 27.21 percent, had net worth < $6,057, the lowest quartile, compared with 24.66 percent of those with children living ($p < 0.10$, non-significant). This pattern was more pronounced with respect to income < $14,563, the lowest quartile ($p < 0.001$).

Nursing home/long-term care residence at the time of final illness was positively associated with childlessness: 45.92 percent of childless persons lived in an institution, compared with 34.53 percent of those who had children ($p < 0.0001$). Differences in self-rated health and good friends near were not related to parental status; whereas difficulties in functional status were associated with childlessness, for ADLs ($p < 0.05$) and IADLs ($p < 0.10$, non-significant). No living siblings, lived alone, no relatives near, and regular social contact were all positively associated with childlessness ($p < 0.05$).

Advance care planning. 52.08 percent of childless decedents had engaged in end-of-life care discussion, compared with 56.29 percent of those with living children ($p < 0.01$). Likewise, 62.83 percent of childless decedents had completed an advance directive, compared with 61.81 percent of those with living children (p-value non-significant). Categorical differences in advance care planning included: 1) *end-of-life care discussion only*, 11.92 percent childless, 14.37 percent child living; 2) *advance directive completion only*, 22.67 percent childless, 19.90 percent child living; 3) *both*, 40.17 percent childless, 41.91 percent child living; and 4) *neither*, 25.24 percent childless, 23.81 percent child living ($p < 0.05$).

Childless persons were 28 percent less likely to engage in *end-of-life care discussion only* versus *no advance care planning* ($p < 0.05$), in the unadjusted multinomial logistic regression model, as hypothesized; yet, there was no direct effect on *advance directive completion*, or *both discussion and advance directive completion*. Childlessness had no significant effect on the likelihood of advance care planning in the final adjusted model (Model 5), contrary to the hypothesis.

Aim 3. Examine any differences in the effect of childlessness on advance care planning over age 50 by marital status and gender.

Childlessness: 14.61 percent of women and 13 percent of men in the decedent population were childless at the end of life ($p < 0.05$). Of this number, 12.75 percent of women and 11.99 percent of men had neither given birth to nor fathered any children, and 1.87 percent of women and 1.01 percent of men had outlived their children. In all, 3.39 percent of women and 5.13 percent of men had at least one living step child at the time they died, and no biological children ($p < 0.0001$).

Mean age at death was 84.16 years among childless women and 80.86 years among women with children living, compared with 78.91 years among childless men and 78.19 years among men with children living ($p < 0.0001$). Median age at death was 87 years among childless women, 82 years among women with children living, 79 years among childless men, and 80 years among men with children living ($p < 0.0001$).

Marital status differed across subgroups by gender and parental status. Only 20.95 percent of childless women were married/partnered at the time of final illness, compared with 29.15 percent of women with children living, 50.09 percent of childless men, and 68.60 percent of men with children living ($p < 0.0001$). A large proportion of women had

been widowed: 52.60 percent of childless women, and 60.27 percent of women with children living. By contrast, only 22.77 percent of childless men, and 21.02 percent of men with living children had been widowed ($p < 0.0001$). Nearly 20 percent of childless women and 18.09 percent of childless men had never married, compared with 1.04 percent of women and 0.54 of men who had living children ($p < 0.0001$).

Non-white race among both women and men ($p < 0.0001$) and non-Hispanic ethnicity (among women, non-significant; among men, $p < 0.001$) were associated with childlessness. Similar proportions of women and men, nearly 40 percent, had no high school diploma regardless of parental status (p-value non-significant). A college degree or above had been earned by 11.59 percent of childless women, compared with 8.44 percent of women with living children; yet, the proportion among men was higher still, 15.75 percent childless; and 15.17 percent men with living children ($p < 0.05$).

With respect to financial status, higher proportions of childless women, 30.91 percent, as well as women with living children, 30.80 percent, had net worth < $6,057, the lowest quartile, compared with 22.39 percent of childless men, and 17.8 percent of men with children living ($p < 0.05$). This pattern was even more pronounced for income < $14,563, the lowest quartile ($p < 0.001$).

Nursing home/long-term care residence at the time of final illness was positively associated with childlessness: nearly 53 percent of childless women lived in an institution, compared with 39.93 percent of women with children, 37.38 percent of childless men, and 28.50 percent of men with children living ($p < 0.0001$). Childless women had the highest frequency of difficulties with basic (p-value non-significant) and

instrumental functioning ($p < 0.05$). Death expected was associated with childlessness among women ($p < 0.05$).

Lived alone was associated with childlessness among both women and men, and highest of all among childless women ($p < 0.0001$). Absence of living siblings was associated with childlessness among women, 39.08 percent ($p < 0.001$). Relatives near was associated with childlessness among men ($p < 0.05$). Social contact rarely was highest among women with children living ($p < 0.001$), relative to other groups.

Advance care planning. Overall, 53.34 percent of childless women in the study sample had engaged in end-of-life care discussion, compared with 57.76 percent of women with children living, 50.47 percent of childless men, and 54.65 percent of men with children living ($p < 0.05$ women; $p < 0.10$ men). Likewise, 67.31 percent of childless women had completed an advance directive, compared with 64.39 percent of women with children living, 57.12 percent of childless men, and 58.93 percent of men with children living (p-value not statistically significant).

Categorical differences in advance care planning included *end-of-life care discussion only*, 21.95 percent among never married women with at least one child living, and 9.85 percent among never married childless women, compared with 14.03 percent overall ($p < 0.0001$).

Unmarried persons over age 50 were less likely to engage in advance care planning, as hypothesized, if they were never married and childless ($p < 0.05$), and more likely to engage in advance care planning if they were divorced/separated or widowed with children living ($p < 0.01$), or widowed and childless ($p < 0.01$). As expected, married childless persons were neither more nor less likely to engage in any type of

advance care planning than married persons with living children, OR ≈ 1 (p-value non-significant).

Unmarried childless men over age 50 were less likely to engage in advance care planning than unmarried childless women across all subgroups: divorced/separated, widowed, and never married, as shown in Figures 4.1, 4.2, and 4.3. Statistically significant results were observed among divorced/child living, widowed/child living, and never married/childless women and men, and widowed/childless women only. Due to sparse data ($n \leq 5$), divorced/childless and never married/children living women and men were eliminated from the final results.

Never married childless women, contrary to what was hypothesized, appeared to be neither more nor less likely to engage in advance care planning, compared with the reference group, married women with living children (p-value non-significant). By contrast, never married childless men were least likely to engage in advance care planning that involved end-of-life care discussion, compared with *no advance care planning* ($p < 0.05$).

The covariates listed in Table 5.1 served as significant predictors of advance care planning in the final multinomial logistic regression model, which included interaction terms for family status (marital/parental) by gender. Statistically significant positive (+) or negative (–) effects on each outcome are noted in the table. An interpretation of these results is provided below in section 5.3.

Table 5.1. *Significant Predictors of Advance Care Planning (ACP), Adjusted Model with Interaction Term for Family Status X Gender. HRS Exit Interviews, 2000 – 2012.*

	Direction of Effect:* + or –		
	ACP Category vs. No ACP Ω (reference)		
Predictor	EOL Discussion Only	AD Completion Only	Both
Family Status ~ (Marital /Parental) by Gender			
Married,[1] Child Living, Women (reference)			
Divorced,[2] Child Living,[3] Women	+	+	+
Widowed, Child Living,[3] Women	+	+	+
Widowed, Childless, Women		+	+
Divorced,[2] Child Living,[3] Men	–		+
Widowed, Child Living,[3] Men	+		+
Never Married, Childless, Men	–		–
Age at Death (in years)	–	+	+
Race, White	+	+	+
Ethnicity, Hispanic	–	–	–
Education ≥ High school diploma	+	+	+
Net Worth ≥ $6,057[4]	+	+	+
Nursing Home/Long-Term Care, Resident		+	+
ADL,[5] Any Difficulties		+	+
Living Siblings		+	
Relatives Near, No	–		–
N	1,215	1,756	3,608

Based on odds ratios reported in Tables 4.19 and 4.20. N = 8,658. * $p < 0.05$

Ω No Advance Care Planning (ACP) = Neither end-of-life care discussion nor advance directive completion, n = 2,079.

[1] Includes partnered.

[2] Includes separated.

[3] Living biological child and any step.

[4] Adjusted to 2012 dollars.

[5] ADL = Activities of daily living (basic).

[6] IADL = Instrumental activities of daily living.

~ Findings for married/childless women, married/childless men, married/child living men, widowed/childless men, and never married/childless women were not statistically significant. Due to sparse data (n ≤ 5), the subgroups divorced/ separated/childless women and men, and never married/child living women and men were deleted from the final results.

5.2. Childlessness in Late Life

This section relates the study findings to existing literature on family structure in late life, and offers possible explanations for the results. Findings pertinent to childlessness are explored first by comparing and contrasting results from the two distinct study populations analyzed: one for Aim 1, and the other for Aims 2 and 3. Key findings are then interpreted for Aim 1, drawing from the relevant literature.

HRS 2012 and HRS Exit Interviews, 2000 – 2012

Two different HRS datasets were used in this study. The first, the HRS 2012, allowed for generalizability of findings to the current U.S. population over age 50, for Aim 1. The second, based on HRS exit interviews conducted with proxies from 2000 – 2012, provided data on the advance care planning experiences of HRS decedents for Aims 2 and 3, as well as family structure and childlessness. Characteristics of the study participants differed markedly between these two datasets, as shown in Table 5.2.

Parental Status and Childlessness. In the HRS 2012, 14.40 percent of respondents were childless, compared with 13.86 percent in the HRS exit interviews from 2000 – 2012. These two figures are within range of those reported in the research literature, 10 – 15 percent childless (Kirmeyer & Hamilton, 2011; Koropeckyj-Cox & Call, 2007). Between the two datasets, older average age of the decedent sample explains the higher proportion having outlived all children in that dataset, shown in Table 5.2.

Average family size was smaller in the HRS 2012 than in the HRS exit interviews. Smaller family size reduces the pool of caregivers available to help the older generation, and increases the risk of outliving all children. The difference in family size between the two study populations reflects the trend among boomers toward fewer

children per couple (Dye, 2010; Kirmeyer & Hamilton, 2011). Boomers comprised more than half of the HRS 2012.

Age and generational cohort. In the HRS 2012, the average age of childless respondents was 66 years, compared with 80 years, the average age at death of childless decedents with an HRS exit interview. The two study populations also differed by cohort, as shown in Table 5.2. Boomers comprised 62.46 percent of the childless population in the HRS 2012, but only 3.23 percent of childless decedents in the HRS exit interviews. The civic cohort comprised 8.29 percent of the childless population in the HRS 2012, but nearly 75 percent of childless decedents in HRS exit interviews from 2000 - 2012.

Gender. In the HRS 2012, the prevalence of childlessness was higher among men, 15.54 percent, than women, 13.43 percent ($p < 0.01$), contrary to the hypothesis. In the HRS exit interviews, by contrast, the prevalence of childlessness was higher among female decedents, as shown in Table 5.2. Possible explanations for this result are discussed later in this chapter, with respect to men in the boomer cohort.

Marital status. Results from this study confirm a strong association between marriage and parenthood, consistent with prior research (Connidis, 2010). These findings also reveal a trend toward more partnerships, increased divorce/separation, and decreased marriage among childless respondents in the HRS 2012, as compared with decedents from the HRS exit interviews. These results appear to be driven by the high proportion of boomers in the HRS 2012. Percent divorced, for example, doubled between the two datasets, as shown in Table 5.2. According to the literature, the prevalence of divorce among boomers has risen to 1 in 3 (Brown & Fen-Lin, 2012; Fen-Lin & Brown, 2012).

Race and ethnicity. The higher proportion of non-white race and Hispanic ethnicity among childless decedents in the HRS exit interviews, as compared with the HRS 2012, likely reflects the use of sample weights. Weights were applied to measures in the HRS 2012 to adjust for oversampling of minorities and men (Ofstedal et al., 2011). Weights were not applied to measures for decedents in the HRS exit interviews, as explained in Chapter 3.

Education. In the HRS 2012, the proportion of childless individuals with a college degree or above was 27.59 percent, compared with 13.42 percent in HRS exit interviews, 2000 – 2012. This change reflects cohort differences in which the overall level of education grew significantly in the U.S. over the last century (Snyder, 1993). Findings are consistent with results from prior studies that demonstrate a higher proportion of college degrees and above among childless women, as compared with mothers (Koropeckyj-Cox & Call, 2007). Older women today came of age at a time when women who pursued higher education were unlikely to have families (Oppenheimer, 1997; Sweeney, 2002).

Financial status. Childless decedents from the HRS exit interviews had lower net worth and total income than childless respondents from the HRS 2012, even though all figures were adjusted to 2012 dollars. This difference probably reflects the older age of the decedent sample, and resources spent down during retirement.

Nursing home/long-term care residence. The vast difference shown in Table 5.2 between nursing home/long-term care residence among the childless in the HRS 2012, 2.82 percent, and 45.92 percent, in HRS exit interviews from 2000 - 2012, reflects the age and health status of the decedent population at final illness. This result is consistent

with prior studies that have found among childless women a higher proportion of nursing home (Akyan, 2003; Freedman, 1996; Nöel-Miller, 2010), and long-term care residence (deMedeiros et al., 2013), especially over age 80 (Houser, 2007; Redfoot et al., 2013).

Lived alone. The large difference in the proportion of childless persons who lived alone, 24.26 percent in the HRS 2012, compared with 52.58 percent in HRS exit interviews from 2000 – 2012, can be attributed to the older age of the decedent population. Over 41 percent of decedents in the HRS exit interviews from 2000 – 2012 had been widowed, a risk that increases with age. This observation is consistent with prior results showing that over half of all childless persons live alone (Koropeckyj-Cox & Call, 2007; Wenger, G. et al., 2007).

Living siblings. The presence of siblings is especially important to the social support of older persons who are childless and unmarried (Connidis, 2010; Rubinstein et al., 1991; Thoits, 2011; Wu & Pollard, 1998). In the HRS 2012, no significant associations between living siblings and childlessness were observed. In the HRS exit interviews from 2000 – 2012, however, nearly 40 percent of childless women, the highest proportion of any subgroup, had no living siblings ($p < 0.001$). This finding reveals another way in which childless women are at risk for lack of social support in late life.

Relatives near. Childless persons tend to have fewer relatives overall, by definition (Wenger, G. et al., 2007). Findings from both the HRS 2012 ($p < 0.0001$) and HRS exit interviews from 2000 – 2012 confirm this association ($p < .01$), which has implications for social support (Thoits, 2011). Notably, childless respondents from the younger cohorts represented in the HRS 2012 had higher proportions of no relatives near than decedents in the HRS exit interviews, as shown in Table 5.2. This finding suggests

that as the current population ages, the number of older persons at risk for poor social support is likely to increase. Implications for engagement in advance care planning is discussed in the next section.

Social contact. Differences in social contact between the two datasets, as shown in Table 5.2, may be attributed to the older age and poor health of the decedent population at final illness. It may be difficult for the oldest old to leave their homes to socialize, due to issues with functional status as summarized above in section 5.2. The decedent childless population had a significantly higher frequency of ADL and IADL limitations, 54.42 and 41.58 percent than younger respondents, as shown in Table 5.2.

Prior research suggests that social contact is higher among never married childless older women (Koropeckyj-Cox & Call, 2007; Wenger G., 2009; Wenger, G. et al., 2007), and lower among unmarried childless older men (Keizer et al., 2008). Results from both the HRS 2012 and HRS exit interviews from 2000 – 2012 confirm that older mothers with living children had lower levels of social contact than childless women and men, and men with living children. Men with living children had the highest level of social contact. Women and men without living children had similar levels of social contact.

Although there were no significant associations between good friends near and childlessness, these findings are notable because they demonstrate that around 40 percent of all individuals over age 50, do not live near good friends. Combined with the absence of relatives nearby, a large proportion of older adults appear to have relatively weak social support networks. This finding has implications for the future caregiving needs of the oldest old, especially childless persons. Possible effects on advance care planning are discussed in the next section.

Table 5.2. *Childlessness in the HRS 2012 and HRS Exit Interviews, 2000 – 2012.*

	HRS, 2012	Exit, 2000 - 2012
	Aim 1	Aims 2 & 3
Characteristic	% Childless	% Childless
Childless	14.40	13.86
No biological child ever born	13.71	12.39
Outlived all biological and any step children	0.69	1.47
Step children only, no biological children	4.85	4.20
Children per household: mean; median, N	2.85; 1.99	3.13; 3
Gender (proportion; prevalence)		
Women	53.69; 13.43	56.08; 14.61
Men	46.31; 15.54	43.92; 13.00
Marital Status		
Married	42.14	31.33
Partnered	6.57	2.42
Divorced/separated	13.00	7.42
Widowed	13.32	39.50
Never married	24.97	19.33
Age; Age at death, in years, mean, N	66.23	79.91
Generational Cohort (proportion)		
Civic, born prior to 1931	8.29	74.92
Silent, born 1931 - 1946	29.26	21.50
Boomer, born 1947 - 1959	62.46	3.23
Race, non-White	16.89	23.08
Ethnicity, Hispanic	8.40	4.33
< High school diploma	9.64	37.42
≥ College degree	27.59	13.42
Net Worth[1] < $13,000	21.03	--
Net Worth[1] < $6,057	--	27.17
Total Income[1] < $16,365	25.71	--
Total Income[1] < $14,563	--	29.25
Nursing Home, Resident	2.82	45.92
ADL, Any difficulties	14.83	54.42
IADL, Any difficulties	8.52	41.58
Living Siblings	11.81	33.08
Lived Alone	24.26	52.58
Relatives Near, No	81.00	70.17
Good Friends Near, No	40.09	37.33
Social Contact < once per year or never	28.90	33.17
Total, N	18,316	8,658

[1]Adjusted to 2012 dollars

Current Meaning of Childlessness

Results from Aim 1 indicate that profound shifts have occurred in the family structure of boomers, relative to earlier cohorts. These findings are consistent with results from prior studies using smaller, more localized datasets and qualitative methods to describe the intergenerational status of boomers in late life (Fingerman, Pillemer, Silverstein & Suitor, 2012; Roth, Keimig, Rubinstein et al., 2012; Silverstein & Gianrrusso, 2010). According to a review of the literature, this is the first study to investigate childlessness in a large national dataset that includes the boomer cohort, now over age 50. Key findings are presented first, followed by a discussion of childlessness among boomer men, step parents, and unmarried partners. These aspects of childlessness carry particular meaning for future engagement in advance care planning.

Key Findings

A key finding of this research is that the prevalence of childlessness was higher among men, 15.54 percent, than women, 13.43 percent ($p < 0.01$), contrary to the hypothesis. Additionally, childlessness was highest among never married men, 80.12 percent, compared with 62.01 percent among never married women ($p < 0.0001$), contrary to what was hypothesized. In prior research, childlessness was more prevalent among women, and much more unbablanced: 17 percent among women, and 11 percent among men (Koropeckyj-Cox et al., 2007). The current findings appear to be driven by increased childlessness among boomer men. Possible explanations are discussed later in this chapter, with respect to men in the boomer cohort.

That childlessness was more prevalent among the youngest respondents in the HRS 2012, and not the oldest, is another key finding of Aim 1. Prior research findings,

using U.S. census data (Kirmeyer & Hamilton, 2011) and data from the 1890 – 1930 birth cohorts from the National Survey of Families and Households (Koropeckyj-Cox & Call, 2007) indicate that the oldest respondents had the highest prevalence of childlessness. These new findings reflect the high proportion of boomers in the HRS 2012, and changing attitudes around child-bearing and family formation among members of this cohort (Fingerman et al., 2012).

Another surprising finding is that low levels of total income were associated with childlessness among both women and men, contrary to the hypothesis that childless women would be better off financially than older mothers. With respect to net worth, there was no statistical difference between childless women and women with living children. Prior research findings, however, suggest that childless older women have higher financial status, compared with older mothers (Dykstra & Keizer, 2009; Plotnick, 2009). The current findings show significant advantages for women only among the subgroup of biologically childless women who had step children. Among these women, the proportion with net worth and income in the lowest quartile was smaller than any other subgroup by marital status or gender, 12.93 and 13.93 percent respectively ($p < 0.001$ and $0 < 0.0001$).

One explanation for this finding is that biologically childless women with step children are doubly advantaged through marriage and education. The proportion of married/partnered women who were biologically childless with step children, 72.22 percent, was significantly higher than any other group ($p < 0.0001$). Marriage is associated with increased financial resources among women and men (Waite & Gallagher 2000; Wilmonth & Koso 2002). Childless older women also tend to have higher levels of

educational achievement than older mothers, as shown in Tables 4.6 and 4.15, and in prior research (Koropeckyj-Cox & Call, 2007). Higher educational achievement generally translates into higher income and net worth across the life course (U.S. Bureau of Labor Statistics, 2015). Notably, women's mean total income was less than men's across all categories ($p < 0.0001$).

These findings also confirm prior results regarding the wealth and income advantages of fathers, compared with childless men (Dykstra & Keizer, 2009; Keizer et al., 2010; Keizer et al., 2008, Plotnick, 2009). Across the categories of childlessness shown in Table 4.3, a significantly higher proportion of childless men had income in the lowest quartile, < $16,365, including those who had never fathered a child, 31.58 percent, men who had outlived all their children, 40.35 percent, and men who had step children only, 17.43 percent, compared with fathers of living children, 13.49 percent ($p < 0.0001$). According to these findings, the presence of living biological or step children appears to be an indicator of income stability. Childless men may be at risk financially, as well as socially (Koropeckyj-Cox, 2003).

Nevertheless, women who had outlived all children were at greatest risk not only financially, but also with respect to lower health status, and social status, including fewer living siblings. Across the categories of childlessness shown in Table 4.3, women who had outlived their children had the highest proportion of low net worth, 37.98 percent, and low total income, 46.14 percent ($p < 0.001$ and $p < 0.0001$). Poverty is a very real risk for older women (DeNavas-Walt & Proctor, 2015; Estes, 2004; O'Rand & Henretta, 1999). This is just one of the many ways that the oldest-old women are disadvantaged. Concerns extend from socioeconomic deprivation, particularly among older women who

are black and Hispanic, to mental health, functional status, and the quality of social support networks (Antonucci, Birditt & Akiyama, 2009; Carstensen, Fung, & Charles, 2003; Dunkle & Jeon, 2015; Krause, 2006; Randall et al., 2010; Spira et al., 2012). These issues are highly relevant to advance care planning, in that they highlight the limited potential that women who have outlived their children may have in accessing the support needed for end-of-life care discussion and advance directive completion.

Childless Boomer Men

Nearly one in five boomer men had no living children, according to results from the HRS 2012. At 19.41 percent, childlessness among boomer men had nearly doubled over the preceding two cohorts, the silent and the civic. Among boomer women, the prevalence of childlessness, 15.67 percent, had increased about 1.5 times over the preceding cohort. Although it was not possible to discern whether these individuals were childless by choice or by circumstance, from the information available in the HRS, a number of potential reasons exist for the observed increase, relative to earlier cohorts.

First, boomer men, like boomer women, may have been influenced by changing norms—and birth control options—that made a child-free life-style more attainable and socially acceptable than it had been in earlier generations (Klineberg, 2012; Koropeckyj-Cox & Pendell, 2007; Lesthaeghe, 1995; 2010). The expense involved in raising children and the time required to pursue an education and start a career may have led some boomers—women as well as men—to postpone parenthood (Allen & Wiles, 2013; Connidis & McMullin, 1996). In the 1970s and 1980s, when many boomers were in their 20s and 30s, an emphasis on work and career for economic and lifestyle reasons deviated from the choices made by earlier cohorts to start families soon after marriage (Kirmeyer

& Hamilton, 2011). Postponed marriage and parenthood increase the risk of infertility for female partners over age 35 years (Chandra et al., 2013).

Greater acceptance of homosexuality during the life course of the boomers is another possible explanation for increased childlessness among men. Previously, homosexual men might have felt more pressure to get married to a woman and have children, regardless of true sexual orientation. Social and political changes among gay and lesbian respondents may have influenced the results in this respect. Older persons who are gay and lesbian are more likely to be single, childless, and live alone (Gabrielson, 2011; Kimmel, 2014).

Another possible explanation for the high prevalence of childlessness among boomer men relates to the scarcity of data. Historically, there have been few sources of information collected on male fertility. The U.S. Census reports the fertility levels of American women, not men. Other than the National Survey of Families and Households, the dataset used in prior studies of childlessness (Koropeckyj-Cox & Call, 2007), additional sources of data on men's fertility apart from their wives' remain sparse, and may be imprecise (Rowland, 2007).

The increase in childlessness among boomers has profound implications for family and social support as this cohort ages. Future issues are expected to arise with custodial care as fewer potential caregivers will be available among the younger generation to care for the boomers (Fingerman et al., 2012; Silverstein & Gianrrusso, 2010). For childless boomer men without partners, these issues loom especially large when combined with the lower financial status and weak friendship networks described above relative to childless men. Similarly, research findings to date suggest that limited

biological family support, childlessness, and reliance on friendship networks may be important factors in the health care decisions of older gay men and lesbians (Blevins, 2006; Czaja et al., 2015; Gabrielson, 2011).

Biologically Childless Step Parents

Currently, one in three boomers is divorced (Brown & Fen-Lin, 2012; Fen-Lin & Brown, 2012). Rising divorce rates have led to a dramatic increase in the number of blended families—step parents and step children—over the last few decades (Pew, 2011; Seltzer & Bianchi, 2013). Findings from this dissertation reveal unique outcomes for the 4.80 percent of HRS respondents who were biologically childless, but had at least one living step child. Although individuals in this subgroup appeared to be well-off financially relative to other childless persons, and nearly 73 percent were married, the strength of future relationships with their step children remains unclear. This uncertainty has implications for the support potential of step children.

Parent-child relationships across the life-course affect the caregiving potential of adult children when their parents and step parents are old (Noël-Miller, 2013). Around 13 percent of individuals in the U.S. have at least one step child (Pew, 2011), although findings from this dissertation indicate that 22 percent of those over age 50 had stepchildren. Step children may, in some cases, serve as a source of support to their older step parents, but research to date suggests otherwise. A growing body of literature points to relatively weak ties between older adults and their adult step children (Henretta, Soldo, & van Voorhis, 2011; Noël-Miller, 2013; Pezzin, Pollak, & Schone, 2008; van der Pas & van Tilburg, 2010; Ward, Spitze, & Deane, 2009). The role of step children in caring for their step parents appears to be limited by the quality of family functioning, parents'

length of marriage, and disruptions due to divorce and widowhood (Noël-Miller, 2013). The potential effect on advance care planning is discussed below in section 5.3.

Unmarried Partners

Findings from this study are also consistent with the increase in unmarried partners, which is strongly associated with childlessness among older adults (Seltzer & Bianchi, 2013; Wang & Parker, 2014). Comparison of the marital status of childless respondents in the HRS 2012 indicates that the prevalence of childlessness, almost 20 percent, was disproportionately high. Although the size of the subgroup was small, due to the relatively low prevalence of partnerships among older adults, a significant gender difference was noted in that the prevalence of childlessness was 16.9 percent among partnered women, compared with 22 percent among partnered men ($p < 0.0001$).

The proportion of individuals who never married is higher now than ever before in U.S. history (Tamborini, 2007). In 2012, 20 percent of adults age 25 and older had never been married compared with 9 percent in 1960 (Wang & Parker, 2014). Prior research shows that an increasing proportion of widowed or divorced persons choose to live as partners, rather than traditional marriage, in a new late life relationship, (Seltzer & Bianchi, 2013). This trend raises a number of issues regarding the role of partners as future caregivers, their legal standing to serve as health care proxies, and instrumental and social support potential between adult children and their parents' partners (Cheng, Birditt, Zarit & Fingerman, 2015; Hogerbrugge & Silverstein, 2015).

5.3. Advance Care Planning and Family Structure in Late Life

This section discusses the study findings in the context of existing literature, and offers possible explanations for the significant predictors of advance care planning. The theoretical framework presented in Chapter 2 is used to interpret the results overall.

Predictors of Advance Care Planning in Late Life

The direction of effect for each significant predictor and covariate in the final multinomial regression model is summarized above in Table 5.1. Results are discussed below, relative to family status (marital status/parental status) by gender.

Childlessness, Marital Status, and Gender

Individuals without adult children lack a key source of social support in old age (Kinsella & Wan, 2009). Childless older adults without a spouse or partner generally have few opportunities to discuss end-of-life care preferences with someone close, and fewer options still of individuals to name as health care agent in a DPAHC (Schickedanz et al., 2009). Unmarried childless men are at particular risk of diminished social support (Wenger, G. et al., 2007), due to generally poor social integration compared with married men, and women with and without children (Dykstra & Keizer, 2009). For these reasons, unmarried childless men were hypothesized to be at risk for lack of engagement in advance care planning.

Results summarized in Table 5.1 and Chapter 4 provide statistical evidence supporting the argument that unmarried childless men over age 50 are less likely to engage in advance care planning than other family status groups, as shown in Figures 4.1, 4.2, and 4.3. Notably, other factors, especially marital status, were more important predictors than childlessness. Odds ratios for all three types of advance care planning

were lower among unmarried men (divorced/child living, widowed/child living, and never married/childless) than unmarried women (divorced/separated with children living, widowed with children living, and widowed/childless), in Tables 4.19 and 4.20. These results demonstrate that marital status and gender interact significantly with childlessness to influence advance care planning. As such, findings from this study extend current understanding of the effect of childlessness on health behaviors such as end-of-life care discussion and advance directive completion.

Prior research has found little support for the idea that childlessness has negative consequences for older persons in terms of psychological well-being (Koropeckyj-Cox, 1998), and loneliness and depression (Zhang & Hayward, 2001). Likewise, in this study, childlessness alone was not associated with advance care planning, according to results from the final adjusted model in Aim 2. In fact, in the final model, marital status appeared to have a stronger effect on advance care planning than childlessness.

Gender. When considered in the context of gender, the interaction effects of marital status and childlessness on advance care planning became clear. The adverse consequences of being childless were evident among unmarried men, but not married men or women, for whom only positive effects on advance care planning were observed, as shown in Table 5.1. Negative effects were observed only among never married/childless men, as discussed below in further detail.

Among men who had been divorced or widowed, the presence of living children appeared to offset the negative effect of being unmarried. In particular, the odds of *both end-of-life care discussion and advance directive completion* compared with *no advance care planning* were positive and significant among these subgroups, as shown in Figure

4.3. Additionally, widowed men with living children had greater odds of engagement in *end-of-life care discussion only* than the reference group, as shown in Figure 4.1.

Divorced/separated child living. Outcomes for divorced/separated persons reflect the expectation that adult children would help to facilitate advance care planning for their unmarried parents. The only exception to this pattern occurred in the case of *end-of-life care discussion only* for divorced men with living children. The negative effect observed in this case is consistent with research showing that adult children are frequently estranged from fathers who are divorced from their mothers (Kaufman & Uhlenberg, 1998; Shapiro & Cooney, 2007). The divorced/separated childless subgroup was eliminated from the final analysis for women and men due to sparse data.

Widowed childless and child living. A higher likelihood of advance care planning was also evident among those who had been widowed, with or without living children, among both women and men. It is possible that the experience of having witnessed the death of a spouse or a parent may trigger advance care planning either at the same time that planning was conducted for the dying spouse, or following the spouse's death. Prior research has demonstrated that witnessing the painful death of a loved one motivates advance care planning (Carr & Khodyakov, 2007a).

Never married childless. Never married childless women over age 50 were hypothesized to be most likely to plan; however no statistically significant effects were detected for this subgroup compared with the reference, married women with living children. By contrast, never married childless men over age 50 were least likely to plan. This result makes sense given the deficits found in this and prior research on the low financial status and limited social relationships of some unmarried men (Dykstra &

Keizer, 2009; Plotnick, 2009). The never married/child living subgroup was eliminated from the final analysis for women and men due to sparse data

Covariates

The direction of effect for each significant covariate in the final regression model is summarized above in Table 5.1. Younger age at death, for example, was associated with the odds of *end-of-life care discussion only*, whereas older age was associated with the odds of *advance directive completion*. This finding is consistent with prior research showing an increased prevalence of advance directive completion with age (Elpern et al., 1993; Moorman & Inoue, 2013; Pew, 2013). Findings are also consistent with prior research showing a positive association between white race and advance care planning (Bischoff et al., 2013; Carr, 2011; Gerst & Burr, 2008; Hopp & Duffy, 2000); Taylor et al., 2010a); a positive association between higher levels of education—having a high school diploma at least—and advance care planning (Carr & Khodyakov, 2007a); and a positive association between higher net worth and advance care planning (Carr, 2011; Carr & Khodyakov, 2007a; Carr, 2012a; Su, 2008).

Notably, nursing home/long-term care residence and basic, but not instrumental, functional status were positively associated with the odds of *advance directive completion*, yet not with the odds of *end-of-life care discussion*. These findings are consistent with the literature on advance directive completion in nursing homes and other long-term care settings (Bischoff et al., 2013), as well as childlessness in these settings (Aykan, 2003; Freedman, 1996; Koropeckyj-Cox & Call, 2007). Nursing homes are required by law to provide information on advance directives to residents and their families (Levin et al., 1999; OBRA, 1990). End-of-life care discussion may be low in

these settings due in part to the population served, childless older women who lack involved family; and individuals with dementia, who may be limited in their capacity to participate in advance care planning (Ashton, Roe, Jack, McClelland, 2014; Beck, McIlfatrick, Hasson, Leavey, 2015).

Consistent with the results of this research, deficits in functional status are positively associated with advance care planning (Bischoff et al., 2013; Elpern et al., 1993) and childlessness (Kendig et al., 2007). Having relatives near increases the likelihood of instrumental and emotional support and the possibility of advance care planning (Kramer et al., 2006; Thoits, 2011). The negative effect shown in Table 5.1 makes sense in that there would be fewer opportunities for end-of-life care discussion without relatives near.

Theoretical Framework: Advance Care Planning as a Social Process

The theoretical framework depicted in Figure 2.1 explains how advance care planning knowledge and experience, as well as discussion with loved ones, lead to advance directive completion. Traditional approaches that rely on legal transactions tend to underestimate the value of personal relationships and open-ended communication (Singer et al., 1998; 1999; Winter & Parks, 2012). Ongoing discussion leads to outcomes that are more consistent with patients' wishes (Detering et al., 2010; Sabatino, 2010; Song et al., 2007; Sudore & Fried, 2010).

Context in Figure 2.1 refers to the constellation of demographic, health, and social factors within which knowledge and experience arise. Significant family status predictors and covariates listed in Table 5.1 can be viewed as context for advance care planning. Within this framework, the pathways from context to knowledge and experience, to

discussion with a loved one, to advance directive completion are consistent with the findings of this dissertation research. For example, widowed persons with living children, an aspect of context, had the highest likelihood of advance directive completion of all the family status groups. Prior research indicates that experience with the painful death of a loved one is associated with increased end-of-life preparation among older adults (Carr & Khodyakov, 2007a). It stands to reason, then, that advance care planning knowledge gained through this experience would lead directly to end-of-life care discussion, consistent with the theoretical framework.

End-of-life care discussion

The prevalence of end-of-life care discussion among HRS decedents in this study was 52.08 percent among childless persons, and 56.29 percent among those with living children ($p < 0.01$). Prior research indicates that 62 percent of all adults in the U.S. had had a discussion with someone about their own wishes for treatment (Pew, 2013). By contrast, results of a survey conducted by an advocacy group indicate that only 27 percent of adults have had a conversation about their care preferences (Conversation Project, 2013). Results from the HRS, however, were based mainly on older data, extracted from exit interviews conducted as long ago as 2000, regarding decedents with an average age of 80.

The significant difference in end-of-life care discussion between individuals with and without living children ($p < 0.01$) suggests that the relational and adaptive aspects of advance care planning may be missing for individuals who are childless. The consequences of this situation are serious. End-of-life care discussion offers potential

decision-makers with a chance to clarify instructions and preferences. A living will cannot possibly address all scenarios.

End-of-life care discussion also provides health care proxies with the confidence to make in-the-moment decisions (McMahan et al., 2012; Wendler & Rid, 2011). Without this authority, proxies tend to approve more rather than less care (Zier et al., 2009). Surrogates feel less anxious about limiting treatment when they understand the values underlying the patient's preferences (Detering et al., 2010; Fritch, Petronio, Helft, & Torke, 2013). Policies and programs that strengthen communication skills and promote end-of-life care discussion among individuals are discussed below in section 5.4.

Advance directive completion

The prevalence of advance directive completion was 62.83 percent among childless decedents (LW = 42.58 percent, DPAHC = 56.78 percent); and 61.81 percent among those with living children (LW = 43.53 percent, DPAHC = 54.41 percent) (p-values non-significant), according to the results of this dissertation. Likewise, results from a Pew national survey, indicate that 38 percent of adults age 50 – 64, 61 percent age 65 – 74, and 58 percent over age 75, had written down their wishes for medical treatment in a document such as a living will (Pew, 2013).

No significant differences in the likelihood of advance directive completion were observed by parental status for any of the family subgroups, as shown in Figure 4.2 and Tables 4.19 and 4.20. This finding suggests that individuals who are childless are able to access appropriate resources to complete an advance directive on their own, or with the help of a partner, if available. Still, improvement in the incidence of advance directive completion across all family status groups is needed, as 27 percent of the U.S. adult

population lacks any form of advance care planning, including 22 percent of those age 75 and older, and 30 percent of those in poor health (Pew, 2013).

5.4. Implications for Policy and Practice

Results of this dissertation are consistent with a recent study estimating that one-quarter of all boomers will become elder orphans, a newly coined term for individuals who reach old age with no family or friends left (Cahn & Ziettlow, 2015). One example of an elder orphan is Clarence Blackmon, an 81-year-old man from North Carolina who made the news in May 2015 when he called 911 because he was hungry, needed groceries, and had no one else to turn to (Bowerman, 2015). Fear of becoming a burden on others was an emotion voiced by a number of older women, including childless older women, in prior research (Girling & Morgan, 2014).

Policy

These findings give rise to a significant public policy issue: Who will take care of the childless boomers when they're old? More pertinent to the topic of this dissertation is the question: Who will support the growing number of childless unmarried persons in advance care planning? In terms of public policy, new laws and procedures are needed to clarify the process of end-of-life decision-making for the unbefriended elderly, who lack an advance directive or anyone to serve as a surrogate decision-maker (Karp & Wood, 2004). Unbefriended patients create a dilemma for health care providers (Varma & Wendler, 2007).

Professional Practice

Findings from this study may be used in professional practice to better support individuals and families in the advance care planning process. A broad definition of

family includes all those "for whom it matters" (IOM, 2014, p. 2-1). Persons related by blood or marriage as well as close friends, partners, companions are considered family in this context, and can all benefit from improved communication. Near the end of life, individual priorities may extend beyond clinical care. Individuals and their families may reflect deeply on existential or spiritual issues. They may also be concerned about bereavement and with practical matters of coping (IOM, 2014). Appropriate support in these areas is an essential component of good care. Improvements in the incidence and quality of advance care planning are seen when families engage in effective communication about end-of-life care preferences, and address the relational issues inherent in such conversations (Scott & Caughlin, 2012).

To increase comfort and confidence in discussing matters related to end-of-life care, specific language can be suggested to clients. Conversation starters are available on websites operated by advocates (Conversation Project, 2015). Similarly, Five Wishes consists of materials and an online form to use to write a living will. Discussion with family and other associates could be initiated using these materials (Aging with Dignity, 2015). Additionally, PREPARE is a possible conversation starter resource. The PREPARE website draws on research findings to address important aspects of advance care planning and end-of-life decision-making. PREPARE offers videos and articles with specific examples showing how to identify what is most important in life, how to communicate effectively with family and friends and doctors, and how to make informed decisions about medical care (Sudore, 2015). These programs are helping to fill the need for culturally-sensitive resources that address the special circumstances of childless individuals and others without close family involvement.

Knowing the family circumstances of a client can help practitioners identify individuals who may need additional support in writing an advance directive or selecting a proxy. The Conversation Project website includes a series of stories posted by individuals who have lost someone close, and what it was like to have had the conversation, or not having talked. These stories are organized by relationship type, including spouse, partner, parent, grandparent, child, sibling, family members, friend, other relative, other loved one. Childless persons may be able to draw ideas from the experiences shared by others in similar circumstances. Additionally, the shift from reliance on advance directive guidelines to "goals of care" conversations using MOLST/POLST forms to guide end-of-life discussions may be helpful in highlighting for practitioners the needs of those who are childless and unmarried.

Childless persons may also need specific ideas for approaching non-kin to serve as a health care proxy. In lieu of family, a proxy may be a friend, a lawyer, a pastor, or other person who shares the individual's values and perspectives about medical decisions near the end of life. Alternatively, individuals without family may want to consider hiring an elder law attorney or private geriatric case manager. There are advantages and disadvantages to hiring a professional to serve as health care proxy. Currently, little is known about the types of services offered, their cost, the quality of services furnished, or whether the outcomes match what the client intended (Span, 2009; 2011; 2013). If no proxy is designated, then it is important to complete a detailed living will (NIA, 2015).

5.5. Limitations and Strengths

Limitations

This study has a number of limitations. First, the observational design limited the analysis to describing and testing the association between childlessness and advance care planning. Specific hypotheses regarding *how* childlessness influences advance care planning could not be tested. Furthermore, as a cross-sectional study, only the direction and strength of the association could be reported; temporal relationships could not be established. It was not possible, therefore, to determine whether family structure and childlessness led to advance care planning or caused it to occur.

The HRS is limited as a dataset for this study in that it was not designed to investigate childlessness or advance care planning per se. Older adults who are childless, never married, or divorced are a relative minority; therefore, small sample sizes limited the subgroup analyses that could be conducted with statistical precision. The following subgroups were excluded from the final analysis due to sparse data ($n \leq 5$) in one or more of the outcome categories: *divorced/separated/childless* and never *married/child living* for both women and men.

Additionally, this study gauged advance care planning by proxy report, without requiring documentation to validate responses. The passage of time between the respondent's death and the exit interview, an average of 13.5 months, could have obscured what the proxy remembered about the decedent's engagement in advance care planning. Recall bias could lead to inaccurate proxy reports. Additionally, spouses and adult children who served as proxy informants in the HRS are likely to have acted as the decedent's DPAHC, if there was one. If so, the experience of surrogate decision-making

could have altered the proxy's report, perhaps to resolve personal distress or to appear consistent with the decedent's wishes. Social desirability bias, in which the proxy reports what is perceived to be the correct or preferred response is a risk in this study.

Further, if the proxy had a strained or distant relationship with the decedent and did not serve as DPAHC, the proxy might not have had enough knowledge to accurately report on the individual's advance care plans. In particular, relationships with step-children can be strained, as discussed above. Moreover, the HRS is limited in the information it collects specific to sexual orientation, apart from partnership category under marital status. It is possible, therefore, for a response to be incorrect or missing in a way that introduces bias. The risk of not knowing the proxy well is greater for those who are childless and unmarried, the subgroups of interest in this study. To determine the magnitude of this concern, a sensitivity analyses was performed and reported in Table 3.5. Results show that similar proportions of *don't know* and *refused* were reported for those with and without children living. Excluding these data points from the final study sample, therefore, would not introduce bias because the responses occurred equally by parental status.

The sampling frame extended back to deaths that occurred in 1998 (for decedents who were the subject of exit interviews conducted in 2000), and this could have introduced temporal bias as personal values and medical practice patterns have changed somewhat over the last 15 years with respect to end-of-life care (Bischoff et al., 2013). Moreover, no information was available in this study on when advance planning occurred. Without information on timing, the interpretation of results was limited, particularly for the subgroup of childless decedents who outlived all of their children.

Finally, the retrospective cross-sectional design limited external validity. The use of a study population comprised of decedents means that the results of Aims 2 and 3 are generalizable only to those over age 50 who died from 1998 – 2010. Nevertheless, the overall objective of this study was to examine associations that could lead to further hypothesis testing in prospective studies.

Strengths

This research design is strong in that it allowed for the inclusion of individuals who lived in nursing homes and long term care facilities as well as the community. Childless older women in particular, reside disproportionately in these institutional settings. At the same time, residents of nursing homes and other long-term care settings tend to have higher rates of advance directive completion. A study targeting community-dwelling adults only would probably have underestimated the prevalence of both childlessness and advance care planning.

5.6. Future Research

Overall, researchers have found few significant deficits related to childlessness in late life, possibly due to adjustments that childless individuals make over the life course to strengthen their relationships and resources outside of the normative parental role (Silverstein & Gianrrusso, 2010). This line of research remains undeveloped, however, in that it consists mainly of studies investigating the disadvantages of childlessness relative to caregiver support, loneliness, depression, and economic status (Bures et al., 2009; Dykstra & Wagner, 2007; Kendig et al., 2007; Koropeckyj-Cox, 1998; 2002; Plotnick, 2009; Zhang& Hayward, 2001). By contrast, the results of this dissertation point toward a deficit in health behavior—advance care planning—among certain family status groups

(e.g., never married childless men). Further research is needed to see whether a deficit exists relative to other health behaviors, such as engagement in cancer screening and medication adherence.

Health care expenditures. The effect of advance care planning on health care expenditures is another line of research to pursue in the context of family status. The increased likelihood of institutional placement would be expected to drive up long-term care costs among the childless. Identification of other key differences in health care expenditures would be useful to policy makers concerned with the high cost of end-of-life care.

Professional services. Another worthwhile topic involves the assessment of services provided by elder law attorneys and/or geriatric case managers hired as health care proxies in the absence of a close relative or associate. Further research is needed to begin to understand this choice, its cost, the quality of services furnished, client satisfaction, and whether the outcomes match expectations. Both qualitative and quantitative research methods are needed to explore the viability of professional services to meet a growing need as the population ages.

In all future research on childlessness, interaction effects by gender must be considered, given the significant findings relative to childless older men in this study. Future research would also benefit from a longitudinal study design, to overcome some of the shortcomings of the cross-sectional design. A longitudinal design would elucidate the relationship between cause and effect. It would allow the researcher to examine, for example, how the timing of changes in family status (e.g., divorce, death of an adult child or spouse) influence specific health behaviors, such as the completion of an advance

directive. Likewise, it would help in identifying any barriers to ongoing action such as end-of-life care discussion. New models of patient care based on these findings, once developed, could then be evaluated in subsequent research studies, and if successful, scaled broadly to improve public health.

APPENDIX A

HRS | HEALTH AND RETIREMENT STUDY

UNIVERSITY OF MICHIGAN
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Survey Research Center
426 Thompson Street
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ph. (734) 936 0314
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MEMORANDUM

TO: Institutional Review Boards/Human Subjects Review Committees

FROM: David R. Weir, Principal Investigator, Health and Retirement Study

RE: Health and Retirement Study Public Use Datasets

The Health and Retirement Study (HRS) is an ongoing longitudinal survey of Americans over the age of 50, sponsored by the National Institute on Aging (U01 AG009740) with support from the Social Security Administration. HRS makes available toresearchers both unrestricted datasets, available to all researchers, and restricted datasets, available only under agreement to researchers who meet rigorousconditions.

No individual identifiers or links to individual identifiers are provided to researchers under any conditions. Moreover, unrestricted datasets from theHRS have been sufficiently purged of secondary identifying information that they poseno significant threat to respondent anonymity. These files are public-use and are distributed via download from our website. We assert that in most cases the HRS public use files qualify as anonymized datasets and that secondary data analysis using these files may qualify for exempt IRB status, under 45 CFR46.101(b).

The entire Health and Retirement Study is under current IRB approval by the relevant committees at the University of Michigan and the National Institute on Aging,the primary sponsor of HRS.

If you have further questions, please feel free tocontact:

Cathy Liebowitz
Survey Research
Center 426
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APPENDIX B

Correspondence from the Institutional Review Board

University of Maryland, Baltimore

January 21, 2015

Not Human Subjects Research (NHSR) Confirmed

To: Lynn Miescier

Link: HP-00063377

An IRB Analyst has reviewed the information provided and has determined that the project meets the definition of **Not Human Subjects Research** (NHSR). IRB oversight is not required and no further actions are required.

Description: **Submission Title:** ACP and Family Structure

POC: Ann Gruber-Baldini

Please contact the HRPO at 410-706-5037 orHRPO@umaryland.edu if you have any questions.

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