FREQUENCY AND EFFECTS OF PHYSICAL, VERBAL, AND SEXUAL ABUSE IN OLDER ADULTS

By

MICHAEL BRADLEY CANNELL

A DISSERTATION PRESENTED TO THE GRADUATE SCHOOL
OF THE UNIVERSITY OF FLORIDA IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

UNIVERSITY OF FLORIDA

2013

To my great grandmother: Regina Smith

ACKNOWLEDGMENTS

I thank my parents. I thank Todd Manini for his many hours and guidance. To be my dissertation committee chair has surely been more trouble than it was worth. I thank Elena Andresen for bringing me to the University of Florida and the countless number of things she has done to help me along the way, both personally and professionally. I also thank my dissertation committee for their guidance and encouragement during this process.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

ADL	Activities of Daily Living
AOA	Administration on Aging
APS	Adult Protective Services
BRFSS	Behavioral Risk Factor Surveillance System
CI	Confidence Interval
EAABIS-R	Elder Abuse Attitudes and Behavioral Intentions Scale – Revised
ED	Emergency Department
EPS	Elderly Protective Service
EGP	Empirical Growth Plot
HR	Hazard Ratio
IADL	Instrumental Activities of Daily Living
MLE	Maximum Likelihood Estimation
NCEA	National Center on Elder Abuse
NORS	National Ombudsman Reporting System
OAA	Older Americans Act
OLS	Ordinary Least Squares
OR	Odds Ratio
RDD	Random Digit Dial
SD	Standard Deviation
SLTCOP	State Long-term Care Ombudsman Program
SVWS	Severity of Violence Against Women Scale
WHI	Women's Health Initiative

Abstract of Dissertation Presented to the Graduate School
of the University of Florida in Partial Fulfillment of the
Requirements for the Degree of Doctor of Philosophy

FREQUENCY AND EFFECTS OF PHYSICAL, VERBAL, AND SEXUAL ABUSE IN OLDER ADULTS

By

Michael Bradley Cannell

December 2013

Chair: Todd M. Manini
Major: Epidemiology

Elder abuse, as distinct from other abuse, became recognized around the middle of the last century. The term “elder abuse” generally relates to abuse experienced by people over age 60. More research is needed to verify frequency of elder abuse, and the needs of the abused. History and background of elder abuse are outlined along with need for additional research. Finally, important new research adds to understanding.

Estimates are as many as 2 to 3 million US older adults may have experienced some type of abuse in 2005.[1,2] Elder abuse has been reported from the Netherlands, Great Britain, and Canada.[1,3] However, no large-scale, easily reproducible, population-based survey of the frequency of elder abuse in America has been done. And little is known about the consequences of abuse to older adults.[4] The current demographic transition will result in a higher older adult population in the United States than at any time in history. As age and dependence rises, so too does the frequency of mistreatment and exploitation.[5,6] Therefore, ensuring the health, safety, and quality of life for vulnerable older adults is an important public health challenge for coming decades.

One of the leading public health documents in the United States, *Healthy People 2020*, has incorporated objectives intended to improve health, function, and quality of life for older adults. *Healthy People* states that, “a measure of elder abuse has been added to encourage data collection on this issue”..[7] This is an indicator of the timeliness and importance of the current research.

The objective of the current research is two-fold, and in direct response to Healthy People 2020 and the National Research Council’s recommendations. First, we aim to estimate the yearly incidence of sexual abuse among older adults based on a large, representative, annually conducted, random digit-dialed telephone survey. The feasibility of this survey for monitoring elder abuse trends in the United States will be evaluated. Data from a large longitudinal study of postmenopausal women, aged 50-79, will be used to examine effects of physical and verbal abuse on physical and cognitive function. A three-paper model will be used to accomplish these objectives.

CHAPTER 1
INTRODUCTION

History and Definitions of Elder Abuse

Colonial American society has been described as a gerontocracy, presided over by the oldest in the community, who were held in great esteem and treated with great respect.[8] This elevated status was particularly conveyed upon older wealthy white men. There is some debate about when this historical era of age veneration began to decline in the United States. Some social gerontologists contend that modernization and the industrial revolution brought about changes to the country, which lowered the position of older Americans, and gradually also changed society's perception about aging and older adults. Specifically, Donald Cowgill (1974) outlined health technology, economic technology, urbanization, and mass education as the social changes which undermined the standing of older adults in society.[9] Others, such as historian David Fischer (1977), contend that the decline of veneration for the older adults in America began much earlier.[10]

Fischer points out that between 1770 and 1820 traces of society's changing attitude towards older adults began to appear across many different facets of society. For example, in churches where the front pews had once been reserved for respected elders from the community, they were now reserved for the wealthy. Legislatures began imposing mandatory retirement ages for the first time. And, pejorative terms such as gaffer and fogy appeared as terms of contempt and disrespect toward older adults. Another historian, W. Andrew Achenbaum (1978),[11] wrote that after the Civil War older people were viewed as ugly and diseased.[8]

During much of the twentieth century, older people in the United States were viewed as poor, frail, and deserted by their children.[8] The economic turmoil of the 1930's was hard on everyone, but perhaps on the nation's oldest residents most of all. Rates of unemployment and poverty among aging Americans increased during the great depression, and remained high until the mid-1960s, which reinforced negative stereotypes of older adults.[8] It is in this context that the first public welfare programs emerged to protect adults who were viewed as unable to protect themselves.[4]

A landmark piece of legislation was passed in 1935 that provided for the "general welfare by establishing a system of federal old-age benefits, and by enabling the several States to make more adequate provision for aged persons".[12] Later amendments to the Social Security Act in the 1960s granted money to the States for the purpose of developing protective services units, and developing six demonstration projects to research adult protective services.[4]

One of these original six demonstration projects represents some of the earliest research into older adult outcomes. Margaret Blenkner and her team at the Benjamin Rose Institute on aging published a paper in 1964 about their results that tested the effects of different levels of social services among non-institutionalized older adults. To their surprise they found that mortality rates among those receiving maximal services were four times that of participants receiving minimal services.[13] While some significant methodological issues have been pointed out, the study was one of the first to bring attention to services intended to increase quality of life among older adults. Soon after this research was published, another landmark piece of legislation was passed. In 1965 congress passed the Older Americans Act (OAA). Among other things, this important

legislation provided grants to the States for community planning and social services, research and development projects, training, and the establishment of the Administration on Aging (AOA).[14]

In 1974 the Social Security Act was amended by congress “to require states to establish protective service units for adults with mental and physical impairments, who are unable to manage on their own, and who were victims or were being exploited or neglected”.[4] In the same year, during a meeting of the house subcommittee on domestic violence, Dr. Suzanne Steinmetz of the University of Delaware testified about cases of older adults who had be tied down, beaten, and even held at gunpoint by family members entrusted to care for them.[15] In many ways it was this testimony, along with hearings held in 1978 describing “granny battering”,[4] that brought about recognition of the broad problem of elder abuse per se. Congress, and particularly Congressman Claude Pepper of Florida, was instrumental in finally bringing attention to this important problem. However, direct federal action was slow to come.

In 1981 Congressman Pepper, along with congresswoman Oakar wrote a report outlining the nature of the elder abuse problem in the United States. The report suggested that thousands of cases of community elder abuse existed and were waiting to be discovered, and it called for more resources to be dedicated to stopping elder abuse. Finally, in 1988, thanks in no small part to the efforts of Congressman Pepper, the National Center on Elder Abuse was created as an amendment to the OAA, and was made permanent in 1992. In addition, since 1996, each State Long-term Care Ombudsman Program (SLTCOP) has been required by the OAA to track and report complaints of elder abuse within the state, particularly among long-term care facilities.

This information is then sent to the AOA for collection in the National Ombudsman Reporting Systems (NORS).

Today, all fifty states and the District of Columbia have laws establishing adult protective service agencies and granting them the authority to investigate claims of elder abuse. It is important to note, however, that there is wide state-to-state variation in definitions of elder abuse, reporting of abuse (mandatory vs. voluntary), classification of abuse as criminal or civil, investigation responsibility and procedures, and remedies for abuse.[16] For example, compare and contrast the differences between two neighboring states: Florida and Georgia. While the definitions of abuse are similar, although not identical, the definition of an elder is functionally very different. In Florida an "elderly person" is defined as "a person 60 years of age or older who is suffering from the infirmities of aging as manifested by advanced age or organic brain damage, or other physical, mental, or emotional dysfunctioning, to the extent that the ability of the person to provide adequately for the person's care or protection is impaired" (§ 825.101 of the 2011 Florida Statutes). However, in Georgia, an "elder person" is defined as "a person 65 years of age or older who is not a resident of a long-term care facility as defined in Article 4 of Chapter 8 of Title 31".[4] These definitions highlight some of the differences inherent to the definition of elder abuse. Not only do age requirements differ, but also life circumstances such as residence in a long-term care facility.

Despite the strides made in recognizing, understanding, and attempting to prevent elder abuse over the past several decades, many more challenges remain. Even today, as shown above, there is no universally accepted definition of elder abuse, which is also frequently referred to as elder mistreatment or elder maltreatment (Table 1-1).

Definitions vary by the writer interested in describing this phenomenon (i.e. the legal field, researchers, social workers, the medical field, and other professions). For example, while the legal community may have greater interest in emphasizing criteria that justify legal intervention, clinicians may emphasize factors that relate to eligibility criteria for social or healthcare services.[17] Even within fields of interest definitions can vary by type of abuse perpetuated, the intent of the individual causing the abuse, characteristics of the abused individual, and characteristics of the person causing the abuse. Therefore, for the purposes of the current research, we will subscribe to the definition given by the National Center on Elder Abuse: "Elder abuse is any knowing, intended, or careless act that causes harm or serious risk of harm to an older person – physically, mentally, emotionally, or financially. The term is quite broad and encompasses many different types of mistreatment".[18] However, when describing the results of previously conducted studies, we will use the original language used by the author.

State of Elder Abuse Research

Although so many have worked tirelessly to bring the elder abuse problem in America out of the shadows, and some political success and recognition have been attained, there is a dearth of scholarly research on elder abuse. As a result, the current system of programs and prevention borrows heavily from child mistreatment and intimate partner violence research, which may not always be applicable.[4] In at least four previous reports the National Research Council and the Institute of Medicine have highlighted the need for research into the phenomenology, magnitude, etiology, and consequences of elder mistreatment.[19-21] However, before highlighting gaps in the current literature, I will first provide a survey of the current state of research on elder

abuse. The published research includes a breadth of disciplines, research methods and measures, making comparison among findings challenging. A full list of studies reviewed for this discussion is given in the Appendix.

Previous Research on Perceptions of Elder Abuse

The first step in solving any problem is to define the problem. When it comes to the problem of elder abuse this step is still a work in progress. There are likely many reasons why we have not settled on one precise definition of elder abuse. One reason is surely because individual people have different perceptions of what constitutes behavior that violates social norms and expectations so that the behavior deserves to be labeled: in this case, labeled as “elder abuse” or “elder mistreatment.” Several studies have attempted to assess some of the factors that drive our perceptions about elder abuse.

At least two early studies found that culture and beliefs held by the older adult can have a strong influence on perceptions of elder abuse. Behaviors towards the older adult that are viewed as acceptable, and therefore go unreported are influenced by the cultural values, attitudes, and traditions of the older adult.[22] Similarly, a study by Moon & Williams (1993) found that reporting perceptions about what behaviors constituted abuse were strikingly different by racial and ethnic background.[23] The authors found that when given a set of (varied abuse) scenarios, only 50% of Korean American women perceived them as abuse. This is in contrast to 67% of Caucasian women, and 75% of African American women.[23]

Childs et al. (2000) collected data on perceptions about elder abuse from 623 volunteers.[17] Four hundred and twenty two young-adults enrolled in undergraduate psychology courses at a University were compared to 201 middle-aged adults from the

surrounding community. Participants were given a modified version of the Elder Abuse Attitudes and Behavioral Intentions Scale – Revised (EAABIS-R), as well as a modified version of the Severity of Violence Against Women Scale (SVWS). The authors found that age affected perceptions of psychological, but not physical, abuse. Their data suggested that middle-aged adults were more likely than young adults to label certain behaviors as abusive, interpret psychological behaviors as being more harmful to the victim, and report incidents of violence. The authors also found some differences in perceptions of abuse by gender, type of abuse, and participants' personal history of family violence.

Older adults experiencing abuse will often first present at emergency departments (ED) of local hospitals. Because these emergency department visits represent possible opportunities for identification and intervention of elder abuse, physician perceptions are important to understand. Jones et al. (1997) surveyed 645 ED physicians from across the country.[24] They found that 52% of ED physicians perceived elder mistreatment as prevalent, but less so than spousal or child abuse. Unfortunately, most physicians also reported being unfamiliar with applicable state laws concerning elder abuse. In addition 75% of physicians surveyed believed that there were no clear-cut medical definitions of elder abuse and neglect, and only 58% felt that emergency department physicians can accurately identify cases of mistreatment.

Previous Research on Reporting of Elder Abuse

Several studies investigate factors that relate to identification and reporting of elder abuse. Understanding when, where, and why cases of elder abuse are reported can be important in informing policies and procedures for intervention. In addition, because so many estimates of incidence and prevalence of elder abuse are derived, at

least in part, from reported (possibly more severe) cases, it is crucial to understand the dynamics of reporting. Finally, highlighting possible differences between reported and non-reported cases of elder abuse could potentially inform research about important differences in causes, types, and outcomes of elder abuse. For example, Wolf & Li (1999), point out that in 1996 even though African Americans and Hispanics made up 8.3% and 4.1% of the US population, 18.7% of reports to authorities of abuse, neglect, and exploitation involved African Americans and 10.0% involved Hispanics.[25] Is this because African Americans and Hispanics are more likely to experience elder abuse, or are they just more likely to report? Issues like these demonstrate why research about reporting behavior is so important.

Lachs et al. (1997) identified all reported cases of physical abuse towards older adults that occurred between 1985 and 1992 in the catchment area of one regional Elderly Protective Service Program (EPS) office in Connecticut.[26] The authors then linked these individuals with ED records from the two ED's in the catchment area. The final analysis sample was 111 community dwelling older adults who represented 572 ED visits. Among these 111 subjects the most common complaint was injury (15.4%) and the most common ICD-9 discharge diagnosis was also injury (19.4%). Qualitative data revealed that forms of abuse included: punching, kicking, slapping, use of knives, use of canes, use of furniture, and use of pipes. Unfortunately, researchers concluded that no specific injury type that could be used to help identify cases of elder abuse in EDs.

Wolfe & Li (1999) characterized rates of reporting of elder abuse in 27 Massachusetts protective services areas.[25] The areas ranged in size from 16,071 to

82,936 adults 60 years of age or older. The authors report that rates of reporting varied across the 27 protective services areas from 2.41 per 1,000 to 9.31 per 1,000 persons age 60 and older. Factors associated with higher reporting rates were lower socioeconomic status, more community training, higher agency service rating scores, lower community agency relationship scores. Agency service rating scores were based on self-reported decision-making processes on cases, services for minorities, and overall services to clients. Community relationship scores were based on surveys sent to local service providers (hospital social workers, police officers, adult day health program directors, home health agency staff, and mental health agency staff), and asked about their working relationship with the local protective service agencies.

Jogerst et al. (2000) used data from the Iowa central registry provided by the Iowa Department of Human Services.[27] Between January 1984 and December 1993, the authors found the average 10-year incidence rate of elder abuse reports was 12.7 per 1,000 people aged 65 and older. Further, the authors found 26.5% of those cases were substantiated. There was also considerable variation by county in both number of cases reported and substantiated per capita. Some community characteristics that were associated with increased elder abuse were increasing population density, and increasing percentages of children in poverty and reported child abuse.

Huber et al. (2001) analyzed data from six states using the National Ombudsman Reporting System (NORS) to describe the relationship between race and gender, and types of complaints in long-term care facilities.[28] Understanding how to best utilize data from the NORS system is important given that ombudsman complaint data are not duplicated by any other agency. Analyzing the 16,945 complaints that contained

information about race and gender of the resident revealed that the number one complaint among White men, minority men, and minority women was “loss of dignity and respect.” Among White women the most common complaints were “accidents” and “call lights unanswered.” Unfortunately, physical abuse was among the top five complaints among all race and gender groups, albeit to different degrees. The authors also found that while complaints lodged by minorities were more often verified than complaints lodged by Caucasian residents, the verified complaints were less often fully resolved.

Pavlik et al. (2001) performed a descriptive study of the prevalence of abuse type by age and gender in the state of Texas.[29] This study used 61,380 records from 43,250 individuals in the Texas Department of Protective and Regulatory Services (TDPRS) Adult Protective Services Division (APS) database in 1997. The authors concluded that the risk of abuse reporting to the APS approximately doubled with each 10-year increase in age. They also found that risk was higher among women across all age groups.

The Prevalence and Incidence of Elder Abuse

Another key step in understanding elder abuse in America is simply to define the current state of the problem. Unfortunately, because of definitional issues, challenges to getting accurate reporting, limited resources, and limited national will, national prevalence of the mistreatment of older adults remains incompletely understood.[21] However, several attempts to quantify the incidence and prevalence of elder abuse have been made, both in community and institutional settings. Many of these estimates rely on cases of elder abuse that have come to the attention of a social welfare agency or some other responsible authority. This is a strategy that almost certainly

underestimates the true prevalence of elder abuse, and perhaps enables the study of only the most extreme cases. Still others rely on extrapolations made from smaller local studies. The existing evidence is described below.

Researchers began making the first serious attempts at quantifying national prevalence in the 1980s. Pillemer & Finkelhor (1988) conducted the first large-scale study, which attempted to accurately define elder abuse in the community.[30] Using a stratified random sample of community dwelling older adults (defined as age 65 or older) the authors interviewed 2,020 residents of the Boston metropolitan area or their proxies. The composition of the final sample was 65% female, 94% white, 40% lived alone, 37% lived with spouse only, 5% lived with child only, 10% lived with spouse and someone else, and 7% lived with others. The authors found that the prevalence of abuse in their sample was 3.2% of older adults. The authors also report that if this rate were consistent across the United States, the national prevalence would be between 701,000 and 1,093,560 abused older adults, a number that has been widely quoted by other studies. For that same year Tatara calculated an estimated national total of 140,000 reports.[31] By 1996, that number had reached 293,000.[5]

Jones et al. (1997) found that 90% of the physicians surveyed reported knowledge of at least one incident of suspected elder abuse in the previous 12 months, and the mean number of suspected cases they evaluated was 4 (standard deviation [SD]±8), only 50% of which were reported.[24] Among the physicians that were aware of at least one incident of expected elder abuse: 91% were aware of neglect, 69% were aware of physical abuse or battery, 68% were aware of psychological abuse, 49% were aware of financial exploitation, and 14% were aware of sexual assault. Physicians reported that

the abuse most often occurred in the person's home, and that the most common reason for suspecting abuse was their interview with the patient. Unfortunately 84% of physicians reported that they rarely ask their patients about elder mistreatment. Finally, ED physicians who recalled education about mistreatment were more likely to report cases of elder abuse (64%) compared to only 49% of physicians that could not recall receiving any such education, suggesting a future role for professional education as one method of detecting (and possible treatment and/or intervention) elder abuse.

The National Elder Abuse Incidence Study (1998) was conducted by the National Center on Elder Abuse (NCEA) and the research firm Westat.[5] This was a large and novel undertaking funded by the Administration for Children and Families and the AOA, with the primary aim of elucidating an estimate of the incidence of abuse and neglect of Americans that were age 60 and older in 1996. This study collected data from 20 counties in 15 states across the nation, focusing on two sources of data within each county: local Adult Protective Services (APS) agencies, and sentinel reports – specifically reports from trained individuals in a variety of agencies in the community that have frequent contact with older adults. They estimated that nationally in 1996 a total of 449,924 community-dwelling older adults, aged 60 or older, experienced incident abuse or neglect. While this was a landmark study at the time, the data are now 15 years old.

Fulmer et al. (2000) measured the prevalence of suspected elder abuse among a probability sample of subjects from a New York state adult day health care facility.[32] Data were collected via a social worker interview, which examined both physical indicator of abuse as well as client's behavioral indicators of abuse. The authors

estimated that 12.3% of clients interviewed had at least one indicator of abuse. When "client apprehension" was excluded, the prevalence estimate dropped to 3.6%.

Mouton (2003) conducted a cross sectional survey of 1,245 community-dwelling, postmenopausal women, aged 50 to 79.[33] Respondents were interviewed using the Domestic Violence Screening Questionnaire. In their sample, 58.5% of women reported experiencing abuse at some point in their adult life. 26.6% reported experiencing physical abuse, 26.6% reported experiencing verbal abuse, and 7.9% reported experiencing gun-related threats.

Mouton et al. (2004) analyzed the prevalence and three-year incidence of physical and verbal abuse among 91,749 postmenopausal women, age 50-79, at baseline from the observational arm of the Women's Health Initiate (WHI) study.[34] They found that 10,199 women (11.1%) reported experiencing some sort of abuse in the previous 12 months. Of the women who experienced abuse, 218 (2.1%) experienced physical abuse only, 9,083 (89.1%) experienced verbal abuse only, and 898 (8.8%) experienced physical and verbal abuse. Of the 48,522 women with year 3 follow-up data that reported no abuse at baseline, 2,431 (5.01%) reported incident abuse.

Banomi et al. (2007) conducted a cross-sectional telephone survey with a random sample of 370 women age 65 and older from a Group Health Cooperative that services clients in western Washington State and northern Idaho.[35] The primary interests of the researchers were assessing the prevalence, types, duration, and frequency of intimate partner violence among older women. In this sample, 2.2% of women reported any partner violence in the past year, 3.5% reported partner violence in the previous 5 years, and 26.5 % reported experiencing lifetime partner violence. Ninety percent of

women who were abused reported having only one abusive partner in her lifetime. 18.1% of women who were abused reported 20 or more episodes of physical violence, and 61.2% of women who were abused reported 20 or more episodes of controlling behavior. The mean duration of abuse was between 3 and 10 years depending on the type.

Laumann et al. (2008) used data from the National Social Life, Health and Aging Project (NSHAP) to estimate the prevalence of elder mistreatment, characteristics of older adults who experience mistreatment, and the relationship between these older adults and those that mistreat them.[36] The NSHAP was a nationally representative probability sample of community dwelling persons aged 57 to 85 from July 2005 to March 2006. African Americans, Hispanics, men, and older adults (aged 75 - 84 years) were oversampled. Seventy-seven percent were asked questions about elder mistreatment during in-person interviews and 33% were asked via a self-administered questionnaire that was left behind after the in-person interview and later mailed to researchers. Although there were no demographic differences between those answering in person and by mail, individuals that did not have to answer in person were more likely to report verbal mistreatment (11.8% vs. 8.0%). Out of the 3,005 respondents in their sample, verbal mistreatment was reported by 9% of respondents, financial mistreatment was reported by 3.5% of respondents, and physical mistreatment was reported by less than 1% of respondents. While this was a well-done study, there was no analysis of sexual abuse. In addition, the in-person interview is a data collection mode that is much more resource intensive that random digit dial (RDD) sampling, and therefore more expensive (and possibly less appropriate) for repeated use.

Acierno et al. (2010) conducted a nationally representative (weighted based on age and gender) RDD telephone survey of 5,777 older adults, aged 60 and above in 2005, from across the continental United States.[1] The authors' primary aim was to estimate the prevalence of physical mistreatment, sexual mistreatment, emotional mistreatment, potential neglect, and financial mistreatment. In their sample 589 (11.4%) of respondents reported experiencing some type of abuse in the previous 12 months. This includes: 254 (4.6%) who experienced emotional mistreatment, 86 (1.6%) that experienced physical mistreatment, 34 (0.6%) who experienced sexual mistreatment, 297 (5.1%) who experienced potential neglect, and 263 (5.2%) who experienced financial mistreatment by family.

Amstadter et al. (2011) conducted a nationally representative (weighted based on age and gender) RDD survey of 5,777 adults age 60 and older in 2005.[2] In their sample the overall number of older adults who experienced emotional mistreatment in the past year was 254 (4.6%), the overall number of older adults who experienced physical mistreatment in the past year was 86 (1.6%), and the number of older adults who experienced sexual mistreatment was 34 (0.6%).

Amstadter et al. (2011) also conducted a RDD telephone survey of South Carolina residents in 2008.[37] Nine hundred and two older adults aged 60 and over were asked about emotional, physical, and sexual mistreatment, neglect, and financial exploitation. In that sample 12.9% experienced emotional mistreatment since age 60, and 5.1% experienced emotional mistreatment in the past year; 2.1% experienced physical mistreatment since age 60, and 1.8% experienced physical mistreatment in the past year; 0.3% reported sexual mistreatment since age 60, and 0.3% reported sexual

mistreatment in the past year. Past year potential neglect and financial mistreatment were estimated to be 5.4% and 6.6% respectively.

Although many attempts have been made to describe the incidence and prevalence of elder abuse across the nation, many of them still leave us with an incomplete picture of the true nature of the problem. In their report, “Elder mistreatment: Abuse neglect, and exploitation in an aging America,” the National Research Council calls attention to the important need for population-based surveys of the incidence and prevalence of elder mistreatment. The surveys conducted by Acierno and Amstadter (2010, 2011) take a step towards meeting this goal. Their data suggest that as of 2005 about 5% of older adults, age 60 and over have recently experienced emotional abuse, about 2% have recently experienced physical abuse, and a little less than 1% recently experienced sexual abuse.[1,2] According to population estimates from the intercensal estimates from the United States Census Bureau, this would translate to about 2.5 million older adults being emotionally abused, nearly 1 million being physically abused, and 250,000 being sexually abused in 2005. However, it is important that prevalence estimates be updated over time, to track trends and formulate policy. Therefore there is still a need for a large-scale, easily reproducible, population-based survey of frequency of elder abuse in America. In fact, the National Research Council specifically calls “to add elder mistreatment case screening or detection modules to existing, comprehensive geographic health and social surveys…”.[21]

Risk Factors Associated with Elder Abuse

While an important first step in epidemiologic research is describing the incidence and prevalence of an issue, we cannot stop there. In order to intervene and prevent the occurrence of elder abuse we must understand the risk factors and pathways, the

causes, by which this comes about. Over the past few decades researchers have attempted to elucidate risk factors for elder abuse by looking at the problem from several different angles. Some research characterizes common traits found among older adults that have experienced abuse,[2,3,5,26,34,37-39] while other research characterizes those who abuse older adults.[3,5,30,36,38,40-42] This research is summarized below.

Pillemer & Finkelhor (1988) conducted the first large-scale study that attempted to accurately characterize elder abuse in the community.[30] Using a stratified random sample of community dwelling older adults (defined as age 65 or older) the authors interviewed 2,020 residents of the Boston metropolitan area or their proxies. Fifty-eight percent of the perpetrators were spouses, 24% were children, and 18% were others. The authors report no difference in abuse by the older adults' race, age, religion, income, or education. However, those living with others vs. alone were in poorer health, and men more often reported being abused.

Pillemer & Suitor (1992) interviewed 236 caregivers of older adults with Alzheimer's disease or some other nonreversible dementia about their fear of violence and actual violence.[40] The mean age of these caregivers was 55 (SD = 14 years), and the mean age of the care recipients was 76 (SD = 4.3). The caregivers were often female (82%), and most were adult children (51%). The remaining caregivers were spouses (32%), other relatives (15%), or friends (2%). Caregivers in this sample were equally likely to be living with the person they cared for (50%). Forty-six respondents (19.5%) reported they ever feared that they may "hit or try to hurt" the older adult they were caring for. Fourteen respondents (5.9%) reported that they had actually "hit or tried

to hurt" the older adult they were caring for. The results of multivariate logistic regression analysis suggest that after adjustment, violence by the older adult care recipient, disruptive behaviors by the older adult, lower caregiver self-esteem, and cohabitation were significantly associated with caregiver fear of become violent. Interestingly, after adjustment, the level of older adult activity limitations, amount of help provided by the caregiver, and social isolation were not predictive of caregivers fearing becoming violent.

Coyne et al. (1993) used an anonymous questionnaire to survey 342 caregivers that called a dementia help line.[41] Caregivers were also given the Zarit Burden Interview (ZBI), and the Zung Self-Rating Depression Scale (ZSDS). Most caregivers were adult children (54.5%), followed by spouses (37.1%), and then other relatives (8.4%). Caregivers that reported ever being physically abusive (11.9%) had provided care for more years, were caring for persons with a lower level of functioning, experienced greater levels of caregiving burden, and had higher self-reported levels of depression than caregivers that reported never being physically abusive. Additionally, those caregivers that had abuse directed towards them by the person they were caring for were more likely to be abusive in return.

Hwalek et al. (1996) studied 552 substantiated cases of non-institutional elder abuse from the Abuse, Neglect and Exploitation Tracking System in Illinois, as well as examined files reported to Illinois APS.[38] The purpose of their study was to characterize the role of substance abuse by perpetrators of elder abuse on the type, severity, and future risk of elder abuse. Future risk of abuse was determined by a client risk assessment form originally developed by Florida's APS. The form identifies five major

risk categories for elder abuse: client factors, environmental factors, transportation and support services, current and historical factors, and perpetrator factors. Among the substantiated reports 23% were reported by a social worker. Of the older adults that experienced abuse in this study: the mean age was 77 years, 73% were women, 73% were White, 54% were widowed, 76% lived in their own home, and many had functional impairments or disability. Among perpetrators: 68% were Caucasian, 66% lived with their older adult, 52% were also caregivers, and 13% had a substance abuse problem. Importantly, abuse committed by substance abusers was more likely to be physical or emotional abuse, as opposed to passive neglect or financial exploitation.

Lachs et al. (1997) merged data from the National Institute on Aging Established Populations for Epidemiologic Studies in the Elderly (EPESE) with records from the state of Connecticut's Ombudsman on Aging.[42] They identified 47 substantiated cases of elder mistreatment in the EPESE cohort in Connecticut. Using bivariate analysis as well as pooled logistic regression, they were able to uniquely analyze major risk factors for abuse prospectively over nine years among older adults in the cohort. In their unadjusted bivariate analysis the authors found risk of elder mistreatment increased when cohort members were non-White, low income, were older, had Activities of Daily Living (ADL) impairments, more cognitive impairment, and increased depressive symptoms. In the fully adjusted model non-White race (odds ratio [OR] 4.0, 95% confidence interval [CI] 2.2 – 7.2), number of ADL impairments (OR 1.3, 95% CI 1.0 – 1.8), and cognitive impairment (OR 3.0, 95% CI 1.1 – 7.7) remained significantly associated with abuse. Further, living alone was significantly protective against abuse (OR 0.3, 95% CI 0.1 -0.8). Interestingly, there was no evidence that the number of

chronic conditions was associated with risk of abuse. In another study by Lachs and colleagues,[26] all cases of physical abuse towards older adults that occurred between 1985 and 1992 in the catchment area of one regional Elderly Protective Service Program (EPS) office in Connecticut were identified, and in 87% of the cases perpetrators of abuse cohabitated with the older adult who was abused.

Results of the National Elder Abuse Incidence Study found that older adults that experienced abuse tended to be older, female, White-Non Hispanic, more dependent, and experiencing depression.[5] Individuals that had committed abuse against an older adult tended to be men, age 41 to 59 (although 34.3% were over the age of 60 also), White non-Hispanic, and related to the older adult.[5]

Dyer et al. (2000) compared a group of 47 older adults that were referred to an urban, public hospital for abuse or neglect with 97 older adults referred during the same time period for something other than abuse or neglect.[39] The results of this case control study indicate that older adults referred to an urban indigent care hospital for abuse or neglect were more likely to have depression and dementia than older adults referred during the same time for reasons other than abuse or neglect.

Mouton et al. (2004) analyzed the prevalence and three-year incidence of physical and verbal abuse among 91,749 postmenopausal women, age 50-79, at baseline from the observational arm of the Women's Health Initiate (WHI) study.[34] After controlling for age, race/ethnicity, occupation, marital status, income, education, smoking, alcohol intake, and living arrangements, factors associated with physical abuse only were African American ethnicity, and employment in the service industry. Factors associated with verbal abuse only were younger age, lower income, employment in the service

industry, and former or current smoking. Factors associated with physical and verbal abuse were younger age, non-White race, lower income, employment in the service industry, being divorced, and being a current smoker.

A literature review by Gorbien & Eisenstein (2005) identifies the following elder mistreatment risk factors for older adults: Older age, being female, lack of access to resources, low income, social isolation, minority status, low level of education, functional impairment, substance abuse, history of family violence, history of psychological problems, caregiver stress, cognitive impairment. In addition they report that perpetrators are most often the primary caregiver, an adult child or spouse, male, have lower incomes, and are financially dependent on the older adult. Many perpetrators are also substance abusers, experience high levels of caregiving stress, and have previously been experienced abuse themselves.[3]

Lauman et al. (2008) analyzed a sample of 3,005 adults aged 57 to 85 from the National Social Life, Health and Aging Project (NSHAP).[36] This is the only study we are aware of that found perpetrators of elder mistreatment were more likely to be non-members of the older adults immediate family (55.6% of physical mistreatment reports, 56.4% of financial mistreatment reports, and 57.3% of verbal mistreatment reports). In an adjusted logistic regression analysis authors found Hispanic ethnicity and older age were protective for verbal and financial abuse. Post-high school education and physical limitations also were risk factors for verbal mistreatment. For financial mistreatment only, they found that African American race was a risk factor, while living with a partner appeared to be protective.

Amstadter et al. (2011) conducted a nationally representative RDD survey of 5,777 older adults age 60 and older.[2] Their aim was to determine the prevalence of elder mistreatment, as well as gender differences in elder mistreatment. Men who were emotionally mistreated were more likely to be emotionally dependent on the perpetrator than women. Women who were emotionally mistreated were more likely to need help with ADLs and to be abused by a family member. Men were more likely than women to be physically mistreated by an individual who had a history of reported trouble with police. Finally, women were more likely than men to experience physical mistreatment by a relative.

Amstadter and colleagues (2011) also conducted a RDD telephone survey of residents of South Carolina in 2008.[37] Nine hundred and two older adults aged 60 and over were asked about emotional, physical, and sexual mistreatment, neglect, and financial exploitation. In this sample, low levels of self-reported social support predicted emotional and physical mistreatment, as well as their needing assistance with ADLs, and poor health status. Interestingly, this study found no gender, income, or age differences in prevalence of abuse.

A greater understanding of the characteristics of perpetrators of elder abuse and older adults that experience abuse is crucial to understanding why elder abuse occurs, and helps provide evidence of how we may be able to curtail these events. Unfortunately, in many ways the current research leaves us with mixed messages. While most studies have found that perpetrators are most often a spouse or adult child,[3,30,40,41] at least one study found contradictory findings.[36] Some studies have found that older adults living with others are at greater risk for elder abuse,[26,42] while others

have not.[36,38,40] Some have found demographic characteristics such as age, gender, race/ethnicity, and income of the older adult to be associated with elder abuse.[2,3,5,34,36,38,42] Others have found no difference by age, gender, race/ethnicity, income, religion, or education.[30,37]

The only factors that, to our knowledge, are constantly reported among individuals who engage in elder abuse are caregiver burden, caregiver psychological problems, caregiver substance abuse, and history of family violence. In addition, characteristics of older adults that are constantly associated with elder abuse are violence towards the caregiver, and greater functional limitations or disability. But, it is important to keep in mind the limitations of many of these studies. Some are generated from small samples, limited geographic areas, and analyze only cases that have been reported to authorities. Importantly, none have established a temporal sequence by means of a longitudinal study design of potential (or population-based general) samples. For example, we cannot determine if caregiver psychological problems, caregiver substance abuse, older adult violence towards the caregiver, and greater functional limitations and disability precede, follow, or co-occur with elder abuse.

Previous research on the effects of elder abuse

As we have already stated, the literature on elder abuse is sparse in many areas. In particular, the consequences (outcomes) of elder abuse are under-studied and poorly understood. This is due, at least in part, to the fact that there is limited longitudinal data to measure elder abuse. Additionally, when such data do exist it is likely that those older adults experiencing abuse have less follow-up information about their outcomes than older adults that do not experience abuse. We can speculate about outcomes based on data from the more robust child abuse and intimate partner violence literature, but given

the number of exposures that differentially effect older adults, it is likely that there would be differences in outcomes associated with abuse later in life as well. Fortunately a hand full of studies have been conducted that can serve as a foundation for understanding the consequences of abuse later in life.

As described above, Lachs et al. (1997) merged data from EPESE with records from the state of Connecticut's Ombudsman on Aging. Among the 47 cohort members with substantiated elder abuse, subjects who began a 3-year interval cognitively intact and became subsequently impaired were at higher risk for abuse, even after adjusting for covariates (OR=5.1, 95% CI=2.0-12.7).[42] However, the authors only analyzed cases of abuse that were reported to authorities. In addition, they were unable to analyze differences in disability, clinical outcomes, or social ties by type of abuse.

Lachs and colleagues (1998) also conducted the first study to examine the effects of elder abuse on all-cause mortality in a cohort of community dwelling older adults.[43] Again, they combined records from EPESE with state of Connecticut Ombudsman / Elderly Protective Service (EPS) records. Three groups were created from 1,383 subjects age 65 and older: individuals with no contact with EPS, individuals with corroborated self-neglect, and individuals with verified elder mistreatment. In an adjusted pooled logistic regression model, elder mistreatment was significantly associated with mortality (OR 3.1, 95% CI 1.4 – 6.7). The most common causes of death in the elder mistreatment group were circulatory disease (66%), symptoms, signs, or ill-defined conditions (22%), neoplasms (4%), and respiratory disease (7%).

Comijs et al. (1999) analyzed the effects of elder mistreatment on psychological distress on 224 members of the Amsterdam Study of the Elderly (AMSTEL).[44] They

compared 77 community-dwelling older adults, age 65 and older, that had experienced verbal, physical, or financial mistreatment in the past year to 147 controls matched on age, gender, socioeconomic status, living conditions, and general health. Compared to older adults that reported no mistreatment in the previous year, older adults that did report mistreatment also had lower levels of social support, felt less in control of their life, less perceived self-efficacy, and greater psychological distress. Authors also found evidence that social support moderated the effect of psychological distress.

As noted above, Mouton et al. (1999) analyzed data from 257 women, age 50 to 79 years, recruited to be in the observational study arm of the WHI from the Newark, NJ site between June 1995 and August 1996.[45] The authors aimed to describe the incidence of domestic violence in older women, and to describe the cross-sectional association between domestic violence and general physical and mental health in older women. In this sample 82 women (32%) reported actual or threatened physical assault at some point in their adult life. Even after adjustment, threatened physical assault was significantly associated with lower mental component scores (MCS) of the Short-form 36 health related quality of life measure (SF-36) in cross-sectional analysis. This could be, of course, either a precursor or outcome of the assault. And in the 2003 Mouton study introduced above, physical abuse in the previous 12 months was associated with a lower SF 36 MCS scores (2.8 points). Verbal abuse in the previous 12 months was associated with a lower MCS score (5.9 points) and a lower physical component summary (PCS) summary score (5.4 points), as well as all eight subscales on the SF-36.[33]

Baker et al. (2009) also analyzed data from 160,676 postmenopausal women, age 50-79 at baseline, from the observational arm of the WHI.[46] Their primary aim was to assess whether or not physical and verbal abuse were associated with total and all-cause mortality. They found that women reporting physical abuse in the past 12 months had significantly higher age-adjusted mortality risk, and higher adjusted risk for "other" cause of death than women who report no abuse. They also found that women who reported verbal abuse in the past 12 months had a significantly higher risk age adjusted risk for cardiovascular death. After fully adjusting for 36 demographic, physical health, mental health, health behavior, and environmental characteristics, the association between physical abuse and mortality remained high, but was not statistically significant (hazard ratio [HR] = 1.40, 95% CI = 0.93-2.11).

In the Amstadter et al. (2010) study described above, the primary aim of the authors was to assess the independent role of mistreatment on poor self-rated health in older adults.[47] Although there was a crude association between physical abuse and self-rated poor health (OR = 1.5, 95% CI = 1.52-4.99), and emotional abuse and self-rated poor health (OR=1.61, 95%CI=1.27-2.04), neither remained significant in a fully adjusted model. Additionally, the authors found evidence that the effect of abuse on self-rated poor health may be mediated by respondent's level of being bothered by emotional symptoms (feeling anxious, depressed, or irritable in the past four weeks).

Mouton et al. (2010) analyzed data from 93,676 women, age 50 – 79 at baseline, in the observational arm of the Women's Health Initiative (WHI).[48] The aim of the authors was to study the association of physical and verbal abuse on overall mental health, depressive symptomology, and social support. They found that women

experiencing both types of abuse had lower SF-36 mental component summary (MCS) scores, and a great number of depressive symptoms. At 3-year follow-up women who experienced incident abuse had a greater increase in number of depressive symptoms when compared to women with no incident abuse. Additionally, women who experience incident abuse showed a decreased MCS score, even after adjustment for sociodemographic covariates.

Luo & Waite (2011) analyzed data from 2,744 respondents to the National Social Life, Health and Aging Project (NSHAP).[49] NSHAP was a nationally representative probability sample of community dwelling older adults, aged 57 to 85 years in 2005/2006. They found that respondents who reported mistreatment also reported lower levels of global happiness and higher levels of psychological distress. In addition, they found that some of the effect of mistreatment might be buffered by social support, social participation, and feelings of social connectedness.

Research to date provides evidence of the negative psychological impact of elder abuse. Abuse experienced by an older person may be a cause of distress, especially for those with fewer resources that can be used to for coping.[49] The detrimental health effects of stressful life events have been well documented.[50,51] Major life stressors, such as elder abuse, can affect individuals' abilities to cope or readjust. Their coping resources can be overused, sapping their physical and psychological reserves and eventually increasing the probability that illness, injury or disease will follow.[50,52] It has already been demonstrated that elder abuse is a stressful life experience that can lead to psychological distress,[33,44,45,47-49] poorer self-rated health,[47] and even mortality.[43,46] However, there is no research to date that specifically examines the effects of recent

physical and verbal abuse on key components of *quality of life* for older adults, such as physical and cognitive function. A greater understanding of such effects is crucial for planning possible interventions, understanding the temporal sequence of elder abuse, and understanding the needs of older adults that have experienced abuse.

The Demographic Transition

There has been a great deal of discussion about our aging population with good reason. The population of older adults is larger and growing faster than at any other time in history. As demonstrated in Figure 1-1, in the year 1900, the population of Americans aged 65 or older was about 3.1 million, and made up 4% of the total U.S. population [53]. One hundred years later the number and percentage had grown to 35.0 million and 12% respectively [53], and these trends are projected to continue for at least the next several decades.

By the year 2040 the number of Americans age 65 and older is expected to reach 81 million, making up an estimated 20% of the United States' population.[53] Amazingly, the fast growing age segment of the US population is adults age 85 and older. In the year 2000 there were approximately 4.2 million adults in this age range, and the number is expected to grow to 6.6 million by the year 2020.[53] This would represent an unprecedented 57% increase in this population. As further evidence of this trend towards an aging population, Figures 1-2 and 1-3 show the population pyramids for the United States in 1900 and 2040 (projected) respectively.

In addition to more people living to old age, they are living longer once they reach old age. In 1950 the average life expectancy of an American reaching age 65 was 13.9 years and by the year 2000 that life expectancy had grown to 17.9 years.[21] In 2007, the

most recent year for which data are available, the life expectancy for some aged 65 was 18.6 years.[54]

In many ways this demographic shift in the population is a sign of the success of centuries old efforts to improve health, longevity, and quality of life. Thanks to advances in agriculture, sanitation, public health, and medicine, reduction in mortality rates, especially infant mortality rates, have steadily declined over the past century [55]. This reduction in mortality rates along with a decrease in fertility rates are the major driving forces of a process known as the demographic transition. Although there has been much speculation about the implications of this transition to an older population, the full impact is likely poorly understood.

What is well understood is that living longer does not necessarily translate to living healthier or living a higher quality of life. With aging there is a general trend towards an increased likelihood of having chronic health conditions.[56] Using data from the 1997 – 2004 National Health Interview Survey (NHIS), a nationally representative cross-sectional survey of the non-institutionalized US population, Freedman and colleagues found an increase in the prevalence of a number of serious chronic conditions. Between 1997 and 2004 the proportion of older adults with cancer increased from 19.3% to 21.3%, the proportion of older adults living with heart and circulatory conditions increased from 64.5% to 67.7%, the proportion of older adults living with metabolic conditions increased from 25.1% to 32.1%, and the proportion of older adults living with arthritis increased from 44.5% to 50.6%.[57]

In addition to the increased risk of chronic disease, older adults are also more likely to experience disability, severe disability, and the need for assistance because of

a health condition than younger people (Figure 1-4). Encouragingly, despite the increasing prevalence of chronic disease among older adults, there is evidence that the relative percent of older adults needing assistance with IADLs and ADLs has actually been in decline over the past couple decades.[57,58] Unfortunately, because of the dramatic aging of the US population, absolute numbers of older adults with disability and severe disability continue to rise. Based on data from the Survey of Income and Program Participation (SIPP), about 22% of people in the United States live with disability, representing approximately 48 million people (Brault, 2009).[59]

As age and dependence on others for care or assistance rises, so too does likelihood of mistreatment and exploitation.[5,6] Taken together the rising proportion of older adults with chronic disease and the increase in the absolute number older adults with disability and assistance needs will likely present a huge strain on our nation's health care system, social services, long-term care infrastructure, and caregivers. Ensuring the health, safety, and quality of life of America's population of vulnerable older adults will be one of the important public health challenges of the coming decades.

Summary

Given the importance of providing the best quality of life possible for America's aging population, elder abuse is a timely topic of study. Although research on elder abuse has been conducted to some extent since the 1960s, compared to other diseases and conditions there remain many gaps in our understanding of this phenomenon. The National Research Council, the Institute of Medicine, and others have repeatedly called for more and higher quality research into elder abuse.[4] Some of the most glaring topics that require further investigation are:

- Refinement and consistency of terminology

- Differentiation of abuse types
- Refinement of instruments and measures
- Lack of population based data
- Lack of prospective data
- Lack of intervention development and evaluation

Unfortunately, the current research does not address all of these topics. However, our three-paper dissertation approach addresses some of these topics in novel ways, and build a foundation for important future research. For example, our paper on sexual abuse from BRFSS data may demonstrate the ability of currently available instruments and measures to produce easily reproducible population-based data. Additionally, our other two papers, based on the WHI data, will be the only two papers to our knowledge that look at the effects of abuse on physical and cognitive function prospectively. They may also show that there are differences by abuse types.

Table 1-1. Definitions of elder abuse / mistreatment used by researchers

Author (Year)	Term(s) used	Definition	Subdomains described
Childs et al. (2000)	1. Elder abuse 2. Elder mistreatment	No single definition given	1. Physical, sexual, psychological, emotional abuse 2. Financial & Material abuse 3. Neglect (passive & active)
Coyne et al. (1993)	Elder abuse	No single definition given	Physical abuse
Dyer et al. (200)	1. Elder abuse 2. Elder mistreatment	The term elder abuse encompasses several types of mistreatment, including physical, financial, & sexual mistreatment.	1. Physical, financial, sexual mistreatment 2. Neglect
Jones et al. (1997)	1. Elder abuse 2. Elder mistreatment	The term elder abuse & neglect is commonly used to describe acts of commission or omission that result in harm or threatened harm or welfare of an older adult.	Battery, psychological abuse, abandonment, exploitation, & neglect

Table 1-1. Continued

Author (Year)	Term(s) used	Definition	Subdomains described
National Center on Elder Abuse (2005)	Elder abuse	Elder abuse is any knowing, intended, or careless act that causes harm or serious risk of harm to an older person – physically, mentally, emotionally, or financially. The term is quite broad & encompasses many different types of mistreatment.	1. Physical abuse: Use of force to threaten or physically injure a vulnerable elder. 2. Emotional abuse: Verbal attacks, threats, rejection, isolation, or belittling acts that cause or could cause mental anguish. 3. Sexual abuse: Sexual contact that is forced, tricked, threatened, or otherwise coerced upon another person, including anyone who is unable to grant consent. 4. Exploitation: Theft, fraud, misuse or neglect of authority, & use of “undue influence” as a lever to gain control over an older person’s money or property. 5. Neglect: A caregivers’ failure or refusal to provide for a vulnerable elder’s safety, physical, or emotional needs. 6. Abandonment: Desertion of a frail or vulnerable elder by anyone with a duty of care. 7. Self-neglect: An inability to understand the consequences of one’s own actions or inaction, which leads to, or may lead to, harm or endangerment.

Table 1-1. Continued

Author (Year)	Term(s) used	Definition	Subdomains described
National Research Council (2003)	1. Elder abuse 2. Elder mistreatment	Elder mistreatment refers to (a) intentional actions that cause harm or create a serious risk of harm (whether or not harm is intended) to a vulnerable elder by a caregiver or other person who stands in a trust relationship to the elder or (b) failure by a caregiver to satisfy the elder's basic needs or to protect the elder from harm.	1. Abuse: Conduct by responsible caregivers or other individuals that constitutes "abuse" under applicable state or federal law. 2. Harm: Injuries or unmet basic needs attributable to acts or omissions by others. 3. Mistreatment: (a) Intentional actions that cause harm or create a serious risk of harm, whether or not intended, to a vulnerable elder by a caregiver or other person who stands in a trust relationship to the elder, or (b) failure by a caregiver to satisfy the elder's basic needs or to protect the elder from harm. 4. Neglect: An omission by responsible caregivers that constitutes "neglect" under applicable federal or state law.
Pavlik et al. (2001)	1. Elder abuse 2. Elder mistreatment	No single definition given	1. Abuse: willful infliction of injury, unreasonable confinement, or cruel punishment. 2. Neglect: the failure to provide for [one's self] the goods or services which are necessary to avoid physical harm, mental anguish, or mental illness, or the failure of a caretaker to provide such goods or services. 3. Exploitation: The illegal or improper act or process of using the resources of an elderly or disabled person for monetary or personal benefit.

Table 1-1. Continued

Author (Year)	Term(s) used	Definition	Subdomains described
Pillemer & Finkelhor (2000)	1. Elder abuse 2. Elder maltreatment	No single definition given	1. Physical abuse meant at least one act of physical violence against the respondent since he or she had turned 65 years of age (by spouse, co-resident child, or one other member of social network). 2. Neglect was defined as deprivation of some assistance that the elderly person needed for important activities of daily living. 3. Psychological abuse… was defined as the elderly person being insulted, sworn at, or threatened at least 10 or more times in the preceding year.
Rosenblatt et al. (1996)	1. Elder abuse 2. Elder mistreatment	Elder mistreatment is a catchall term that includes the harm of abuse, neglect, exploitation, & endangerment.	1. Abuse: non-accidental physical, mental, or sexual maltreatment 2. Neglect: failure to provide adequate food, clothing, shelter, or medical care 3. Exploitation: misuse of funds, property, or dignity 4. Endangerment: a life threatening situation caused by the inability of the threatened person to respond
Wolf & Li (1999)	1. Elder abuse 2. Elder mistreatment	Elder abuse is defined as an act or omission that results in serious physical or emotional injury to an elderly person, or financial exploitation of an elderly person.	1. 2.41 to 9.31 reports per 1,000 persons age 60 & older. 2. Factors associated with higher rates of reporting were lower socioeconomic status, more community training, higher agency service rating scores, lower community agency relationship scores

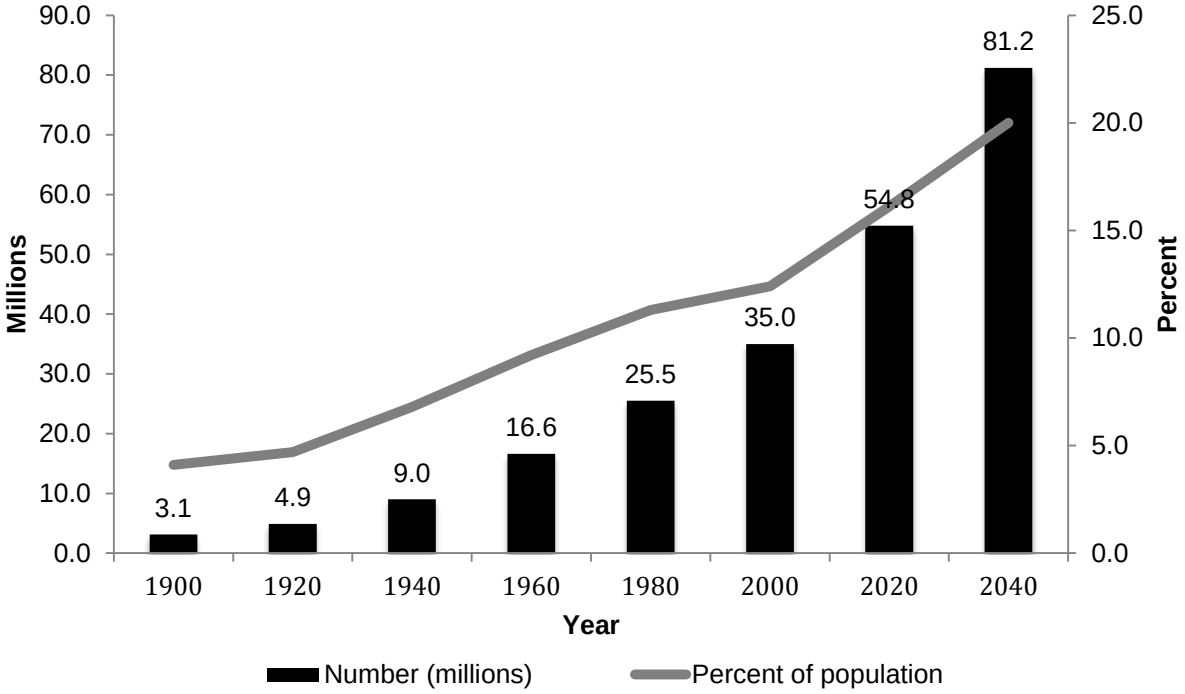

Figure 1-1. Number and Percent of Persons aged 65+, United States, 1900-2030.
Source: Administration on Aging (2010)

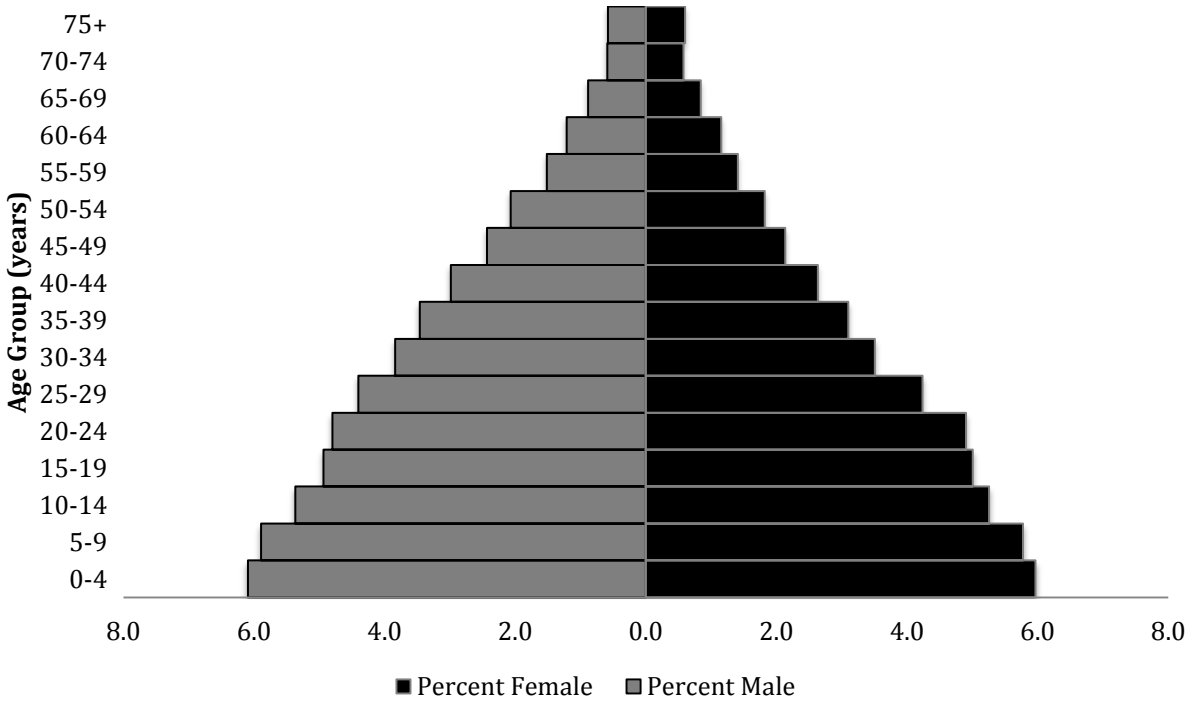

Figure 1-2. Population pyramid of the United States, 1900. Source: U.S. Census Bureau (2004)

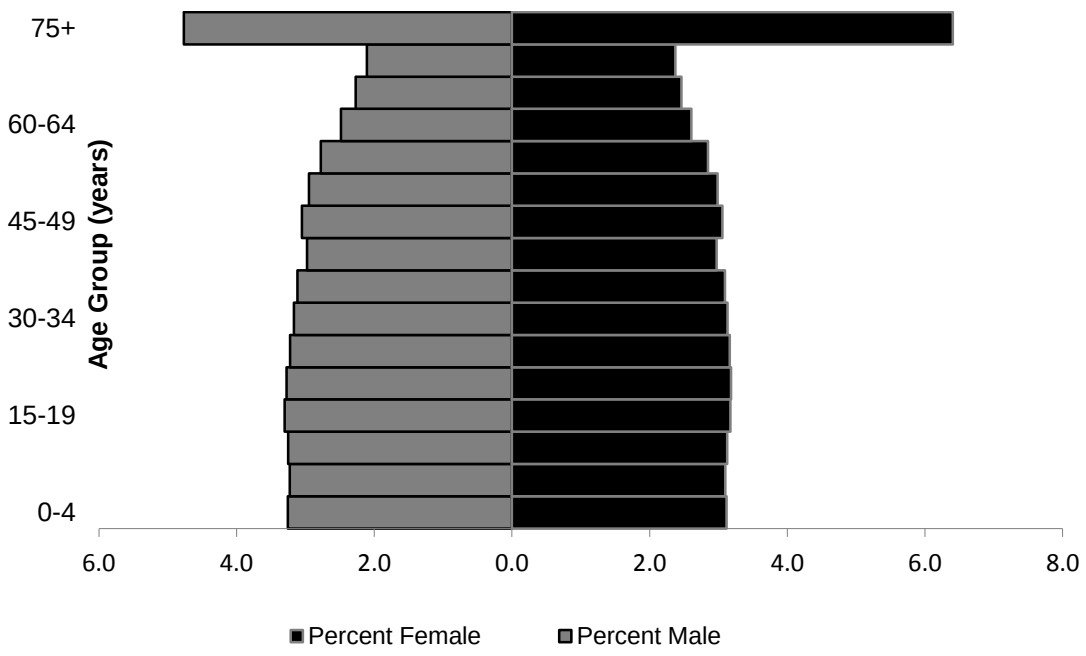

Figure 1-3. Population pyramid of the United States, 2040 (projected). Source: U.S. Census Bureau (2011)

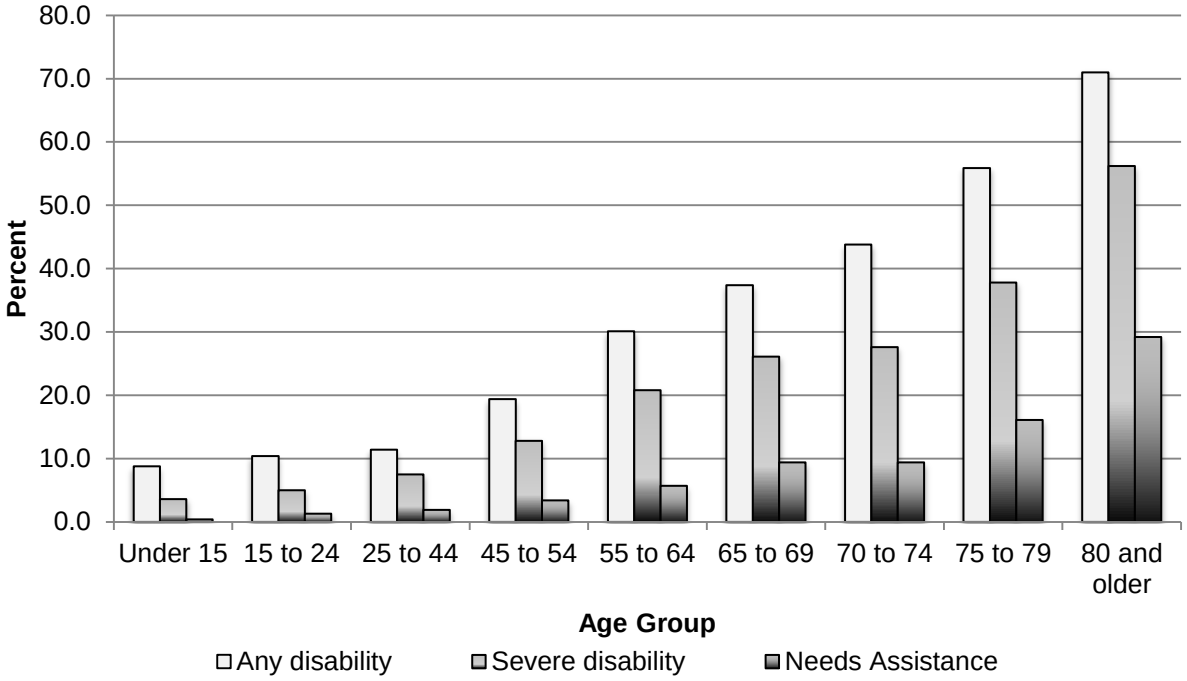

Figure 1-4. Percent of U.S. population with any disability, severe disability, and need of assistance due to disability, by age group, 2005. Source: U.S. Census Bureau, Survey of Income and Program Participation, June-September 2005. Data taken from: Brault MW. (2008).

CHAPTER 2
U.S. POPULATION ESTIMATES AND CORRELATES OF SEXUAL ABUSE OF OLDER ADULTS

Introduction

As the population of the U.S. ages, we increasingly turn to understanding experiences and risks that may have historically been "hidden" among older adults. One of these veiled topics is sexual abuse. Sexual abuse of older adults (or elder sexual abuse) is defined as, "non-consensual sexual contact of any kind with an elderly person. Sexual contact with any person incapable of giving consent is also considered sexual abuse. It includes, but is not limited to, unwanted touching, all types of sexual assault or battery, such as rape, sodomy, coerced nudity, and sexually explicit photographing" [60].

Despite the best attempts of sexual abuse advocacy groups, misconceptions about the true nature of sexual abuse persist. Sexual abuse, and rape in particular, is not a crime of passion. It is a violent act carried out in order to exert power and control over people who are perceived to be vulnerable and accessible [61]. Previous research has found that populations that lack, or are perceived to lack power such as: females, children, individuals with developmental disabilities, and some racial or ethnic minorities are disproportionately targeted for sexual abuse or rape [62]. Older adults, particularly those with age-associated disability may be less likely to be medically examined, less likely to make their sexual abuse experience known, less likely to have their criminal case successfully prosecuted, more likely to feel isolated and dependent on care, fear being removed from their residence, and be more likely to hold generational beliefs in nondisclosure of private matters. These characteristics increase their vulnerability [62,63].

In their seminal work, "Elder mistreatment: Abuse, neglect, and exploitation in an aging America," the National Research Council repeatedly points out there is a critical

lack of nationally representative, population-based estimates of the prevalence and incidence of elder abuse. Specifically they write, “research is needed on risk factors for neglect, psychological mistreatment, sexual abuse, and financial abuse” (pg. 5). While many studies have attempted to extrapolate national estimates of elder abuse using single state or local population-based samples, or samples based on reported cases of abuse or neglect [24,30,32,35,37,64] there have been only two studies to date that claim to be nationally representative [1,2,5]. The Acierno and Amstadter studies provided the most current estimates of the prevalence of sexual abuse in older adults. However, as the authors point out, there are a few limitations to these data. There were low numbers of older adults reporting exposure to sexual abuse, and they were not able to assess risk factors or outcomes associated with the recent sexual abuse of older adults with statistical precision. A nationally representative sample of older adults large enough to assess factors correlated with such recent sexual abuse would be highly useful.

In the current study we aimed to address some of the gaps in the study of sexual abuse in older populations using a large and robust representative survey of community dwelling older adults from across a geographically diverse sample of states in the U.S. Our primary aim was to estimate the annual prevalence of sexual abuse. Secondarily, we characterize older adults who report experiencing sexual abuse in order to understand factors associated with recent sexual abuse.

Methods

The current analysis used data from the Behavioral Risk Factor Surveillance System (BRFSS). The BRFSS is a random digit dial (RDD), landline telephone (recently augmented with a cell phone sample) survey that samples community-dwelling adults age 18 and older to collect information about their health and health behaviors. It is

managed by the Centers for Disease Control and Prevention (CDC) and is administered by states and territories [65-67]. The BRFSS is administered annually in all 50 states, the District of Columbia, and U.S. territories. It consists of a core section of questions administered nationally and separate modules that states may choose to use. After data collection, sample weights are applied to respondent data to correct for selection and response issues. The resulting BRFSS data represent a state or territory's non-institutionalized civilian adult population based on age, gender, and race/ethnicity.

During 2005, 2006, and 2007 a total of 24 states fielded an optional BRFSS module that asked six questions about incidents of recent (in the past year) sexual violence. In order to achieve maximum sample size and geographic representation, we pooled and reweighted all three years of data. The survey weights of states that participated in one year were multiplied by 3, and by 3/2 if the state participated in two years. Next, because we were primarily interested in factors associated with sexual abuse in older adults, the data were restricted to participants age 60 and over for the logistic regression analysis. The choice of using age 60 as a cutoff is in line with previous research [1,2] and many state definitions of older adult eligibility for programs [68].

Measuring Sexual Abuse

In order to increase the privacy and safety of participants, interviewers asked participants if they were in a safe place to answer questions about physical and/or sexual violence or other unwanted sexual experiences before sexual violence questions were asked. To further improve privacy and increase response, all but two questions (Questions 5, Relationship; and 6, Perpetrator's Gender) required only a yes or no answer. Participants were also told that they could skip any question they did not want to answer. At the end of the question section, interviewers provided a phone number to

an organization that provides trained counselors. In 2005, 2006, and 2007 the following six questions about sexual violence were asked of participants:[67]

- In the past 12 months, has anyone exposed you to unwanted sexual situations that did not involve physical touching? Examples include things like flashing you, peeping, sexual harassment, or making you look at sexual photos or movies.
- In the past 12 months, has anyone touched sexual parts of your body after you said or showed that you didn't want them to or without your consent?
- In the past 12 months, has anyone attempted to have sex with you after you said or showed that you didn't want to or without your consent, but sex did not occur?
- In the past 12 months, has anyone had sex with you after you said or showed that you didn't want to or without your consent?
- At the end of the most recent incident, what was your relationship to the person who [*had sex – or attempted to have sex*] with you after you said or showed that you didn't want to or without your consent? [*Complete stranger, a person know for less than 24 hours, acquaintance, friend, date, current boyfriend/girlfriend, former boyfriend/girlfriend, fiancé, spouse or live-in partner, former spouse or live-in partner, someone you were dating, first date, co-worker, neighbor, parent, step-parent, parent's partner, other relative, other non-relative, multiple perpetrators*]
- Was the person who did this male or female?

In keeping with our previously given definition of sexual abuse, any respondent who answered affirmatively to any combination of questions 1 through 4 were classified as having experienced sexual abuse. In addition to these six questions about *recent* sexual abuse, questions 3 and 4 were also rephrased to ask participants if they have *ever* experienced attempted or completed unwanted sex. If they responded affirmatively then the gender and relationship of the perpetrator was also ascertained. Because of sparse responses in some categories we collapsed answers to the perpetrator question (Question 5) to five categories: current or former romantic partner, family member, friend or acquaintance, a person known less than 24 hours, or others.

Previous research provided insight into possible risk factors of sexual abuse in older adult populations to select as covariates in the present analysis. Several demographic characteristics, behavioral factors, physical and mental health conditions, and environmental factors have been implicated in either increasing risk, or as outcomes among older [1-3,5,37,62]. Fortunately the BRFSS is a large and robust data source that measures many of these factors.

Measures

Demographic characteristics we investigated were: age, gender, race/ethnicity, annual household income, educational attainment, employment status, and marital status. Health behaviors among respondents that we investigated were: binge drinking and smoking. Binge drinking was defined as 5 or more drinks per occasion for men, and 4 or more drinks per occasion for women [67].

Participants were asked if their general health was excellent, very good, good, fair, or poor. We collapsed these categories into two groups: “excellent, very good, or good” vs. “fair or poor.” Disability status of participants was measured by two questions: “Are you limited in any way in activities because of physical, mental, or emotional problems,” and, “do you now have any health problem that requires you to use special equipment, such as a cane, wheelchair, a special bed, or a special telephone.” Participants who answered affirmatively to either question were classified as a person with a disability [69]. Two questions were used as measures of mental health: life satisfaction, and poor mental health days. Participants were asked how satisfied they were with their life, in general. We combined responses to “very satisfied or satisfied,” and “dissatisfied or very dissatisfied.” Finally, participants were asked, “now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many

days during the past 30 days was your mental health not good?" We dichotomized responses to no days compared to one or more days.

Statistical Analysis

Our total sample of pooled data from 24 states included 223,113 participants. There were 59,857 participants with no information about recent sexual abuse, which left 163,256 participants. Next, because we conducted a complete case analysis, participants with missing data for key variables were dropped from our data (n=10,755) leaving 152,501 participants for descriptive analysis. Finally, for the logistic regression analysis of correlates of older adult sexual abuse, we excluded 105,715 participants who were under age 60 leaving 46,819 (unweighted) participants age 60 or older.

We conducted simple bivariate analysis on all variables of interest comparing past year sexual abuse experience. We computed weighted descriptive means and percentages and 95% confidence intervals (CI). We used simple logistic regression to measure the unadjusted odds ratio (OR) association between experiencing recent sexual abuse and variables of interest. Finally, we conducted multivariable logistic regression to measure the adjusted odds ratio (AOR) association between the outcomes of recent sexual abuse and exposures of interest, along with their 95% confidence intervals (CI). A cross-product interaction term was included in the model to test for interactions between gender and binge drinking behavior. Variables were retained in the final model if they had a crude statistical association with recent sexual abuse or were found to be previously associated with other forms of elder abuse. All analyses were conducted using Stata/IC 12.1 (StataCorp, College Station, TX), using weighting procedures to account for the complex sampling design of the BRFSS. The University of Florida Institutional Review Board approved this project.

Results

Our results indicate among the 24 states that used the sexual violence module, approximately 0.8% of older adults reported sexual abuse in the previous year. The 95% confidence interval suggests that the prevalence could have been as low as 0.6% or as high as 1.0%. After applying survey weights, this represents approximately 278,479 community-dwelling older adults experienced recent sexual abuse over a three-year period in these 24 states. Of those who reported recent sexual abuse, 17% reported experiencing attempted unwanted sexual intercourse in the past year, and 6.1% reported unwanted sexual intercourse in the past year. Among older adults who experienced recent sexual abuse, 41.1% reported *ever* experiencing an unwanted attempt to have sexual intercourse with them, and 27.3% report that they *ever* experienced unwanted sexual intercourse. Among older adults who reported that they did not experience *recent* sexual abuse, 4.4% reported that someone *ever* attempted to have unwanted sexual intercourse with them, and 2.1% reported that unwanted sex *ever* occurred.

There was no statistically significant gender difference in the perpetrator of the (attempted) sex act in those older adults who reported recent sexual abuse. However, men were more likely to be the perpetrator among older adults *ever* experiencing an attempt to have or completed unwanted sex (95% men vs. 5% women). For both groups of older adults, the perpetrator of the (attempted) sex act was most often a current or former romantic partner (36.6% and 49.5%) followed by a friend or acquaintance (33.4% and 39.5%). Of note, among adults who experienced recent sexual abuse, the perpetrator of the (attempted) sex act was less likely to be a family member (2.1% vs.

10.9%) or a person known for less than 24 hours (6.4% vs. 14%) in comparison to older adults that report no recent sexual abuse and a more distant event.

We analyzed data from 366 older adults who experienced recent sexual abuse. Of these participants, 62% were between the ages of 60 and 69, 74% were white, non-Hispanic, 26% reported an annual household income less than $20,000, and 37% were married or a member of an unmarried couple (Figure 2-2). In the adjusted logistic regression analysis, other race, non-Hispanic (AOR=2.10, 95% CI: 1.26-3.51), missing income (AOR=2.56, 95% CI: 1.05-6.27) or income <$15,000 (AOR=2.53, 95% CI: 1.06-6.07), being unemployed (AOR=2.08, 95% CI: 1.23-3.52), and being unmarried (AOR=2.46, 95% CI: 1.49-4.04) were statistically significantly associated with increased odds of recent sexual abuse (Table 2-1). High school graduation (AOR=0.54, 95% CI: 0.33-0.87) had a statistically significant protective effect (Table 2-2).

Forty-two percent of older adults who reported experiencing recent sexual abuse also self-reported fair or poor general health (Figure 2-3). In addition, 52% were classified as a person with a disability (Figure 2-3). In the adjusted logistic regression analysis, dissatisfaction with life (AOR=2.27, 95% CI: 1.43-3.61) and having a poor mental health day in the previous month (AOR=1.99, 95% CI: 1.38-2.88) were the only health conditions that remained statistically significantly associated with recent sexual abuse (Table 2-1). Finally, among contextual factors we investigated, only lack of emotional support remained statistically significantly associated with abuse after adjustment (AOR=2.05, 95% CI: 1.44-2.91) (Table 2-1).

In order to further explain observed associations between sexual abuse, gender, and binge drinking behavior, a gender-by-binge drinking interaction term was added to

the regression model. Table 2-1 indicates that the association between binge drinking and recent sexual abuse varies significantly by gender (AOR=0.22, 95% CI: 0.06-0.79). Figure 2-4 displays the weighted proportion of men and women who reported experiencing recent sexual abuse by reported binge drinking behavior. There was no difference between the proportion of men and women who experienced recent sexual abuse among participants that do not binge drink. However, among older adults who binge drink, the proportion of women who experienced recent sexual abuse was much higher than among men. Finally, the results shown in Table 2-2 suggest that among men, participants reporting recent sexual abuse are at 24% increased odds (not statistically significant) of also reporting that they engage in binge drinking. Alternatively, among women, participants reporting recent sexual abuse are at 455% increased odds ($p<0.001$) of also reporting that they engage in binge drinking, even after controlling for other risk factors.

Discussion

Our study aimed to estimate the annual prevalence of sexual abuse among an age, race, and gender representative sample of community-dwelling older adults across a geographically diverse sample of states in the U.S. Additionally, we aimed to characterize factors associated with elder sexual abuse. In our weighted community-based sample of 24 states, prevalence of recent (past year) sexual abuse was 0.8% among adults age 60 and over. However, it is likely that this is an under estimate because of nonresponse bias. In other words, some of the most vulnerable, and therefore most likely to experience abuse, did not participate in the BRFSS due to conditions such as dementia, disability, or institutionalization. In addition, sexual abuse is underreported because of guilt and stigma. [70]. By comparison the 1996 National Elder

Abuse Incidence Study reported that 0.3% of all *reported* cases of elder abuse that were subsequently substantiated were sexual in nature. Acierno et al. (2010) reported the prevalence of sexual abuse was 0.6% in a representative RDD sample of 5,777 older adults from across the United States, and Amstadter et al. (2011) reported sexual abuse to be 0.3% in a representative RDD sample of 903 older South Carolinians. It is unclear if the underestimate would have produced any bias in the estimated relationships within the resulting sample.

In the current study, we found that the most common perpetrator of recent (attempted) rape of older adults were current or former romantic partners. The least common perpetrators were family members (not including current or former romantic partners). These results differ slightly from the findings of others who have examined the perpetrator relationship in non-sexual forms of elder abuse. Although one study found that fifty-eight percent of the perpetrators in their sample were spouses [30], others studies have found that perpetrators are most often adult child caregivers [3,40]. This finding suggests that the risk factors for elder sexual abuse may differ from those of other forms of abuse. However, it is important to acknowledge that “adult child” was not a specific response category on the BRFSS. Respondents who were abused by an adult child would have had to report being abuse by an “other relative.” This potentially biased our results.

Finally, our results indicate an association between binge drinking behavior and sexual abuse. This finding is consistent with the literature on sexual violence in general[71]. Our cross-sectional data do not allow us to determine the temporal sequence of this relationship; however, at least one prospective study attempted to tease out the

directionality of this relationship in a sample of younger adult women (Kilpatrick, Acierno, Resnick, Saunders, & Best, 1997). Their results support the conclusion that sexual violence leads to alcohol abuse, perhaps as a coping mechanism [70]. Furthermore, we caution against the interpretation that binge-drinking may have a causal relationship to sexual victimization since acts of sexual aggression reflect behavioral choices made by perpetrators. In addition to the main effect of binge drinking behavior and sexual abuse, we also found an interesting interaction between binge drinking and gender. Namely, the association is much stronger among women than men. Future longitudinal research is warranted because understanding the relationship between alcohol use/misuse and sexual abuse in older adults could potentially prove important to intervention strategies.

There are several strengths to this study. While this is not the first estimate of the prevalence of elder sexual abuse in the U.S., it is the first to do so using an easily available existing population-based data source (the BRFSS). As noted above, estimates from this study were very similar to estimates from studies specially conducted for the purpose of estimating prevalence of elder abuse. Our study demonstrates the feasibility and economic value of tracking population trends in elder abuse using the BRFSS. Additionally, using the BRFSS we report on a representative sample of 46,819 community dwelling older adults in our final analysis – over eight times more participants than other similar studies. These additional participants provide sufficient sample to detect a larger number of associations than prior studies.

Our study was limited by missing information such as important confounders or correlates associated with sexual abuse. For example, information about caregiving

status, previous other traumatic events, and perpetrator characteristics may be useful in future studies. In addition to the inclusion of some unmeasured predictors we would prefer to have more precise measures of some of the variables we did have. For example, we did not find a statistically significant association between disability status and abuse. Specifically, while prior research has examined abuse in women with disability [72], it will require a larger study to disentangle age and disability status, and this should be the focus of future research. Disability questions used on the BRFSS are very broad, and do not differentiate by severity of disability and this may obscure a gradient of risk, or otherwise bias the association to the null based on BRFSS-based research. More-depth questions on disability are now used on the BRFSS (as of 2013), potentially adding to future inquiries on abuse, disability, and older adults [73]. Further, given that other studies have found adult children to often be the perpetrators of sexual abuse [74,75] future studies should include this category explicitly. Finally, due to the cross-sectional nature of the data source, the temporal sequence of some of the observed associations is not clear, and we note above where some associations are likely to be reversed (outcomes of abuse rather than predictors of it).

Conclusions

Older adults in our society are sometimes viewed as asexual and excluded from consideration as potential targets for sexual assault [61,62]. These findings indicate that date and acquaintance sexual victimization extends throughout the lifespan. There is a need for health promotion efforts targeted specifically towards older adults, encouraging them to seek services, if possible, after exposure to sexual abuse. Rape crisis centers across the U.S. provide many different services; however, traditionally these centers have provided services primarily to those who are young, white, and female [62], and staff

may not be specifically trained to address the unique needs of older adults. Furthermore, despite the fact that sexual abuse services exist, many older adults may not be knowledgeable or linked with them [62]. The oldest adults and those who have special needs may not be able to contact these centers or have access to their services. Given that these are people who may have the greatest need, future work should address finding ways to reach out to the oldest adults who have disability, or who are frail or isolated.

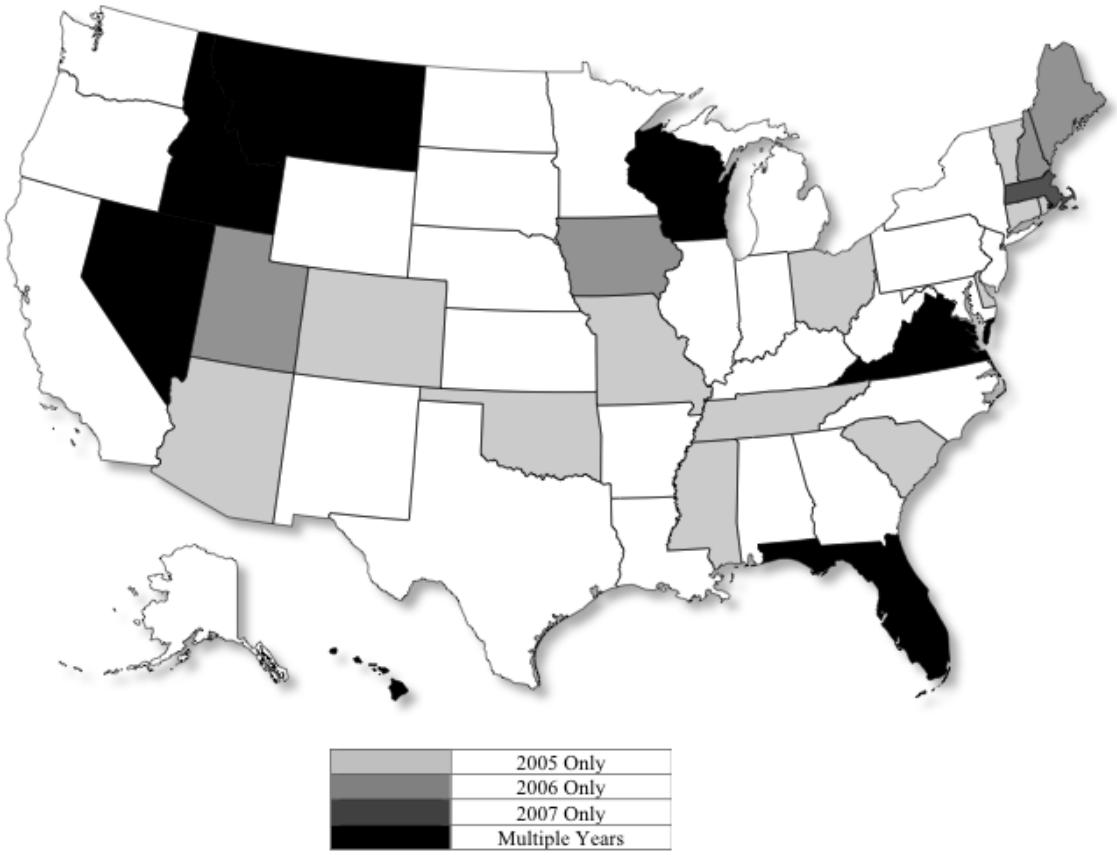

Figure 2-1. States that used the sexual violence optional module on the Behavioral Risk Factor Surveillance System (BRFSS) 2005†, 2006‡, and 2007§.

†2005: Arizona, Colorado, Connecticut, Delaware, Florida, Hawaii, Idaho, Mississippi, Missouri, Nevada, Ohio, Oklahoma, Rhode Island, South Carolina, Tennessee, Vermont, Virginia, Wisconsin
‡2006: Florida, Hawaii, Idaho, Iowa, Maine, Montana, Nevada, New Hampshire, Utah, Virginia, Wisconsin
§2007: Hawaii, Idaho, Massachusetts, Montana, Virginia

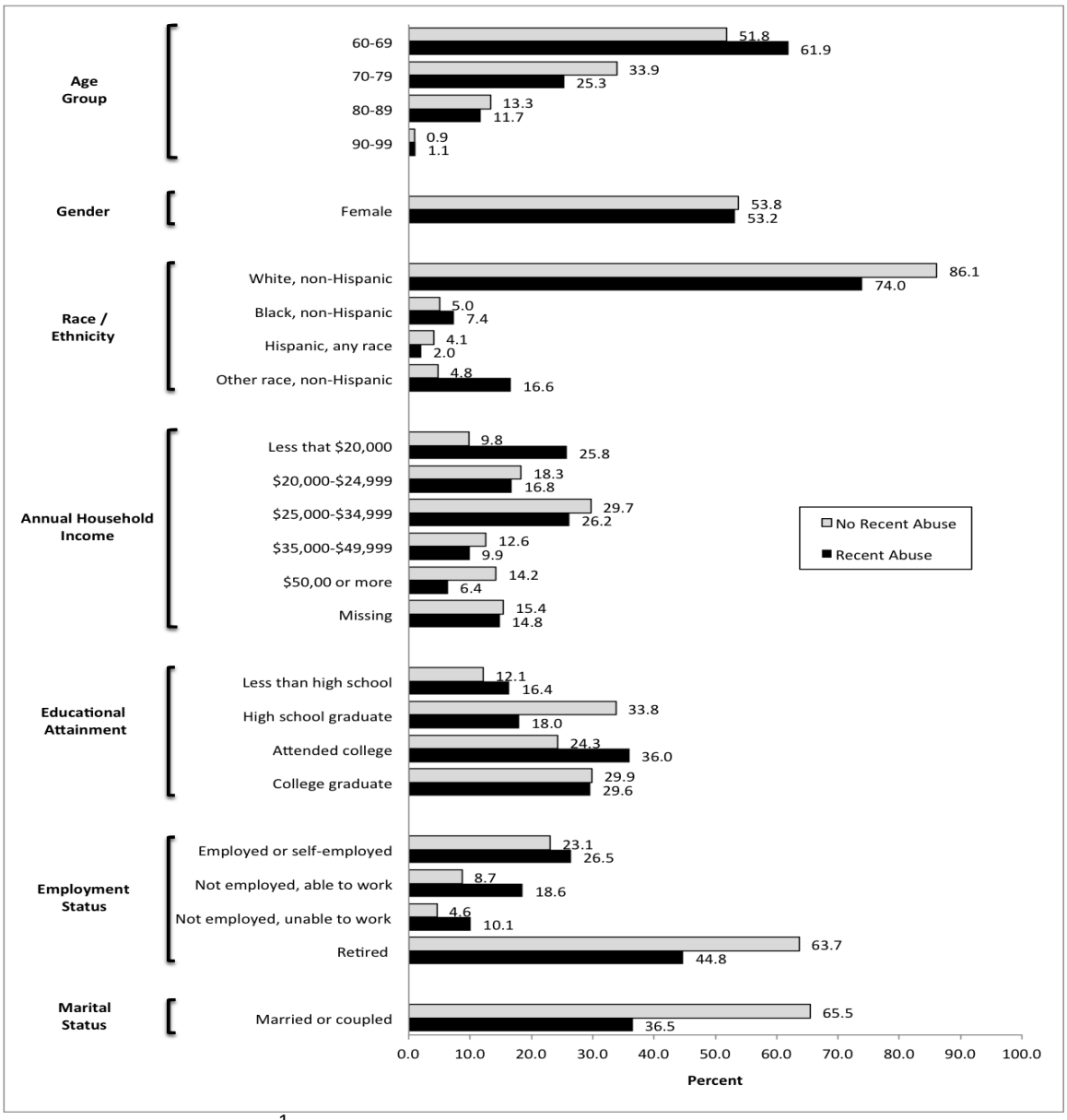

Figure 2-2. Weighted[1] descriptive sociodemographic characteristics of older adults by recent abuse[2] experience. Results from the 2005, 2006, and 2007 Behavioral Risk Factor Surveillance System from 24 states[3].

1. Weighted to represent the age, sex, and race/ethnicity of the non-institutionalized adult population of the states.
2. Consistent with NCEA definition, sexual abuse "is defined as non-consensual sexual contact of any kind with an elderly person. Sexual contact with any person incapable of giving consent is also considered sexual abuse. It includes, but is not limited to, unwanted touching, all types of sexual assault or battery, such as rape, sodomy, coerced nudity, and sexually explicit photographing." Here, this type of activity occurring in the previous 12 months is considered recent.
3. Arizona, Colorado, Connecticut, Delaware, Florida, Hawaii, Idaho, Iowa, Maine, Massachusetts, Mississippi, Missouri, Montana, Nevada, New Hampshire, Ohio, Oklahoma, Rhode Island, South Carolina, Tennessee, Utah, Vermont, Virginia, Wisconsin. Not all states asked sexual abuse questions in all three years.

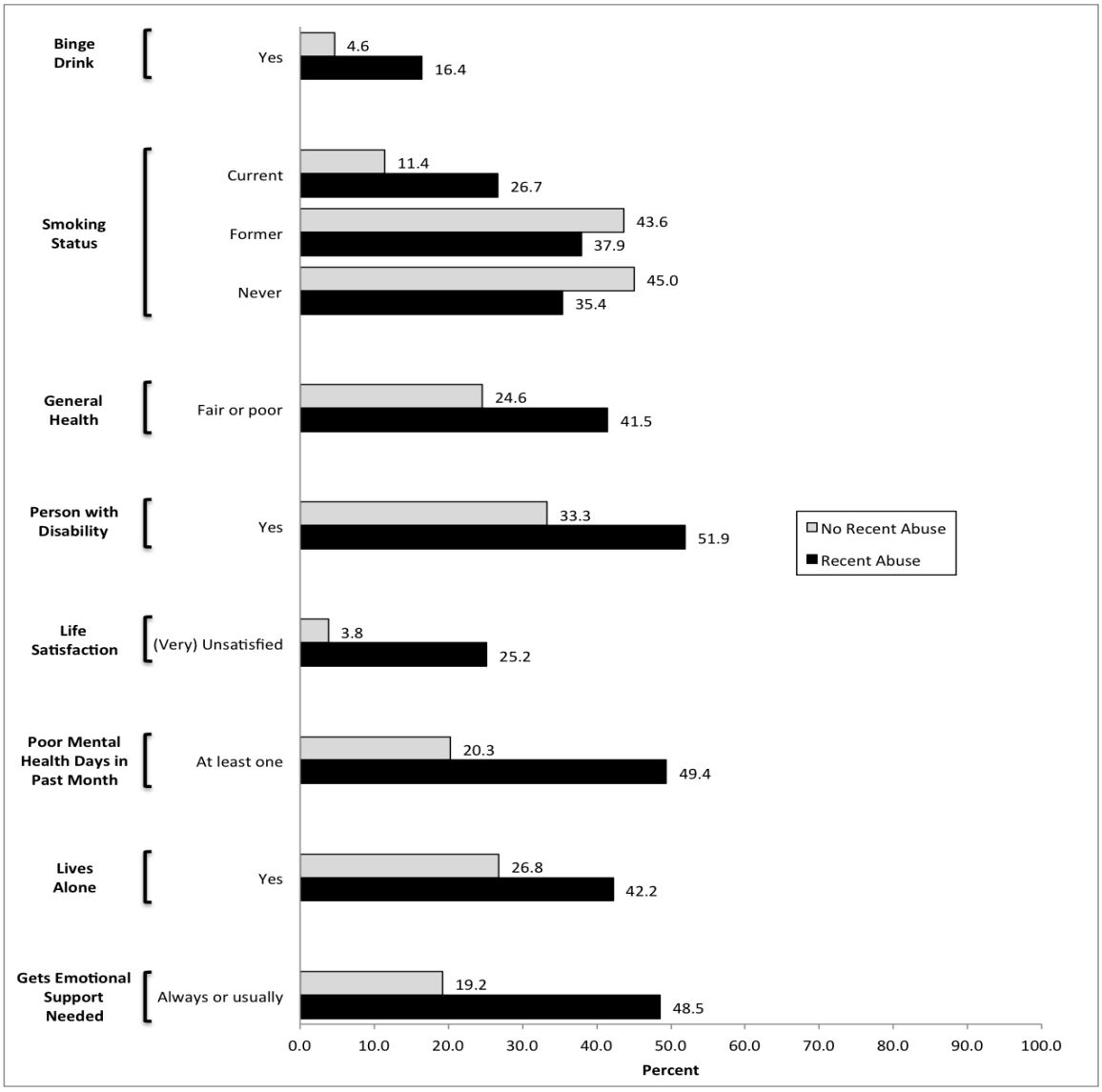

Figure 2-3. Weighted[1] descriptive characteristics of health behaviors, physical and mental health conditions, and environmental factors for older adults by recent abuse[2] experience. Results from the 2005, 2006, and 2007 Behavioral Risk Factor Surveillance System from 24 states[3].

1. Weighted to represent the age, sex, and race/ethnicity of the non-institutionalized adult population of the states.
2. Consistent with NCEA definition, sexual abuse "is defined as non-consensual sexual contact of any kind with an elderly person. Sexual contact with any person incapable of giving consent is also considered sexual abuse. It includes, but is not limited to, unwanted touching, all types of sexual assault or battery, such as rape, sodomy, coerced nudity, and sexually explicit photographing." Here, this type of activity occurring in the previous 12 months is considered recent.
3. Arizona, Colorado, Connecticut, Delaware, Florida, Hawaii, Idaho, Iowa, Maine, Massachusetts, Mississippi, Missouri, Montana, Nevada, New Hampshire, Ohio, Oklahoma, Rhode Island, South Carolina, Tennessee, Utah, Vermont, Virginia, Wisconsin. Not all states asked sexual abuse questions in all three years.

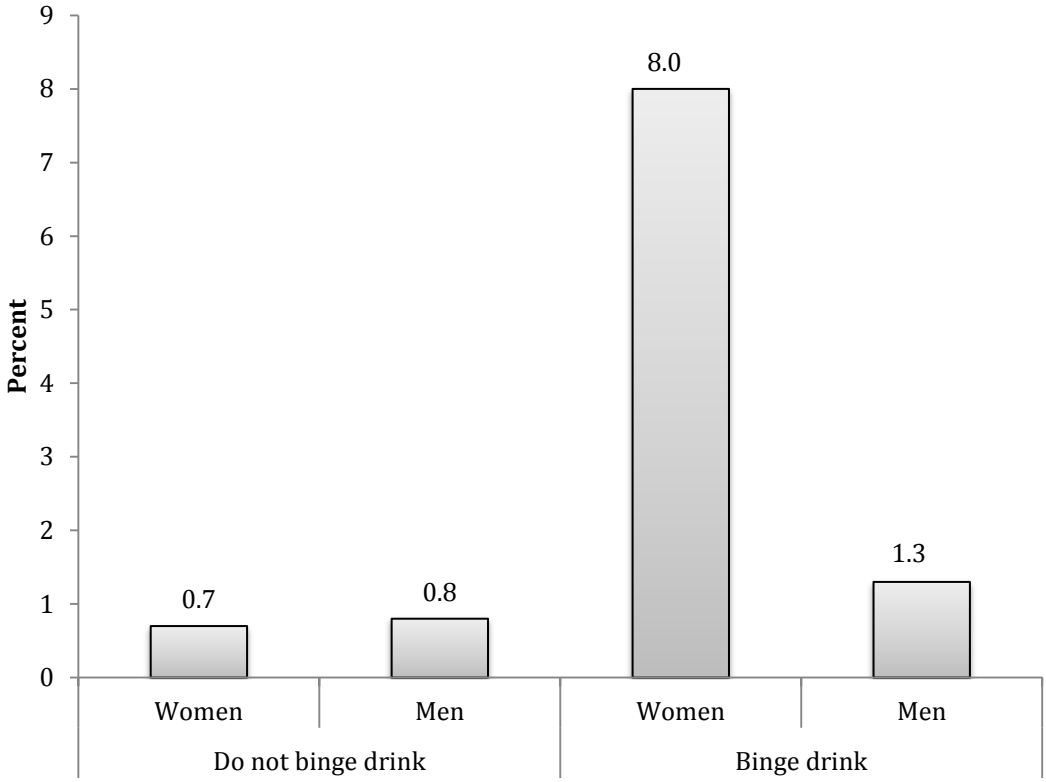

Figure 2-4. Proportion of older adults who have experienced recent sexual abuse by binge drinking behavior and gender. Results of the Behavioral Risk Factor Surveillance System (BRFSS) 2005, 2006, and 2007.

Table 2-1. Weighted[1] unadjusted and adjusted odds of older adults experiencing recent sexual abuse[2] in 2005, 2006, or 2007 (pooled). Results of the Behavioral Risk Factor Surveillance System from 24 states[3].

Variable	Category	Unadjusted OR[4] (95% CI[5])	Adjusted OR[4] (95% CI[5])
Age	Per 10 year increase	.58 (.55 – .62)	0.86 (0.65 – 1.12)
Gender	Female	Ref.	
	Male	1.03 (0.63 – 1.66)	
Race / Ethnicity	White, non-Hispanic	Ref.	Ref.
	Black, non-Hispanic	1.70 (0.78 – 3.73)	1.17 (0.52 – 2.63)
	Hispanic, any race	0.57 (0.24 – 1.39)	0.43 (0.17 – 1.06)
	Other, non-Hispanic	4.01 (1.23 – 13.07)*	2.10 (1.26 – 3.51)*
Annual Household Income	>$75,000	Ref.	Ref.
	$50,000-$75,000	1.73 (0.72 – 4.16)	1.82 (0.78 – 4.22)
	$25,000-$50,000	1.94 (0.92 – 4.12)	2.07 (0.91 – 4.69)
	$15,000-$25,000	2.02 (0.92 – 4.47)	1.75 (0.72 – 4.24)
	<$15,000	5.81 (2.08 – 16.24)*	2.53 (1.06 – 6.07)*
	Missing	2.12 (0.93 – 4.82)	2.56 (1.05 – 6.27)*
Education	College grad	Ref.	Ref.
	Some college	1.50 (0.76 – 2.93)	0.90 (0.56 – 1.45)
	High school grad	0.54 (0.33 – 0.87)*	0.37 (0.21 – 0.66)*
	Less than high school	1.37 (0.84 – 2.22)	0.72 (0.38 – 1.38)
Employment	Retired	Ref.	Ref.
	Employed	1.64 (1.08 – 2.47)*	1.82 (1.18 – 2.83)*
	Not employed	3.05 (1.03 – 9.06)*	2.08 (1.23 – 3.52)*
	Unable to work	3.11 (1.81 – 5.34)*	1.17 (0.66 – 2.07)
Married	Married	Ref.	Ref.
	Unmarried	3.43 (2.21 – 5.31)*	2.46 (1.49 – 4.04)*
Binge Drinking[6]	Yes	4.07 (1.20 – 13.81)*	
Smoking	Never smoked	Ref.	Ref.
	Former smoker	1.10 (0.75 – 1.63)	0.98 (0.67 – 1.45)
	Current smoker	2.97 (1.33 – 6.63)*	1.19 (0.78 – 1.83)
General Health	(Very) good or excellent	Ref.	Ref.
	Fair or poor	2.17 (1.24 – 3.80)*	1.05 (0.70 – 1.59)

Table 2-1. Continued

Variable	Category	Unadjusted OR[4] (95% CI[5])	Adjusted OR[4] (95% CI[5])
Person with Disability[7]	Yes	2.16 (1.33 – 3.50)*	1.31 (0.85 – 2.00)
Life Satisfaction	(Very) satisfied	Ref.	Ref.
	Not satisfied	8.59 (3.72 – 19.88)*	2.27 (1.43 – 3.61)*
Poor Mental Health Days	At least one	3.82 (2.32 – 6.28)*	1.99 (1.38 – 2.88)*
Live Alone	Yes	1.99 (1.26 – 3.15)*	1.07 (0.63 – 1.80)
Emotional Support	Always or Usually	Ref.	Ref.
	Sometimes, Rarely, or Never	3.96 (2.39 – 6.54)*	2.05 (1.44 – 2.91)*
Gender X Binge Drinking Interaction Term			0.22 (0.06 – 0.79)*

1. Weighted to represent the age, sex, and race/ethnicity of the non-institutionalized adult population of the states.
2. Consistent with NCEA definition, sexual abuse "is defined as non-consensual sexual contact of any kind with an elderly person. Sexual contact with any person incapable of giving consent is also considered sexual abuse. It includes, but is not limited to, unwanted touching, all types of sexual assault or battery, such as rape, sodomy, coerced nudity, and sexually explicit photographing." Here, this type of activity occurring in the previous 12 months is considered recent.
3. Arizona, Colorado, Connecticut, Delaware, Florida, Hawaii, Idaho, Iowa, Maine, Massachusetts, Mississippi, Missouri, Montana, Nevada, New Hampshire, Ohio, Oklahoma, Rhode Island, South Carolina, Tennessee, Utah, Vermont, Virginia, Wisconsin. Not all states asked sexual abuse questions in all 3 years.
4. Odds Ratio
5. Confidence Interval
6. Binge drinker defined as: 5 or more drinks per occasion for men, and 4 or more drinks per occasion for women.
7. Disability defined as reporting being limited in any activities because of physical, mental, or emotional problems, or having health problems that require use of special equipment, or both.

*Statistically significant ($p<0.05$)

Table 2-2. Weighted[1] unadjusted and adjusted odds of older adults who binge drink[2] experiencing recent sexual abuse[3] in 2005, 2006, or 2007 (pooled), by gender. Results of the Behavioral Risk Factor Surveillance System from 24 states[4].

		Experienced Recent Sexual Abuse	
		Unadjusted OR[5] (95% CI[7])	Adjusted[6] OR[5] (95% CI[7])
Men	Do not binge drink	Referent	Referent
	Binge drink	1.66 (0.61, 4.59)	1.24 (0.51, 3.05)
Women	Do not binge drink	Referent	Referent
	Binge drink	13.14 (2.18, 79.40)	5.55 (2.40, 12.84)

1. Weighted to represent the age, sex, and race/ethnicity of the non-institutionalized adult population of the states.
2. Binge drinker defined as: 5 or more drinks per occasion for men, and 4 or more drinks per occasion for women.
3. Consistent with NCEA definition, sexual abuse "is defined as non-consensual sexual contact of any kind with an elderly person. Sexual contact with any person incapable of giving consent is also considered sexual abuse. It includes, but is not limited to, unwanted touching, all types of sexual assault or battery, such as rape, sodomy, coerced nudity, and sexually explicit photographing." Here, this type of activity occurring in the previous 12 months is considered recent.
4. Arizona, Colorado, Connecticut, Delaware, Florida, Hawaii, Idaho, Iowa, Maine, Massachusetts, Mississippi, Missouri, Montana, Nevada, New Hampshire, Ohio, Oklahoma, Rhode Island, South Carolina, Tennessee, Utah, Vermont, Virginia, Wisconsin. Not all states asked sexual abuse questions in all 3 years.
5. Odds Ratio
6. Adjusted model includes: age, race/ethnicity, annual household income, educational attainment, employment status, marital status, smoking status, general health, disability status, level of satisfaction with life, at least one poor mental health day in the past month, living alone, amount of social support received.
7. Confidence Interval

CHAPTER 3
RISK OF PHYSICAL IMPAIRMENT IN POSTMENOPAUSAL WOMEN WHO EXPERIENCE PHYSICAL AND EMOTIONAL ABUSE

Introduction

By the best estimates, as many as 2 to 3 million older adults experience some type of elder abuse annually.[1,2] The definition of elder abuse varies by locality, discipline, organization, and researcher; however, physical abuse, emotional abuse, sexual abuse, financial exploitation, and neglect and abandonment are generally accepted to be the primary forms of elder abuse.[60] The extent to which these forms of abuse share common risk factors and outcomes is not yet clear, but it is not uncommon for an older adult who experiences one form of elder abuse to experience multiple forms of elder abuse.[60,76] While recent additions to the literature have made significant contributions to our understanding of elder abuse; we need more research in order to fully understand the needs of older adults who experience abuse. Specifically, longitudinal research is lacking that examines functional outcomes among older adults that have experienced abuse.[4]

Although there is considerable individual variability, there is a general decline in physical function with age, particularly among women.[77] These declines can limit the ability of older adults to perform a variety of daily tasks, which can ultimately lead to disability, loss of functional independence, and reduced health related quality of life (HRQoL).[76] Elder abuse has the potential to accelerate the decline in physical function as it theoretically contributes to the two most common pathways leading to functional impairments - chronic health conditions and physical injuries.[4,46,78-80]

Our primary aim was to evaluate the effect of physical and emotional abuse on risk of significant physical impairment (SPI), defined on a standard scale that assesses

difficulty performing common daily tasks (e.g. stair climbing, walking etc.), in a large sample of post-menopausal women. We hypothesized that women who experienced physical and/or emotional abuse are at increased risk of SPI as compared to women who did not experience abuse. Secondarily, we also tested the hypothesis that women who experience abuse have an accelerated decrease in physical function over time than women who do not experience abuse.

Methods

Participants

The Women's Health Initiative (WHI) has been described in detail elsewhere.[81] Briefly, the WHI is a large, multicenter study sponsored by the National Heart, Lung, and Blood Institute (NHLBI) to study strategies for preventing heart disease, various cancers, and osteoporotic fractures in postmenopausal women. WHI consisted of two main components: a clinical trial component (CT), and an observational study (OS) component. Beginning in September 1993 postmenopausal women, aged 50 to 79, were recruited at 40 clinical centers in the United States using mass mailings to voter registration lists, vehicle registration lists, and driver's license lists. Respondents who were eligible were enrolled in one or more of the three clinical trial arms of the study: hormone replacement therapy, dietary modification (low-fat, high fruit vegetable and grain), and calcium and vitamin D supplementation.

Women who were ineligible or unwilling to participate in the clinical trial were invited to participate in the WHI observational study. Exclusion criteria included: medical conditions predictive of a survival time of less than 3 years, known alcoholism, known drug dependency, known mental illness, know dementia, or participation in another clinical trial. The primary aim of the OS was to track the health habits and medical

history of participants, and examine their relationship with various disease outcomes. At the close of recruitment in 1998 68,132 women were enrolled in the CT study and 93,676 women were enrolled in the OS study. Participants were followed for 8 to 12 years. In the current study, information from a subset of participants from both components (CT & OS) was used to address the study hypotheses.

A total of 161,808 women were enrolled in both arms (CT & OS) of the WHI. Of those, 492 did not answer the two questions used to measure abuse experience and were excluded from the analysis. In addition, 403 women with no physical function score were also excluded from the analysis. Because we were interested in SPI subsequent to abuse, we excluded all women who had physical function scores at or below the cut point for SPI at baseline (61,246) as described below. Because data was not collected at every follow-up for every variable used in the analysis, the last observation forward method was used to impute values for missing covariates of interest. Finally, 359 women were excluded because they were missing data at all follow-up occasions for covariates of interest. Before excluding these women we conducted a sensitivity analysis. There were no important differences between women excluded for missing covariates and women retained in the final analysis, and removal of these women did not change the unadjusted coefficient for the effect of abuse on SPI. These exclusions led to a final sample size for the current analysis of 99,308 women.

Measuring Physical Function

The primary outcome of interest for the current study was physical function as measured by the physical function scale (PFS) on the Rand 36-Item Health Survey (SF-36), where higher scores indicate more favorable physical function.[82] The PFS has been

previously used for research in many different populations, including community dwelling older adults, and has been shown to be valid and reliable.[83] In brief, the PFS is comprised of 10 questions, which are each scored 1-3 (Table 3-1). Women are told, "The following are questions about a typical (or usual) day's activities. Does your health now limit you in these activities and, if so, how much?" Possible Responses are:

- No, not limited at all
- Yes, limited a little
- Yes, limited a lot

Responses are then recoded on a 0-100 scale. A participant that responds, "No, not limited at all" is scored at 100 for that question; a participant that responds, "Yes, limited a little" is scored at 50 for that question; and a participant that responds, "Yes, limited a lot" is scored at 0 for that question. The scores from the ten individual questions are then averaged together resulting in a composite physical function score that ranges from 0 to 100, where 100 indicates higher levels of functioning. PFS can be evaluated as a continuous variable; however, a PFS score less than or equal to 80 is also used to classify one as having significant physical impairment, and is the cut point we applied in the current study.[84]

Measuring Abuse

The primary exposure of interest was self-reported physical and emotional abuse. Women participating in WHI were asked two questions at baseline, and during follow-up, pertaining to abuse. The abuse questions come from previous studies by Matthews and colleagues (1997),[85] and are worded as follows:

- Below are some hard things that happen to people. Please try to think back over the past year to remember if any of these things happened. Mark the answer that seems best. Over the past year: Were you physically abused by being hit,

slapped, pushed, shoved, punched, or threatened with a weapon by a family member or close friend?

- Below are some hard things that sometimes happen to people. Please try to think back over the past year to remember if any of these things happened. Mark the answer that seems best. Over the past year: Were you verbally abused by being made fun of, severely criticized, told you were a stupid or worthless person, or threatened with harm to yourself, your possessions, or your pets, by a family member or close friend?

Answer choices available to respondents were:

- No
- Yes, and upset me: Not too much
- Yes, and upset me: Moderately
- Yes, and upset me: Very much

The "Yes" responses were originally collapsed to create a dichotomous variable (abuse/no abuse) for both the physical and emotional abuse questions. However, during analysis we found statistical evidence to suggest the superiority of categorizing abuse as a three-level exposure variable: no abuse, experiencing one form of abuse only, or experiencing both physical and emotional abuse.

Covariates

Covariates of interest were selected based on previously published literature demonstrating their association with abuse[3,5,30,33,36,37,39,42,44,46,48,79,80] or physical function[77,86-103]. Questions about demographic, socioeconomic status, general health, and social factors were assessed using standard questionnaires and in-person clinic interviews.[46] Alcohol consumption was a self-reported measure of the average number of drinks per day/week consumed over the previous three months. In accordance with definitions used by the Centers for Disease Control and Prevention,[67] women were considered to drink heavily if they self-reported consuming more than 1 drink per day on average. Social support was measured using nine items from the Medical Outcomes

Study (range 9 to 45), with higher scores indicating more social support.[104] Body Mass Index (BMI) was calculated from a participant's height and weight and categorized according to recommendations from the National Institutes of health.[105] A BMI less than 25 was considered neither overweight nor obese, a BMI between 25 and 29.9 was considered overweight, a BMI between 30 and 34.9 was considered obese, a BMI between 35 and 39.9 was considered obese class II, and a BMI of 40 or greater was considered extreme obese. Depressive symptoms were assessed using the CES-D/DIS depression screener, which consists of 6 items from the Center for Epidemiologic Studies Depression Scale (CES-D) and two items from the Diagnostic Interview Schedule (DIS). Possible scores range from 0 to 1 and higher scores indicate greater likelihood of depression. A score greater than or equal to 0.06 indicated depressive disorder.[106]

Analysis

The primary goal of the study was to estimate a valid measure of the effect of experiencing abuse on physical function. Therefore, variable selection was carried out using a combination of *a priori* knowledge and the change-in-estimate method.[107-111] We started with 13 candidate variables, which we term the fully adjusted model: age, race/ethnicity, marital status, annual household income, education, living alone, study component (CT or OS), smoking status (current smoker, former smoker, never a smoker), heavy drinking, social support, BMI categories, general health (excellent or very good vs. good, fair, or poor), and depression. The change-in-estimate method retains a candidate variable in the adjusted model if its removal from the model would alter the coefficient for the exposure variable of primary interest, in this case abuse, by at least ten percent. This method yielded a sufficiently adjusted model consisting of the

following variables: baseline physical function, age, general health, and depression. The fully adjusted model with all covariates is also presented.

Baseline characteristics

Baseline descriptive characteristics for the 99,308 women included in the sufficiently adjusted models are presented in Table 3-2. Mean values for continuous measures and proportions for categorical measures are presented by abuse experience, along with associated p-values for the likelihood of observed differences being due to chance. Hypothesis tests were carried out using ANOVA for continuous measures and the chi-square test for categorical measures. It should be noted that due to the large sample sizes, even small differences in means or proportions were statistically significant at the conventional $p<0.05$ level. Therefore we caution against interpreting statistically significant differences between groups as being meaningful.

Time-to-event analysis

Differences in hazard of SPI by abuse experience were estimated using discrete-time hazard models. The time frame for each woman's analysis was the interval, in years, between her baseline measure of abuse and the earliest of the following: (1) the first time a PFS score at or below 80 was observed (incident case); (2) last subsequent visit in which any data was recorded (but SPI was not observed) (censored); (3) death from any cause (censored). The unadjusted effects of abuse experience, the sufficiently adjusted effects of abuse experience, and fully adjusted effects of abuse experience on hazard of SPI are presented in Table 3-3.

Multi-level models

We were also interested in learning more about the reason for differing hazard of SPI between groups. To evaluate the contribution of abuse to differing initial functional

status at baseline, as well as accelerated changes (declines) in PFS over time, we used multilevel modeling. We simultaneously measured the between and within person effects of predictors of interest on raw PFS. When estimating differences in rate of change, it was important to control for baseline scores. However, when estimating differences in initial status, it is logically inappropriate to control for baseline score. Therefore, the adjusted models presented in Table 3-4 (B & C) were run twice. We first estimated the adjusted differences in initial status using the full dataset. Next, we created a new model term representing each woman's initial PFS. We then dropped each woman's first observation, and estimated the adjusted differences in rate of change by abuse experience, controlling for initial PFS. Full results are given in Table 3-4.

All analyses were conducted using Stata/IC 12.1 (StataCorp, College Station, TX). All participants gave written informed consent to participate in the study and the University of Florida Institutional Review Board approved the use of de-identified data to conduct the analysis.

Results

Baseline Characteristics

Of the 99,308 women included in the study sample, 13,967 experienced either emotional or physical abuse during follow-up, and 1,292 experienced both. About 15% of women (14,808) reported experiencing emotional abuse at some point during follow-up. About 1.6% of women (1,636) reported experiencing physical abuse at some point during follow-up. At baseline, women who reported no abuse had the highest mean PFS (93.5), followed by women who reported one form of abuse (93.1), and finally women who reported experiencing both forms of abuse (93.0).

In general, women who experienced one or both forms of abuse were younger than those experiencing no abuse (No abuse = 62.5; one form = 60.7; both forms = 59.8). Women who experienced both forms of abuse were less often white, non-Hispanic (72.2%) than women who experienced one form (84.7%) or no abuse (85.3%). They were also more likely to be in the lowest income category (18.8%) than women who experienced one form (11.9%) or no abuse (10.5%). Likewise, they also had less formal education (6.7% less than high school) than women who experienced one form (3.4%) or no abuse (3.5%).

Specific results are listed in Table 3-2. In brief, overall health at baseline differed significantly between groups. Women who experienced one or both forms of abuse were less likely to report being in excellent or very good health (68.2% and 62.5%, respectively) when compared to women experiencing no abuse (73.8%). Additionally, women experiencing any form of abuse were approximately 3 to 4 times more likely to report depressive symptoms than women not experiencing abuse.

Time-to-event Analysis

Figure 3-1 shows the sample's survival function and median lifetimes-by-abuse experience. It took a median of 12.9 years for half of the women in the no abuse group to experience SPI. By contrast, it took 11.2 years for half the women who experienced physical and verbal abuse to reach an SPI outcome. Women who experienced only verbal abuse or only physical abuse had a slightly longer time without SPI than women reporting both forms of abuse, but less than women who experienced no abuse (12.1 years).

Table 3-3 shows the results of fitting three different discrete-time hazard models to the WHI data: unadjusted, sufficiently adjusted, and fully adjusted. Results of the

sufficiently adjusted model indicate that women who experience either verbal abuse only or physical abuse only had, on average, 1.14 times higher odds of SPI in every year than women who never report abuse. Additionally, women who experienced verbal and physical abuse had, on average, 1.27 times higher odds of SPI in every year than women who never report abuse. Further adjustment for race/ethnicity, marital status, annual household income, educational attainment, living alone, study component, smoking behavior, drinking behavior, social support, and body mass index had virtually no effect on the estimated abuse – physical function relationship.

Multi-level Model

Figure 3-2 shows the observed mean physical function scores, and accompanying 95% confidence intervals, by age and abuse experience. The graph is truncated on the lower end at age 55, and the higher end at age 85, to increase readability. Fewer observations at the ends of the age spectrum cause the estimates to become less stable. Figure 3-2 demonstrates that PFS declines with increasing age and that PFS is generally lower in women who experience one or two forms of abuse compared to women experiencing no forms of abuse.

Finally, Table 3-4 presents the results of fitting three separate multilevel models to estimate the differences in initial PFS and differences in rate of change in PFS over time, adjusted for confounders. Model B, the sufficiently adjusted effects of abuse on PFS, provides evidence that women who experience abuse have a lower initial PFS score. For example, women who experienced one form of abuse were about 0.4 points lower and women experiencing both forms of abuse were 0.9 points lower than women who reported no abuse. Results of testing for a difference in rate of decline were mixed. Women who experienced one form of abuse declined, on average, by 0.09 points more

every 10 years than women reporting no abuse. However, there was no evidence that the rate of decline was greater in women experiencing both forms of abuse.

Discussion

In this sample of 99,308 postmenopausal women, aged 50 to 87 at baseline, women who experienced abuse were at increased risk of significant physical impairment as compared to women reporting no abuse. Moreover, women who experienced physical *and* emotional abuse were at greater risk of SPI than women experiencing only one form of abuse. We conducted additional analyses to better understand if this increased risk was due to lower PFS at baseline, accelerated decline in PFS over time, or both. Results of these analyses suggest that there is very little difference in rate of decline in physical function by abuse experience; however, there are small, but important, differences in initial physical function score by abuse status. None of these changes are dramatic, but their combined effect is enough to put women who are abused at increased risk SPI in every year of observation. Put another way, at any given time there is a pool of women whose PFS is near 80. For this group of women even modest additional insults to function will result in a PFS that crosses the threshold for SPI. Our results suggest that women who experience abuse are at greater risk of crossing this threshold.

Our results build on previous research into the relationship between elder abuse and physical function. In their recent review article, Lachs and Pillemer (2004) discuss the evidence for and against physical impairment as a risk factor for elder abuse.[112] The assumption being that decreased physical function increases caregiver stress, and reduces the older adult's ability to protect themselves. They find little empirical evidence to support this hypothesis. Alternatively, Dong and colleagues (2009) found elder self-

neglect was cross-sectionally associated with lower levels of physical function and greater self-reported disability.[113] In a second study, they found that greater decreases in physical function and increases in ADL disability were associated with higher probability of abuse being reported to social service agencies.[80] While these previous studies have added to the global understanding of the relationship between abuse and physical impairments they aren't sufficient to establish a temporal sequence and thus a causal relationship. To our knowledge this is the first study to prospectively investigate the effect of abuse on incident physical impairments among a large sample of women who are initially non-impaired.

Findings from this study have potentially important public health implications. Women who have experienced abuse may be in need of additional care services aimed at maintaining physical independence in the community. Although the results of studies to date are mixed, dependence between the older adult and their caregivers is thought to be a risk factor for elder abuse.[1,42,112] Not only would an intervention strategy aimed at reducing physical limitations directly address the health related quality of life for older adults with functional limitations, but it may also have the added benefit of reducing dependence between vulnerable older adults and their caregivers in some cases. For example, intervention strategies that provide services such as housekeeping, meal preparation, respite care, and social support have shown promise.[114] However, it should be noted that these programs have received little rigorous evaluation, and may only be applicable to a limited subset of all elder abuse cases.[114]

Finding from this study also have potentially important implications for elder abuse research. One plausible explanation for our results is that we observed the long-term

effects of abuse that occurred earlier in life. If abuse affects physical function or functional reserve in middle age, then it will theoretically increase the incidence of SPI (i.e. function below a fixed threshold) in later life, even if it has no effect on the rate of decline in older age. More research is needed to understand the ratio of, and differential circumstances between, older adults who experience some form of abuse for the first time compared to older adults who continue to experience abuse that also occurred earlier in life. These are potentially distinct groups with unique risk factors requiring differing intervention strategies. At the very least, these results indicate the need to intervene at an early stage prior to reaching late life.

Finally, this study potentially contributes to our understanding of the causal mechanism linking elder abuse to SPI. Others have shown that depressive symptoms in older adults are associated with risk of declining physical function.[102] Results of the Medical Outcomes Study suggest that the impact of depression on function may be comparable to, or exceed, the impact of other major chronic health conditions including hypertension, diabetes, and arthritis.[115] Although this association is incompletely understood, some have posited that depression and declining physical function are mutually reinforcing, and likely stem from a combination of biological (e.g. neural, hormonal, and immunological alterations) and psychological (e.g. disengagement, unhealthy behaviors) processes.[102] A separate, but related, body of literature indicates that there is an association between elder abuse and poor mental health – including depression.[44,45,47-49,64] Therefore we hypothesized that elder abuse may lead to SPI through chronic health conditions (particularly depression) and direct physical injury. Although we did not formally test this hypothesis, and cannot make any definitive

statements regarding the validity of this hypothesis, our results are consistent with those that would be expected if the hypothesis were correct. Specifically, adding general health and depression significantly attenuates the elder abuse – SPI relationship (Table 2). The addition of the other covariates in the fully adjusted model do little to further explain the elder abuse – SPI relationship. In the fully adjusted model a residual relationship between elder abuse and SPI remains, which could potentially be mediated by direct physical injuries – of which we had no measures. Testing the validity of this hypothesis is a potentially useful next step as it may lead to effective intervention strategies. For example, screening for, and treating, depression among older adults who have experienced elder abuse.

It should be noted that this study has a number of limitations. First, although our sample is very large, it is not a random sample of the U.S. population of older women, and therefore, may not be generalizable. Second, we have limited measures of abuse. Ideally, we would like to have more detailed information about the duration of the abuse, the frequency of the abuse, the severity of the abuse, and other types of abuse. Future research should confirm our findings with more robust measures of the abuse experience. Finally, because theories of elder abuse and causal mechanisms between elder abuse and health outcomes remain underdeveloped, it is possible that our study is missing important confounding factors or risk modifiers. Undoubtedly, as elder abuse research continues, our understanding of the mechanisms surrounding this complex phenomenon will improve.

However, this study has several strengths as well. First, no other study to our knowledge has longitudinally investigated the effects of different forms of abuse on

physical function – a key component quality of life, and ability to remain independent. Second, this study uses a very large and diverse population of women from across the U.S. Finally, this study has practical implications for public health professionals, service providers, researchers, and clinicians. As others have suggested, our results indicate that screening for elder abuse should be standard practice during clinical evaluation of physical function.[80] Additionally, organizations that provide services to women who have experienced abuse should be aware that their clients are likely to have lower physical function and might be in need of services to prevent the loss of independence.

Conclusion

Elder abuse is an important public health problem that profoundly affects both health and health related quality of life. This study demonstrates that postmenopausal women who experience physical and/or emotional abuse are at increased risk of significant physical impairment. However, these risks are likely influenced by the chronic effects of abuse, as evidenced by lower baseline physical function scores among women who experienced abuse. The literature will be further enhanced when future studies are able to account for the initial occurrences of abuse and use a more detailed account of abuse status in a representative sample of the U.S. population.

Table 3-1. 10 questions (tasks) on the SF-36 used to obtain physical functioning scale score

1. Vigorous activities, such as running, lifting heavy objects, or strenuous sports
2. Moderate activities, such as moving a table, vacuuming, bowling, or golfing
3. Lifting or carrying groceries
4. Climbing several flights of stairs
5. Climbing one flight of stairs
6. Bending, kneeling, stooping
7. Walking more than a mile
8. Walking several blocks
9. Walking one block
10. Bathing or dressing yourself

Table 3-2. Baseline characteristics of 99,308 women from the Women's Health Initiative clinical trial and observational study cohorts by abuse experience.

Characteristic	No Abuse n=84,049	One Form[1] n=13,967	Both Forms[2] n=1,292	p-value
Physical function, mean	93.5	93.1	93.0	<.0001
Age, mean	62.5	60.7	59.8	<.0001
Race/ethnicity (%)				
White, non-Hispanic	85.3	84.7	72.2	
Black, non-Hispanic	7.1	6.4	12.6	<.0001
Hispanic	3.4	4.8	8.1	
Other race, non-Hispanic	4.2	4.3	7.2	
Marital status (%)				
Married or marriage-like relationship	65.1	68.2	61.4	<.0001
Annual household income (%)				
Less than $20,000	10.5	11.9	18.8	
$20,000 - $34,999	20.7	20.2	24.2	
$35,000 - $49,999	19.8	19.3	16.5	<.0001
$50,000 - $74,999	20.8	20.7	17.2	
$75,00 or more	21.7	21.2	16.6	
Missing	6.5	6.7	6.7	
Education (%)				
Less than High School	3.5	3.4	6.7	
High School Graduate	15.7	12.4	13.3	<.0001
Attended College	36.2	37.5	43.3	
College Graduate	44.6	46.7	36.7	
Living alone (%)	24.2	20.2	20.5	<.0001
Study arm (%)				
Clinical trial	41.4	43.7	45.5	<.0001
Observational study	58.6	56.3	54.5	
Smoking status (%)				
Current				
Former	6.2	7.8	10.7	<.0001
Never	41.9	43.0	38.3	
	51.9	49.2	51.1	
Heavy drinker[1] (%)	13.6	12.9	12.2	<.05
Social support construct, mean	37.4	33.6	32.1	<.0001
Body Mass Index (%)				
Neither overweight nor obese				
Overweight	43.1	41.2	37.0	
Obese I	36.2	36.5	35.3	<.0001
Obese II	14.9	15.9	20.5	
Extreme Obese	4.3	4.8	5.0	
	1.5	1.6	2.2	
General health (%)				
Excellent or very good	73.8	68.2	62.5	<.0001
Depression (%)	6.5	17.0	27.1	<.0001

1. Women who reported physical abuse OR emotional abuse, but not both forms.

2. Women who reported experiencing physical AND emotional abuse

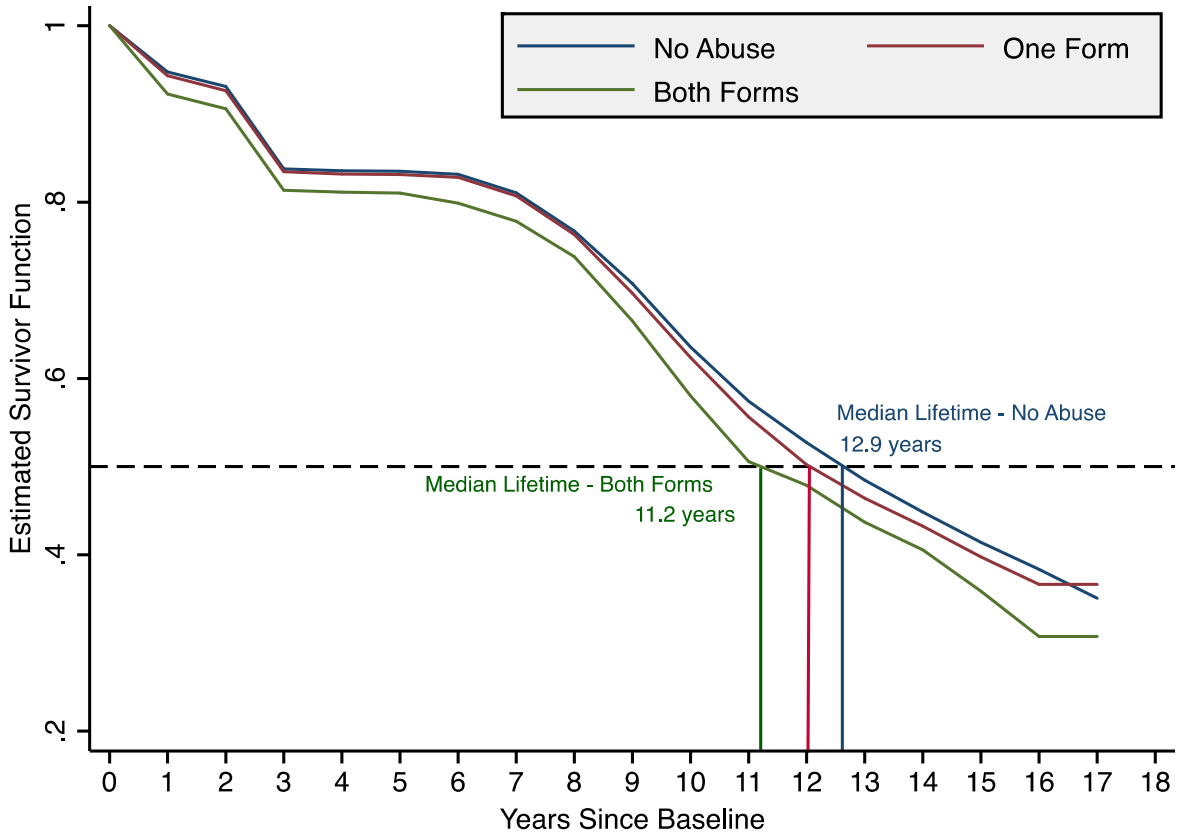

Figure 3-1. Estimated sample survival function (and estimated median lifetime) for SPI by year since baseline measurement of abuse and by abuse type for a sample of 99,308 women from the Women's Health Initiative

Table 3-3. Unadjusted and adjusted hazard ratios relating abuse to significant physical impairment (SPI), results from the Women's Health Initiative

Form of Abuse[1]	n Total	n SPI[2]	Hazard Ratio (95% Confidence Interval)
Unadjusted			
None	84,330	33,165	Ref.
One form	14,005	5,878	1.19 (1.15-1.22)
Both forms	1,298	531	1.36 (1.25-1.49)
Sufficiently Adjusted[3]			
None	84,049	33,095	Ref.
One form	13,967	5,866	1.14 (1.10-1.17)
Both forms	1,292	531	1.27 (1.15-1.39)
Fully Adjusted[4]			
None	80,009	31,703	Ref.
One form	13,300	5,590	1.14 (1.11-1.18)
Both forms	1,198	488	1.26 (1.14-1.38)

1. Women were categorized by abuse exposure in the following way: (1) None – woman never reports experiencing any form of abuse during follow-up (2) One form – woman reports experiencing emotional abuse or physical abuse, but not both (3) Both forms – woman reports experiencing emotional and physical abuse
2. Significant Physical Impairment. Defined as a score of 80 or less on the physical functioning subscale of the Rand 36-Item Health Survey (SF-36)
3. Sufficiently adjusted for baseline physical function score, age, general health, and depressive symptoms
4. Full adjusted for baseline physical function score, age, general health, depressive symptoms, race/ethnicity, marital status, annual household income, educational attainment, living alone, study component, smoking behavior, drinking behavior, social support, and body mass index

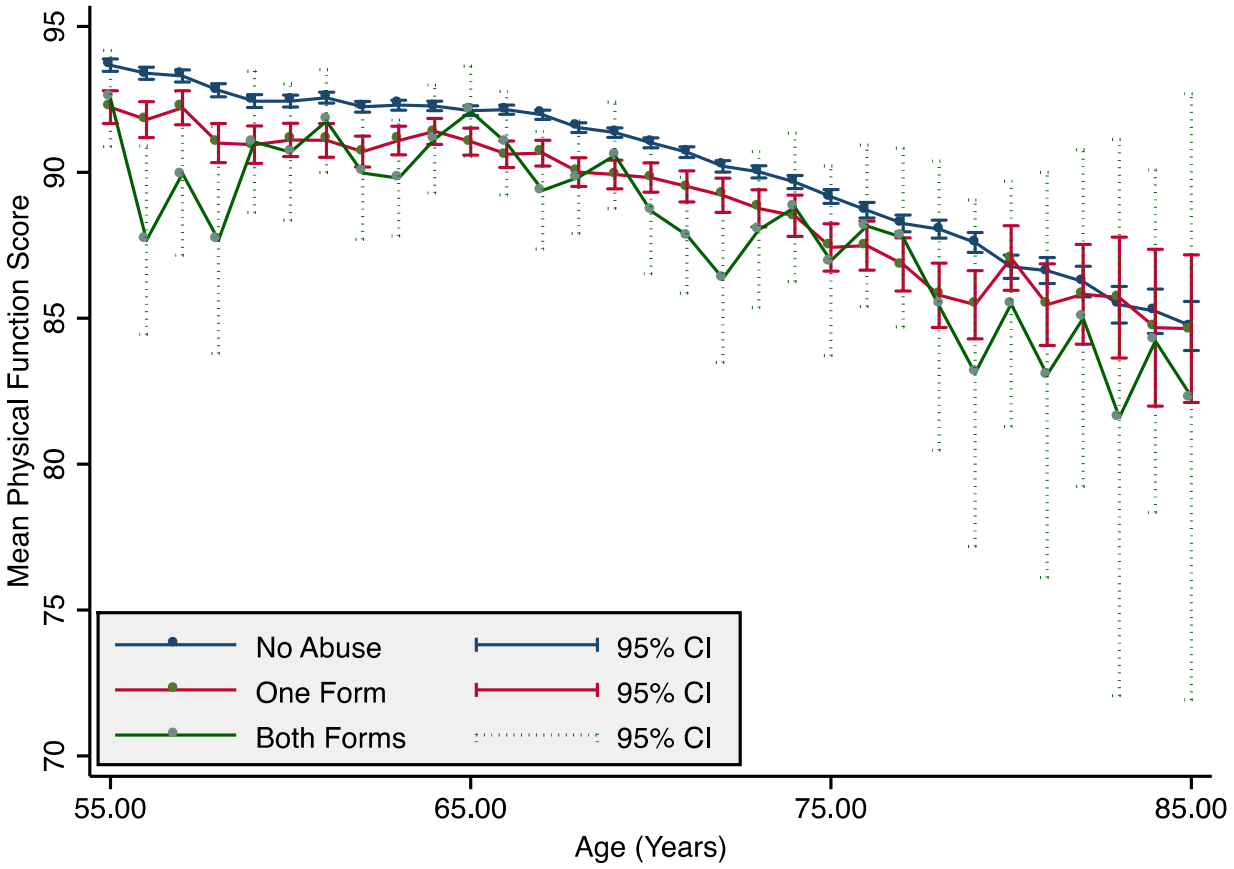

Figure 3-2. Observed mean physical function scores, and 95% confidence intervals, by age in years and abuse experience

Table 3-4. Model estimated differences in initial physical function score and trajectories of change in physical function score over time (years) by abuse experience, results from the Women's Health Initiative.

	Model A	Model B†	Model C†
Difference in Initial PFS (se)			
No abuse	Ref.	Ref.	Ref.
One form	-0.49 (0.06)**	-0.32 (0.06)**	-0.28 (0.06)**
Both forms	-1.22 (0.20)**	-0.86 (0.20)**	-0.67 (0.21)*
Difference in Rate of Change (se)			
No abuse	Ref.	Ref.	Ref.
One form	-0.13 (0.02)**	-0.09 (0.02)**	-0.08 (0.02)**
Both forms	-0.54 (0.08)**	-0.05 (0.07)	-0.05 (0.07)

*p<.05, **p<.001 for the null hypothesis that the difference in the current estimate and the estimate for no abuse is equal to zero.

Model A: Unadjusted effects of abuse on initial physical function score and rate of change in physical function score over time (in years)
Model B: Effects of abuse on initial physical function score and rate of change, sufficiently adjusted for general health and depressive symptoms
Model C: Model B further adjusted for race/ethnicity, marital status, annual household income, educational attainment, living alone, study component, smoking behavior, drinking behavior, social support, and body mass index

† Difference in rate of change estimates are additionally adjusted for baseline PFS.

CHAPTER 4
RISK OF PROBABLE COGNITIVE IMPAIRMENT IN POSTMENOPAUSAL WOMEN WHO EXPERIENCE PHYSICAL AND EMOTIONAL ABUSE

Introduction

The importance of preventing injury and violence (IVP) is receiving increased recognition in the field of public health. As an example, Healthy People 2020, the nation's public health roadmap, incorporates two IVP directed developmental objectives. IVP-39 is to "reduce violence by current or former intimate partners," and IVP-40 is to "reduce sexual violence."[117] One frequently overlooked aspect of IVP is the commission of these acts, and the resulting affects, in the older adult population – elder abuse.

The National Center on Elder Abuse describes elder abuse as any knowing, intentional, or negligent act by a caregiver or any other person that causes harm or a serious risk of harm to a vulnerable adult.[18] Elder abuse is typically viewed as occurring in one or more of the following seven types: physical abuse, verbal (emotional) abuse, sexual abuse, financial exploitation, neglect, abandonment, and self-neglect.[18] Because elder abuse is a relatively fledgling area of study, the causes, course, and outcomes are not well understood. However, recent studies suggest that as many as 2 to 3 million older adults in the U.S. may have experienced some type of abuse in 2005.[1,37] As the number and proportion of older adults is expected to climb, we need more research to understand the potential long-term health consequences and the needs of those experiencing elder abuse. This need is reflected in another Health People 2020 objective, OA-12, which directs the field to "increase the number of States, the District of Columbia, and Tribes that collect and make publicly available information on the characteristics of victims, perpetrators, and cases of elder abuse, neglect, and exploitation."[7]

In their seminal work, “Elder mistreatment: Abuse, neglect, and exploitation in an aging America,” the National Research Council recommends that “the clinical course, antecedents, and outcomes of the various types of elder mistreatment occurrence are poorly understood, necessitating more longitudinal investigations” (pp. 4). We previously examined the effects of abuse on physical function.[118] An understudied outcome that we focus on in the current research is an increased risk of cognitive decline following elder abuse. The increasing recognition for preserving cognitive function in late life and the potential deleterious effects that elder abuse has on cognition makes the current longitudinal analysis particularly timely.

Our primary aim was to compare the risk of probable cognitive impairment (PCI) between older women reporting physical and/or emotional abuse in the past year and older women who reported no exposure to physical or emotional abuse in the past year. We hypothesized that women who experienced abuse were at increased risk of PCI as compared to women who did not experience abuse. Secondarily, we tested the hypothesis that women who experienced abuse had a greater rate of decrease in cognitive function over time than women who did not experience abuse.

Methods

Participants

The Women’s Health Initiative (WHI) has been described in detail elsewhere.[81] Briefly, the WHI is a large, multicenter study sponsored by the National Heart, Lung, and Blood Institute (NHLBI) to study strategies for preventing heart disease, various cancers, and osteoporotic fractures in postmenopausal women. Exclusion criteria included: medical conditions predictive of a survival time of less than 3 years, known alcoholism, known drug dependency, known mental illness, know dementia, or

participation in another clinical trial. In the current study, we analyzed data from a subset of women that were assigned the Hormone Replacement Therapy (HRT) arm of the WHI.

The HRT arm of the WHI was divided into Estrogen plus Progestin (E + P) and Estrogen alone (E-alone). Both treatments were randomly assigned and placebo-controlled to investigate the benefits of HRT in women with and without hysterectomy. A subset of 12,242 women, who were between the ages of 65 and 96 completed the Modified Mini-Mental State Examination[119] (3MS). Recruitment was closed in 1998, and participants were followed for 8 to 12 years.

The final sample size for the current analysis was 11,258 women. Of the 12,242 women who completed at least one valid 3MS, 34 did not answer the two questions used to measure abuse experience and were excluded from the analysis. Because we were interested in PCI subsequent to abuse, we excluded all women who had 3MS scores at or below the education-adjusted cut point for PCI at baseline (n=172) as described below. Because data was not collected at every follow-up for every variable used in the analysis, the last observation forward method was used to impute values for missing covariates of interest. Finally, 778 women were excluded because they were missing data at all follow-up occasions for covariates of interest. Before excluding these women we conducted a sensitivity analysis. Women who were excluded from the analysis because of missing covariates were less likely to be white, less likely to be married, had lower annual household income, had less formal education, more likely to live alone, and were in worse self-reported health. Importantly, there was no between-group difference in the proportion of women who experience abuse or SPI. The removal

of these women did not qualitatively change the unadjusted coefficient for the effect of abuse on PCI (data not shown).

Measuring Global Cognitive Function

The primary outcome of interest for the current study was global cognitive function as measured by the Modified Mini-Mental State Examination (3MS).[119] The 3MS has been previously used independently in research in many different groups, including community dwelling older adults, and has demonstrated good internal consistency and reliability.[120,121] The 3MS is comprised of 46 questions and tasks, making up 15 parts, which measure several important domains for cognitive function. Domains include: temporal and spatial orientation, immediate and delayed recall, executive function (mental reversal, 3-stage command), naming, verbal fluency, abstract reasoning (similarities), praxis (obeying commands), writing, and visuoconstructional abilities (copying).[122] Performance in all domains contribute to an overall measure of global cognitive function.[121,123]

The analysis used the total 3MS score that ranged from 0 and 100, where higher scores indicate more favorable cognitive function. To address the goals of the study, the 3MS score was expressed two ways. First, the score was dichotomized according to cut points previous used to denote probably cognitive impairment (3MS score ≤80 for those with ≤8 years of education and ≤88 for those with ≥9 years of education).[124,125] Secondly, to conduct multilevel modeling, 3MS score was expressed as a continuous variable.

Measuring Abuse

The primary exposure of interest was self-reported emotional or physical abuse. Women participating in WHI were asked two questions at baseline, and during follow-

up, pertaining to abuse. The abuse questions were based on previous studies by Matthews and colleagues (1997)[85], and are worded as follows:

- Below are some hard things that happen to people. Please try to think back over the past year to remember if any of these things happened. Mark the answer that seems best. Over the past year: Were you physically abused by being hit, slapped, pushed, shoved, punched, or threatened with a weapon by a family member or close friend?

- Below are some hard things that sometimes happen to people. Please try to think back over the past year to remember if any of these things happened. Mark the answer that seems best. Over the past year: Were you verbally abused by being made fun of, severely criticized, told you were a stupid or worthless person, or threatened with harm to yourself, your possessions, or your pets, by a family member or close friend?

Answer choices available to respondents were:

- No
- Yes, and upset me: Not too much
- Yes, and upset me: Moderately
- Yes, and upset me: Very much

We collapsed “Yes” responses to create a dichotomous variable (abuse/no abuse) for both the physical and emotional abuse questions. Any “yes” response to either question was used to categorize women who experienced abuse. Women who responded “No” to both questions about abuse were categorized as women who did not experience abuse.

Covariates

Covariates of interest were selected based on previously published literature demonstrating their association with abuse[3,5,30,33,36,37,39,42,44,46,48,79,80] or cognitive function[121,125-130] Questions about demographic, socioeconomic, health-related, and social factors were assessed using self-report questionnaires and in-person clinic interviews.[46] Alcohol consumption was a self-reported measure of the average number of drinks per week consumed over the previous 3 months. In accordance with

definitions used by the Centers for Disease Control and Prevention,[67] women were considered to drink heavily if they self-reported consuming more than 1 drink per day on average. Social support was measured using nine items from the Medical Outcomes Study (range 9 to 45), with higher scores indicating more social support.[104] Sleep disturbance was measured using the 5-item Women's Health Initiative Insomnia Rating Scale (range 0 to 20, with higher scores indicating greater sleep disturbance.[131] Body Mass index (BMI) was calculated from a participant's height and weight and categorized according to recommendations from the National Institutes of health.[105] A BMI less than 25 was considered neither overweight nor obese, a BMI between 25 and 29.9 was considered overweight, a BMI between 30 and 34.9 was considered obese, a BMI between 35 and 39.9 was considered obese class II, and a BMI of 40 or greater was considered extreme obese. Depressive symptoms were assessed using the CES-D/DIS depression screener, which consists of 6 items from the Center for Epidemiologic Studies Depression Scale (CES-D) and two items from the Diagnostic Interview Schedule (DIS). Possible scores range from 0 to 1 and higher scores indicate greater likelihood of depression. A score greater than or equal to 0.06 indicated depressive disorder.[106]

Analysis

Baseline descriptive characteristics for the 11,258 women included in the fully adjusted models are presented in Table 4-1. Mean values for continuous measures and proportions for categorical measures are presented by abuse experience, along with associated p-values for the likelihood of observed differences being due to chance. Hypothesis tests were carried out using standard t-tests for continuous measures and the chi-square test for categorical measures. It should be noted that due to the large

sample sizes, even small differences in means or proportions were statistically significant. Therefore we caution against interpreting statistically significant differences between groups as necessarily meaningful differences between groups.

Time-to-event analysis

Differences in risk of PCI by abuse experience were estimated using discrete-time hazard models. The time frame for each woman's analysis was the interval, in years, between her baseline measure of abuse and the earliest of the following: (1) a subsequent 3MS at or below the cut point for PCI (≤80 for those with ≤8 years of education and ≤88 for those with ≥9 years of education) (incident case); (2) last subsequent visit in which any data was recorded (but SPI was not observed) (censored); (3) death from any cause (censored). Models were created by grouping the covariates, and entering them stepwise into successive models to examine their effect on the association between abuse and cognitive function. In the first model (Model A), we adjusted only for baseline 3MS scores. In the second model (Model B), we adjusted for the following sociodemographic and health behavior characteristics: age, race/ethnicity, marital status, annual household income, educational attainment, living alone, use of hormone replacement therapy, smoking behavior, and heavy drinking. Finally, in the fully adjusted model (Model C) we added: sleep disturbance, social support, body mass index, self-reported general health, and depression.

Multi-level models

Secondarily, we were interested in evaluating the rate of change in 3MS scores between groups. To evaluate the contribution of abuse to accelerated changes (declines) in 3MS scores over time, we used multilevel modeling. However, these models contributed no meaningful additional information to our interpretation of the

relationship between abuse and cognitive function. Therefore, they will not be discussed further and data are not shown, but the results are available from the authors.

All analyses were conducted using Stata/IC 12.1 (StataCorp, College Station, TX). All participants gave written informed consent to participate in the study and The University of Florida Institutional Review Board approved the use of de-identified data to conduct the analysis.

Results

Baseline Characteristics

Of the 11,258 women included in the study sample, 1,638 experienced either emotional or physical abuse during follow-up, and 117 experienced both. About 12% of women (n=1,341) reported experiencing emotional abuse at some point over the past year. About 1.3% of women (n=148) reported experiencing physical abuse at some point over the past year. At baseline, there was no difference in mean 3MS scores between women who did and did not report being abused over the past year (94.8 vs. 95.0 respectively). Overall, 1,100 women (9.8% of the study sample) experienced PCI.

Women who reported experiencing abuse during follow-up were more likely to be married at baseline (59%) than women who reported no abuse (53.9%). Additionally they were less likely to live alone (26.4% vs. 33.1%), reported lower mean levels of social support (32.3 vs. 36.2), were less likely to report being in excellent or very good health (51.5% vs. 58.6%), and almost three times as likely to screen positive for depressive disorder (17% vs. 6.2%). There were also small, but statistically significant, differences in baseline age, race/ethnicity, sleep disturbance score, and body mass index. There were no between group differences in randomization to HRT or Placebo,

annual household income, educational attainment, use of hormone replacement therapy, smoking behavior, or drinking behavior.

Time-to-event Analysis

Figure 4-1 shows the estimated sample survival function by abuse experience. Roughly 10% of women who experienced abuse and 10% women who did not experience abuse experienced PCI. Visual inspection of the graph provides no evidence of differing survival curves between women who do and do not experience abuse. Additionally, at 9 years post-baseline, women experiencing and not experiencing abuse had the same incidence of PCI. Table 4-2 provides further evidence of a lack of between-group differences in risk of PCI. There was no association between abuse and PCI in the minimally, partially, or fully adjusted models.

Discussion

In this sample of 11,258 postmenopausal women, who averaged 70 years old at baseline, 1,638 (14.5%) experienced physical or emotional abuse at some point during follow-up. Additionally, 1,100 (10%) women experienced PCI at some point during follow-up. We hypothesized that older women experiencing physical or emotional abuse were at increased risk of PCI over time compared to women who did not experience abuse. Among the women included in the current analysis, we found no evidence to support this hypothesis. Moreover, we found no evidence of significantly different baseline 3MS scores, or rates of decline in 3MS scores, by abuse experience.

These findings make an important contribution to the literature. PCI was no more common in the abuse group (9.7% of women, 95% Confidence Interval [CI] = 9.2% - 10.3%) than the non-abuse group (9.9% of women, 95% CI = 8.6% - 11.5%). This is particularly meaningful given the relatively high proportion women in our study that

experienced abuse (14.5%), and the relatively high proportion of women in our study who experienced PCI (~10%). It is possible that abuse does lead to cognitive decline, but the study results were biased towards the null by misclassification of women who experienced abuse but reported that they did not. Given the highly sensitive nature of these questions it is possible that women were ashamed or afraid to admit to abuse occurrence. However, in a previous study that analyzes data from a similar group of women, we found that abuse was a significant risk factor for declines in physical function.[118] The high comparative proportion of women reporting abuse also makes the bias explanation less credible. Another explanation, which has more utility for public health application, is that elder abuse confers very little, if any, additional risk of cognitive decline on older adult women. For reasons that require additional research (e.g. greater impact of direct injury), abuse appears to be a much greater insult to older women's physical function, than to older women's cognitive function. This information should be used to direct future research, and perhaps more importantly, direct resources and services for women who experience abuse.

We now turn to a discussion of how this research fits into the larger literature on the topic of elder abuse and cognitive function. Several previous studies found an association between dementia or cognitive impairment and elder abuse – particularly physical abuse.[6,39-41,112,132] However, most of these studies have used small and highly selective samples of older adults, and focused on dementia as the risk factor for elder abuse (i.e. sequentially the opposite of the relationship that we hypothesized in the current study). The general hypothesis is that caregiver stress associated with caring for an older adult with dementia, particularly violent or aggressive older adults, provokes an

abusive response by the caregiver. In a 1993 study of 342 caregivers of an older adult with dementia, Coyne et al. found that 11.9% report being physically abusive toward the older adult they were caring for.[41] In 1992, Paveza et al. found a total of 5.4% of caregivers of an older adult with Alzheimer's Disease reported being violent towards the older adult.[132] In a convenience sample of 142 older adults referred to an urban geriatric treatment center, Dyer et al. (2000) found that older adults referred by adult protective services (APS) were more likely to have dementia than patients referred from other sources.[39] Heath et al. (2005) analyzed data from 211 older adults referred to APS in New Jersey in order to describe the prevalence of common health conditions among individuals who have experienced elder abuse. In their sample dementia was the most frequently diagnosed condition.[6] And a 2009 study by Cooper et al. found that among 220 family caregivers of older adults with dementia in England, 52% reported abusive behavior.[133] However, the samples and methods used in these studies limit the certainty with which we can draw conclusions for larger populations.

We are aware of only two studies to date that use large, population-based, data to investigate the association between elder abuse and cognitive function. Lachs et al. (1997)[42] merged data from the National Institute on Aging Established Populations for Epidemiologic Studies in the Elderly (EPESE) with records from the state of Connecticut's Ombudsman (n=2,812). They identified 47 substantiated cases of elder mistreatment in the EPESE cohort in Connecticut. In their fully adjusted model, abuse was associated with being non-White race (odds ratio [OR] 4.0, 95% confidence interval [CI] 2.2 – 7.2), the number of ADL impairments (OR 1.3, 95% CI 1.0 – 1.8), and having cognitive impairment (OR 3.0, 95% CI 1.1 – 7.7). More recently, Dong et al. (2011)[134]

combined data from the Chicago Health and Aging Project (CHAP) with elder abuse reports from Illinois Adult Protective Services (n=8,932). They identified 238 CHAP participants who were reported to APS. In their sample, the risk of elder abuse was significantly higher for those with lower MMSE scores – every one point lower score was associated with a 5% increase in elder abuse (OR 1.05, 95% CI 1.03-1.08).

Although each of the previously mentioned studies made invaluable contributions to understanding the risks associated with elder abuse, knowledge regarding its effect on cognitive function remains incomplete. Initial epidemiologic research into the association between variables of interest frequently leaves us with only an educated guess as to which is the cause and which is the effect, and the relationship between elder abuse and cognition is no different. Our study is the first to prospectively investigate the effect of physical and emotional abuse on global cognitive function among older postmenopausal women without evidence of cognitive impairment. Our results, when put in the context of the larger literature previously described, suggest that cognitive decline likely leads to increased risk of elder abuse, rather than elder abuse leading to an increased risk of cognitive decline. This finding should be replicated and confirmed in future population-based studies; however, should it hold true, there are important clinical and public health implications. For example, screening for cognitive decline may be an effective first step in primary prevention for some cases of elder abuse. Additionally, public health interventions should be aimed at empowering and supporting caregivers, particularly those who care for someone with dementia, to openly discuss and effectively cope with the challenges they face.

It should be noted that this study has a number of limitations. First, our results may not be generalizable to all older postmenopausal women. Second, we have limited measures of abuse. Ideally, we would like to have further information about the duration of the abuse, the frequency of the abuse, the severity of the abuse, and other types of abuse. Future research should confirm our findings with more robust measures of the abuse experience. Finally, because theories of elder abuse, and causal mechanisms between elder abuse and health outcomes remain underdeveloped, it is possible that our study is missing important confounding factors or risk modifiers. Undoubtedly, as elder abuse research continues, our understanding of the mechanisms surrounding this complex phenomenon will improve.

However, this study has several strengths as well. To our knowledge, it is the first to prospectively investigate the effect of physical and emotional abuse on cognitive function in well-functioning women. Second, this study uses a very large and diverse population of women from across the U.S. Finally, while many previous studies have concentrated on older adults with a clinical diagnosis of the most severe cognitive impairments (e.g. Alzheimer's Disease), our study used a measure of cognition that precedes outright symptoms of dementia.

Conclusion

Elder abuse is an important public health problem that profoundly affects both health and health related quality of life. We found no evidence that elder abuse causes cognitive decline among older, postmenopausal women. Future research should confirm our results. Interested agencies, organizations, healthcare professionals, and policy makers should direct resources towards increased awareness of elder abuse, screening of older adults, and support for caregivers.

Table 4-1. Baseline characteristics of 11,258 women from the Women's Health Initiative clinical trial cohort by abuse experience.

Characteristic	No Abuse n=9,620	Abuse[1] n=1,638	p-value
Baseline 3MS Score, mean	95.0	94.8	N/S
Age in years, mean	70.1	69.6	<0.001
Race/ethnicity (%)			
White, non-Hispanic	88.1	85.1	
Black, non-Hispanic	6.5	7.3	<0.05
Hispanic	2.2	3.5	
Other race, non-Hispanic	3.2	4.1	
Marital status (%)			
Married or marriage-like relationship	53.9	59.2	<0.001
Annual household income (%)			
Less than $20,000	24.4	26.2	
$20,000 - $34,999	30.7	30.0	
$35,000 - $49,999	19.4	19.6	N/S
$50,000 - $74,999	12.6	12.6	
$75,00 or more	7.2	7.1	
Missing	5.7	4.5	
Education (%)			
Less than High School	7.1	7.9	
High School Graduate	22.2	19.5	N/S
Attended College	40.2	40.6	
College Graduate	30.5	32.0	
Living alone (%)	33.1	26.4	<0.001
Hormone Replacement Therapy (%)	49.8	50.0	N/S
Smoking status (%)			
Current	6.7	7.0	N/S
Former	39.4	41.5	
Never	53.9	51.5	
Heavy drinker[1] (%)	12.1	12.1	N/S
Sleep Disturbance Score, mean	6.8	7.7	<0.001
Social support construct, mean	36.2	32.3	<0.001
Body Mass Index (%)			
Neither overweight nor obese	30.0	24.4	
Overweight	36.9	37.7	<0.001
Obese I	21.6	23.8	
Obese II	8.3	10.4	
Extreme Obese	3.2	3.7	
General health (%)			<0.001
Excellent or very good	58.6	51.5	
Depression (%)	6.2	17.0	<0.001

N/S = Not statistically significant at the p<0.05 level

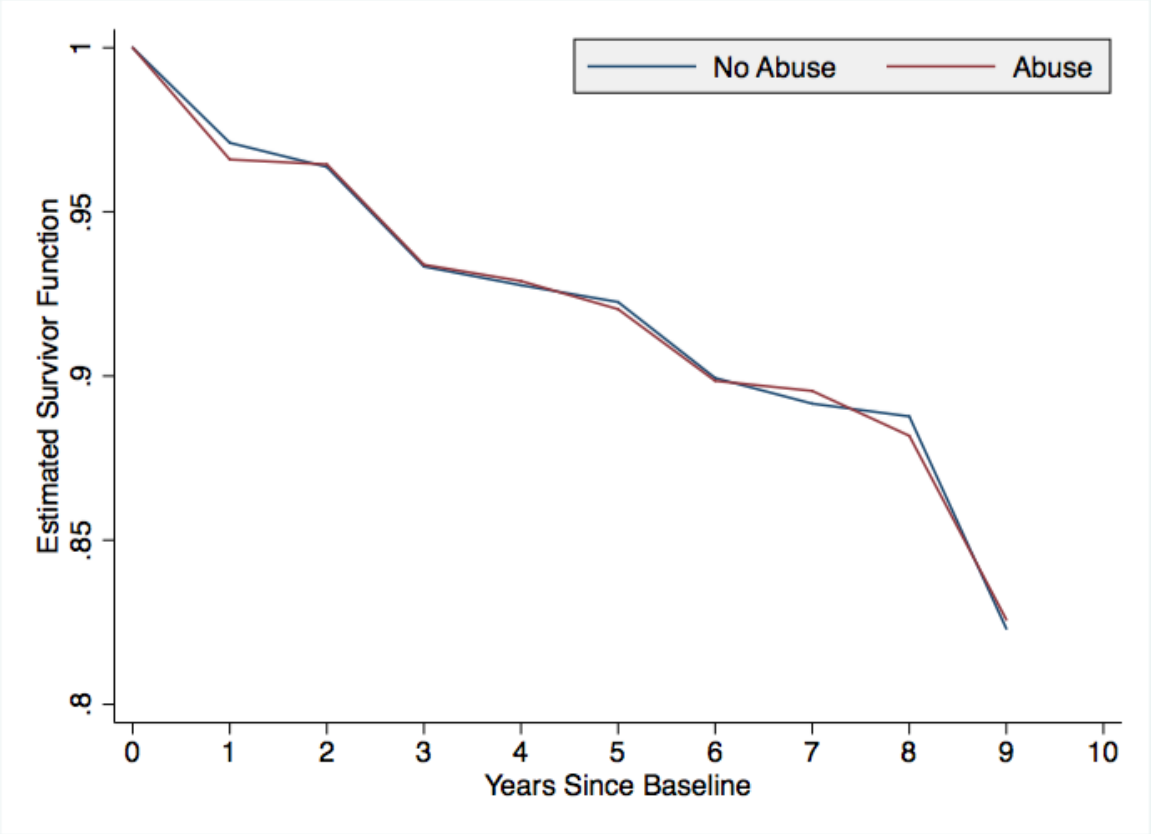

Figure 4-1. Estimated sample survival function for PCI by year since baseline measurement of abuse and by abuse type for a sample of 11,258 women from the Women's Health Initiative

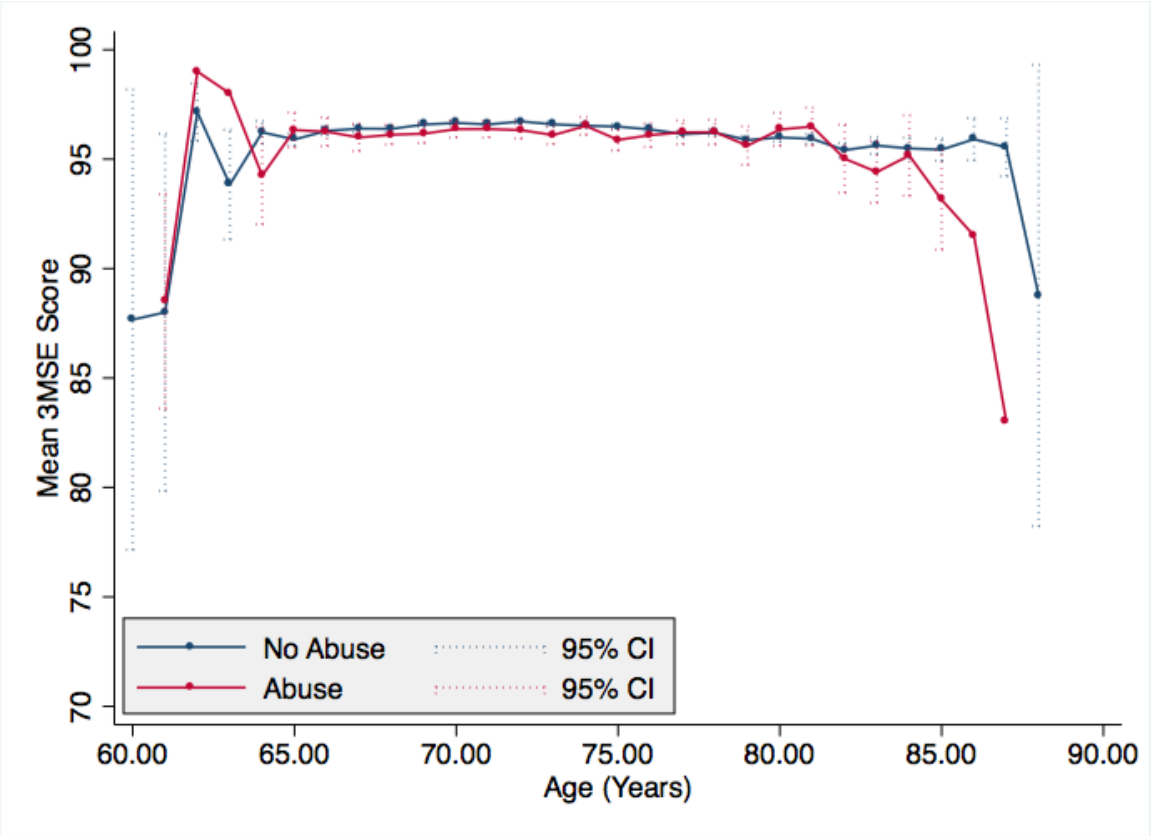

Figure 4-2. Observed mean modified mini-mental state examination scores, and 95% confidence intervals, by age in years and abuse experience

Table 4-2. Unadjusted and adjusted hazard ratios relating abuse to Probable Cognitive Impairment (PCI), results from the Women's Health Initiative

Model	n		Hazard Ratio (95% Confidence Interval)
	Total	PCI[1]	
Model A			
No abuse	10,275	1,010	Ref.
Abuse	1,761	176	.90 (.72-1.14)
Model B			
No abuse	9,944	971	Ref.
Abuse	1,692	169	.91 (.72-1.16)
Model C			
No abuse	9,620	937	Ref.
Abuse	1,638	163	.82 (.64-1.06)

1. Significant Physical Impairment defined as a 3MS score ≤80 for those with ≤8 years of education and ≤88 for those with ≥9 years of education

Model A: Effect of abuse on risk of PCI adjusted for baseline 3MS score
Model B: Model A + age, race / ethnicity, marital status, annual household income, educational attainment, living alone, hormone replacement therapy, smoking behavior, and drinking behavior
Model C: Model B + sleep disturbance, social support, body mass index, general health, and depression

CHAPTER 5
DISCUSSION AND FUTURE DIRECTIONS

Introduction

Elder abuse is an unfortunate phenomenon that has, historically, received little attention. There is much we do not understand about its nature and scope – both of which are prerequisites to the development and implementation of informed policies and interventions. The National Research Council, Institute of Medicine, Administration on Aging, and others have all highlighted this gap in our understanding and called for more research and greater resources devoted to the study of elder abuse.[4] In addition, Healthy People 2020, our nation's public health roadmap, now includes one objective and two sub-objectives directly targeted toward an increased understanding of elder abuse.[7] The goal of the current research was to increase awareness of elder abuse, and its prevalence, causes, and consequences.

The National Research Council and others have repeatedly highlighted the lack of representative population-based frequency estimates of the occurrence of elder abuse – particularly sexual abuse.[1,4,70] In Chapter 2 of this dissertation, we directly address this gap in the literature. Using the BRFSS, an age, race, and gender representative sample of community-dwelling older adults, we estimate the prevalence of past year elder sexual abuse at roughly 0.8%. In the year 2010, this translates into roughly 450,000 men and women.[135] If current population trends continue, and prevalence remains at this level, over 850,000 older adults will experience sexual abuse in the year 2050.[136] Additionally, we found a strong association between elder sexual abuse and binge drinking – particularly among women. This finding is important because of its potential to increase the effectiveness of future interventions.

In addition to the need for more population-based studies, many have called for more prospective studies that investigate the effects of elder abuse.[4,112] In Chapters 3 & 4 of this dissertation we addressed that need. In Chapter 3, we used data from a large and diverse sample of postmenopausal women, the majority of whom were age 60 and older, to investigate the effect of elder abuse on physical function. We found that older women who experience abuse are at increased risk of significant physical impairment. This is important because it helps us better understand what services older women who experience abuse need. This finding also supports the suggestion that screening for elder abuse should occur routinely alongside clinical evaluation of physical function.[80]

Finally in Chapter 4, we investigate the effect of elder abuse on global cognitive function in postmenopausal women. Our results provided no evidence for a deleterious effect of physical and emotional abuse on cognition in older women. However, we report this finding with some cautions. In our overall sample of women there was very little change in average 3MS score over time. It is possible that the women in our sample are not representative of the general U.S. population of older women, or some subset of women for whom abuse does confer additional risk. Second, there were some limitations to our measures of abuse experience. We discuss these further below.

Lessons Learned

Aside from the primary questions answered in the preceding chapters, in the course of completing this research several lessons were learned. In Chapters 3 and 4 we investigated the relationship between abuse and functional outcomes using two separate statistical analysis techniques. The first was a discrete-time hazard model comparing the average time to a previously established score on the 3MS or SF-36 that is indicative of reaching a meaningful level of functional (either physical and cognitive)

impairment. The second was the use of multilevel modeling to estimate mean initial functional status – measured on a continuous scale – and mean rate of decline, accounting for important differences between and within women over time. Neither analysis is “better” or “worse”, but after spending a great deal of time on interpretation of our results, we feel as though each serves a unique purpose. The discrete-time hazard model speaks more to the “big picture” question: Are older women who experience abuse at greater risk of reaching important levels of functional impairment in any given year than older women who do not experience abuse. The answer to this question is important for direct service providers and policy makers. It speaks to the needs of women who are living with abuse. On the other hand, the multilevel model parses up this risk in two ways – functional status the start of follow-up and change in functional status during follow-up. Doing so is most useful to researchers who are trying to understand *how* and *when* abuse produces increased risk of functional impairments.

We also learned about the importance of how abuse is measured. The questions used in the WHI simply asked about previous year exposure to physical abuse generally, or emotional abuse generally. While the WHI data has many strengths, it quickly became apparent that the measures of abuse used was not one of them. We recommend that future studies of elder abuse capture the following dimensions of the abuse experience. The first dimension is *severity* of the abuse. For example, it seems reasonable to assume that being handled roughly and being stabbed represent extremes of a continuum of physical abuse, and that risk is not equally distributed across this continuum. This is not meant to condone being handled roughly or to imply that it conveys no risk; rather, it means that better understanding of the distribution of

risk across this continuum will allow for a better understanding of the relationship between elder abuse and outcomes. The second dimension is the *duration or initiation* of abuse. It is likely that there are important differences between older adults who experience abuse for the first time later in life, and older adults who continue to experience abuse that was initiated earlier in life – both in terms of outcomes and how we approach intervention. The third dimension is *frequency* of the exposure. This measure goes back to the idea of a continuum of risk. It seems reasonable to assume that risk is not equally distributed among individuals who experience an abusive event one time, and those who experience multiple abuse events daily. Finally, and we are not the first to lament this point, when measuring elder abuse it is critical to measure all forms of abuse (i.e. physical, emotional, sexual, financial, neglect) and their perpetrators. This information is crucial to move the field forward in terms of refinement of terminology, differentiation of abuse types, and implementation of effective interventions.

Remaining Gaps in Understanding

This dissertation makes several useful contributions the fields of public health, epidemiology, and elder abuse. However, many important gaps in our understanding remain. Future research should attempt to address these gaps. Just a few examples follow.

How do we fully enumerate the occurrence of elder abuse in the community? In a review of elder abuse assessment measures, Ron Acierno writes about the 5 main sources of data on elder abuse: agency records, sentinel reports, criminal justice statistics, caregiver/family interviews, and direct interviews with older adults (over the phone or in person).[4] All of these methods have been used with varying degrees of

success, and all have their strengths and weaknesses. However, the general consensus is that, regardless of the methodology used, we are undercounting the frequency of elder abuse in the United States.[4] Additionally, it may be that the individuals who aren't currently being counted are not a random sample of older adults who experience abuse. They may differ in important ways. Therefore, estimating the true population prevalence and incidence of elder abuse, and its risk factors, remain an essential priority for elder abuse research.

Should an act of abuse committed by a stranger be considered "elder abuse"? As previously indicated, there are many different definitions of elder abuse. Many of them identify the perpetrator of the abusive act as a "caregiver" or "person in a position of trust." Presumably this is because the circumstances surrounding an abusive event perpetrated by a stranger are markedly different from those perpetrated by a trusted other. We do not necessarily dispute that. However, to our knowledge, the frequency in which strangers are perpetrating acts of violence against older adults is not currently known. Some believe that it could be a significant portion of cases – especially in the realm of financial abuse/exploitation.[4] Additionally, in terms of outcomes, it may make little difference *who* commits the abusive act. Given that elder abuse is still a relatively immature topic of research, it may make sense to keep our terminology as inclusive as possible as we refine our understanding of causes, consequences, and interventions.

Next, our understanding of direct vs. indirect effects of elder abuse is lacking. As an example, in chapter 3 we found that elder abuse is associated with increased risk of experiencing significant physical impairment. However, in chapter 4, we found no evidence of elder abuse being associated with cognitive impairment. One potential

explanation is that direct injury to the trunk and limbs of older adults leads to impairments in physical function. By this logic, one could hypothesize that the same decrements to cognitive function were not observed because there were fewer direct injuries to the head, or because cognition is more resilient in the face of direct injury. In order to address this hypothesis forensic data collected from older adults would be useful. An alternative explanation is that some indirect pathway (e.g. chronic stress response) mediates the relationship between elder abuse and functional impairments. If this is the case, a better understanding of these indirect pathways could lead to opportunities for tertiary prevention among older adults who have experienced abuse.

Perhaps the greatest gap in our current understanding of elder abuse is how to prevent it. Scientifically credible and rigorously evaluated prevention research is currently lacking. One logical starting point would be the adaptation of interventions already successfully implemented in other related fields, such as child abuse and family violence. However, we must also recognize that there are important differences between these populations. For example, older adults may be more reluctant to disclose information about abuse events, and older adults are more likely to have limitations due to health problems or impaired function. Some general intervention strategies that show promise include: screening, mandatory reporting laws, adult protective services, education of professionals, caregiver support interventions, education of potential victims, and legal and victim advocacy services.[114] While all have their supporters, reliable evaluation data does not exist to definitively comment on the relative effectiveness of each. However, the extent of the problem and its potentially serious consequences clearly justifies the development of effective prevention strategies.

In light of our findings, lessons learned, and recognition of remaining gaps, we are working on next steps in our research agenda. In chapter 2, we demonstrated the utility of using the BRFSS to track elder abuse trends at the population level. We intend to add improved elder abuse measures to the BRFSS and use them to monitor the frequency and distribution of elder abuse as the population ages. Additionally, the strong association we found between binge drinking and elder abuse among older women warrants further investigation. In chapter 3, we found that elder abuse increased risk for SPI, but we cannot say if this is due primarily to physiological barriers to function or psychological barriers to function (e.g. lack of self-efficacy, or fear of abuser). We intend to address this question in future studies. And ultimately, our goal is to adapt or develop effective intervention programs and/or policies that prevent the occurrence, or limit the negative effects, of elder abuse.

Conclusions

Elder abuse is an important public health topic. As our population ages, it is likely that the need to understand and appropriately address elder abuse will increase in importance. This dissertation advances the field in important ways, and highlights several important remaining gaps in our understanding. Through research, we continue to advance awareness of elder abuse and further elucidate its causes and consequences. Our hope is that this path will ultimately lead to effective intervention strategies that improve the health and quality of life of older adults everywhere.

APPENDIX
SUMMARY OF ELDER ABUSE / MISTREATMENT STUDIES

Author (Year)	Sample Size	Characteristics of Older Respondents that Experienced Abuse	Methods	Select Findings
Acierno et al. (2010)	5,777 older adults, age 60 & above from the continental United States	Listed separately by type of abuse.	Cross-sectional, RDD telephone survey of residents of the continental United States	Men who were emotionally mistreated were more likely to be emotionally dependent on the perpetrator than women (χ^2=4.53, p=0.03). Women who were emotionally mistreated were more likely to need help with ADLs (χ^2=9.42, p=0.02) & to be abused by a family member (χ^2=20.63, p<0.001). Men were more likely than women to be physically mistreated by an individual who had a history of legal problems (χ^2=5.36, p=0.02). Finally, women were more likely than men to experience physical mistreatment by a relative (χ^2=7.80, p=0.005).

Author (Year)	Sample Size	Characteristics of Older Respondents that Experienced Abuse	Methods	Select Findings
Amstadter et al. (2010)	5,777 older adults, age 60 & above from the continental United States	Not reported	Cross-sectional, RDD telephone survey of residents of the continental United States	Emotion & physical mistreatment were not significantly predictive of self-reported poor health in a fully adjusted model. Additionally, the authors found evidence that the effect of abuse on self-rated poor health may be mediated by respondent's level of being bothered by emotional symptoms (feeling anxious, depressed, or irritable in the past four weeks).
Amstadter et al. (2011a)	5,777 older adults, age 60 & above from the continental United States	Not reported	Cross-sectional, RDD telephone survey of residents of the continental United States	Overall number of older adults who experienced emotional mistreatment in the past year was 254 (4.6%), physical mistreatment in the past year was 86 (1.6%), & the number of older adults who experienced sexual mistreatment was 34 (0.6%).

Author (Year)	Sample Size	Characteristics of Older Respondents that Experienced Abuse	Methods	Select Findings
Amstadter et al. (2011b)	902 South Carolinians age 60 & above	Low levels of support predicted emotional & physical mistreatment, as well as needing assistance with ADLs & poor health status. No gender, income, or age differences in prevalence of abuse.	Cross-sectional, RDD telephone survey of South Carolinians	12.9% experienced emotional mistreatment since age 60, & 5.1% experienced emotional mistreatment in the past year; 2.1% experienced physical mistreatment since age 60, & 1.8% experienced physical mistreatment in the past year; 0.3% reported sexual mistreatment since age 60, & 0.3% reported sexual mistreatment in the past year. Past year potential neglect & financial mistreatment were estimated to be 5.4% & 6.6% respectively.
Baker et al. (2009)	160,676 postmenopausal women aged 50-79 at baseline	Younger age, American Indian or Hispanic race/ethnicity, never having sex, being divorced or separated, lower income, lower education, & service industry occupation	Adjusted Cox proportional hazards analysis.	In a minimally adjusted model physical abuse (hazard ratio [HR] = 1.66, 95% confidence interval [CI] = 1.19-2.32), verbal abuse (HR=1.16, 95% CI=1.09-2.32), & both (HR=1.41, 95% CI=1.16-1.71) were associated with greater risk of mortality. The associations did not remain significant in the fully adjusted model.

Author (Year)	Sample Size	Characteristics of Older Respondents that Experienced Abuse	Methods	Select Findings
Banomi et al. (2007)	370 women, age 65 & older	Descriptive statistics were given for total sample, & were not stratified by abuse.	Cross-sectional. Telephone interview with random sample from a Group Health Cooperative.	Percent of women reporting any partner violence: 2.2% in past year, 3.5% in past 5 years, & 26.5 % in lifetime. 90% of abused women reported having only one abusive partner in her lifetime. 18.1% of abused women reported 20 or more episodes of physical violence, & 61.2% reported 20 or more episodes of controlling behavior. Mean duration of abuse was between 3 & 10 years depending on the type.
Childs et al. (2000)	422 College students & 201 Middle-aged adults from the surrounding community	Older adults were not directly studied.	Respondent's perceptions about elder abuse were compared.	Middle-aged adults were more likely than young adults to label certain behaviors as abusive, interpret psychological behaviors as being more harmful to the victim, & report incidents of violence. Some differences in perceptions of abuse by gender, type of abuse, & participants' personal history of family violence.

Author (Year)	Sample Size	Characteristics of Older Respondents that Experienced Abuse	Methods	Select Findings
Comijs et al. (1999)	77 older adults, aged 65 & older that experienced verbal aggression, physical aggression, or financial mistreatment in the previous year. 147 controls matched on age, gender, socioeconomic status, living conditions, & health	Lower levels of social support, less mastery of affect, less perceived self-efficacy, & greater psychological distress.	Matched case-control study	Older adults that experienced mistreatment had higher levels of psychological distress. Social support moderated the effect of psychological distress.

Author (Year)	Sample Size	Characteristics of Older Respondents that Experienced Abuse	Methods	Select Findings
Coyne et al. (1993)	342 caregivers of older adults with dementia	Most were a parent or spouse of the caregiver, had lower levels of functioning, & were abusive toward the caregiver.	Cross-sectional questionnaire distributed to caregivers that called a help line.	Most caregivers were adult children (54.5%), followed by spouses (37.1%), & then other relatives (8.4%). Caregivers that reported ever being physically abusive (11.9%) had provided care for more years, were caring for persons with a lower level of functioning, experienced greater levels of caregiving burden, & had higher self-reported levels of depression than caregivers that reported never being physically abusive. Additionally, those caregivers that had abuse directed towards them by the person they were caring for were more likely to be abusive in return.

Author (Year)	Sample Size	Characteristics of Older Respondents that Experienced Abuse	Methods	Select Findings
Dyer et al. (2000)	144 older adults referred to an urban public hospital	More likely to be White, male, have a higher geriatric depression score, & have dementia than general hospital population.	Case-control	Most caregivers were adult children (54.5%), followed by spouses (37.1%), & then other relatives (8.4%). Caregivers that reported ever being physically abusive (11.9%) had provided care for more years, were caring for persons with a lower level of functioning, experienced greater levels of caregiving burden, & had higher self-reported levels of depression than caregivers that reported never being physically abusive. Additionally, those caregivers that had abuse directed towards them by the person they were caring for were more likely to be abusive in return.
Fulmer et al. (2000a)	9 sites drawn through a random sample	Individual characteristics of abused older adults not evaluated	Descriptive study	12.3% of clients interviewed had at least one indicator of abuse. When “client apprehension” was excluded, the prevalence estimate dropped to 3.6%.

Author (Year)	Sample Size	Characteristics of Older Respondents that Experienced Abuse	Methods	Select Findings
Gorbein & Eisenstein (2005)	N/A	Older age, being female, lack of access to resources, low income, social isolation, minority status, low level of education, functional impairment, substance abuse, history of family violence, history of psychological problems, caregiver stress, cognitive impairment	Literature review	Elder abuse & neglect should be treated as a geriatric syndrome, & tools should be developed accordingly.
Huber et al. (2001)	16,945 complaints to the NORS reporting system from 6 states	Individual characteristics of abused older adults not evaluated	Ecological study of six states	Most frequent complaints were loss of dignity, accidents, physical abuse, call lights unanswered, poor personal hygiene. Complaints lodged by minorities were more often verified than complaints lodged by Caucasian residents, the verified complaints were less often fully resolved.

Author (Year)	Sample Size	Characteristics of Older Respondents that Experienced Abuse	Methods	Select Findings
Hwalek et al. (1996)	552 cases of substantiated cases of non-institutionalized elder abuse in the state of Illinois	73% of reports were from women, 73% were Caucasian, 54% were widowed, 76% lived in their own home, many had functional impairments or disability, & the mean age of those reporting was 77 years.	Cross-sectional descriptive study	Among perpetrators: 68% were Caucasian, 66% lived with their older adult, 52% were also caregivers, & 13% had a substance abuse problem. Importantly, abuse committed by substance abusers was more likely to be physical or emotional abuse, as opposed to passive neglect or financial exploitation.
Jogerst et al. (2000)	99 counties in Iowa	Individual characteristics of abused older adults not evaluated	Ecological study of 99 counties in Iowa	Between January 1984 & December 1993 the average incidence rate of elder abuse reports was 12.7 per 1,000 population 65 & older. Further, the authors found 26.5% of those cases were substantiated. Increased population density & percentages of children in poverty were correlated with increased reporting of elder abuse.

Author (Year)	Sample Size	Characteristics of Older Respondents that Experienced Abuse	Methods	Select Findings
Jones et al. (1997)	645 emergency department physicians from around the US	Individual characteristics of abused older adults not evaluated	Cross-sectional study surveying physicians	90% of the physicians surveyed reported knowledge of at least one incident of suspected elder abuse in the previous 12 months. Physicians evaluated 4 ± 8 suspected cases of elder mistreatment in the past 12, & 50% were reported.
Lachs et al. (1997a)	47 substantiated cases of elder mistreatment in the Epidemiologic Studies in the Elderly (EPESE) cohort	Non-White race, increased ADL impairment, increased depressive symptoms	Prospective cohort pooled logistic regression analysis	There was no evidence of number of chronic conditions being associated with risk of abuse. Incident cognitive impairment was associated with abuse & neglect.
Lachs et al. (1997b)	111 community-dwelling adults aged 65 & over, representing 572 emergency department visits	Five most common complaints presentation in the emergency department were: Injury-related (15.4%), respiratory problems (13.3), nausea & vomiting, abdominal pain, other digestive problems (16.8%), chest pain (10.1%), malaise & fatigue (7.7%)	Descriptive study of 7 years of cohort data	30.6% were admitted to the hospital. 66% had at least one injury-related complaint.

Author (Year)	Sample Size	Characteristics of Older Respondents that Experienced Abuse	Methods	Select Findings
Lachs et al. (1998)	1,383 subjects age 65 & older from the Epidemiologic Studies in the Elderly (EPESE) cohort	Individual characteristics of abused older adults not evaluated	Prospective cohort pooled logistic regression analysis	Elder mistreatment was significantly associated with mortality (OR 3.1, 95% CI 1.4 – 6.7). The most common causes of death in the elder mistreatment group were circulatory disease (66%), symptoms, signs, or ill-defined conditions (22%), neoplasms (4%), & respiratory disease (7%).
Laumann et al. (2008)	3.005 community dwelling adults, aged 57 to 85 from the National Social Life, Health & Aging Project (NSHAP)	Verbal mistreatment: non-Hispanic, younger, post-high school education, & physical limitations. Financial mistreatment: non-Hispanic, African American race, younger, living alone.	Cross-sectional survey of community-dwelling older adults.	In their sample verbal mistreatment was reported by 9% of respondents, financial mistreatment was reported by 3.5% of respondents, & physical mistreatment was reported by less than 1% of respondents.
Luo & Waite (2011)	2,744 community dwelling adults, aged 57 to 85 from the National Social Life, Health & Aging Project (NSHAP)	Lower global happiness scores, higher psychological distress, White, non-Hispanic, younger, high school graduate, employed, & lower income	Cross-sectional survey of community-dwelling older adults.	Evidence that some of the effect of mistreatment might be buffered by social support, social participation, & feelings of social connectedness was found.

Author (Year)	Sample Size	Characteristics of Older Respondents that Experienced Abuse	Methods	Select Findings
Mouton (1999)	257 women, age 50 to 79 years	Individual characteristics of abused older adults not evaluated	Cross-sectional study survey using Domestic Violence Screening Questionnaire (DVSQ) & SF-36. Women who were screened for a clinical trial.	In this sample 82 women (32%) reported actual or threatened physical assault at some point in their adult life. Even after adjusted, threatened physical assault was significantly associated with lower mental component scores (MCS) of the SF-36.
Mouton (2003)	1,245 community-dwelling, postmenopausal women, aged 50 to 79	Younger women (50 to 59 years), divorced or separated women, & Hispanic women had highest ABUSE scores	Cross-sectional study survey using Domestic Violence Screening Questionnaire (DVSQ) & SF-36. Women who were screened for a clinical trial.	58.5% of women reported being abused at some point in their adult life. 26.6% reported being physically abused, 49.6% reported being verbally abused. Physical abuse in past 12 months associated with lower mental component summary (MCS) scores. Verbal abuse in past 12 months associated with lower MCS & physical component summary (PCS) scores.

Author (Year)	Sample Size	Characteristics of Older Respondents that Experienced Abuse	Methods	Select Findings
Mouton et al. (2004)	91,749 postmenopausal women age 50-79 at baseline	Physical abuse only: African American ethnicity & employment in the service industry Verbal abuse only: Younger age, lower income, employment in the service industry, & former or current smoking. Physical & verbal abuse: Younger age, non-White race, lower income, employment in the service industry, being divorced, & being a current smoker.	Baseline & 3-year follow up analysis of observational arm of Women's Health Initiative (WHI)	10,199 women (11.1%) reported being abused in the previous 12 months. Of the women who reported abuse, 218 (2.1%) experienced physical abuse only, 9,083 experienced verbal abuse only, & 898 (8.8%) experienced physical & verbal abuse. Of the 48,522 women with year 3 follow-up data that reported no abuse at baseline, 2,431 (5.01%) reported incident abuse.
National Center on Elder Abuse & Westat (1998)	Adult Protective Services (APS) agencies & sentinel reporters	Older (>80 years), female, White-Non Hispanic, more dependent, & experiencing depression.	Cross-sectional survey of APS agencies & reports form sentinels that frequently interact with older adults in the community.	In 1996 449,924 community-dwelling older adults, aged 60 or older, experienced incident abuse or neglect nation-wide.

Author (Year)	Sample Size	Characteristics of Older Respondents that Experienced Abuse	Methods	Select Findings
Pavlik et al. (2001)	61,380 records from 43,250 individuals in the Texas Department of Protective & Regulatory Services (TDPRS) Adult Protective Services Division (APS) database	Individual characteristics of abused older adults not evaluated	Cross-sectional descriptive analysis	The risk of being reported to the APS approximately doubles with each 10-year increase in age. The risk was higher among women across all age groups.
Pillemer & Suitor (1992)	236 caregivers of older adults with Alzheimer's disease or some other nonreversible dementia	Individual characteristics of abused older adults not evaluated	Cross-sectional descriptive analysis	46 respondents (19.5%) reported to have ever feared that they may "hit or try to hurt" the older adult they were caring for. Fourteen respondents (5.9%) reported that they had actually "hit or tried to hurt" the older adult they were caring for. After adjustment, violence by the older adult, disruptive behaviors by the older adult, lower caregiver self-esteem, & cohabitation were significantly associated with caregiver fear of become violent.

Author (Year)	Sample Size	Characteristics of Older Respondents that Experienced Abuse	Methods	Select Findings
Pillemer & Finkelhor (1988)	2,020 older adults (age 65+) or proxies	65% female, 94% Caucasian, 40% lived alone, 37% lived with spouse only, 5% lived with child only, 10% lived with spouse & someone else, 7% lived with other	Stratified random sample of older adults in Boston, MA metropolitan area	63 persons reported being maltreated. This translated to a rate of 32 per 1,000. Physical violence was the most common form of abuse. 58% of the perpetrators were spouses, 24% were children, & 18% were other. No difference in abuse by race, age, religion, income, or education. Those that did not live alone, were in poorer health, & males more often reported being abused.
Wolf & Li (1999)	27 Massachusetts protective services areas Range: 16,071 to 82, 936 adults 60 years of age or older.	Not collected. Unit of analysis was protective service area, not individual older adults.	Ecological study looking at correlates of reporting within protective service areas.	Rates of reporting varied across the 27 protective services areas from 2.41 per 1,000 persons age 60 & older to 9.31 per 1,000 persons age 60 & older. Factors associated with higher rates of reporting were lower socioeconomic status, more community training, higher agency service rating scores, lower community agency relationship scores.

REFERENCES

1. Acierno R, Hernandez MA, Amstadter AB, et al. Prevalence and correlates of emotional, physical, sexual, and financial abuse and potential neglect in the United States: the National Elder Mistreatment Study. *Am J Public Health.* 2010;100(2):292-297.

2. Amstadter AB, Cisler JM, McCauley JL, Hernandez MA, Muzzy W, Acierno R. Do incident and perpetrator characteristics of elder mistreatment differ by gender of the victim? Results from the National Elder Mistreatment Study. *J Elder Abuse Negl.* 2011;23(1):43-57.

3. Gorbien MJ, Eisenstein AR. Elder abuse and neglect: an overview. *Clin Geriatr Med.* 2005;21(2):279-292.

4. National Research Counsel, Committee on National Statistics and Committee on Law and Justice DoBaSSaE. Elder mistreatment: Abuse, neglect, and exploitation in an aging America. In: Bonnie RJ, Wallace RB, eds. *Panel to review risk and prevalence of elder abuse and neglect*. Washington, DC: The National Academies Press; 2003: http://www.nap.edu/openbook.php?isbn=0309084342. Accessed February 17, 2013.

5. National Center on Elder Abuse, The American Public Human Services Association in collaboration with Westat Inc. *The national elder abuse incidence study.* September 1998.

6. Heath JM, Brown M, Kobylarz FA, Castaño S. The prevalence of undiagnosed geriatric health conditions among adult protective service clients. *Gerontologist.* 2005;45(6):820-823.

7. United States Department of Health and Human Services. Older adult 2020 topics and objectives. *Healthy People 2020* 2010; http://www.healthypeople.gov/2020/topicsobjectives2020/objectiveslist.aspx?topicId=31. Accessed June, 21, 2013.

8. Quadagno J. *Aging and the life course: An introduction to social gerontology.* 3rd ed. New York, NY: McGraw-Hill; 2005.

9. Cowgill D. The aging of populations and societies. *Annals of the American Academy of Political and Social Science.* 1974;415(29):1-18.

10. Fischer DH. *Growing old in America.* New York, NY: Oxford University Press; 1977.

11. Achenbaum W. *Old age in the new land.* Baltimore, MD: Johns Hopkins University Press; 1978.

12. Social Security Administration. Social Security Act (Act of August 14, 1935) [H.R. 7260] Preamble.

13. Blenkner M, Jahn J, Institute of Welfare Research (Community Service Society of New York), Wasser E. *Serving the aging: an experiment in social work and public health nursing.* New York, NY1964.

14. Administration on Aging, United States Department of Health and Human Services. Older Americans Act. http://www.aoa.gov/aoaroot/aoa_programs/oaa/index.aspx. Accessed November 7, 2011.

15. Pepper C, Oakar M. Elder abuse: an examination of a hidden problem. Washington, DC: U.S. Government Printing Office; 1981.

16. Stiegel L, Klem E. Explanation of the "Immunity for Good Faith Reporting: Provisions and Citations in Adult Protective Services Laws, by State" and "Immunity for Good Faith Reporting: Criteria in Adult Protective Services Laws, by State" Charts. American Bar Association Commission on Law and Aging 2007.

17. Childs HW, Hayslip Jr B, Radika LM, Reinberg J. Young and middle-aged adults' perceptions of elder abuse. *The Gerontologist.* 2000;40(1):75-85.

18. National Center on Elder Abuse. Major Types of Elder Abuse. 2011; http://www.ncea.aoa.gov/ncearoot/Main_Site/FAQ/Basics/Types_Of_Abuse.aspx . Accessed March 31, 2012.

19. Cohn F, Salmon ME, Stobo JD. *Confronting chronic neglect: the education and training of health professionals on family violence.* National Academies Press; 2002.

20. Crowell NA, Burgess AW. *Understanding violence against women.* National Academies Press; 1996.

21. National Research Council, Committee on National Statistics and Committee on Law and Justice DoBaSSaE. Elder mistreatment: Abuse, neglect, and exploitation in an aging America. In: Bonnie RJ, Wallace RB, eds. *Panel to review risk and prevalence of elder abuse and neglect*. Washington, DC: The National Academies Press; 2003: http://www.nap.edu/openbook.php?isbn=0309084342. Accessed February 17, 2013.

22. Griffin LW. Elder maltreatment among rural African-Americans. *Journal of Elder Abuse & Neglect.* 1994;6(1):1-28.

23. Moon A, Williams O. Perceptions of elder abuse and help-seeking patterns among African-American, Caucasian American, and Korean-American elderly women. *The Gerontologist.* 1993;33(3):386-395.

24. Jones JS, Veenstra TR, Seamon JP, Krohmer J. Elder mistreatment: national survey of emergency physicians. *Ann Emerg Med.* 1997;30(4):473-479.

25. Wolf RS, Li D. Factors affecting the rate of elder abuse reporting to a state protective services program. *The Gerontologist.* 1999;39(2):222-228.

26. Lachs MS, Williams CS, O'Brien S, Hurst L, Tinetti ME. ED use by older victims of family violence. *Annals of Emergency Medicine.* 1997;30(4):448-454.

27. Jogerst GJ, Dawson JD, Hartz AJ, Ely JW, Schweitzer L. Community characteristics associated with elder abuse. *Journal of the American Geriatrics Society.* 2000;48(5):513-518.

28. Huber R, Borders K, Netting FE, Nelson HW. Data From Long-Term Care Ombudsman Programs in Six States The Implications of Collecting Resident Demographics. *The Gerontologist.* 2001;41(1):61-68.

29. Pavlik VN, Hyman DJ, Festa NA, Dyer CB. Quantifying the problem of abuse and neglect in adults—analysis of a statewide database. *Journal of the American Geriatrics Society.* 2001;49(1):45-48.

30. Pillemer K, Finkelhor D. The prevalence of elder abuse: a random sample survey. *Gerontologist.* 1988;28(1):51-57.

31. Tatara T. *Summaries of national elder abuse data: an exploratory study of state statistics based on a survey of state adult protective service and aging agencies.* National Aging Resource Center on Elder Abuse; 1990.

32. Fulmer T, Ramirez M, Fairchild S, Holmes D, Koren MJ, Teresi J. Prevalence of elder mistreatment as reported by social workers in a probability sample of adult day health care clients. *Journal of Elder Abuse and Neglect.* 2000;11(3):25-36.

33. Mouton C. Intimate partner violence and health status among older women. *Violence Against Women.* 2003;9(12):1465-1477.

34. Mouton CP, Rodabough RJ, Rovi SL, et al. Prevalence and 3-year incidence of abuse among postmenopausal women. *American Journal of public health.* 2004;94(4):605-612.

35. Bonomi AE, Anderson ML, Reid RJ, et al. Intimate partner violence in older women. *Gerontologist.* 2007;47(1):34-41.

36. Laumann EO, Leitsch SA, Waite LJ. Elder mistreatment in the United States: prevalence estimates from a nationally representative study. *J Gerontol B Psychol Sci Soc Sci.* 2008;63(4):S248-S254.

37. Amstadter AB, Zajac K, Strachan M, Hernandez MA, Kilpatrick DG, Acierno R. Prevalence and correlates of elder mistreatment in South Carolina: the South Carolina elder mistreatment study. *J Interpers Violence.* 2011;26(15):2947-2972.

38. Hwalek MA, Neale AV, Goodrich CS, Quinn K. The association of elder abuse and substance abuse in the Illinois Elder Abuse System. *The Gerontologist.* 1996;36(5):694-700.

39. Dyer CB, Pavlik VN, Murphy KP, Hyman DJ. The high prevalence of depression and dementia in elder abuse or neglect. *J Am Geriatr Soc.* 2000;48(2):205-208.

40. Pillemer K, Suitor JJ. Violence and violent feelings: what causes them among family caregivers? *J Gerontol.* 1992;47(4):S165-172.

41. Coyne AC, Reichman WE, Berbig LJ. The relationship between dementia and elder abuse. *Am J Psychiatry.* 1993;150(4):643-646.

42. Lachs MS, Williams C, O'Brien S, Hurst L, Horwitz R. Risk factors for reported elder abuse and neglect: a nine-year observational cohort study. *Gerontologist.* 1997;37(4):469-474.

43. Lachs MS, Williams CS, O'Brien S, Pillemer KA, Charlson ME. The mortality of elder mistreatment. *JAMA.* 1998;280(5):428-432.

44. Comijs HC, Penninx BW, Knipscheer KP, van Tilburg W. Psychological distress in victims of elder mistreatment: the effects of social support and coping. *J Gerontol B Psychol Sci Soc Sci.* 1999;54(4):P240-245.

45. Mouton CP, Rovi S, Furniss K, Lasser NL. The associations between health and domestic violence in older women: Results of a pilot study. *Journal of women's health & gender-based medicine.* 1999;8(9):1173-1179.

46. Baker MW, LaCroix AZ, Wu C, Cochrane BB, Wallace R, Woods NF. Mortality risk associated with physical and verbal abuse in women aged 50 to 79. *J Am Geriatr Soc.* 2009;57(10):1799-1809.

47. Amstadter AB, Begle AM, Cisler JM, Hernandez MA, Muzzy W, Acierno R. Prevalence and correlates of poor self-rated health in the United States: the national elder mistreatment study. *Am J Geriatr Psychiatry.* 2010;18(7):615-623.

48. Mouton CP, Rodabough RJ, Rovi SL, Brzyski RG, Katerndahl DA. Psychosocial effects of physical and verbal abuse in postmenopausal women. *Ann Fam Med.* 2010;8(3):206-213.

49. Luo Y, Waite LJ. Mistreatment and psychological well-being among older adults: Exploring the role of psychosocial resources and deficits. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences.* 2011;66(2):217-229.

50. Pearlin LI, Schieman S, Fazio EM, Meersman SC. Stress, health, and the life course: Some conceptual perspectives. *Journal of Health and Social Behavior.* 2005;46(2):205-219.

51. Cohen S, Janicki-Deverts D, Miller GE. Psychological stress and disease. *JAMA: the journal of the American Medical Association.* 2007;298(14):1685-1687.

52. Pearlin LI. The sociological study of stress. *Journal of health and social behavior.* 1989:241-256.

53. Administration on Aging USDoHaHS. A profile of older Americans: 2010. 2010.

54. Statistics NCfH. Health, United States, 2010. 2011.

55. Kinsella K, Phillips DR. *Global aging: The challenge of success.* Population Reference Bureau;2005.

56. Crimmins EM. Trends in the health of the elderly. *Annu. Rev. Public Health.* 2004;25:79-98.

57. Freedman VA, Schoeni RF, Martin LG, Cornman JC. Chronic conditions and the decline in late-life disability. *Demography.* 2007;44(3):459-477.

58. Freedman VA. Late-life disability trends: an overview of current evidence. Paper presented at: Workshop on Disability in America: A New Look2006.

59. Brault MW. *Americans with disabilities: 2010.* US Department of Commerce, Economics and Statistics Administration, US Census Bureau; 2012.

60. National Center on Elder Abuse. Major Types of Elder Abuse. http://www.ncea.aoa.gov/ncearoot/Main_Site/FAQ/Basics/Types_Of_Abuse.aspx . Accessed March 31, 2012.

61. Poulos CA, Sheridan DJ. Genital injuries in postmenopausal women after sexual assault. *J Elder Abuse Negl.* 2008;20(4):323-335.

62. Vierthaler K. Best practices for working with rape crisis centers to address elder sexual abuse. *J Elder Abuse Negl.* 2008;20(4):306-322.

63. Burgess AW, Ramsey-Klawsnik H, Gregorian SB. Comparing routes of reporting in elder sexual abuse cases. *J Elder Abuse Negl.* 2008;20(4):336-352.

64. Mouton CP. Intimate Partner Violence and Health Status among Older Women. *Violence Against Women.* 2003;9(12):1465-1477.

65. Gentry EM, Kalsbeek WD, Hogelin GC, et al. The behavioral risk factor surveys: II. Design, methods, and estimates from combined state data. *Am J Prev Med.* 1985;1(6):9-14.

66. Remington PL, Smith MY, Williamson DF, Anda RF, Gentry EM, Hogelin GC. Design, characteristics, and usefulness of state-based behavioral risk factor surveillance: 1981-87. *Public Health Rep.* 1988;103(4):366-375.

67. Centers for Disease Control and Prevention. Behavioral Risk Factor Surveillance System. http://www.cdc.gov/brfss/. Accessed June 16, 2012.

68. Older Americans Act Amendments of 2006, 42 USC Chapter 35 (2006).

69. Erickson WA, Dumoulin-Smith A, Center RRaT. *User guide: A guide to disability statistics from the Behavioral Risk Factor Surveillance System.* 2009.

70. Black MC, Basile KC, Breiding MJ, et al. The National Intimate Partner and Sexual Violence Survey (NISVS): 2010 Summary Report. Atlanta, GA: National Center for Injury and Violence Prevention and Control, Centers for Disease Control and Prevention; 2011.

71. Centers for Disease Control and Prevention. Fact sheet: Understanding sexual violence. http://www.cdc.gov/ViolencePrevention/pdf/SV_Factsheet-a.pdf. Accessed July 27, 2012.

72. Barrett KA, O'Day B, Roche A, Carlson BL. Intimate partner violence, health status, and health care access among women with disabilities. *Womens Health Issues.* 2009;19(2):94-100.

73. Dorsey R, Graham G. New HHS data standards for race, ethnicity, sex, primary language, and disability status. *JAMA.* 2011;306(21):2378-2379.

74. Ramsey-Klawsnik H. Elder sexual abuse: Preliminary findings. *Journal of Elder Abuse and Neglect.* 1991;3(1):73-90.

75. Ramsey-Klawsnik H. Elder sexual abuse within the family. *Journal of Elder Abuse and Neglect.* 2004;15(1):43-58.

76. Dong X. Medical implications of elder abuse and neglect. *Clin Geriatr Med.* 2005;21(2):293-313.

77. Beckett LA, Brock DB, Lemke JH, et al. Analysis of change in self-reported physical function among older persons in four population studies. *Am J Epidemiol.* 1996;143(8):766-778.

78. Crews J. Aging, disability, and public health. In: Lollar D, EM A, eds. *Public health perspectives on disability: Epidemiology to ethics and beyond*. New York, NY: Springer; 2011:163-183.

79. Dong XQ, Simon MA, Beck TT, et al. Elder abuse and mortality: the role of psychological and social wellbeing. *Gerontology.* 2011;57(6):549-558.

80. Dong X, Simon M, Evans D. Decline in physical function and risk of elder abuse reported to social services in a community-dwelling population of older adults. *J Am Geriatr Soc.* 2012;60(10):1922-1928.

81. Design of the Women's Health Initiative clinical trial and observational study. The Women's Health Initiative Study Group. *Control Clin Trials.* 1998;19(1):61-109.

82. Ware JE, Sherbourne CD. The MOS 36-item short-form health survey (SF-36). I. Conceptual framework and item selection. *Med Care.* 1992;30(6):473-483.

83. Bohannon RW, DePasquale L. Physical Functioning Scale of the Short-Form (SF) 36: internal consistency and validity with older adults. *J Geriatr Phys Ther.* 2010;33(1):16-18.

84. Lin J, Curhan GC. Kidney function decline and physical function in women. *Nephrol Dial Transplant.* 2008;23(9):2827-2833.

85. Matthews KA, Shumaker SA, Bowen DJ, et al. Women's health initiative. Why now? What is it? What's new? *Am Psychol.* 1997;52(2):101-116.

86. Rowe JW, Kahn RL. Successful aging. *Gerontologist.* 1997;37(4):433-440.

87. Seeman T, Chen X. Risk and protective factors for physical functioning in older adults with and without chronic conditions: MacArthur Studies of Successful Aging. *J Gerontol B Psychol Sci Soc Sci.* 2002;57(3):S135-144.

88. Stuck AE, Walthert JM, Nikolaus T, Büla CJ, Hohmann C, Beck JC. Risk factors for functional status decline in community-living elderly people: a systematic literature review. *Soc Sci Med.* 1999;48(4):445-469.

89. Guralnik JM, LaCroix AZ, Abbott RD, et al. Maintaining mobility in late life. I. Demographic characteristics and chronic conditions. *Am J Epidemiol.* 1993;137(8):845-857.

90. Arber S, Ginn J. Gender and inequalities in health in later life. *Soc Sci Med.* 1993;36(1):33-46.

91. Goldman N, Korenman S, Weinstein R. Marital status and health among the elderly. *Soc Sci Med.* 1995;40(12):1717-1730.

92. Berkman LF, Seeman TE, Albert M, et al. High, usual and impaired functioning in community-dwelling older men and women: findings from the MacArthur Foundation Research Network on Successful Aging. *J Clin Epidemiol.* 1993;46(10):1129-1140.

93. Snowdon DA, Ostwald SK, Kane RL. Education, survival, and independence in elderly Catholic sisters, 1936-1988. *Am J Epidemiol.* 1989;130(5):999-1012.

94. Branch LG. Health practices and incident disability among the elderly. *Am J Public Health.* 1985;75(12):1436-1439.

95. House JS, Lepkowski JM, Kinney AM, Mero RP, Kessler RC, Herzog AR. The social stratification of aging and health. *J Health Soc Behav.* 1994;35(3):213-234.

96. Liu X, Liang J, Muramatsu N, Sugisawa H. Transitions in functional status and active life expectancy among older people in Japan. *J Gerontol B Psychol Sci Soc Sci.* 1995;50(6):S383-394.

97. Moritz DJ, Kasl SV, Berkman LF. Cognitive functioning and the incidence of limitations in activities of daily living in an elderly community sample. *Am J Epidemiol.* 1995;141(1):41-49.

98. Launer LJ, Harris T, Rumpel C, Madans J. Body mass index, weight change, and risk of mobility disability in middle-aged and older women. The epidemiologic follow-up study of NHANES I. *JAMA.* 1994;271(14):1093-1098.

99. Idler EL, Kasl SV. Self-ratings of health: do they also predict change in functional ability? *J Gerontol B Psychol Sci Soc Sci.* 1995;50(6):S344-353.

100. Bohannon RW, Brennan PJ, Pescatello LS, Marschke L, Hasson S, Murphy M. Adiposity of elderly women and its relationship with self-reported and observed physical performance. *J Geriatr Phys Ther.* 2005;28(1):10-13.

101. Bruce ML, Seeman TE, Merrill SS, Blazer DG. The impact of depressive symptomatology on physical disability: MacArthur Studies of Successful Aging. *Am J Public Health.* 1994;84(11):1796-1799.

102. Penninx BW, Guralnik JM, Ferrucci L, Simonsick EM, Deeg DJ, Wallace RB. Depressive symptoms and physical decline in community-dwelling older persons. *JAMA.* 1998;279(21):1720-1726.

103. Gallo JJ, Rabins PV, Lyketsos CG, Tien AY, Anthony JC. Depression without sadness: functional outcomes of nondysphoric depression in later life. *J Am Geriatr Soc.* 1997;45(5):570-578.

104. Kahn R, Antonucci T. Convoys over the life course: Attachment, roles, and social support. In: Baltes P, Brim O, eds. *Life span development and behavior*. New York: Academic Press; 1980:253-268.

105. U.S. Department of Health and Human Services, National Heart L, and Blood Institute. Classification of overweight and obese by BMI, waist circumference, and associated disease risks. 2013; http://www.nhlbi.nih.gov/health/public/heart/obesity/lose_wt/bmi_dis.htm. Accessed May 20, 2013.

106. Burnam MA, Wells KB, Leake B, Landsverk J. Development of a brief screening instrument for detecting depressive disorders. *Med Care.* 1988;26(8):775-789.

107. Greenland S. Invited commentary: variable selection versus shrinkage in the control of multiple confounders. *Am J Epidemiol.* 2008;167(5):523-529; discussion 530-521.

108. Mickey RM, Greenland S. The impact of confounder selection criteria on effect estimation. *Am J Epidemiol.* 1989;129(1):125-137.

109. Greenland S. Modeling and variable selection in epidemiologic analysis. *Am J Public Health.* 1989;79(3):340-349.

110. Maldonado G, Greenland S. Simulation study of confounder-selection strategies. *Am J Epidemiol.* 1993;138(11):923-936.

111. Vansteelandt S, Bekaert M, Claeskens G. On model selection and model misspecification in causal inference. *Stat Methods Med Res.* 2012;21(1):7-30.

112. Lachs MS, Pillemer K. Elder abuse. *Lancet.* 2004;364(9441):1263-1272.

113. Dong X, Mendes de Leon CF, Evans DA. Is greater self-neglect severity associated with lower levels of physical function? *J Aging Health.* 2009;21(4):596-610.

114. Pillemer K, Mueller-Johnson K, Mock S, Suitor J, Lachs M. Elder abuse prevention programs: The state of the art. In: Doll L, Bonzo S, Mercy J, Sleet D, Haas E, eds. *Handbook of Injury and Violence Prevention*. New York, NY: Springer; 2007:245-252.

115. Wells KB, Trust PM. The functioning and well-being of depressed patients: results from the Medical Outcomes Study. 1989.

116. Albert SM, Freedman VA. *Public health and aging: maximizing function and well-being.* Springer Publishing Company; 2010.

117. U.S. Department of Health and Human Services. Injury and Violence Prevention. http://healthypeople.gov/2020/topicsobjectives2020/objectiveslist.aspx?topicId=24. Accessed August 9, 2013.

118. Cannell B, Andresen E, Maldonado-Molina M, Cook R, Manini T. Risk of physical impairment in postmenopausal women who experience physical and emotional abuse. *In review.* 2013.

119. Teng EL, Chui HC. The Modified Mini-Mental State (3MS) examination. *J Clin Psychiatry.* 1987;48(8):314-318.

120. Bravo G, Hébert R. Reliability of the Modified Mini-Mental State Examination in the context of a two-phase community prevalence study. *Neuroepidemiology.* 1997;16(3):141-148.

121. Rapp SR, Legault C, Henderson VW, et al. Subtypes of mild cognitive impairment in older postmenopausal women: the Women's Health Initiative Memory Study. *Alzheimer Dis Assoc Disord.* 2010;24(3):248-255.

122. Rapp SR, Espeland MA, Shumaker SA, et al. Effect of estrogen plus progestin on global cognitive function in postmenopausal women: the Women's Health Initiative Memory Study: a randomized controlled trial. *JAMA.* 2003;289(20):2663-2672.

123. Espeland MA, Rapp SR, Robertson J, et al. Benchmarks for designing two-stage studies using modified mini-mental state examinations: experience from the Women's Health Initiative Memory Study. *Clin Trials.* 2006;3(2):99-106.

124. Shumaker SA, Reboussin BA, Espeland MA, et al. The Women's Health Initiative Memory Study (WHIMS): a trial of the effect of estrogen therapy in preventing and slowing the progression of dementia. *Control Clin Trials.* 1998;19(6):604-621.

125. Shumaker SA, Legault C, Rapp SR, et al. Estrogen plus progestin and the incidence of dementia and mild cognitive impairment in postmenopausal women: the Women's Health Initiative Memory Study: a randomized controlled trial. *JAMA.* 2003;289(20):2651-2662.

126. U.S. Department of Health and Human Services, National Institute on Aging, Alzheimer's Disease Education and Referral Center. 2011-2012 Alzheimer's Disease Progress Report: Intensifying the Research Effort. 2012; http://www.nia.nih.gov/alzheimers/publication/2011-2012-alzheimers-disease-progress-report/. Accessed June 24, 2013.

127. Centers for Disease Control and Prevention. The Healthy Brain Initiative. 2011; http://www.cdc.gov/aging/healthybrain/index.htm. Accessed June 24, 2013.

128. Chen JH, Lin KP, Chen YC. Risk factors for dementia. *J Formos Med Assoc.* 2009;108(10):754-764.

129. van der Flier WM, Scheltens P. Epidemiology and risk factors of dementia. *J Neurol Neurosurg Psychiatry.* 2005;76 Suppl 5:v2-7.

130. Atkinson HH, Rapp SR, Williamson JD, et al. The relationship between cognitive function and physical performance in older women: results from the women's health initiative memory study. *J Gerontol A Biol Sci Med Sci.* 2010;65(3):300-306.

131. Levine DW, Kripke DF, Kaplan RM, et al. Reliability and validity of the Women's Health Initiative Insomnia Rating Scale. *Psychol Assess.* 2003;15(2):137-148.

132. Paveza GJ, Cohen D, Eisdorfer C, et al. Severe family violence and Alzheimer's disease: prevalence and risk factors. *Gerontologist.* 1992;32(4):493-497.

133. Cooper C, Selwood A, Blanchard M, Walker Z, Blizard R, Livingston G. Abuse of people with dementia by family carers: representative cross sectional survey. *BMJ.* 2009;338:b155.

134. Dong X, Simon M, Rajan K, Evans DA. Association of cognitive function and risk for elder abuse in a community-dwelling population. *Dement Geriatr Cogn Disord.* 2011;32(3):209-215.

135. United States Census Bureau. 2010 Census. 2013; http://www.census.gov/2010census/. Accessed September 5, 2013.

136. United States Census Bureau. 2012 National Population Projections: Summary Tables. http://www.census.gov/population/projections/data/national/2012/summarytables.html. Accessed September, 5, 2013.

BIOGRAPHICAL SKETCH

Dr. Cannell received his PhD in epidemiology and a graduate certificate in gerontology from the University of Florida in Dec. 2013. He received his BA in political science and marketing from the University of North Texas in 2005, and his MPH with a concentration in epidemiology from the University of Louisville in 2009. During his doctoral studies, he was a graduate research assistant for the Florida Office on Disability and Health, an affiliated scholar with the Claude D. Pepper Older Americans Independence Center, and a student-inducted member of the Delta Omega Honorary Society in Public Health. His current research is on issues of aging, function, and quality of life.