ASSOCIATIONS BETWEEN SEX AND HIV TESTING, HIV RISK, AND HIV RISK PERCEPTION AMONG A NATIONAL SAMPLE OF ADULTS AGED 65 YEARS AND OLDER

Lashanda Baham Glasgow

A Dissertation

Submitted to Franklin University in partial fulfillment of
the requirements for the degree of

DOCTORATE OF HEALTHCARE ADMINISTRATION

May 2021

Committee:

Mary Bynum, Committee Chair

Cynthia L. Smoak, Committee Member

Chenelle A. Jones, Committee Member

Franklin University

This is to certify that the dissertation prepared by

Lashanda Glasgow

"Associations Between Sex and HIV Testing, HIV Risk and HIV Risk Perception Among A National Sample of Adults Aged 65 Years and Older"

Has been approved by the committee as satisfactory completion of the dissertation requirements for the degree of

Doctor of Healthcare Administration

Dr. Mary Bynum (May 13, 2021 15:24 EDT) — 05/13/2021

Dr. Mary Bynum, Committee Chair and Department Chair, Health Programs, Franklin University

Chenelle A. Jones — 05/13/2021

Dr. Chenelle Jones, Committee Member and Assistant Dean, Community Engagement, Franklin University

Cynthia L. Smoak (May 17, 2021 14:22 EDT) — 05/17/2021

Dr. Cynthia Smoak, Committee Member and Adjunct Faculty, Franklin University

Gail Frankle (May 18, 2021 08:52 EDT) — 05/18/2021

Dr. Gail Frankle, Program Chair, DHA Franklin University

Wendell Seaborne — 05/18/2021

Dr. Wendell Seaborne, Dean, Doctoral Studies Franklin University

FRANKLIN UNIVERSITY
Doctoral Studies

ABSTRACT

Julie Barnickle, Advisor

Routine HIV testing for adults 65 years and older is imperative for prevention and treatment efforts among the vulnerable population. To date, limited research exists that examines associations between sex in HIV testing, HIV risk perception, and HIV risk among adults who are 65 years and older. Certain risk behaviors can lead to missed testing opportunities for some Medicare beneficiaries aged 65 and older, increasing the likelihood of new HIV transmissions and late-stage diagnoses. A federal mandate requires that Medicare Part B (outpatient insurance) cover annual wellness visits, which allow providers and beneficiaries to develop personalized prevention plans of care. However, Medicare does not offer routine HIV testing to beneficiaries 65 years and older, unless they specifically ask for a test (risk perception) or considered at risk (actual risk). This quantitative, cross-sectional, causal-comparative research design was guided by the health belief model (HBM) and theory of gender and power (TGP). Chi-square tests analyzed secondary data from the 2018 National Health Interview Survey, Adult Sample file regarding HIV testing, HIV risk perception and HIV risk among non-institutionalized adults, 65 years and older. The significance of statistical tests was determined at the .05 alpha level. Study findings revealed a significant association between sex and HIV testing prevalence, with men (24.3%) testing more frequently than do women (20.1%). Findings also revealed a significant association between sex and HIV risk. Men (41%), when compared to women (22%), were almost twice as likely to have at least one factor increasing HIV risk. There was no significant association between sex and HIV risk perception. Findings revealed that both men (99.6%) and women (99.6%) equally lacked HIV risk perception.

Keywords: Medicare, older adults, HIV testing, HIV risk, HIV risk perception, CMS, NHIS, cross-sectional, quantitative, United States, HBM, TGP.

Dedication

I would like to dedicate this dissertation first, to my husband, Dexter, who provided continuous encouragement throughout my entire doctoral journey. You are my pillar of peace. I love you, Dex! I would also like to dedicate this dissertation to my children, Kayden and Anaya. You kept me motivated and encouraged to become "Dr. Mommy!" Thank you and dad for sacrificing countless hours away from me while I spent them in front of the computer. I can only hope that I have inspired you always to keep pushing. I also dedicate this dissertation to my mother, Pam. Although I did not understand while growing up, thank you for sacrificing so much to ensure I would have a better life and be successful. I am who I am because of you. Finally, I dedicate this dissertation to my mother-in-law, Ms. Olive, "Mother O." Although you are no longer here with us, your gentle and encouraging words pushed me to pursue this degree. Thank you for seeing and believing that I could do this before I did. I love you all! We have all earned this degree!

Acknowledgments

First and foremost, I would like to thank God for making this at all possible. Although this journey was not easy, my faith remained grounded in You. I am so grateful that You saw fit for me to obtain a doctorate.

Secondly, I would like to thank my dissertation committee. Thank you, Dr. Mary Bynum for stepping in to be my committee chair. Though the COVID-19 pandemic caused the waters to sway a bit, you stepped in and ensured we remained on course. Thank you for the encouragement, regular check-ins, and conversations. I truly appreciate you! I would also like to give appreciation to Dr. Cynthia Smoak. You were with me from the start of my doctoral journey. Thank you for the laughs, "realness", and for your encouragement. You have helped me off the ledge quite a few times, and I thank you! To Dr. Chenelle Jones, thank you for accepting the request to be on my committee. Your genuineness, knowledge in quantitative research, and constructive feedback richly impacted me. I could not have asked for a better committee!

To my sister-in-law, Dr. Francine Conway, thank you for your sincere encouragement and support throughout this journey. I appreciate your willingness to help! To my sister-in-law Dr. Jamie Baham, thank you for answering my crazy questions about statistics! I am so happy to have a statistician in the family! To my brother, Thomas, thank you for your encouragement and prayers. To Dr. Hollie Jones, I genuinely thank you for all your assistance and feedback. Lastly, to my Franklin University peers, staff and educators, I sincerely thank you for being so supportive throughout this journey.

Table of Contents

List of Figures

List of Tables

Chapter One: Introduction

Nearly four decades ago, gay-related immunodeficiency (GRID), later renamed acquired immune deficiency syndrome (AIDS), appeared in the United States (Blake et al., 2017; Caring for the AIDS Patient, 1983). New York City and San Francisco were the epicenters (Blake et al., 2017; Caring for the AIDS Patient, 1983; NIAID, 2019). The first recorded surveillance associated with AIDS occurred in 1980 among five homosexual men who presented with *Pneumocystis carinii* pneumonia (PCP), a life-threatening lung infection that can affect individuals with severely compromised immune systems (Curran & Jaffe, 2011; NIH, 1994). In 1981, 26 cases of Kaposi's sarcoma (KS), a rare cancer that forms in the lining of the lymph and blood vessels, appeared among young homosexual men in New York and California who also displayed PCP (Curtiss et al., 2016).

In 1981, there were six women in the U.S. who had the same symptoms as the five men displayed the previous year (Zierler & Krieger, 1997). The start of the AIDS epidemic in the United States resulted in misdiagnosis and late diagnosis of women partly due to misconceptions that women "didn't get AIDS" (Gollub, 1999, p. 1479; Wiener, 1991). Early AIDS observers also mentioned that risk behaviors such as intravenous drug use were the likely mode of HIV transmission rather than risk associated with heterosexual intercourse (Gollub, 1999; Wiener, 1991). The proportion of women infected with AIDS rose from 6% in 1984 to 19% in 1995, with poor women of color disproportionately affected (Zierler & Krieger, 1997).

Human immunodeficiency virus (HIV) destroys the CD4 protein on the surface of T helper cells, and when, left untreated, destroys the immune system (NIAID, 2019). People living with HIV (PLWH) can transmit the virus via blood, semen, pre-seminal fluid, rectal fluid, breast milk, and vaginal fluids (U.S. Department of Health and Human Services [HHS], 2020). Infected

individuals risk developing life-threatening opportunistic infections that lead to death (NIAID, 2019). HIV has three stages: Acute HIV infection; Clinical latency, and AIDS (CDC, 2019). Acute infection occurs within two to four weeks after initial infection and presents with flu-like symptoms (Centers for Disease Control and Prevention [CDC], 2019). The clinical latency stage is typically asymptomatic and can last 10 years or more (CDC, 2019). When the CD4 count drops below 200 cells/mm, or the person develops severe opportunistic infections, they have AIDS (CDC, 2019).

The emergence of anti-retroviral therapy (ART) in the 1990s was a pivotal advancement in HIV care as it inhibits HIV disease progression and restores the body's immunity (García-Deltoro, 2019; Knight et al., 2014; Ohl et al., 2013). However, HIV positive individuals require lifelong adherence to ART to maintain immune function and viral suppression (Rhee & Greenblatt, 2008). An analysis of 81,213 PLWH aged 18-64 found that from 2012 to 2014, 26.2% of women lacked ART prescriptions compared to 19.5% of men (Iqbal et al., 2018). According to Nasi et al. (2017), the older HIV population (50+) is a result of ART use among individuals infected at a younger age, as well as the increasing rates of new infections among older adults.

Background of the Problem

In 2006, the CDC (2020c) released revised recommendations for routine opt-out HIV testing in all health care settings for those between 13 and 64 years of age. Opt-out testing is HIV screening performed after the patient is notified that the test will occur. Consent is implied unless the patient refuses or defers testing (Branson et al., 2006; Leidel et al., 2015). The purpose of such testing was to increase routine HIV screening, reduce HIV transmission risks, remove HIV-testing stigmas, and encourage earlier diagnosis and treatment (CDC, 2020c; Ford et al. 2015).

The CDC (2020) estimates that there are 1.1 million PLWH in the United States, with approximately half greater than or equal to 50 years of age. PLWH often have multiple comorbid illnesses, making care and disease management a challenge for healthcare providers (Abara et al., 2014; Solomon et al., 2014; Ware et al., 2018).

A key strategy of the HHS' *Ending the HIV Epidemic: A Plan for America* initiative is early detection (HHS, 2020). Early detection is also an essential component of the HIV Care Continuum, which consists of HIV diagnosis, care, retention in care, and viral suppression (CDC, 2020c; Williams et al., 2019; Yoon et al., 2018). According to the National Institute on Aging (2017), individuals 50 and older are less likely to obtain HIV testing. Although, the number of new HIV infections in the U.S. has remained steady since 2013, 15% of those living with HIV do not know they are infected. This number accounts for almost 40% of new HIV transmissions (Kaiser Family Foundation [KFF], 2019; Patel et al. 2020).

Medicare is the federal health insurance program for those 65+, and younger adults with certain disabilities (KFF, 2016). Currently, 1% of Medicare enrollees are HIV positive (KFF, 2016). In 2015, Medicare expanded coverage to include one HIV test annually if the individual is at increased risk for HIV infection (CMS, 2015). Medicare defined individuals with an increased risk for HIV as those in the following categories:

(a) Men who had sex with men (MSM)

(b) Men and women who have unprotected intercourse

(c) A person with a history of injection drug use

(d) Prostitution

(e) Individuals who contracted or request testing for other sexually transmitted diseases

(f) Individuals who request an HIV test

(h) Those with new sexual partners

(i) A physician's opinion that the person is high risk (CMS, 2015).

The HIV positive Medicare population also has more multiple comorbid illnesses such as diabetes, hepatitis infections, cardiovascular diseases, kidney disease, arthritis, and hypertension (HIV Patients 65 Years or Older, 2017; KFF, 2016). Syme et al. (2017) stated that older adults have a low perception of sexual risk, but often underestimate their sexual risk. Since the 1990s, the number of HIV positive Medicare beneficiaries tripled from roughly 42,520 in 1997 to 120,000 in 2014 (KFF, 2016). Routine HIV testing for adults 65 and older is imperative for prevention and treatment efforts among this vulnerable population (KFF, 2019).

Problem Statement

The general problem is that the number of adults 50 years and older with HIV diagnoses is increasing, and older adults are less likely to receive HIV testing (NIA, 2017). By 2030, 70% of the U.S. HIV population will be 50 years of age and older—a 20% increase from 2016 (Wing, 2016). According to HHS (2016), 21% of Medicare beneficiaries living with HIV are 65 and older (KFF, 2016). A federal mandate requires that Medicare Part B (outpatient insurance) cover annual wellness visits that allow providers and beneficiaries to develop personalized prevention plans of care (42 C.F.R. § 410.15, 2015). The specific problem is that despite the statutory requirement, Medicare does not offer routine HIV testing to beneficiaries 65 years and older unless they specifically ask for a test (risk perception) or are deemed at-risk (actual risk) (CMS, 2015; Cuenca & Kapsner, 2019). Consequently, certain risk behaviors may go undetected for some Medicare beneficiaries 65+, increasing the likelihood of new HIV transmissions and late-stage diagnoses.

Many of the risk behaviors associated with HIV are constant among all age groups, yet there are additional risk behaviors unique to older adults (Glaude-Hosch et al., 2015). Many older adults, for example, remain sexually active and may experience lifestyle changes such as divorce or losing a spouse (Bergeron et al., 2017; O'Brien et al., 2014). Smith et al. (2020) stated that older adults have reported poor engagement with their health care providers concerning their sexual health. Inadequate patient-provider engagement contributes to knowledge gaps, limited access to resources, and lack of interventions to reduce their risk of contracting and passing STDs (Bergeron, 2017; Smith et al., 2020). Misconceptions that HIV affects only younger individuals and mistaken beliefs that they are unlikely to have exposure to HIV contribute to sexual risk behaviors such as unprotected intercourse and multiple partners (Bergeron et al., 2017; Solomon et al., 2014).

Further, the availability of erectile dysfunction drugs has shown to increase unprotected sex among men over the age of 50 (Cook et al., 2010), whereas decreased high-risk sexual behaviors were associated with men who were either married or living with a partner (Cook et al., 2010). Among this group, excessive alcohol consumption, MSM, and illicit drug use also created a higher likelihood of risky sexual behaviors (Cook et al., 2010). Glaude-Hosch et al. (2015) conducted a study on sexual behaviors among 1,429 adults 60 and older, with the average age being 69.9 years. The results showed that 49.3% of respondents engaged in sexual intercourse, with only 3% using a protection barrier (Glaude-Hosch et al., 2015).

Post-menopausal women are less likely to use a condom, as they are no longer concerned about becoming pregnant (Bergeron et al., 2017). Age-related vaginal thinning and dryness also increase the risk of HIV transmission (Abara et al., 2014; Solomon et al., 2014). Understanding the risk behaviors of older adults spotlight the need for routine HIV testing in all health care

settings, including nursing and retirement homes (Abara et al., 2014; Oliva-Moreno, & Trapero-Bertran, 2018; Solomon et al., 2014).

Purpose of the Study

The purpose of this quantitative, causal-comparative study was to examine if there were significant associations between sex and HIV testing, risk, and risk perceptions among non-institutionalized adults 65 years and older. To date, limited research exists that examines differences in HIV testing, risk perceptions, and actual risk among adults 65+ (Pilowsky & Wu, 2015; Syme et al., 2017). Researchers found that individuals 50 and older are less likely to receive an HIV test because they do not perceive themselves to be at risk (Abara et al., 2014; Cook et al., 2010; Solomon et al., 2014). These groups are also often misdiagnosed, and their symptoms attributed to age-related factors (Zingmond et al., 2001). Moreover, older adults face additional psychosocial challenges related to difficulty accessing healthcare, fear of receiving a positive diagnosis, and frequently experience social isolation (Diagnosis of HIV Infection, 2018; Ford et al., 2015). Consequently, initial testing often confirms late-stage HIV (Diagnosis of HIV Infection, 2018; Ford et al., 2015).

An important factor affecting HIV testing is sex differences. Men receive a diagnosis of HIV and AIDS at a higher rate than females (CDC, 2018). According to the CDC (2018), in 2017, the rate of AIDS diagnoses among women and men 55 years and older was 1.8 and 5.7 per 100,000 individuals, respectively (CDC, 2018). The rate per 100,000 of HIV diagnoses among the same group were 2.3 for female and 6.2 for males (CDC, 2018). Pan et al. (2017) examined sex differences related to sexual risk behaviors among 777 males and 504 females across 12 community-based substance use disorder treatment programs in the U.S. Sixty percent of men

and 57% of women reported not using condoms during sex. However, 38% of men and 17% of women reported never having had a test for HIV (Pan et al., 2017).

Research Questions

This study involved examining associations between sex and HIV testing, HIV risk, and HIV risk perception among respondents to the *National Health Interview Survey* (NHIS) (NHIS, 2018), *Adult Sample File*. Respondents were age 65 and older. According to Kalseth and Halvorsen (2020), older women use health care services more often than do men. However, the researchers noted that while women typically live longer than do men, they have poorer health (Kalseth & Halvorsen, 2020). The research questions were appropriate to gain insight into these findings.

RQ1. To what extent is there a significant association between sex and HIV testing prevalence among adults 65 years and older?

$H_0$1: There is no significant association between sex and HIV testing prevalence among adults 65 years and older.

H_a1: There is a significant association between sex and HIV testing prevalence among adults 65 years and older.

RQ2. To what extent is there a significant association between sex and actual HIV risk among adults 65 years and older?

$H_0$2: There is no significant association between sex and actual HIV risk among adults 65 years and older.

H_a2: There is a significant association between sex and actual HIV risk among adults 65 years and older.

RQ3. To what extent is there a significant association between sex and HIV risk perceptions among adults 65 years and older?

$H_0$3: There is no significant association between sex and HIV risk perceptions among adults 65 years and older.

H_a3: There is a significant association between sex and HIV risk perceptions among adults 65 years and older.

Significance of Study

According to the NIH (2020), older individuals are less likely to have a test for HIV for several reasons. PLWH who are 50 years and older often have a higher prevalence of multiple comorbid illnesses, making care and disease management difficult (Abara et al., 2014; Solomon et al., 2014; Ware et al., 2018). Compounding age-related challenges, signs of HIV infection may be mistaken for other age-related conditions and increase the likelihood of an advanced stage disease when first diagnosed (HHS, 2019; NIH, 2020). Researchers also indicated the need for routine HIV testing in all health care settings, including nursing and retirement homes because those over 50 are more likely to engage in risky sexual behaviors and less likely to obtain HIV testing (Abara et al., 2014; CDC, 2020; Oliva-Moreno & Trapero-Bertran, 2018; Solomon et al., 2014).

The study may be of significance to Medicare policymakers to guide in the development of targeted HIV outreach efforts for the 65 and older Medicare population, in addition to targeted provider education for Medicare-certified health care providers. In 2017, 17% of new HIV diagnoses were of adults aged 50 and older (CDC, 2020). According to the Administration for Community Living (2019), more efforts need to occur to inform older adults and healthcare providers of the importance of HIV education and prevention. Zingmond et al. (2017) conducted

a study of 9,796 HIV positive individuals in California. Eighty-three percent were age 50 and older. The results of the study found that individuals with multiple comorbidities, and who were over 60 years old, had annual median medical expenses of $34,142 (Zingmond et al., 2017).

Methodology Overview

A quantitative and causal-comparative, cross-sectional design was appropriate for this study because this method and design uses pre-existing data that cannot change, such as the data for this study (Schenker & Rumrill, 2004). Additionally, this research tested for significant associations between variables without inferring causality (Creswell & Creswell, 2017). Using data from the *2018 NHIS Adult Sample File*, descriptive statistics and chi-square analyses determined if significant associations between sex and HIV testing, HIV risk perception, and HIV risk existed.

Theoretical Framework

Understanding the variables that influence HIV testing among Medicare-aged individuals is increasingly important because this group remains at risk for a diagnosis of advanced HIV. There are various theoretical models that guided research related to HIV/AIDS testing, such as social learning theory, the theory of planned behavior, and the theory of reasoned action. Although each theory focuses on predictive factors that contribute to human behaviors, they either do not measure individual perceptions of risk, or individual risk perception is not a central component of these measures (Bandura, 1977; Feldman & Lynch, 1988; Fishbein & Ajzen, 1975). However, the health belief model (HBM) best applied to this study to understand the associations between sex and HIV testing, risk, and risk perception among adults 65 years and older.

Emerging in the 1950s, the HBM is one of the most widely used psychosocial theoretical models that explain health-related behaviors (Champion & Skinner, 2008; Schnall et al., 2015). The HBM uses the following premises:

a) Individuals consider themselves vulnerable to a condition,
b) Think the condition would have severe consequences,
c) Believe that a plan available to them would be favorable in reducing either their vulnerability to or severity of the condition,
d) Believe the anticipated benefits of taking action overshadow the barriers to (or costs of) action, they are likely to take the necessary action believed to mitigate their risks (Champion & Skinner, 2008).

The core constructs for HBM are perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy (Leidel et al., 2017). The constructs of HBM have predicted sexual risk behaviors among older adults, such as condom-less sex, never being tested for HIV, and being unaware of partner status (Syme et al., 2017). Researchers previously established that risky behaviors, lower HIV testing rates and lower risk perception exist in adults over 50 (Akers et al., 20017; KFF, 2016; Khumsaen & Stephensen, 2017). However, for this study, the HBM was modified to determine the extent of significant associations between sex and HIV testing, HIV risk, and HIV risk perceptions in non-institutionalized adults 65 and older.

A key theory undergirding of the HBM is risk perception (Leidel et al., 2017). Ferrer and Klein (2015) defined risk perception as the perceived susceptibility to a threat, which could also serve as a key motivational factor to change (Adams et al., 2014). Healthcare decision-makers' understanding of how risk perceptions are formed is critical yet poorly understood (Burnett,

2015). Risk perception should have a targeted health-specific approach, rather than a broad theoretical perspective (Burnett, 2015; Georges et al., 2018). Although risk perceptions can be classified as low (optimistic), and high (pessimistic) (Ferrer & Klein, 2015), it is critical for high-risk populations to have accurate risk perceptions according to Nobles et al. (2020). For instance, individuals aged 65 and older must first recognize the possibility of contracting HIV before becoming interested in obtaining an HIV test.

Table 1

Depiction of HBM and HIV Testing among Adults 65 Years and Older

	Perceived Susceptibility	Perceived Severity	Perceived Benefits	Perceived Barriers	Cues to Action	Self-efficiency
HIV Testing among people 65 years and older	The belief of the likelihood that the elderly person would test HIV positive.	Feelings about the seriousness of con-tracting and not treating HIV.	Timely linkage to care, retention in care, and viral suppression	Fear, denial, resistance to testing.	Peer or family influences, and quality access to care.	Individual's confidence and ability to take an HIV test.

Adapted from: Leidel, S., Leslie, G., Boldy, D., & Girdler, S. (2017). A comprehensive theoretical framework for the implementation and evaluation of opt-out HIV testing. *Journal of Evaluation in Clinical Practice*, *23*(2), 301–307.

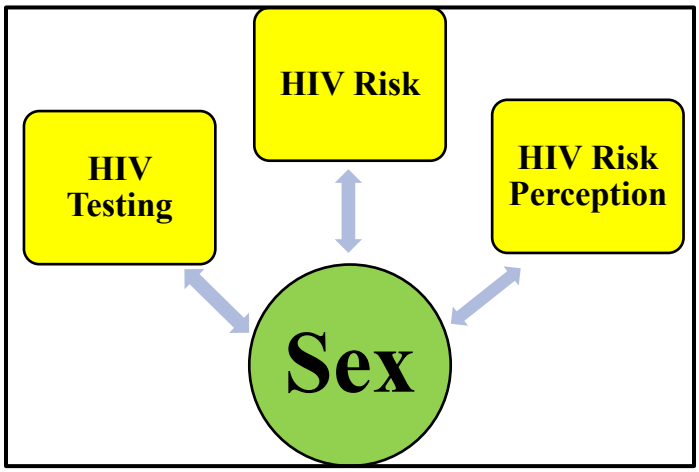
Conceptual Framework

Although HBM can help determine the extent to which there were significant associations between sex and HIV testing, risk perceptions, and HIV risk among adults 65 and older, it was also essential to understand and address any differences in the population due to their sex. Understanding the factors that shape older men's and women's perceptions of risk, actual risk behaviors, and HIV testing prevalence is fundamental for HIV prevention this group. The conceptual framework for this study uses Connell's (1987) theory of gender and power (TGP) (Wingood & DiClemente, 2000).

Researchers used TGP to inform targeted healthcare interventions to improve population health (Odlum et al., 2019). Theorists proposed that three social constructs (sexual division of labor, the sexual division of power, and the structure of cathexis) describe the gendered relationship between males and females on societal and institutional levels (Wingood & DiClemente, 2000). The association between the imbalance of power and equality based on sex carries over to health risk and proactive health behaviors (DiClemente et al., 2002). Although biological factors contribute to health differences between men and women, social, political, and cultural ones more significantly influence health behaviors and outcomes (Kavanagh et al., 2018). This study included Connell's (1987) TGP to gain insight into sexual inequities contributing to HIV risk perceptions, actual risk, and testing among adults 65 and older.

Figure 1

The Study's Conceptual Model



Definition of Terms

Access to health care: Having a usual place for routine, preventative, and sick care. Also, the inability to afford care, and reasons for delaying care, including with reasons being transportation, obtaining an appointment, and appointment wait time (Reif et al., 2017).

American Indian/Alaska Native: A person whose origins are from the original peoples of the Americas.

ART: "Refers to Anti-retroviral therapy" (García-Deltoro, 2019).

Asian: A person whose origins are in the Far East, Southeast Asia, or the Indian subcontinent (e.g., Vietnam, China, India Japan, Korea).

Black/African American: A person with origins among Black racial groups of Africa.

Elderly: Individuals aged 65 and older (Singh, 2014).

Employment Status: The respondent's employment condition, occupation, industry, and workplace. It also includes individuals who have ever worked, such as retired persons (Bracha & Burke, 2017).

Functional limitations: The degree of difficulty respondent has in conducting specific physical tasks and social and recreational engagement without assistance (Koroukian et al., 2016).

Gender: An individual's understanding of their gender (CDC, 2019).

HIV/AIDS tests: A screening that can detect human immunodeficiency virus (HIV) and acquired immunodeficiency syndrome (AIDS) in the body (CDC, 2019).

Marital status: Whether a person is married, divorced, widowed, separated, never married, or living with a partner (NHIS, 2017).

MSM: "Refers to Men who sleep with men" (CMS, 2015).

Native Hawaiian/Pacific Islander: A person having origins in any of the original people of Hawaii, Guam, Samoa, or other Pacific Islands.

PLWH: "People living with HIV" (HHS, 2020).

Race: The U. S. Office of Management and Budget's (OMB) five categories by which individuals self-identify race (CDC, 2019).

Risky sexual behaviors: Activities that expose a person's risk of contracting STIs, including HIV, and adversely affecting their health (Chawla & Sarkar, 2019).

Sex: Biological differences between males or females (Newman, 2018).

Sexual orientation: Whether a person is gay, lesbian, straight, bisexual, or unsure.

White: A person of European, Middle Eastern, or North African origin.

Assumptions

The study used secondary data based on the *2018 NHIS, Sample Adult File responses*. Survey planners used geographically clustered sampling techniques in selecting sample dwelling units. In addition, the planners used oversampling techniques for Black, Hispanic, and Asian adults aged 65 and older. It is an assumption that sampling and oversampling provide an accurate representation of the American population. Interviews from the *2018 NHIS, Adult Sample File* were conducted face-to-face. An assumption was that survey respondents answered honestly and that participants provided responses based on their individual perceptions, feelings, and beliefs.

Limitations

This study had several limitations. First, as the *2018 NHIS, Adult File Sample* questionnaire does not fully conform for use in this type of study, research was limited to extracting data representing only the adult aged 65 years and older population. This study excluded data from people who were in long-term care facilities, institutionalized persons, active-duty military and U.S. nationals living in foreign countries.

It is important to note that the older population is less likely to receive HIV testing in outpatient settings, but more likely to be diagnosed with HIV in inpatient hospital settings (Ford et al., 2015). Self-reported questions could contribute to both recall and social desirability biases,

jeopardizing the study's reliability and validity. Recall bias sometimes occurs when respondents inaccurately recall past events, potentially leading to under- or over-reporting of responses (Althubaiti, 2016). Fisher (1993), citing work by Maccoby and Maccoby (1953), defined social desirability bias as a phenomenon in which respondents are reluctant or incapable of accurately reporting sensitive topics. There was a possibility that respondents may have also answered with what they perceived the interviewer wanted to hear (Fisher, 1993). Although not feasible for this study, Fisher (1993) suggested using indirect questioning (i.e., structured questions from the perspective of others) to mitigate the effects of social desirability bias.

Delimitations

The omission of active-duty military personnel was not a limitation in this study because the population would likely not meet the age inclusion criteria. In the fiscal year 2017, the average age for active-duty military officers was 46.1, and the average age for active-duty enlisted personnel was 43.1 (Department of Defense, 2019).

Additionally, as data collected in this cross-sectional study took place at a single point in time rather than over a period, causality could not be established, and generalization of the results were limited (Setia, 2016). During data collection, respondents were not asked about their own or their partners' sexual history, current HIV status, past drug use, or risk perception for contracting HIV. However, the original responses from the identified variables of interest for this study were recorded to coincide with the HBM.

Summary and Organization of Study

Certain risk and risk perceptions may be related to HIV testing behaviors among adults 65 years and older. HIV testing is critical for HIV prevention and treatment. This quantitative, cross-sectional, causal-comparative study analyzed significant associations between sex and HIV

testing behaviors, risk, and risk perceptions among adults 65 years and older. Chapter 1 included a synopsis of the problem, background, significance of the study concerning risk perception, risk, and HIV testing among the older population.

The HBM provided an explorative perspective unique to the 65 and older Medicare population. Using sex as the independent variable, this study examined the statistical significance of associations between sex and HIV testing, HIV risk, and HIV risk perception. The current body of research concerning HIV testing behaviors and the elderly population did not specifically target adults aged 65 and older. Research concerning HIV testing and risk behaviors among older adults are heavily focused on adults 50 years and older. Therefore, this researcher sought to fill that gap. The TGP provided a conceptual framework of how to explain how sex differences influence HIV testing among the target population.

Chapter 2 includes reviews of peer-reviewed studies related to the aging population and HIV. The literature search covered HIV testing, risk perception, risk, and sex differences from historical and current perspectives.

Chapter Two: Literature Review

Chapter 1 included the rationale for the study by highlighting disparities in human immunodeficiency virus (HIV) testing by sex that adults aged 65 and older may encounter. The previous chapter also emphasized the importance of addressing HIV testing among the elderly as a potential Medicare policy concern. This study sought to answer research questions regarding the extent significant associations between sex and HIV testing, risk perceptions, and actual risk behaviors among adults 65 years and older. This review of literature includes a critical analysis of psychosocial theoretical frameworks for explaining sex differences in HIV testing and behaviors among older adults. Analyzing the literature provided the reader with broader insight into the importance of increasing HIV testing among adults aged 65 years and older. Chapter 2 also includes a thematic approach to sex differences, risk perception, risk behaviors, and HIV testing.

Searches, Articles, and Journals

The researcher used the Franklin University Online Library to search for peer-reviewed journal articles in EBSCO Host, ProQuest, OhioLINK, MEDLINE, CINAHL, SocINDEX, and Psychological and Behavioral Sciences Collection databases. Examples of inclusive search terms are “Medicare-aged adults, older adults and HIV testing, HIV perceptions of risk, and HIV risk behaviors.” Most the results are from 2015-2020, but several older sources were necessary to provide context, as were historical data from federal sources such as HHS, CDC, and NIH.

HIV Testing

HIV testing remains a critical component to combat the HIV epidemic since the Food and Drug Administration approved HIV antibody testing in 1985 (Levine & Bayer, 1989). Early HIV researchers identified the time from initial HIV diagnosis to AIDS as approximately 8 years

(Furrow, 1989). Death generally occurred within 18 months of developing AIDS (Furrow, 1989). In 1989, Anthony Fauci, MD, Director of the National Institute of Allergy and Infectious Diseases, publicly affirmed that knowing one's status was a great benefit (Levine & Bayer, 1989). However, national HIV testing debates have since occurred across social, political, and medical sectors (Elgalib et al., 2018; Levine & Bayer, 1989; O'Grady & Schüklenk, 2009).

Many in the HIV/AIDS advocacy movement viewed the government's initial testing strategies as controversial and unethical (Levine & Bayer, 1989). In 1982, federal funding for domestic and international HIV/AIDS was very limited (well under $1 million) but increased considerably during the course of the epidemic (KFF, 2019). The U.S. government's early response efforts, in comparison to those of Europe, as well as South Africa, demonstrated the strong impact that HIV policies have on population health (Elgalib et al., 2018; Deblonde et al., 2018; Simelela et al., 2015).

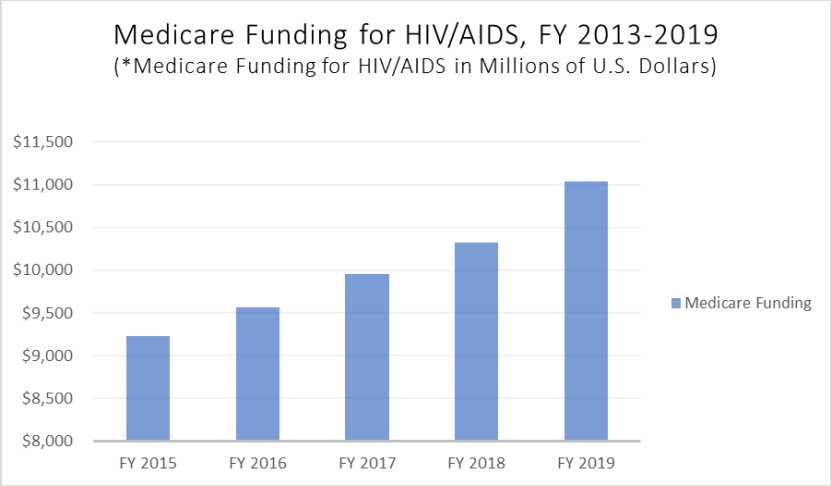
The South African government's initial denial of, resistance to, and ignorance about HIV and its treatment laid the groundwork for the country's current HIV epidemic (Chater & van Niekerk, 2016; Simelela et al., 2015). South Africa currently accounts for approximately 7 million (19%) of PLWH globally—the largest of any country (Allinder, 2020; Sabi & Rieker, 2017; Simelela et al., 2015). By contrast, approximately 1.1 million Americans live with HIV (Bradley et al., 2019). The European Union's (EU) and the U.S. government's early HIV responses were similar, although Europe currently has greater challenges concerning late-stage HIV diagnoses (Allenstetter, 1994, *Estimating the Burden of HIV*, 2020). In 2016, 50% of new HIV diagnoses in the EU were late-stage infections (Deblonde et al., 2018), while 21.3% of HIV diagnoses in the U.S. were in that category (Krueger et al., 2019).

Initial HIV testing in the U.S. targeted high-risk groups, such as MSM, injection drug users, and hemophiliacs (Elgalib et al., 2018; Knight et al., 2014). The media also began highlighting occupational transmissions of HIV among healthcare workers treating HIV positive patients (Crenshaw, 1988; E.R.D., 1991). As a result, health professionals supported mandatory HIV testing for all patients admitted to the hospital (E.R.D., 1991; Furrow, 1989). However, researchers argued that not only were there no clinical indications to test asymptomatic individuals, but there were also no effective treatments available for individuals with a positive HIV result (Levine & Bayer, 1989; O'Grady & Schüklenk, 2009). Evidence now suggests that targeted HIV testing strategies result in missed diagnoses, increased stigma, and decreased risk perceptions, which create testing barriers (Elgalib et al., 2018; Kort et al., 2017).

In 2019, the federal HIV budget was $21.5 billion (KFF, 2019). While 62% of the budget was for domestic care and treatment, only 3% went to prevention (KFF, 2019). Medicare provides the largest federal funding for domestic HIV care and treatment (KFF, 2019). In 2015, the Centers for Medicare and Medicaid Services (CMS) expanded Medicare's HIV screening coverage for beneficiaries between 15 and 65 years of age, pregnant women, and all others considered at increased risk for contracting the disease (Jensen et al., 2015). CMS' decision to expand HIV screening coverage was due to the United States Preventive Services Task Force's HIV testing recommendation for health care providers (Jensen et al., 2015). Figure 2 shows Medicare funding for HIV/AIDS from 2015 to 2019.

Figure 2

Federal Funding to Medicare for HIV/AIDS by Fiscal Year



From Kaiser Family Foundation. (2019). U.S. Federal Funding for HIV/AIDS: Trends over Time. Retrieved from https://www.kff.org/global-health-policy/fact-sheet/u-s-federal-funding-for-hivaids-trends-over-time/

Following CMS' decision to expand its HIV screening coverage in 2015, Medicare HIV funding has steadily increased (KFF, 2019), from $8 billion in FY 2015 to approximately $11 billion in FY 2019 (KFF, 2019). Medicare's per capita spending for HIV-positive beneficiaries was approximately $45,489 (KFF, 2016). In 2019, the Medicare Part D drug benefit for ART exceeded $35,000 per HIV-positive beneficiary, and $20,000 for pre-exposure prophylaxis for this group (Tseng et al., 2020). However, no data for Medicare HIV testing expenditures were found (KFF, 2019; Tseng et al., 2020).

Older Adults and HIV Testing

Although there are a limited number of studies on HIV testing among the older population, there has been considerable research among 50 and older (Tillman & Hayley, 2015). Studies found that routine HIV testing is vital for adults over the age of 50, though testing rates among this group have been consistently low (Ford et al., 2015; Tillman & Haley, 2015). Low

rates of HIV testing among older adults contribute to undiagnosed cases and advanced infections (Ford et al., 2015; Krueger et al., 2019). For instance, in 2016, researchers in the U.S. observed that 36.3% of late-stage (symptomatic) HIV diagnoses were among adults 55 years of age and above (Krueger et al., 2019).

The increase in nationwide HIV testing among older adults since 2006 has been unsustainable and selective (Ford et al., 2015). Ford et al. (2015) conducted a study analyzing HIV testing prevalence using the Behavioral Risk Factor Surveillance System (BRFS) surveys from 2003-2010. The respondents, ages 50 to 64 (n = 872,797), were among the oldest age category to which the CDC's testing recommendation applied (Ford et al., 2015). Only 1.4% of those surveyed reported engaging in HIV risk behaviors. Annual HIV testing prevalence decreased from 5.5% in 2003 to 3.6% in 2006. However, following implementation of the 2006 recommendations, HIV testing rates for this group increased to 4.5% by 2009. By 2010, however, they declined to 2006 levels (Ford et al., 2015).

Ford et al. (2015) found that, when compared to younger adults, those 50 and older were 40% less likely to have received an HIV screen within the previous year. Older adults also disproportionately received testing and diagnoses in hospitals, suggesting that they already exhibited symptoms by the time they were tested (Ford et al., 2015). Fleckenstein and Cox (2015) stated that although sexual frequency decreases as individuals age, routine sexually transmitted infection (STI) testing, including HIV testing, is necessary for sexually active older adults. Nonetheless, only 16% of sexually active older adults reported receiving HIV screenings (Ford et al., 2015). Researchers suggested that various factors, such as HIV knowledge, access to care, and patient-provider relationships, contribute to older adults' likelihood (or lack thereof) of obtaining HIV testing (Ford et al., 2015; Krueger et al., 2019).

Dai and Meyer (2019) conducted a study using BRFS surveys from 2014-2016 to examine health disparities in sexual minority older adults in the U.S. The team analyzed data from 350,778 heterosexual and sexual minority respondents ages 50+ (Dai & Meyer, 2019). Compared to heterosexual older adults, older adults identifying as lesbian, gay, or bisexual were more likely to have obtained an HIV test (Dai & Meyer, 2019). However, the researchers noted that the results were not surprising, as HIV prevention campaigns typically target high-risk groups (Dai & Meyer, 2019).

HIV Risk Perceptions

The HBM is based on assumptions that (a) if individuals consider themselves vulnerable to HIV, (b) think HIV would have severe consequences, (c) believe that a plan available to them would be favorable in reducing either their vulnerability to or severity of the disease and, (d) believe the anticipated benefits of taking action overshadow the barriers to (or costs of) action, they are more likely to take the necessary action believed to mitigate their risks (Champion & Skinner, 2008; Leidel et al., 2017). Wing (2016) mentioned that 18% of newly diagnosed individuals were aged 50 and older. Yet, older adults do not perceive themselves as at risk for contracting STIs (Sexually Transmitted Disease, 2018; Syme et al., 2015).

Many factors influenced perceptions of sexual risk among older people (Syme et al., 2017). Foster et al. (2015) likened the knowledge of older adults regarding HIV to that of teenagers. The researchers argued that older adults and teenagers lack personal awareness of HIV/AIDS and likely lack interest in prevention measures (Foster et al., 2015). Syme et al. (2017) asserted that social and historical factors influence older adults' risk perception for contracting HIV.

At the onset of the U.S. HIV/AIDS epidemic, homosexuals and individuals considered promiscuous were the only populations seen as affected by the disease (Syme et al., 2017). Many older adults were in their 20s to 40s during the era and perceived that HIV/AIDS did not affect heterosexual relationships (Syme et al., 2017). In addition, HIV prevention and education programs targeted populations considered at risk (e.g., younger adults (Foster et al., 2015). HIV prevention strategies created the perception that the disease does not affect the older population (Syme et al., 2017). Although HIV education has since expanded to include many demographic groups, the gap in HIV knowledge among older adults persists (Conner et al., 2019).

Older adults are an underserved population, and often excluded from public health HIV primary prevention strategies (Altschuler & Katz, 2015; Conner et al., 2019). Older adults are less knowledgeable about the risks of HIV transmission due to a lack of age-specific educational materials. Conner et al. (2019) conducted a study that reviewed materials that specifically targeted older individuals. Of the 29 health departments and 13 state and local agencies on aging, the researchers found just nine HIV education resources for older adults (Conner et al., 2019). Further, only two of those materials contained age-specific risk reduction recommendations (Conner et al., 2019).

Altschuler and Katz (2015) conducted a study using a focus group concerning the perceptions and opinions surrounding the significance of HIV/AIDS prevention education for older adults. Participants were 52 ethnically diverse adults between the ages of 50-82. They were very sympathetic towards those they knew with HIV. However, they lacked education about providing care for PLWH.

The group also lacked awareness about HIV/AIDS prevention in the workplace. For example, one participant worked in a medical setting for many years without wearing masks or

gloves, but once they became mandatory, he questioned the rationale for wearing them. Participants also had conversations concerning the need for an HIV test with their healthcare providers. One participant stated that he asked his younger healthcare provider if he would be receiving an HIV test. The provider reportedly laughed and asked, "Why would you want an HIV test?" (p. 695). Researchers consistently reiterated the need for older adults to raise the issue of contracting HIV (Altschuler & Katz, 2015).

Although older adults often do not perceive themselves to be in danger of contracting HIV, previous research has indicated that health care providers also have a lower sexual risk perception of older patients (Cruz, 2019; Ritter & Ueno, 2019; Syme et al., 2017). Cruz (2019) stated that once adults reach 50, only 38% of men and 22% of women discuss sex with their healthcare providers. Syme et al. (2017) noted that although adults 65 years of age and older receive a thorough sexual risk assessment, sexual health discussions do not occur between providers and older patients.

Altschuler and Katz (2015) asserted that while older adults may understand the importance of receiving HIV/AIDS education, their healthcare providers' ageist stereotypes contribute to the misconception that HIV/AIDS prevention awareness is not necessary for older adults. Though patient health outcomes relate to patient-provider relationships, older adults often face HIV testing barriers when discussing the subject with their providers (Al-Amin et al., 2016; Cruz, 2019; Syme et al., 2015). Healthcare providers avoid addressing sexual health topics with older adults because they perceive them as irrelevant to the aging community (Bergeron et al., 2017). Also, older adults often do not receive HIV and other STI screening for several reasons, including not being considered susceptible by their providers; older adults often ignore or

confuse HIV symptoms for age-related illnesses, and they are not comfortable engaging in such conversations with their clinicians (Conner et al., 2019; *Sexually Transmitted Disease*, 2018).

HIV Risk Behaviors

Sexual behaviors of older adults tend to change as they begin to experience health problems and find alternative ways to seek pleasure (Iveniuk et al., 2016). According to Ritter and Ueno (2019), 20-30% of older adults are sexually active into their 80s. Wang et al. (2015) studied 606 older adults having a mean age of 75 and found 70% engaged in sex at least once each week. A study comparing HIV-related behaviors of older and younger adults found that adults 50-75 years of age were less likely, when compared to younger adults, to use condoms (Prati et al., 2015). The study also found that although older adults continue to engage in intercourse, they were less also likely to have had a test for HIV (Prati et al., 2015).

Infectious disease specialists recommend that older PLWH receive a screening for high-risk behaviors and other STIs at each visit and maintain that all older adults consider an HIV screening (Wing, 2016). One estimate found that approximately 30% of older PLWH engaged in unprotected sex (Lovejoy et al., 2015). Low condom use among older adults is not a concern only in the U.S. (Houle et al., 2018). Research comparing sexual behavior and HIV risk among rural South Africans found that HIV-positive older adults reported higher condom use than HIV-negative older adults (Houle et al., 2018). Investigators also found that only 55% of the sample reported having had a test for HIV (Houle et al., 2018).

Although low-risk perception contributes to older adults' sexual risk behaviors, substance use, mental health disorders, poverty, and lower education levels are considered barriers to HIV testing (Aholou et al., 2016; Blake et al., 2017; Ompad et al., 2016). HIV risk has been linked to mental health, illicit drug use, and alcohol use (McCabe et al., 2017). Continued risk behaviors,

therefore, increase the likelihood of HIV transmission among the older adult population (Lovejoy et al., 2015; Wing, 2016). The results from a study of 95 older PLWH found that 48% of respondents reported illicit drug use within the past 12 months (Ompad et al., 2016).

Sex Differences and HIV Health Behaviors

Gender alone does not increase risk for HIV (Robillard et al., 2017). However, cultural and societal factors provide insight into sex-based differences and similarities of HIV testing and risk behaviors (Nydegger & Claborn, 2020; Odlum et al., 2019). Dai and Meyer (2019) observed that in a sample of women aged 65 and older, 10.3% of heterosexuals, 25% of lesbians, and 11.8% of bisexuals reported an HIV test. For men in the same age group, 16.3% of heterosexuals, 66.7% of gays, and 26.1% of bisexual reported at least one test for HIV (Dai & Meyer, 2019).

Connell's (1987) TGP provides a unique framework for understanding HIV risk behaviors in women and men (Wingood & DiClemente, 2000). According to Carmack et al. (2020), the TGP has been widely used in studies concerning sexual decision-making in women. The theory is also based on the premise that (a) the sexual division of labor, (b) the sexual division of power, and (c) cathexis, or social norms explain gender inequalities at both societal and institutional levels (Carmack et al., 2020; Wingood & DiClemente, 2000). Carmack et al. also indicated that drug and alcohol abuse are behavioral risk factors that exert power over a woman's ability to create change. For instance, women are more likely to participate in unsafe sexual behaviors when they lack the power to negotiate condom use and lack the ability to change certain sexual situations (Carmack et al., 2020).

Scholars contend women are at a disadvantage when receiving quality healthcare (Plaza, 2020; Read et al., 2016). According to Plaza (2020), women are more vulnerable to gender-

biased diagnosis than are men. Older women living in rural areas were 30% less likely than those living in urban areas to have received HIV screening after reaching the age of 45 (Tillman & Haley, 2015). Healthcare professionals are also more likely to dismiss women's symptoms as psychosomatic, causing mutual distrust between clinicians and patients (Plaza, 2020).

Men and women engage in increased HIV risk behaviors when they experience a higher need for mental health support and have lower social support (Fang et al. 2019; Read et al., 2016). Fang et al. (2019) analyzed BRFS data from 2016 of 33,705 individuals assessing mental health status, social support, and HIV risk behaviors. They found that 40.3% of females indicated a higher need for mental health, compared to 29.5% of males (Fang et al., 2019). In addition, 10.8% of males responded that they received low levels of social support, compared to 7.9% of females (Fang et al., 2019).

Reidy et al. (2016) noted that due to gender norms and social beliefs, women tend to internalize and express their problems through depressive and anxiety disorders. Gender roles are typically society's expectations and standards about how men and women should appropriately behave. Men tend to externalize stress by engaging in more risky behaviors, such as alcohol and drugs (Fang et al., 2019; Read et al., 2016). Researchers suggested that masculine gender roles influence their risk behaviors (Reidy et al., 2016). The researchers also indicate that men who perceive themselves in traditionally masculine gender roles are less likely to use condoms, have a higher number of sexual partners, and are less likely to access medical care.

Men may also increase their HIV risk behaviors when experiencing discrepancy stress (Reif et al., 2016). Discrepancy stress occurs when a man fails to conform to society's masculine gender role. Scholars posited that when a man does not perceive himself to be sufficiently masculine, he may be more likely to validate his masculinity by engaging in unprotected sex and

using drugs and alcohol (Reif et al., 2016). Carrillo and Hoffman (2016) conducted a study on 100 men who self-identified as heterosexual, heteroflexible, and bisexual, rather than MSM. All the study participants were sexually active with both men and women and perceived themselves as very masculine and straight. However, secretive same-sex risk behaviors placed their partners at higher risk for contracting HIV (Carrillo & Hoffman, 2016).

Substance use also plays an important role in increasing sexual risk behaviors (Whittle et al., 2019). Scholars argued that there is a trans-directional relationship between substance use and sexual behaviors (Nydeggar & Claborn, 2020; Whittle et al., 2019). At-risk women are more likely to use alcohol and illicit drugs to cope with social and structural challenges (Nydeggar & Claborn, 2020; Whittle et al., 2019). Gender-based violence, unprotected sex, and transactional sex become worse with substance use (Whittle et al., 2019). Women experiencing intimate partner violence find it difficult to negotiate condom use with their partner (Nydeggar & Claborn, 2020; Whittle et al., 2019). At-risk women experiencing housing instability, food insecurity, and lack of income engage in transactional sex in exchange for shelter, money, and drugs (Nydeggar & Claborn, 2020).

Studies also show that after alcohol and drug use, economic dependence increases women's vulnerability to HIV risk behaviors (Odlum et al., 2019). A focus group study among 60 Dominican American women found that in some cases male partners must put money on the table each morning before leaving. Otherwise, the woman would not sleep with him. Some women felt it necessary to sleep with their partner out of financial necessity (Odlum et al., 2019). Scholars maintain that gender inequality, economic dependency, and relationship dynamics affect women's HIV sex risk behaviors (Odlum et al., 2019; Robillard et al., 2017).

Summary

HIV prevention and testing are critical components in reducing the transmission of the disease (Elgalib et al., 2018). Evidence consistently supports the assessment that older adults are more vulnerable to late-stage HIV diagnoses (Ford et al., 2015; Krueger et al., 2019). A weakness of the literature appears to be that not many studies consider only the 65 and older population (Tillman & Hayley, 2015). As a result, much of the data presented consisted of adults aged 50 and older. Since the early 1980s, federal policies related to HIV testing have targeted a younger population (Ford et al., 2015; Jensen et al., 2015). Scholars consistently provided data suggesting that targeted HIV testing strategies have negative implications, such as missed diagnoses, decreased risk perceptions, and increased stigma (Elgalib et al., 2018; Kort et al., 2017).

Most studies considered adults age 50 and older and therefore the current body of research is likely consistent with the CDC's routine HIV testing recommendations. The CDC recommends that individuals aged 13-64, as well as those considered at-risk, receive HIV testing (Jensen et al., 2015). Medicare's HIV testing policy permits coverage for beneficiaries aged 65 years and older if they request an HIV test (Jensen et al., 2015). Medicare also covers HIV testing when the healthcare provider suspects the patient may be at risk (Jensen et al., 2015). It is imperative that Medicare also understands the psychosocial factors that influence the 65 and older population's testing behaviors.

The research provided strong evidence that HIV outreach and education are necessary for Medicare beneficiaries age 65 and older, and Medicare-certified healthcare providers (Ford et al., 2015; Krueger et al., 2019). It is also imperative that older adults and their clinicians become educated on sexual health among the aging population (Syme et al., 2017). Policymakers must

consider the sexual, cultural, and socio-economic differences that contribute to the HIV testing behaviors of older adults (Prati et al., 2015; Wing, 2016). Gender roles can increase both men's and women's substance use and vulnerability to HIV risk (Reidy et al., 2016). Although the number of HIV diagnoses within the U.S. has decreased, adults 65 years and older will remain vulnerable to missed diagnoses until mitigating actions are taken (Ford et al., 2015; Jensen et al., 2015; Tillman & Haley, 2015).

Many of the studies cited in this chapter established the impact of older age (50 and older) on HIV risk behaviors and HIV testing prevalence. In addition, some authors addressed sex differences consistent with the TPG framework. However, a limitation to the TGP framework is that it is exclusive to the heterosexual dyad (Wingood & DiClemente, 2000). While several studies provided data concerning high-risk behaviors among older MSM, those studies did not consider women who slept exclusively with women. Therefore, this quantitative causal-comparative study explored the extent to which there were significant associations between sex and HIV testing risk perception, and HIV risk among *NHIS, Adult Sample File* respondents age 65 years and older.

Chapter 3 details research design strategy and data analysis procedures. The final sections of the chapter include a description of the study's reliability, validity, researcher bias, data collection procedures, and data analysis plan.

Chapter Three: Methodology

The purpose of this quantitative, causal-comparative study was to examine if there were significant associations between sex and HIV testing, risk, and risk perceptions among non-institutionalized adults, 65 years and older. The study independent variable was sex, and dependent variables were HIV testing, HIV risk, and HIV risk perception. The study involved the statistical analysis of healthcare data collected from the *2018 National Health Interview Survey, Sample Adult file*. The *NHIS* data has been widely evaluated by investigators since 1957 and remains a key source of information for monitoring various health aspects of the U.S. population (Blewett et al., 2016). Researchers confirmed that older adults have lower HIV risk perceptions, increased sexual risk, and lower HIV testing prevalence.

Sex alone does not increase or decrease the risk for contracting HIV (Robillard et al., 2017). Cultural and societal factors provide insight into differences and similarities of HIV testing and risk behaviors related to sex (Nydegger & Claborn, 2020; Odlum et al., 2019). Connell's (1987) TGP is based on the premise that the social constructs of labor, power, and cathexis explain gender inequalities on societal and institutional levels (Wingood & DiClemente, 2000). The HBM provided a framework to understand potentially significant associations between sex and HIV testing, HIV risk, and HIV risk perception (Long et al., 2018). However, there is a gap in the literature concerning the HIV behaviors of those 65 and older. This chapter evaluates the research design and rationale, methodology, data analysis plan, and ethical considerations.

Research Design and Rationale

Appropriate research design is the blueprint for effective research (Bloomfield & Fisher, 2019). In this quantitative study, the researcher used a cross-sectional, causal-comparative design

to examine potential relationships of sex to HIV testing, HIV risks, and HIV risk perception among adults 65 years and older. The 65+ population is important to this study because Medicare coverage eligibility begins at age 65 (with certain exceptions) and the population no longer falls within the CDC's recommended age span (13-64 years) for HIV testing. According to Goodman et al. (2020), selecting the appropriate research design, sample, and data collection relate to research questions and hypotheses. This researcher sought to answer research questions regarding the association between sex and HIV testing, HIV risk perceptions, and HIV risk among adults 65 years of age and older.

Cross-Sectional Design

According to Cowell (2020), cross-sectional studies in healthcare typically identify factors associated with health, health behaviors, or health risk. Cross-sectional studies differ from longitudinal studies based on time (Creswell & Creswell, 2017). Data from cross-sectional studies are from a specific point in time, whereas data collected for longitudinal studies are collected occur over a period and require multiple measures taken (Creswell & Creswell, 2017). Additionally, cross-sectional studies allow inferences based on existing differences between subjects (Creswell & Creswell, 2017).

Causal-Comparative Design

Both causal-comparative and correlational designs emphasize relationships among two or more variables in non-experimental research (Creswell & Creswell, 2017; Ket'pi, 2017; Miksza & Elpus, 2018). However, there are fundamental differences to consider when selecting an appropriate study design (Creswell & Creswell, 2017; Miksza & Elpus, 2018). For instance, researchers conducting causal-comparative designs cannot manipulate the independent variable, while correlational studies do not allow any variable to be manipulated (Creswell & Creswell,

2017; Ket'pi, 2017). Correlational research measures the directional change and strength of relationships (Rezigalla, 2020). Causal-comparative design measures the effects of the independent variable on the dependent variables (Blair, 2016; Creswell & Creswell, 2017; Salkind, 2010). Lastly, causal-comparative research includes groups that are pre-existing or naturally formed, rather than randomly assigned groups (Creswell & Creswell, 2017; Miksza & Elpus, 2018).

Rationale

The study used a cross-sectional, causal-comparative design because the researcher will be gathering secondary data from the *2018 NHIS* without altering the study setting. Findings from the *NHIS* reflect a particular moment in time. Therefore, any previous or future *NHIS* responses to the same questions may be inconsistent with the results of this cross-sectional study. Understanding the statistical significance of associations between sex and the dependent variables among traditional Medicare-age individuals is increasingly important, as this group remains at risk for having late-stage HIV (Abara et al., 2014; Solomon et al., 2014; Ware et al., 2018). Finally, the findings from this study could serve as a baseline to support future cross-sectional studies, as well as longitudinal and experimental research concerning HIV and adults 65 years and older.

Research Questions and Hypotheses

As previously stated, limited research exists concerning HIV testing and HIV risk behaviors among older adults (Pilowsky & Wu, 2015; Syme et al., 2017). Further, although Medicare covers annual HIV testing in some situations, patients' risk perception and actual risk behaviors may hinder testing opportunities for those most susceptible to contracting the illness. Furthermore, examining relationships between sex and HIV testing, HIV risk perception, and

HIV risk among adults 65 years and older, could ultimately result in fewer late-stage diagnoses, and point out the need for Medicare policy reform. Three research questions examine these relationships:

RQ1. To what extent is there a significant association between sex and HIV testing prevalence among adults 65 years and older?

$H_0$1: There is no significant association between sex and HIV testing prevalence among adults 65 years and older.

H_a1: There is a significant association between sex and HIV testing prevalence among adults 65 years and older.

RQ2. To what extent is there a significant association between sex and actual HIV risk among adults 65 years and older?

$H_0$2: There is no significant association between sex and actual HIV risk among adults 65 years and older.

H_a2: There is a significant association between sex and actual HIV risk among adults 65 years and older.

RQ3. To what extent is there a significant association between sex and HIV risk perceptions among adults 65 years and older?

$H_0$3: There is no significant association between sex and HIV risk perceptions among adults 65 years and older.

H_a3: There is a significant association between sex and HIV risk perceptions among adults 65 years and older.

Methodology

Obtaining a foundational knowledge of the three research methods (quantitative, qualitative, and mixed-methods) is important when determining which approach is most appropriate (Hamed, 2016; Roberts, 2010). Roberts (2010) emphasized that a research method should align with the study's problem, purpose, theory, and type of data. Qualitative research allows researchers to gain insight by collecting subjective data (McGrath et al., 2019). It also encourages the emergence of new themes or phenomena (Creswell & Creswell, 2019). Quantitative research, on the other hand, is objective, numerically based to test hypotheses, and designed to predict cause-and effect relationships or describe trends and phenomena (Creswell & Creswell, 2019; McGrath et al., 2019). A mixed-methods approach combines both quantitative and qualitative research and adds richness and depth to a study (Creswell & Creswell, 2019; Roberts, 2010). However, the strengths and weaknesses of the three research methods, as well as practical constraints of time and money, determined the most appropriate research method for this study.

Quantitative Method Rationale

Quantitative research uses numerical data collected from questionnaires and survey instruments (Creswell & Creswell, 2017). A quantitative research method was ideal for this study, as secondary data were collected from the *NHIS*. Although qualitative research could help identify underlying themes regarding study variables, research questions and hypotheses, the study's variables and using the *NHIS* instrument support a quantitative approach. Therefore, this study used this method to answer the research questions by measuring the association between sex and HIV testing, HIV risk, and HIV risk perception among adults 65 years of age and older.

Participants

The *2018 NHIS, Adult Sample File* consists of 25,417 publicly available records. Knowledgeable proxies provided responses for 388 individuals. The Sample Adult component response rate was 83.9%. However, the final response rate for the Sample Adult component was 53.1%. Included is health information from non-institutionalized individuals 18 years and older (NHIS, 2019). Missing is data from homeless individuals, active-duty military, civilians living on military bases, individuals in long-term care facilities, detained individuals, and U.S. nationals living abroad (NHIS, 2019).

Sampling Plan

The normal annual sample size beginning in 2016 was approximately 87,500 individuals. The 2018 *NHIS* sample was slightly lower to accommodate a bridge sample between 2018 and the 2019 redesign. Approximately half of the sample in quarter four received the 2018 version and the remaining sample received the initial redesigned *NHIS*. The bridge sample was not included in the 2018 *NHIS* sample size total or response rates. Therefore, the 2018 *NHIS* data contains a population of 72,831 individual records.

During the sample selection process, Black, Hispanic, and Asian individuals age 65 and older are oversampled to increase the precision of estimates for the groups. The 2018 *NHIS, Adult Sample File* reported 7,297 respondents were 65 years and older. The sample consists of 3,049 males and 4,248 females and analyzed for possible associations between independent and dependent variables.

Operationalization of Variables

This researcher sought to determine significant associations between sex and HIV testing, HIV risk, and HIV risk perception among adults 65 years and older. The findings could help guide future research regarding sex-specific HIV health behaviors in the Medicare population.

HIV testing was a dependent variable in this study. According to the Kaiser Family Foundation (2016), routine HIV testing is critical for prevention and treatment of HIV among vulnerable populations. Adults 50 years of age and older are less likely to receive HIV testing (CDC, 2020; Olivera-Moreno & Trapero-Bertran, 2018). The number of adults 50 years and older, living with HIV is growing, which could increase the likelihood of disease transmission among the older population (NIA, 2017). One question from the survey related to HIV testing (see Appendix A). Responses were recoded as "yes" or "no" to measure if respondents for this study had ever been tested for HIV. Responses that were coded as "refused," "not ascertained," and "don't know" were omitted from this study because these responses did not meet the inclusion criteria.

HIV risk was the second dependent variable, which was measured with four questions from the *NHIS* (see Appendix A). Two of the questions were sex-specific and used as ad hoc information in the study. Those questions included male respondents who identified as MSM and female respondents who within the past three years tested positive for HPV, an STI that can cause cervical cancer (NHIS, 2019). The final two questions were combined and recoded into one. The responses included respondents with past or current frequent, moderate, or heavy alcohol use, as well as those who tested positive for hepatitis. The omitted responses included lifetime abstainers, as well as past and current infrequent, unknown, and light frequency drinkers.

Sexual risk behaviors for contracting HIV have been linked to mental health, illicit drug use and alcohol use (McCabe et al., 2017). As such, risk behaviors increase the likelihood of HIV transmission among older adults (Lovejoy et al., 2015; Wing, 2016). In addition, men who sleep with men are a high-risk group (Elgalib et al., 2018; Knight et al., 2014). Although some researchers consider STI prevalence a risk factor for HIV transmission (Heudebert et al., 2019), Medicare considers individuals who contracted or request testing for other STIs to be at risk (CMS, 2015). Therefore, the risk variable was recoded to determine if the respondent had "any" (or at least one) and "no" risk for HIV.

The final dependent variable for this study was risk perception. Perceived susceptibility refers to the belief in one's likelihood of getting a certain disease or illness (Leidel et al., 2017). Risk perception can be classified as low (optimistic) or high (pessimistic) (Ferrer & Klein, 2015). One question was derived from the survey (see Appendix A), which was recoded to allow "any" (or at least one) and "no" risk perception responses. Responses stating, "It's unlikely you've been exposed to HIV," were recoded as having "No" risk perception. Responses such as: "You didn't want to think about HIV or about being HIV positive;" "You were afraid of losing job, insurance, housing, friends, family, if people knew you were positive for AIDS infection;" "You were worried your name would be reported to the government if you tested positive;" and "You were afraid to find out if you were HIV positive (that you had HIV)" were recoded as having "Any" perception of risk. The remaining responses were excluded from the analysis, as they did not indicate having any or no risk perception. Ultimately, recoding the responses into nominal data allowed descriptive statistics and chi-square analysis to answer the research questions and test the hypotheses. The chi-square test of independence was appropriate to examine if significant associations existed between sex and HIV testing, HIV risk and HIV risk perception.

Data Collection Instrument

Questionnaires and surveys with closed-ended questions are the most common quantitative data collection tools (Creswell & Creswell, 2017). The instrumentation used for this study was the *2018 NHIS, Adult Sample File*. The *NHIS* is an annual cross-sectional survey conducted by the CDC's National Center for Health Statistics (NCHS) (NHIS, 2019). Throughout the year, 2018 NHIS data were collected by using computer-assisted personal interviewing (CAPI). Trained interviewers conducted face-to-face interviews in the homes of respondents and entered responses directly into their laptops.

Telephone interviews were done if requested by a respondent, or when weather conditions prevented a face-to-face interview. All information collected by NHIS was strictly confidential in accord with Section 308(d) of the *Public Health Service Act* (42 U.S.C. §242), which prevents disclosing information that may compromise the confidentiality promised to survey respondents. This study included survey questions from the *NHIS* that were selected and recoded as described above. Questions related to secondary data coincided with the research variables, research questions, and study design. They also ensured the reliability and validity of the study.

Validity

Reliability and validity are essential in quantitative research to demonstrate a study's rigor and trustworthiness. Validity ensures that a measurement tool actually measures what is expected (Creswell & Creswell, 2017). The *NHIS* interviewers assessed for validity by utilizing range and consistency checks, which could be programmed into the CAPI system to prevent numerical errors. In the event an out-of-range value was erroneously entered, an error code would appear, as when an interviewer might mistakenly enter a respondent's age as 670 years

instead of 67 years. In addition to built-in checks, data cleaning was essential. The data cleaning process included verification of the number of cases in the data files, frequency counts, and deleting invalid values.

Reliability

Reliability ensures that an instrument can produce accurate and consistent numerical data (Creswell & Creswell, 2017). The NHIS uses a complex cluster sampling design to provide a representation of the non-institutionalized U.S. population. *NHIS* data were weighted for proper analysis to ensure reliable estimates (NHIS, 2019). The *Sample Adult* final weight (WTFA_SA) was also adjusted for post-stratification, design, ratio, and nonresponse. Unweighted *NHIS* data may result in significantly biased estimates (NHIS, 2019). However, to ensure reliability in this study, Cronbach's alpha coefficient was used during data analysis to ensure consistent and trustworthy results. The Cronbach's alpha coefficient of reliability range is from zero to one (McLeod, 2019). This study used an alpha coefficient of .05 indicating a 5% margin of error. Additionally, alpha = .01 was used to test if any statistically significant findings at the .05 level were also found to be statistically significant at the .01 level.

Data Analysis Plan

This data analysis plan supported a quantitative, cross-sectional, causal comparative approach (Creswell & Creswell, 2017; Ket'pi, 2017; Miksza & Elpus, 2018). Data from the survey for a secondary analysis were examined for significant associations between the variables. Secondary data analysis used the *Statistical Analysis Software* (SAS) program. The *Adult Sample File* dataset was downloaded from the CDC's *NHIS* public website.

After uploading the data file into *SAS*, the file was examined for data inconsistencies, outliers, and missing values. Data were then recoded and categorized by variable. Frequency and

percentages were calculated on nominal (categorical/dichotomous) data and mean/standard deviations were calculated for the independent variable. Chi-square analyses addressed the research questions and hypotheses in this study. Table 2 includes the applicable variable, level of measurement and statistical analysis conducted for this study and illustrates the applicable variable, level of measurement and statistical analysis conducted for this study.

Table 2

Data Analysis Plan Description

Research Question	Dependent Variable	Independent Variable	Level of Measurement	Statistical Analysis
RQ1: To what extent is there significant association between sex and HIV testing prevalence among adults 65 years and older?	HIV Testing	Sex	Nominal: response to measure whether the population had ever tested for HIV.	Chi-square
RQ2: To what extent is there significant association between sex and HIV risk among adults 65 years and older?	HIV Risk	Sex	Nominal: Combined two variables and recoded into 1	Chi-Square
RQ3: To what extent is there significant association between sex and risk perception among adults 65 years and older?	HIV Risk Perceptions	Sex	Nominal: Dichotomous responses to measure whether the population has HIV risk perception or no HIV risk perceptions.	Chi-Square

Summary

Medicare beneficiaries who are 65 years and older are not offered routine HIV testing unless they specifically ask for a test (risk perception) or are deemed at risk (actual risk) for HIV

(CMS, 2015; Cuenca & Kapsner, 2019). However, studies have shown that older adults and their healthcare providers miss testing opportunities due to the lack of HIV education and outreach (Ford et al., 2015; Krueger et al., 2019). The literature review provided insight concerning sex differences in HIV risk perception, risk behaviors and HIV testing in older adults. However, no studies were found that provide the extent, if any, of associations between sex and HIV testing, risk perception, and risk behaviors among adults age 65 years and older.

The purpose of this quantitative, causal-comparative study was to examine if there were significant associations between sex and HIV testing, HIV risk, and HIV risk perception among non-institutionalized adults 65 years and older. The study used statistical analysis of healthcare data collected from the *2018 National Health Interview Survey, Sample Adult* file. The collection and analysis of data for this study provided answers to the three research questions. The results of this study also provide insight to Medicare HIV policy decision makers concerning HIV testing among the older population and add to the literature concerning HIV testing behaviors of Medicare-aged adults.

Chapter 4 includes the results of the quantitative data analysis. An explanation and description of the statistical analysis is included, along with a discussion that addresses the research questions and hypotheses.

Chapter Four: Data Collection and Analysis

The purpose of this quantitative, causal-comparative study was to examine if there were significant associations between sex and HIV testing, HIV risk, and HIV risk perception among non-institutionalized adults, 65 years and older. This secondary, cross-sectional study was a causal-comparative quantitative analysis of the 2018 NHIS, Sample Adult File. The study was guided by a modified HBM) and TGP. The independent variable in this study was sex. The three dependent variables were HIV testing, HIV risk, and HIV risk perception. The following research questions helped to guide the analysis of this study.

The research questions for this study were:

RQ1. To what extent, is there a significant association between sex and HIV testing prevalence among adults 65 years and older?

$H_0$1: There is no significant association between sex and HIV testing prevalence among adults 65 years and older.

H_a1: There is a significant association between sex and HIV testing prevalence among adults 65 years and older.

RQ2. To what extent, is there a significant association between sex and actual HIV risk among adults 65 years and older?

$H_0$2: There is no significant association between sex and actual HIV risk among adults 65 years and older.

H_a2: There is a significant association between sex and actual HIV risk among adults 65 years and older.

RQ3. To what extent, is there a significant association between sex and HIV risk perceptions among adults 65 years and older?

$H_0$3: There is no significant association between sex and HIV risk perceptions among adults 65 years and older.

H_a3: There is a significant association between sex and HIV risk perceptions among adults 65 years and older.

This chapter reviews the research questions and hypotheses for this study. The following sections include descriptions of the data collection approach, the descriptive statistics for the sample, and the results from the statistical analysis.

Data Collection and Analysis

Descriptive statistics were provided to ascertain the characteristics of the independent variable and the dependent variables. The secondary data for this study were collected from the 2018 NHIS, Sample Adult File. Since the NHIS uses a complex sampling design to provide a representation of the non-institutionalized U.S. population, the 2018 NHIS data were weighted for proper analysis. The data were uploaded into SAS (SAS® Studio). The frequency counts for each variable were compared with the frequency counts reported by the 2018 NHIS to ensure full data were captured. After confirming the accuracy of the data, the variables for this study were selected and re-coded for chi-square test for independence statistical analysis. Since no hypothesis test is 100% accurate, this study used a confidence level of 95% and a 5% margin of error (McLeod, 2019). Therefore, significance of statistical tests was determined at the .05 alpha level. However, statistically significant results were also found at the .01 alpha level, indicating that there was less than 1% probability that the null was correct.

Descriptive Statistics

The population included 25,417 Sample Adult respondents; 11,550 males and 13,867 females were included. As shown in Table 3, the total unweighted sample size was 7,297

individuals. It is important to note that the 2018 NHIS' weighted estimate for this sample is 51,410,017. The study sample consisted of 3,049 males and 4,248 females who satisfied the inclusion criteria of being 65 years and older. Selection bias was examined by a running a chi-square goodness-of-fit test on the independent variable, sex. The results revealed a significant difference in the proportions of men and women, X^2 (1, N = 7297) = 73.0, p < .001. This suggests that selection bias may exist, which limits the generalizability of the findings to other populations. It is interesting to also observe that the overall mean age was 73.65 years. The mean age for male respondents was 73.17 years and 74.04 years for female respondents.

Table 3

Results from Chi-Square Goodness-of -Fit Test to Assess Selection Bias by Sex of All Adults 65 Years and Older Using 2018 NHIS, Adult Sample File

	n	%	Weighted Estimates	*M* Age (years)	X^2 *p* value
Sample size	7297		51,410,017		
Sex					
Male	3049	45.00	23,133,111	73.17	< .0001
Female	4248	55.00	28,276,906	74.04	

Note. Statistical results are based on weighted estimate.

HIV Testing

Table 4 includes the data for the study's dependent variables. The dependent variables include HIV testing, HIV perception of risk, and HIV risk. The HIV testing variable included 6,931 participants who responded as either ever receiving an HIV test or never receiving an HIV test (except for tests as part of blood donations). A total of 366 responses were excluded from the

data analysis. Survey participants who refused to respond or did not know if they had ever been tested were omitted, as well as responses that were not ascertained. The results revealed that 22% of respondents received an HIV test at least once in their lifetime, whereas 78% reported never receiving an HIV test.

HIV Risk Perception

Respondents who have never been tested for HIV were provided a list of reasons for not testing. A total of 2,761 respondents were excluded from the analysis. Responses such as not knowing where to test, not liking needles, no particular reason for not testing, refusing to respond, and answers not obtained were excluded. The remaining 4,536 respondents were included. Nearly 100% of individuals believed it was unlikely that they have ever been exposed to HIV. Less than a half a percent (0.37%) exhibited any indication of having HIV risk perceptions.

HIV Risk

Concerning the HIV risk variable, two questions pertaining to alcohol use and hepatitis were individually recoded to create two nominal responses. The variables were then combined to create a composite risk variable. The data in the resulting risk variable were analyzed. Before the analysis of the risk sum, the individual risk factors were analyzed. Of 7,201 respondents, 28% exhibited alcohol risk behaviors; 72% did not exhibit alcohol risk behaviors. Data analysis also revealed that approximately 4% of the 7,197 respondents had a hepatitis diagnosis. Remarkably, 96% did not present the individual risk factor. The risk sum-ratio indicated that approximately 30% of respondents exhibited at least one HIV risk factor. The remaining 70% did not. Although not included in the HIV risk variable data analysis, it is interesting to note two additional sex-specific HIV risk factors. Approximately 11% of female respondents reported being diagnosed

with the sexually transmitted infection (STI), Human papillomavirus (HPV). Two percent of the male respondents were men who sleep with men (MSM).

Table 4

Dependent variables characteristics of all adults 65 years and older using 2018 NHIS, Adult Sample File

Dependent Variables	*n*	*Weighted estimate*	*%*
HIV Testing	6931	48,895,081	--
Yes	1560		22.02
No	5371		77.98
HIV Perception of Risk	4536	32,065,396	--
No	4517		99.63
Any	19		0.37
HIV Risk	7297	51,410,017	--
Yes	2237		30.37
No	5060		69.64
HIV Risk 1: Alcohol	7201	50,766,628	--
Yes	2047		28.06
No	5154		71.94
HIV Risk 2: Hepatitis	7197	50,661,941	--
Yes	286		3.90
No	6911		96.11
*HIV Risk 3: Abnormal Pap Smear	1371	9,809,929	--
Yes	147		11.45
No	1224		88.55
**HIV Risk 4: MSM	2969	22,553,167	--
Yes	64		1.67

No	2905	96.11

Note: Total n=7297.
**HIV Risk 3: Abnormal Pap Smear (Not included in final analysis).*
***HIV Risk 4: MSM (Not included in final analysis).*

Sex Differences

Stratified by sex, Table 5 shows the distribution of HIV testing, HIV risk perception and HIV risk among the study sample. Concerning HIV testing, 24% of men reported receiving an HIV test, whereas 20% of females reported receiving an HIV test. Conversely, 76% of men and 80% of women reported as never receiving an HIV test. Interestingly, both men and women equally reported as perceiving themselves to not be at risk for HIV. Nearly 100% of both men and women reported that they were unlikely to be exposed to HIV. Data analysis revealed that 41% of men had at least one HIV risk factor compared to 22% of women. Lastly, 59% of men and 78% of women did not report any factors as increasing the risk of contracting HIV.

Table 5

Results from Chi-Square Test for Independence on Sex Differences in HIV Testing, HIV Risk and HIV Risk Perception

	Male		Female				
Variables	*%*	*n (weighted estimate)*	*%*	*n (weighted estimate)*	df	Rao-Scott Chi-square	*p value*
HIV Testing					1	12.390	<.0001
Yes	24.30	749 (5,354,455)	20.14	811 (5,412,112)			
No	75.70	2152 (16,671,436)	79.86	3219 (21,457,078)			
HIV Risk Perception					1	0.0004	.984

No		1820		2697			
	99.63	(13,981,405)	99.63	(17,965,926)			
Any		7		12			
	0.37	(51,980)	0.37	(66,085)			
HIV Risk					1	245.410	<.0001
Yes		1283		954			
	40.98	(9,480,256)	21.68	(6,129,036)			
No		1766		3294			
	59.02	(13,652,855)	78.32	(22,147,870)			

Note. Statistical results are based on weighted estimate. Variables that are in bold are statistically significant (α =.01 and .05).

Statistical Analysis and Hypothesis Testing

Statistical Assumptions

The chi-square test for independence was used in this study to determine if there were significant associations between sex and HIV testing, HIV risk and HIV risk perception. The sample size was adequate as it contained greater than five frequencies in each cell (Verma & Abdel-Salem, 2019). The observations in each group were independent, and the expected frequencies appeared only once (Verma & Abdel-Salem, 2019). Therefore, all assumptions for the chi-square test were met.

Research Question One

Research question one was, “To what extent is there significant association between sex and HIV testing prevalence among adults 65 years and older?” The following null hypothesis was tested: “There is no significant association between sex and HIV testing prevalence among adults 65 years and older.” A chi-square test for independence accomplished this by showing the statistical significance of association between sex and HIV testing. There was a significant

association between sex and HIV testing prevalence among adults 65 years and older, X^2 (1, N = 6931) = 12.39, $p < .001$. The null hypothesis was rejected, therefore there was significant association between sex and HIV testing among adults 65 years and older. Testing prevalence was more frequent among men (24.3%) than women (20.1%).

Research Question Two

Research question two was, "To what extent is there significant association between sex and HIV risk among adults 65 years and older?" The following null hypothesis was tested: "There is no significant association between sex and HIV risk among adults 65 years and older." A chi-square test for independence examined the statistical significance associations between sex and HIV risk. There was a statistically significant association between sex and HIV risk among adults 65 years and older, X^2 (1, N=7297) =245.41, $p < .001$. The null hypothesis was rejected, as there was significant association between sex and HIV risk among adults 65 years and older. Men (40.9%) were almost twice as likely to have at least one HIV risk compared to women (21.6%).

Research Question Three

Research question three was, "To what extent are is there significant association between sex and HIV risk perception among adults 65 years and older?" The following null hypothesis was tested: "There is no significant association between sex and HIV risk perception among adults 65 years and older." A chi-square test for independence examined the statistically significant association between sex and HIV risk perception. There was no statistically significant association between sex and HIV risk perception among adults 65 years and older, X^2 (1, N = 4536) = 0. 0004, p = .9843. The null hypothesis was accepted, as there was no significant

association between sex and HIV risk perception among adults 65 years and older. Men (99.6%) and women (99.6%) reported equally as having no HIV risk perception.

Summary

Chapter 4 included the results of this quantitative, cross-sectional causal-comparative design study for sex associations between HIV testing, HIV risk and HIV risk perception among adults 65 years. The data for this study were uploaded, recoded to nominal responses, and analyzed in SAS. The data analysis included descriptive statistics and chi-square analysis addressing each research question. and older. The chapter examined secondary data from the 2018 NHIS, Adult Sample File. The significance levels were set at .05, however analysis also revealed significance at the .01 level. Table 3 included the characteristics of the independent variable, which indicated a significant sex difference in the sample. The 7,297-sample size consisted of all adult respondents 65 years and older. The overall mean age was 73.65 years. The results of a chi-square goodness-of-fit test revealed a 10% difference in the proportion of men (45%) and female (55%) participants. The study centered on three research questions,

1. To what extent, is there a significant association between sex and HIV testing prevalence among adults 65 years and older?
2. To what extent, is there a significant association between sex and actual HIV risk among adults 65 years and older?
3. To what extent, is there a significant association between sex and HIV risk perceptions among adults 65 years and older?

Table 4 displayed characteristics of the dependent variables, HIV testing, HIV risk perception and HIV risk. It also included ad hoc findings for two sex-specific risk factors, Abnormal Pap Smears and MSM. 11% of female respondents reported an abnormal Pap Smear

due to HPV, whereas only 1.7% of men reported as sleeping with other men. Table 5 revealed results from the Chi-square statistical analysis. The results revealed that 22% of respondents received an HIV test in the past and 78% have not.

The findings for research question one revealed a statistically significant association between sex and HIV testing. The HIV testing prevalence among males (24.3%) were approximately 4% greater than that of females (20.1%). Findings for research question two also revealed a statistically significant association between sex and HIV risk. Men (40.9%) were almost two times as likely to report as having at least one risk when compared to females (21.6%). Lastly, findings for research question three revealed no statistically significant association between sex and HIV risk perception as approximately 99.6% of males and 99.6% of females lacked HIV risk perception.

Chapter 5 includes a detailed discussion of the key findings. The findings are evaluated in the context of the HBM as well as the TGP. The findings are also examined for consistencies with the current body of literature, as evaluated in Chapter 2. Lastly, includes the limitations, recommendation for future research, and implications for Medicare policy change.

Chapter Five: Conclusions and Recommendations

The purpose of this quantitative, causal-comparative study was to examine possible significant associations between sex and HIV testing, risk perception, and risk among non-institutionalized adults 65 years and older. The HBM was the framework for selecting the study's dependent variables. To understand the influences that contributed to sex differences, the theory of gender and power was applied. As stated in Chapter 2, a limitation of the theory is its use of only the heterosexual dyad. However, this study also addressed factors that pertained to non-heterosexuals. Chi-square tests were conducted to determine if associations between the independent and dependent variables were significant.

Interpretation of Findings

Research Question 1

The first research question asked the extent to which there were significant association between sex and HIV testing prevalence among adults 65 years and older. It was hypothesized that there was a significant sex difference in HIV testing. Consistent with the literature, the results from a chi-square test for independence indicated statistical significance. Therefore, H_{1a} was accepted.

Findings from this study support results from similar studies concerning HIV testing and older adults. A longitudinal study by Ford et al. (2015) found that only 16% of adults aged 60-64 had ever taken an HIV test, compared to 22% of respondents in this study. Although the respondents in Ford's et al.'s study were within the CDC's age range for routine HIV testing recommendations, the low HIV testing prevalence is consistent with results from this study. Results from this study support Ford's et al. findings of minimal testing among older adults. This is an ongoing concern that has not been adequately addressed.

This study supported the alternate hypothesis that there was significant association between sex and HIV testing prevalence among adults age 65 years and older. The study findings revealed that 24% of men, compared to 20% of women, reported receiving an HIV test. Additionally, 76% of men and 80% of women in this study reported that they had not received an HIV test in their life. A study conducted by Dai and Meyer (2019) revealed that only 10% of older heterosexual women and 16% of heterosexual men reported having an HIV test.

Although the two studies were similar in that men had a higher HIV testing prevalence than did women, it is important to understand the reasons for this. Kalseth and Halvorsen (2020) stated that women use healthcare more often than do men. This may be because women have historically had difficulty accessing quality healthcare compared to men (Plaza, 2020; Read et al., 2016).

Research Question 2

The second research question asked the extent to which there were differences in HIV risk among adults 65 years and older based on sex. A chi-square test rejected the null hypothesis and revealed that there was a statistically significant difference. Therefore, H_{2a} was accepted. The risk data analyzed by the chi-square test included hepatitis diagnosis and alcohol use. As this was a secondary data analysis, the survey questions and responses selected for the risk variable were limited.

Although the *2018 NHIS, Adult Sample File* did not specifically ask respondents about their STI history, the risk variable in this chi-square test included only data pertaining to a hepatitis diagnosis, an STI, as well as alcohol use. However, a diagnosis of hepatitis does not include all STIs. While the *NHIS* contained data pertaining to HPV in women, and men who

sleep with men, they were not included in the chi-square analysis because they could not be equally compared with differences in sex.

This finding was not fully supportable in the literature, in part due to a limitation in available data. In addition, other researchers considered sexual behaviors, such as condom use and MSM, as HIV risks (Houle et al., 2018; Lovejoy et al., 2015; Prati et al., 2015). Medicare considers sexually transmitted infections and MSM to be increased risk factors for contracting HIV (CMS, 2015). In addition, HIV risk has been linked to mental health, illicit drug use, and alcohol use (Carrillo & Hoffman, 2016; Ford et al., 2015; McCabe et al., 2017). Societal gender roles, mental health, and cultural differences also influence risk (Fang et al., 2019; Read et al., 2016; Reif et al., 2016; Whittle et al., 2019). It is interesting to note that men were almost twice as likely to have at least one factor increasing HIV risk (41% versus 22%).

Research Question 3

The third research question asked the extent to which there was association between sex and HIV risk perceptions among adults 65 years and older. A chi-square analysis accepted the null hypothesis. There was no statistical relationship between sex and HIV risk perception among adults 65 years and older. Therefore, H_{3a} was not accepted.

Both men (86%) and women (84%) are equal in having no risk perceptions concerning HIV/AIDS. The findings from this study were supported by the current literature. Older adults are generally underserved and not targeted by HIV prevention strategies. This leads to a lack personal awareness and interest in HIV prevention measures, and healthcare providers often fail to discuss HIV risk due to ageist stereotypes (Altschuler & Katz, 2015; Conner et al., 2019; Foster et al., 2015; Syme et al., 2017). This finding suggest that sex differences are minimally important in identifying ways to address the problem.

Limitations of the Study

Chapters 1 discussed a number of limitations and delimitations. Limitations addressed in this chapter are based on factors discovered while analyzing the *NHIS* data and should be considered in the interpretation of findings. First, the dataset included a great deal of missing data. The missing records, as well as responses such as "don't know," were omitted. Also, as mentioned earlier in this chapter, the risk variable did not contain adequate data to either support or not support the literature. Selection bias (using only the 65 and older population) prevented generalizing the findings to other populations (Russell et al., 2019).

Although the specific problem of the study pertained to Medicare's lack of HIV testing coverage for beneficiaries 65 years and older (unless they were deemed to be at risk), there was no indication other insurance in this study. An additional limitation was the inability to determine the timeframe or age at which a respondent received an HIV test or STI diagnosis. This study could not determine the number of times a participant may have tested, or if they were HIV positive at the time the survey was conducted. This is another area for further research.

Recommendations for Further Research

There are several recommendations for future research on HIV and adults aged 65 years and older. Future research could focus on the same variables as this study, but also include additional demographical data such as marital status, level of education, and race/ethnicity. It is important to examine the relationship between certain demographics and HIV testing among the Medicare-age population. Researchers asserted there is a link between an individual's health and socioeconomic level within society (Özdemir & Özdemir, 2019). Individuals with lower skillsets, education, and incomes generally have poorer health compared to individuals with more education and income (Özdemir & Özdemir, 2019). With the addition of more predictor

variables, a future study could use logistic regression models to predict the likelihood of adults 65 years and older having an HIV test based on marital status, level of education, race/ethnicity, risk, and risk perception.

This study relied solely on existing 2018 *NHIS* data and encountered a number of limitations as a result. Thus, future primary studies should continue to explore HIV testing, risk, and risk perceptions of the 65 and older population. Researchers should also carefully examine the methodology, design, and data collection to distinguish if respondents already have HIV, the age of initial diagnosis, and risk behaviors before diagnosis.

A longitudinal, mixed methods design should also be conducted on a cohort of adults 65 years and older who receive HIV education during the study. A mixed methods approach would allow the researcher to obtain a holistic view of both unique and universal challenges that elderly men and women encounter concerning HIV. The information from a longitudinal study may be useful in developing policy, programs, and funding to increase HIV testing prevalence, decrease HIV risk behaviors, and improve HIV risk perception in this population.

Implications of the Study

The results of this study showed that there was statistical significance associating sex and HIV testing and HIV risk in adults 65 years and older. However, there was no association between sex and HIV risk perception, because men and women equally lacked HIV risk perception. Evidence-based research can create changes in policy (Robinson et al., 2021). To date, there are limited studies on HIV and adults 65 years and older (the Medicare population).

According to the CDC's *HIV Surveillance Report* of 2018 (2020), the rate of new HIV diagnoses in adults 65 years and older decreased from 2014 through 2018. The decrease in HIV diagnoses could also indicate lower HIV testing prevalence among the group. The findings from

this study revealed that although men had a higher testing prevalence than did women, the overall sample's HIV testing prevalence was still less than 25% of the sample. Further, men were almost twice as likely to be at risk for contracting HIV.

From 2012-2016, the prevalence of stage 3 HIV infection and AIDS increased by 54% among adults 65 years and older, the largest increase of any age group (CDC, 2020). Though the CDC's (2020) routine voluntary HIV testing recommendation for those 13-64 years remained unchanged since 2006, the Infectious Diseases Society of America recommends that all sexually active adults and pregnant women should receive routine HIV screenings (USPSTF, 2019). Medicare adopted the Preventive Services Task Force (USPSTF) HIV screening recommendations as well for its HIV testing policies (CMS, 2015).

The specific problem in this study was that despite a statutory requirement, Medicare does not offer routine HIV testing to beneficiaries 65 years and older, unless they specifically ask for a test (risk perception) or their provider considers them at risk (actual risk) (CMS, 2015; Cuenca & Kapsner, 2019). The findings from this study revealed that regardless of sex, approximately 85% of the sample lacked HIV risk perception—and an increased likelihood of missed testing opportunities, and late-stage HIV diagnoses. The HBM shows that if people do not consider themselves at risk, or do not understand the benefits of early diagnosis or the severe consequences of late-stage HIV infections, they are less likely to take an HIV test (Champion & Skinner, 2008).

Older age does not preclude individuals from contracting HIV, so it is imperative that this population is able to have routine testing. The American Geriatrics Society (2020) stated that the aging population is growing at a rate that outpaces the supply of geriatricians. As of FY2019, Medicare's HIV expenditures were approximately $11.0 billion, 51% of total federal funding for

HIV/AIDS care (KFF, 2019). HIV-positive Medicare beneficiaries are overwhelmingly male (74%) and have a higher prevalence of co-morbid illnesses (KFF, 2016). According to Jacobsen and Walensky (2017), cost-effectiveness analyses are beneficial to policy-makers in that they allow them to consider how and where to budget funds.

No study was found concerning the cost-effectiveness of HIV testing and prevention strategies for Medicare beneficiaries 65 years and older (Jacobsen & Walensky, 2017; Tran et al., 2019). The complexity of HIV health care challenges requires innovative and flexible health care leaders who can also adapt to and create change (Harden & Fulop, 2015). As more of the HIV population receives Medicare, it may not be feasible for the agency to alter its HIV testing policies. However, there are options for governmental, organizational, and educational decision-makers. For example, findings from a cost-effectiveness analysis of HIV prevention for people who inject drugs in the U.S. suggests that a combination of prevention strategies effectively prevents HIV among the population (Bernard et al., 2017). Those strategies included prevention efforts specific to the population, such as needle exchange programs, HIV treatment for infected individuals, and pharmacological therapy (Bernard et al., 2017).

Findings from this study can follow a similar model to assess cost-effective HIV prevention efforts without HIV testing. Findings from this study revealed an alarming proportion (99.6%) of respondents lacked HIV risk perception. However, the literature provides strong evidence to support targeted, age-specific HIV education resources (Altschuler & Katz, 2015; Conner et al., 2019). Age-specific HIV outreach programs can target the Medicare population. The information could increase their level of HIV knowledge, ability to mitigate risky behaviors, and increase the likelihood of requesting an HIV test when they perceive themselves to be at risk.

In addition to HIV risk, HIV risk perception and testing behaviors resulting from a lack of HIV knowledge needs to be improved using better engagement between older adults and their healthcare providers (Bergeron et al., 2017; Cruz, 2019; Syme et al., 2015). This conclusion was another result of the present study. As patient health outcomes depend on the quality of patient-provider relationships, sex and age-specific HIV training is necessary for Medicare-certified providers. Given the well-documented existence of HIV testing challenges faced by older people, it is imperative for researchers to continue to study the Medicare population in hopes of improving HIV-related outcomes.

References

Adams, L., Stuewig, J., Tangney, J., & Kashdan, T. (2014). Perceived susceptibility to AIDS predicts subsequent HIV risk: A longitudinal evaluation of jail inmates. *Journal of Behavioral Medicine, 37*(3), 511–523. https://doi-org.links.franklin.edu/10.1007/s10865-013-9507-8

Al-Amin, M., Makarem, S. C., & Canose, J. (2016). The effects of hospital-level factors on patients' ratings of physician communication. *Journal of Healthcare Management, 61*(1), 28–43. https://doi-org.links.franklin.edu/10.1097/00115514-201601000-00007

Albarracin, D., Johnson, B., Fishbein, M., & Muellerleile, P.A. (2001). Theories of reasoned action and planned behavior as models of condom use: A meta-analysis. *Psychological Bulletin, 127*(1), 142–161.

Altenstetter, C. (1994). European Union responses to AIDS/HIV and policy networks in the pre-Maastricht era. *Journal of European Public Policy, 1*(1), 413–440.

Allinder, S. (2020). *The world's largest HIV epidemic: South Africa requires an emergency response.* Centers for Strategic and International Studies. https://www.csis.org/features/worlds-largest-hiv-epidemic-0

Althubaiti, A. (2016). Information bias in health research: Definition, pitfalls, and adjustment methods. *Journal of Multidisciplinary Healthcare*, *9*, 211–217. https://doi.org/10.2147/JMDH.S104807

Altschuler, J., & Katz, A. (2015). "Of course, it's relevant!": A focus group study of older adults' perceived importance of HIV/AIDS prevention education. *Qualitative Social Work, 14*(5), 687–701. https://doi-org.links.franklin.edu/10.1177/1473325014566667

American Geriatric Society. (2020). *Geriatrics Workforce by Numbers*. https://www.americangeriatrics.org/geriatrics-profession/about-geriatrics/geriatrics-workforce-numbers

Bandura, A. (1998) Health promotion from the perspective of social cognitive theory. *Psychology & Health, 13*(4), 623–649. doi:10.1080/08870449808407422

Bergeron, C. D., Goltz, H. H., Szucs, L. E., Reyes, J. V., Wilson, K. L., Ory, M. G., & Smith, M. L. (2017). Exploring sexual behaviors and health communication among older women. *Health Care for Women International, 38*(12), 1356–1372. doi:10.1080/07399332.2017.1329308.

Bernard, C. L., Owens, D. K., Goldhaber-Fiebert, J. D., & Brandeau, M. L. (2017). Estimation of the cost-effectiveness of HIV prevention portfolios for people who inject drugs in the United States: A model-based analysis *PLOS MED*, *14*(5), 1–19. https://doi.org/10.1371/journal.pmed.1002312

Blake, B. J., Taylor, G. A. J., & Sowell, R. L. (2017). Exploring experiences and perceptions of older African American males aging with HIV in the rural southern United States. *American Journal of Men's Health, 11(2*), 221–232. doi:10.1177/1557988316662875.

Bradley, H., Rosenberg, E. S., & Holtgrave, D. R. (2019). Data-driven goals for curbing the U.S. HIV epidemic by 2030. *AIDS & Behavior, 23*(3), 557–563. https://doi-org.links.franklin.edu/10.1007/s10461-019-02442-7

Branson, B., Handsfield, H., Lampe, M. A., Janssen, R., Taylor, A., Lyss, S. B., & Clark, J. E. (2006). Revised recommendations for HIV testing of adults, adolescents, and pregnant women in health care settings. *MMWR Morbidity Mortality Weekly Report*, *55*(14), 1–17. https://www.cdc.gov/mmwr/preview/mmwrhtml/rr5514a1.htm

Brooks, J. T., Buchacz, K., Gebo, K. A., & Mermin, J. (2012). HIV infection and older Americans: The public health perspective. *American Journal of Public Health, 102*(8), 1516–1526. https://doi.org/10.2105/AJPH.2012.300844

Burnett, E. J. (2015). Understanding risk perceptions and responses of the public, healthcare professionals and the media: The case of *Clostridium difficile*. https://discovery.dundee.ac.uk/ws/files/6880265/Final_PhD_Thesis_for_Discovery_submission.pdf

Caring for the AIDS Patient—Fearlessly. (1983). *Nursing*, *13*(9), 50–55. https://doi-org.links.franklin.edu/10.1097/00152193-198309000-00022

Carmack, C., Roncancio, A. M., Gerecht, L., & Ansari, M. (2020). Perceived partner beliefs about condoms and self-efficacy communication within the context of the theory of gender and power. *Journal of Community Psychology, 48*(5), 1424–1437. https://doi-org.links.franklin.edu/10.1002/jcop.22337

Carrillo, H., & Hoffman, A. (2016). From MSM to heteroflexibilities: Non-exclusive straight male identities and their implications for HIV prevention and health promotion. *Global Public Health: An International Journal for Research, Policy and Practice*, *11*(7-8), 923–936. https://doi-org.links.franklin.edu/10.1080/17441692.2015.1134272

Centers for Disease Control and Prevention [CDC]. (2018) *Atlas Plus: HIV/AIDS Diagnosis Data.* https://gis.cdc.gov/grasp/nchhstpatlas/charts.html

CDC (2019). *HIV and Older Americans*. https://www.cdc.gov/hiv/pdf/group/age/olderamericans/cdc-hiv-older-americans.pdf

CDC (2020a). *HIV Surveillance Report, 2018 (Updated), 31*. https://www.cdc.gov/hiv/library/reports/hiv-surveillance.html

CDC. (2020b). *HIV Testing*. https://www.cdc.gov/hiv/testing/index. html

CDC (2020c). *Opt-out screening*. https://www.cdc.gov/hiv/ clinicians/screening/opt-out.html

Champion, V. L., & Skinner, C. S. (2008). The health belief model. In K. Glanz, B. K. Rimer, & K. Viswanath (Eds.), *Health Behavior and Health Education Theory, Research, and Practice.* (pp. 45–65). Jossey-Bass.

Chawla, N., & Sarkar, S. (2019). Defining "high-risk sexual behavior" in the context of substance use. *Journal of Psychosexual Health, 1*(1), 26–31. https://journals.sagepub.com/doi/pdf/10.1177/2631831818822015

Conner, L. R., Fernández, Y., Junious, E., Piper, C., & Rowan, D. (2019). Evaluating HIV educational materials for older people. *Journal of the International Association of Providers of AIDS Care, 18*. https://doi-org.links.franklin.edu/10.1177/2325958219849054

Connell, R. (1987). *Gender and power*. Stanford University Press.

Conroy, A. A. (2015). The influence of relationship power dynamics on HIV testing in rural Malawi. *Journal of Sex Research, 52*(3), 347–359. https://doi.org/10.1080/00224499.2014.883590

Cook, R. L., McGinnis, K. A., Samet, J. H., Fiellin, D. A., Rodriquez-Barradas, M. C., Kraemer, K. L., Gibert, C. L., Braithwaite, R. S., Goulet, J. L., Mattocks, K., Crystal, S., Gordon, A. J., Oursler, K. K., & Justice, A. C. (2010). Erectile dysfunction drug receipt, risky sexual behavior and sexually transmitted diseases in HIV-infected and HIV-uninfected men. *Journal of General Internal Medicine, 25*(2), 115–121. https://doi-org.links.franklin.edu/10.1007/s11606-009-1164-9

Cowell, J. M. (2020). Publishing cross-sectional studies. *The Journal of School Nursing*, *36*(1), 6–7. https://doi-org.links.franklin.edu/10.1177/1059840519896452

Crenshaw, T. L. (1988). HIV testing: voluntary, mandatory, or routine? *The Humanist, 48*(1), 29–34.

Creswell, J. W., & Creswell, J. D. (2017). *Research design: Qualitative, quantitative, and mixed methods approaches.* Sage.

Curran, J. W., Jaffe, H. W. (2011). AIDS: The early years and the CDC's response. *MMWR Morbidity & Mortality Weekly Report, 60*(04), 64–69. https://www.cdc.gov/mmwr/preview/mmwrhtml/su6004a11.htm

Curtiss, P., Strazzulla, L. C., & Friedman-Kien, A. E. (2016). An update on Kaposi's sarcoma: Epidemiology, pathogenesis and treatment. *Dermatology and Therapy, 6*(4), 465–470. https://doi.org/10.1007/s13555-016-0152-3

Dai, H., & Meyer, I. H. (2019). A population study of health status among sexual minority older adults in select U.S. geographic regions. *Health Education & Behavior, 46*(3), 426–435.

Dailey, A. F, Hoots, B. E, Hall, H. I, Song, R., Hayes, D., Fulton, Jr., P., Prejean, J., Hernandez, A. L., Koenig, L. J., Valleroy, L. A. (2017). Vital signs: Human immunodeficiency virus testing and diagnosis delays — United States. *MMWR Morbidity & Mortality Weekly Rep*, *66* (47); 1300–1306. http://dx.doi.org/10.15585/mmwr.mm6647e1External.

Deblonde, J., Van Beckhoven, D., Loos, J., Boffin, N., Sasse, A., Nöstlinger, C., & Supervie, V. (2018). HIV testing within general practices in Europe: A mixed-methods systematic review. *BMC Public Health, 18*(1), 1191. doi:10.1186/s12889-018-6107-0

Department of Defense. (2019). *Statistical Report on the Military Retirement System.* https://actuary.defense.gov/Portals/15/Documents/MRS_StatRpt_2017%20v4.pdf?ver=2018-07-30-094920-907

Diagnoses of HIV infection among adults aged 50 years and older in the United States and dependent areas, 2011–2016. (2018). *HIV Surveillance Supplemental Report. 23*(5).

Elgalib, A., Fidler, S., & Sabapathy, K. (2018). Hospital-based routine HIV testing in high-income countries: a systematic literature review. *HIV Medicine, 19*(3), 195–205. https://doi-org.links.franklin.edu/10.1111/hiv.12568

Emlet, C. A., O'Brien, K. K., Goldsen, K. F. (2019). The global impact of HIV on sexual and gender minority older adults: Challenges, progress, and future directions. International *Journal of Aging & Human Development, 89*(1), 108–126. https://doi-org.links.franklin.edu/10.1177/0091415019843456

E.R.D. (1991). Minimizing risk preferable to mandatory HIV testing in hospitals. *Second Opinion, 17*(2), 154.

Erikson, E.H. (1963). *Childhood and society* (2nd ed.). Norton.

Fan, H., Fife, K. H., Cox, D., Cox, A. D., & Zimet, G. D. (2018). Behavior and health beliefs as predictors of HIV testing among women: A prospective study of observed HIV testing. *AIDS Care, 30*(8), 1062–1069. https://doi-org.links.franklin.edu/ 10.1080/ 09540121.2018.1442555

Fang, L., Chuang, D. M., & Al-Raes, M. (2019). Social support, mental health needs, and HIV risk behaviors: A gender-specific, correlation study. *BMC Public Health, 19*(1), 651. doi:10.1186/s12889-019-6985-9.

Feldman, J. M., & Lynch, J. G. (1988). Self-generated validity and other effects of measurement on belief, attitude, intention, and behavior. *Journal of Applied Psychology, 73*(3), 421–435. https://doi.org/10.1037/0021-9010.73.3.421

Ferrer, R., & Klein, W. M. (2015). Risk perceptions and health behavior. *Current Opinion in Psychology, 29*(2), 85–89. https://doi.org/10.1016/j.copsyc.2015.03.012

Fleckenstein, J. R., & Cox, D. W., II. (2015). The association of an open relationship orientation with health and happiness in a sample of older US adults. *Sexual and Relationship Therapy, 30*(1), 94–116. https://doi-org.links.franklin.edu/10.1080/ 14681994.2014. 976997

Fisher, R. (1993). Social desirability bias and the validity of indirect questioning. *Journal of Consumer Research, 20*(2), 303–315. https://doi-org.links.franklin.edu/10.1086/209351

Ford, C., Godette, D., Mulatu, M., & Gaines, T. (2015). Recent HIV prevalence, determinants, and disparities among US older adult respondents to the Behavioral Risk Factor Surveillance System. *Sexually Transmitted Diseases, 42*(8), 405–410. doi:10.1097/ OLQ.0000000000000305

Ford, C. L., Lee, S.-J., Wallace, S. P., Nakazono, T., Newman, P. A., & Cunningham, W. E. (2015). HIV testing among clients in high HIV prevalence venues: Disparities between older and younger adults. *AIDS Care*, *27*(2), 189–197. https://doi-org.links.franklin.edu/ 10.1080/09540121.2014.963008

Ford, C. L., Mulatu, M. S., Godette, D. C., & Gaines, T. L. (2015). Trends in HIV testing among U.S. older adults prior to and since release of CDC's routine HIV testing recommendations: National findings from the BRFSS. *Public Health Reports, 130(*5), 514. https://doi-org.links.franklin.edu/10.1177%2F003335491513000514

Foster, V., Clark, P. C., & Holstad, M. M. (2015). The self-reported sexual behaviors of single older African Americans. *Journal of Health Disparities Research & Practice, 8*(2), 1–11.

Frimpong, J. A., D'Aunno, T., Helleringer, S., & Metsch, L. R. (2016). Spillover effects of HIV testing policies: Changes in HIV testing guidelines and HCV testing practices in drug treatment programs in the United States. *BMC Public Health, 16*(666). https://doi-org.links.franklin.edu/10.1186/s12889-016-3322-4

Furrow, B. R. (1989). AIDS and the health care provider: The argument for voluntary HIV testing. *Villanova Law Review, 34*(5), 823–870.

García-Deltoro, M. (2019). Rapid initiation of antiretroviral therapy after HIV diagnosis. *AIDS Reviews, 21*(2), 55–64. https://doi-org.links.franklin.edu/10.24875/AIDSRev.M19000027

Georges, D., Desjardins, D., Lebeau, M., Messier, S., & Dascal, A. (2018). Health care workers' risk perceptions and willingness to report for work during an influenza pandemic. *Risks 6*(8). http://dx.doi.org/10.3390/risks6010008

Guaraldi, G., Zona, S., Brothers, T. D., Carli, F., Stentarelli, C., Dolci, G., & Falutz, J. (2015). Aging with HIV vs. HIV seroconversion at older age: A diverse population with distinct comorbidity profiles. *PLOS ONE*, *10*(4), e0118531. https://doi-org.links.franklin.edu/10.1371/journal.pone.0118531

Glaude-Hosch, J.A., Smith, M. L., Heckman, T. G., Miles, T. P., Olubaju, B. A., & Ory, G. O. (2015). Sexual behaviors, healthcare interactions, and HIV-related perceptions among adults age 60 years and older: An investigation by race/ethnicity. *Current HIV Research (13)*359. https://doi.org/10.2174/1570162X13666150511124959

Gollub, E. L. (1999). Human rights is a US problem, too: The case of women and HIV. *American Journal of Public Health*, *89*(10), 1479–1482.

Goodman, P., Robert, R. C., & Johnson, J. E. (2020). Rigor in PhD dissertation research. *Nursing Forum*, *55*(4), 611–620. https://doi-org.links.franklin.edu/10.1111/nuf.12477

Harden, H., & Fulop, L. (2015). The challenges of a relational leadership and the implications for efficacious decision-making in healthcare. *Asia Pacific Journal of Health Management, 10*(3), SI51–SI62. https://search-ebscohost-com.links.franklin.edu/login.aspx?direct=true&db=bth&AN=112128152&site=eds-live

Harris, T. G., Rabkin, M., & El-Sadrr, W. M. (2018). Achieving the fourth 90: Healthy aging for people living with HIV. *AIDS*, *32*, 1563–1569. doi:10.1097/QAD.0000000000001870

Heudebert, J. P., Tamhane, A., Burkholder, G. A., & Dionne-Odom, J. (2019). Erectile dysfunction medication prescription: STI and risk behavior in men with HIV. *Journal of Sexual Medicine, 16(*5), 691–700. https://doi-org.links.franklin.edu/10.1016/j.jsxm.2019.02.007

HIV patients 65 years or older face higher rates of serious non-HIV illnesses. (2017). *HIV Treatment ALERTS,* 6–8. https://links.franklin.edu/login?url= https://search.ebscohost.com/login.aspx?direct=true&db=c9h&AN=121245655&site=eds-live

Houle, B., Mojola, S. A., Angotti, N., Schatz, E., Gómez-Olivé, F. X., Clark, S. J., Williams, J. R., Kabudula, C., Tollman, S., & Menken, J. (2018). Sexual behavior and HIV risk across the life course in rural South Africa: trends and comparisons. *AIDS Care*, *30*(11), 1435–1443. https://doi-org.links.franklin.edu/10.1080/09540121.2018.1468008

Hughes, A. K., & Alford, K. R. (2017). HIV transmission: Myths about casual contact and fear about medical procedures persist among older adults. *Social Work in Public Health, 32*(1), 49–52. https://doi-org.links.franklin.edu/10.1080/19371918.2016.1188743

Iqbal, K., Huang, Y. A., Peters, P., Weidle, P., & Hoover, K. (2018). Antiretroviral treatment among commercially insured persons living with HIV in an era of universal treatment in

the United States - 2012-2014. *AIDS Care*, *30*(9), 1128–1134. https://doi-org.links.franklin.edu/10.1080/09540121.2018.1489099

Iveniuk, J., O'Muircheartaigh, C., Cagney, K., & Cagney, K. A. (2016). Religious influence on older Americans' sexual lives: A nationally-representative profile. *Archives of Sexual Behavior, 45*(1), 121–131. https://doi-org.links.franklin.edu/10.1007/s10508-015-0534-0

Jacobsen, M. M., & Walensky, R. P. (2016). Modeling and cost-effectiveness in HIV prevention. *Current HIV/AIDS reports*, *13*(1), 64–75. https://doi.org/10.1007/s11904-016-0303-2

Jensen, T.S., Chin, J., Ashby, L., Rollins, J., Caplan, S., & Miller, S. (2015). *Decision Memorandum for Screening for Human Immunodeficiency Virus (HIV) Infection*. https://www.cms.gov/medicare-coverage-database/details/nca-decision-memo.aspx?NCAId=276

Johns, D. M., Bayer, R., & Fairchild, A. L. (2016). Evidence and the politics of deimplementation: The rise and decline of the "counseling and testing" paradigm for HIV prevention at the US Centers for Disease Control and Prevention. *The Milbank Quarterly, 94*(1), 126–162. https://doi-org.links.franklin.edu/10.1111/1468-0009.12183

Kaiser Family Foundation. (2018). Medicaid and HIV. https://www.kff.org/hivaids/fact-sheet/medicaid-and-hiv/

Kaiser Family Foundation. (2019a). *The HIV/AIDS Epidemic in the United States: The Basics*. https://www.kff.org/hivaids/fact-sheet/the-hivaids-epidemic-in-the-united-states-the-basics/

Kaiser Family Foundation. (2019b). *U.S. Federal Funding for HIV/AIDS: Trends Over Time*. https://www.kff.org/global-health-policy/fact-sheet/u-s-federal-funding-for-hivaids-trends-over-time/

Kalseth, J., & Halvorsen, T. (2020). Health and care service utilization and cost over the life-span: A descriptive analysis of population data. *BMC Health Services Research*, *20*(435), https://doi.org/10.1186/s12913-020-05295-2

Kavanagh, S. A., Shelley, J. M., & Stevenson, C. (2018). Is gender inequity a risk factor for men reporting poorer self-rated health in the United States? *PLOS ONE, 13*(7), 1.

Khumsaen, N., & Stephenson, R. (2017). Beliefs and perception about HIV/AIDS, self-efficacy, and HIV sexual risk behaviors among young Thai men who have sex with men. *AIDS Education and Prevention, 29*(2), 175–190. https://doi.org/10.1521/aeap.2017.29.2.175

Karpiak, S. E., & Brennan-Ing, M. (2016). Aging with HIV: The challenges of providing care and social supports. *Generations, 40*(2), 23–25. https://search-ebscohost-com.links.franklin.edu/login.aspx?direct=true&db=slh&AN=118292951&site=eds-live

Knight, R., Shoveller, J., Greyson, D., Kerr, T., Gilbert, M., & Shannon, K. (2014). Advancing population and public health ethics regarding HIV testing: A scoping review. *Critical Public Health, 24(*3), 283–295. https://doi.org/10.1080/09581596.2013.800188

Knight, Z. G. (2017). A proposed model of psychodynamic psychotherapy linked to Erik Erikson's eight stages of psychosocial development. *Clinical Psychology & Psychotherapy, 24*(5), 1047–1058. https://doi-org.links.franklin.edu/10.1002/cpp.2066

Koroukian, S. M., Schiltz N., Warner, D. F., Sun, J., Bakaki, P. M., Smyth, K. A., Stange, K. C., Given, C. W. (2016). Combinations of chronic conditions, functional limitations, and

geriatric syndromes that predict health outcomes. *Journal of General Internal Medicine, 31*(6), 630–637. doi:10.1007/s11606-016-3590-9

Krueger, A., Van Handel, M., Dietz, P. M., Williams, W. O., Patel, D., & Johnson, A. S. (2019). HIV testing, access to HIV-related services, and late-stage HIV diagnoses across US States, 2013–2016. *American Journal of Public Health, 109*(11), 1589. https://doi-org.links.franklin.edu/10.2105/AJPH.2019.305273

Late Presentation Working Groups in EuroSIDA and COHERE. (2020). Estimating the burden of HIV late presentation and its attributable morbidity and mortality across Europe 2010-2016. *BMC Infectious Diseases*, *20*(1), 728. doi:10.1186/s12879-020-05261-7

Leidel, S., Wilson, S., McConigley, R., Boldy, D., & Girdler, S. (2015). Healthcare providers' experiences with opt-out HIV testing: A systematic review. *AIDS Care, 27*(12), 1455–1467. https://doi-org.links.franklin.edu/10.1080/09540121.2015.1058895

Leidel, S., Leslie, G., Boldy, D., & Girdler, S. (2017). A comprehensive theoretical framework for the implementation and evaluation of opt-out HIV testing. *Journal of Evaluation in Clinical Practice, 23*(2), 301–307. https://doi-org.links.franklin.edu/10.1111/jep.12602

Levine, C., & Bayer, R. (1989). The ethics of screening for early intervention in HIV disease. *American Journal of Public Health, 79*(12), 1661–1667. https://doi-org.links.franklin.edu/10.2105/AJPH.79.12.1661

Lovejoy, T. I., Heckman, T. G., Sikkema, K. J., Hansen, N. B., & Kochman, A. (2015). Changes in sexual behavior of HIV-infected older adults enrolled in a clinical trial of standalone group psychotherapies targeting depression. *AIDS and Behavior, 19*(1), 1–8. https://doi-org.links.franklin.edu/10.1007/s10461-014-0746-7

Lunenburg, F. C., & Irby, B. J. (2008). *Writing a successful thesis or dissertation: Tips and strategies for students in the social and behavioral sciences*. Corwin.

McCabe, B. E., Schaefer Solle, N., Peragallo Montano, N., & Mitrani, V. B. (2017). Alcohol misuse, depressive symptoms, and HIV/STI risks of US Hispanic women. *Ethnicity & Health*, *22*(5), 528–540. https://doi-org.links.franklin.edu/10.1080/13557858.2016.1244738

McCann, N.C., Horn, T.H., Hyle, E.P., & Walensky, R.P. (2020). HIV antiretroviral therapy costs in the United States, 2012-2018. *JAMA Intern Med, 180*(4), 601–603. doi:10.1001/jamainternmed.2019.7108

McGrath, C., Palmgren, P. J., & Liljedahl, M. (2019). Twelve tips for conducting qualitative research interviews. *Medical Teacher, 41*(9), 1002–1006. https://doi-org.links.franklin.edu/10.1080/0142159X.2018.1497149

McLeod, S. A. (2019). *What a p-value tells you about statistical significance*. Simply Psychology. https://www.simplypsychology.org/p-value.html

Miksza, P., & Elpus, K. (2018). *Correlational design and analysis*. Oxford University Press. https://doi-org.links.franklin.edu/10.1093/oso/9780199391905.003.0006

Nasi, M., De Biasi, S., Gibellini, L., Bianchini, E., Pecorini, S., Bacca, V., Guaraldi, G., Mussini, C., Pinti, M., & Cossarizza, A. (2017). Ageing and inflammation in patients with HIV infection. *Clinical & Experimental Immunology, 187*(1), 44–52. doi:10.1111/cei.12814

National Institute on Aging. (2017). *HIV, AIDS, and Older People*. https://www.nia.nih.gov/health/hiv-aids-and-older-people

National Institute of Allergy and Infectious Diseases [NIAID]. (2017). *Vaccine Research Studies Frequently Asked Questions*. https://www.niaid.nih.gov/clinical-trials/vaccine-clinical-studies-faq

NIAID (2019). *HIV/AIDS.* https://www.niaid.nih.gov/diseases-conditions/hivaids

National Institute of Health [NIH]. (2019). HIV and Specific Populations. https://aidsinfo.nih.gov/understanding-hiv-aids/fact-sheets/25/80/hiv-and-older-adults

Newman, T. (2018). Sex and gender: What is the difference? *Medical News Today.* https://www.medicalnewstoday.com/articles/232363

Nobles, A. L., Leas, E. C., Noar, S., Dredze, M., Latkin, C. A., Strathdee, S. A., & Ayers, J. W. (2020). Automated image analysis of Instagram posts: Implications for risk perception and communication in public health using a case study of #HIV. *PLOS ONE, 15*(5), 1.

Nydegger, L. A., & Claborn, K. R. (2020). Exploring patterns of substance use among highly vulnerable Black women at-risk for HIV through a syndemics framework: A qualitative study. *PLOS ONE, 7*.

Occupational transmission of human immunodeficiency virus. (1990). *American Journal of Public Health, 80(*2), 242.

Odlum, M., Black, D., Yoon, S., Maher, C., Lawrence, S., & Osborne, J. (2019). Exploring HIV concern in a population of Dominican American women midlife and older. *BMC Public Health, 19*(1), 1.

O'Grady, B., & Schüklenk, U. (2009). Rethinking mandatory HIV testing. *Bioethics, 23*(8), ii. https://doi-org.links.franklin.edu/10.1111/j.1467-8519.2009.01765.x

Ompad, D. C., Giobazolia, T. T., Barton, S. C., Halkitis, S. N., Boone, C. A., Halkitis, P. N., Kapadia, F., & Urbina, A. (2016). Drug use among HIV+ adults aged 50 and older:

Findings from the GOLD II study. *AIDS Care, 28*(11), 1373–1377. https://doi-org.links.franklin.edu/10.1080/09540121.2016.1178704

Ott, R. L., & Longnecker, M. (2016). *An introduction to statistical methods and data analysis* (7th ed.). Cengage Learning.

Pan, Y., Metsch, L. R., Wang, W., Wang, K.S., Duan, R. Kyle, T., Gooden, L. K., Feaster, D.J. (2017). Gender differences in HIV sexual risk behaviors among clients of substance use disorder treatment programs in the U.S. *Archives of Sex and Behavior 46*, 1151–1158. https://doi.org/10.1007/s10508-015-0686-y

Pastore, D. H., Thomé, R. C. A., Dias, C. M., Arruda, E. F., & Yang, H. M. (2018). A model for interactions between immune cells and HIV considering drug treatments. *Computational & Applied Mathematics, 37*(1), 282–295. https://doi-org.links.franklin.edu/10.1007/s40314-017-0528-8

Patel, D., Johnson, C. H., Krueger, A., Maciak, B., Belcher, L, Harris, N., & DiNenno, E. A. (2020). Trends in HIV testing among US adults, aged 18-64 years, 2011-2017. *AIDS and Behavior*, *24*(2), 532–539. https://doi.org/10.1007/s10461-019-02689-0

Plaza, C. (2020). Miss diagnosis: Gendered injustice in medical malpractice law. *Columbia Journal of Gender and Law, 2,* 91.

Prati, G., Mazzoni, D., & Zani, B. (2015). Psychosocial predictors and HIV-related behaviors of old adults versus late middle-aged and younger adults. *Journal of Aging and Health, 27*(1), 123–139. https://doi-org.links.franklin.edu/10.1177/0898264314538664

Quinn, K. G., Murphy, M. K., Nigogosyan, Z., & Petroll, A. E. (2020). Stigma, isolation and depression among older adults living with HIV in rural areas. *Ageing and Society, 40*(6), 1352–1370. doi:10.1017/S0144686X18001782

Read, J. G., Porter, J. R., & Gorman, B. K. (2016). Gender and the mental-physical health connection among U.S. adults. *Sociological Forum, 31*(4), 1104. doi:10.1111/socf.12298

Reidy, D., Brookmeyer, K., Gentile, B., Berke, D., Zeichner, A., Reidy, D. E., Brookmeyer, K. A., & Berke, D. S. (2016). Gender role discrepancy stress, high-risk sexual behavior, and sexually transmitted disease. *Archives of Sexual Behavior, 45*(2), 459–465. doi:10.1007/s10508-014-0413-0

Reif, S., Safley, D., McAllaster, C., Wilson, E., & Whetten, K. (2017). State of HIV in the US deep south. *Journal of Community Health, 42*(5), 844–853. https://doi-org.links.franklin.edu/10.1007/s10900-017-0325-8

Rendina, H. J., & Parsons, J. T. (2018). Factors associated with perceived accuracy of the Undetectable=Untransmittable slogan among men who have sex with men: Implications for messaging scale-up and implementation. *Journal of the International AIDS Society, 21*(1), 1-e25055. https://doi-org.links.franklin.edu/10.1002/jia2.25055

Rezigalla A. A. (2020). Observational study designs: Synopsis for selecting an appropriate study design. *Cureus*, *12*(1), e6692. https://doi.org/10.7759/cureus.6692

Rhee, M. S., & Greenblatt, D. J. (2008). Pharmacologic consideration for the use of antiretroviral agents in the elderly. *Journal of Clinical Pharmacology*, *48*(10), 1212–1225. doi:10.1177/ 0091270008322177.

Rinehart, D. J., Al-Tayyib, A. A., Sionean, C., Whitesell, N. R., Dreisbach, S., & Bull, S. (2018). Assessing the theory of gender and power: HIV risk among heterosexual minority dyads. *AIDS and Behavior, 22*(6), 1944–1954. https://doi-org.links.franklin.edu/10.1007/s10461-017-1983-3

Ritchwood, T. D., Bishu, K. G., & Egede, L. E. (2017). Trends in healthcare expenditure among people living with HIV/AIDS in the United States: evidence from 10 years of nationally representative data. *International Journal for Equity in Health, 16*, 1–10. https://doi-org.links.franklin.edu/10.1186/s12939-017-0683-y

Ritter, L. J., & Ueno, K. (2019). Same-sex contact and lifetime sexually transmitted disease diagnoses among older adults. *Journal of Aging & Health, 31*(6), 1043–1064. doi:10.1177/0898264317754028

Robillard, A., Padi, A., Lewis, K., Julious, C., & Troutman, J. (2017). Advice for prevention from HIV-positive African-American women: "My story is not just a story." *Culture, Health & Sexuality, 19*(5), 630–642. https://doi-org.links.franklin.edu/ 10.1080/ 13691058.2016.1243732

Robinson, K.A., Brunnhuber, K., Ciliska, D., Juhl, C. B., Christensen, R., & Lund, H. (2021). Evidence-based research series-paper 1: What evidence-based research is and why is it important? *Journal of Clinical Epidemiology, 129*, 151–157. doi:10.1016/j.jclinepi.2020. 07.020

Russell, G., Mandy, W., Elliott, D., White, R., Pittwood, T., & Ford, T. (2019). Selection bias on intellectual ability in autism research: A cross-sectional review and meta-analysis. *Molecular Autism, 10*(1),10–19. doi:10.1186/s13229-019-0260-x

Sabi, S. C., & Rieker, M. (2017). The role of civil society in health policy making in South Africa: a review of the strategies adopted by the Treatment Action Campaign. *African Journal of AIDS Research, 16*(1), 57–64. doi:10.2989/16085906.2017.1296874

Salkind, N. J. (Ed.) (2010). *Encyclopedia of research design.* Sage. doi:10.4135/ 9781412961288

Sankar, A., Nevedal, A., Neufeld, S., Berry, R., & Luborsky, M. (2011). What do we know about older adults and HIV? A review of social and behavioral literature. *AIDS Care, 23*(10), 1187–1207. https://doi-org.links.franklin.edu/10.1080/09540121.2011.564115

Santa Cruz, J. (2019). Sex and the older adult: No one wants to talk about it. *Today's Geriatric Medicine, 12*(5), 12–15.

Schnall, R., Rojas, M., & Travers, J. (2015). Understanding HIV testing behaviors of minority adolescents: A health behavior model analysis. *The Journal of the Association of Nurses in AIDS Care*, *26*(3), 246–258. https://doi.org/10.1016/j.jana.2014.08.005

Setia M. S. (2016). Methodology series module 3: Cross-sectional studies. *Indian Journal of Dermatology, 61*(3), 261–264. https://doi.org/10.4103/0019-5154.182410

Sexually transmitted disease? At my age? (2018). *Harvard Health Letter, 43*(4), 6.

Simpson S. H. (2015). Creating a data analysis plan: What to consider when choosing statistics for a study. *The Canadian Journal of Hospital Pharmacy, 68*(4), 311–317. https://doi.org/10.4212/cjhp.v68i4.1471

Singh, S., & Bajorek, B. (2014). Defining 'elderly' in clinical practice guidelines for pharmacotherapy. *Pharmacy Practice, 12*(4), 489. https://doi.org/10.4321/s1886-36552014000400007

Slack, J. D. (1992). Responding to the global epidemic of AIDS: Cultural and political challenges facing governments. *Policy Studies Journal, 20*(1), 124–134. https://doi.org/10.1111/ j.1541-0072.1992.tb01447.x

Smith, M. L., Bergeron, C. D., Goltz, H. H., Coffey, T., & Boolani, A. (2020). Sexually transmitted infection knowledge among older adults: psychometrics and test-retest

reliability. *International Journal of Environmental Research and Public Health, 17*(7). https://doi-org.links.franklin.edu/10.3390/ijerph17072462

Sormanti, M., & Shibusawa, T. (2007). Predictors of condom use and HIV testing among midlife and older women seeking medical services. *Journal of Aging and Health*, *19*(4), 704–719. https://doi.org/10.1177%2F0898264307301173

Spira, M., & Berger, B. (2016). The impact of aging on clinical practice: A developmental challenge. *Clinical Social Work Journal, 44*(2), 127–134. https://doi-org.links.franklin.edu/10.1007/s10615-015-0555-0

Syme, M. L., Cohn, T. J., & Barnack-Tavlaris, J. (2017). A comparison of actual and perceived sexual risk among older adults. *Journal of Sex Research, 54*(2), 149–160. https://doi-org.links.franklin.edu/10.1080/00224499.2015.1124379

Tillman, J. L., & Hayley, M. D. (2015). HIV and STI testing in older adults: An integrative review. *Journal of Clinical Nursing 24*(15-16), 2074–2095. doi:10.1111/jocn.12797

Tran, B. X., Nguyen, L. H., Turner, H. C., Nghiem, S., Vu, G. T., Nguyen, C. T., Latkin, C. A., Ho, C., & Ho, R. (2019). Economic evaluation studies in the field of HIV/AIDS: Bibliometric analysis on research development and scopes (GAP$_{RESEARCH}$). *BMC Health Services Research*, *19*(1), 834. https://doi.org/10.1186/s12913-019-4613-0

Tseng, C. W., Dudley, R. A., Chen, R., & Walensky, R. P. (2020). Medicare Part D and cost-sharing for antiretroviral therapy and preexposure prophylaxis. *JAMA Network Open, 3*(4), e202739. https://doi-org.links.franklin.edu/10.1001/jamanetworkopen.2020.2739

U. S. Preventive Services Task Force. (2019). Screening for HIV infection: U. S. Preventive Services Task Force recommendation statement. *JAMA, 321*(23), 2326–2336. doi:10.1001/jama.2019.6587

Verma, J. P., & Abdel-Salam, A.-S. G. (2019). *Testing statistical assumptions in research*. Wiley.

Wang, V., Depp, C. A., Ceglowski, J., M. F. T., Thompson, W. K., Rock, D., & Jeste, D. V., (2015). Sexual health and function in later life: A population-based study of 606 older adults with a partner. *The American Journal of Geriatric Psychiatry, 23*(3), 227–233. doi:10.1016/J.JAGP.2014.03.006

Wiener, L. S. (1991). Women and human immunodeficiency virus: A historical and personal psychosocial perspective. *Social Work*, *36*(5), 375–378.

Whittle, H. J., Sheira, L. A., Frongillo, E. A., Palar, K., Cohen, J., Merenstein, D., Wilson, T. E., Adedimeji, A., Cohen, M. H., Adimora, A. A., Ofotokun, I., Metsch, L., Turan, J. M., Wentz, E. L., Tien, P. C., & Weiser, S. D. (2019). Longitudinal associations between food insecurity and substance use in a cohort of women with or at risk for HIV in the United States. *Addiction, 114*(1), 127–136. doi:10.1111/add.14418.

Wing, E. J. (2016). HIV and aging. *International Journal of Infectious Diseases, 53*, 61 127–136. https://doi.org/10.1016/j.ijid.2016.10.004

Wingood, G. M., & DiClemente, R. J. (2000). *Health Education & Behavior, 27*(5), 539–565. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.605.8742&rep=rep1&type = pdf

Wright, E. R., & Carnes, N. (2016). *Understanding the HIV/AIDS epidemic in the United States: The role of syndemics in the production of health disparities*. Springer.

Wutoh, A. K., Brown, C. M., Dutta, A. P., Kumoji, E. K., Clarke-Tasker, V., & Xue, Z. (2005). Treatment perceptions and attitudes of older human immunodeficiency virus–infected

adults. *Research in Social & Administrative Pharmacy*, *1*(1), 60.–76. doi:10.1016/j.sapharm.2004.12.005

Zierler, S., & Krieger, N. (1997). Reframing women's risk: Social inequalities and HIV infection. *Annual Review of Public Health*, *18*(1), 401–436. doi:0.1146/annurev.publhealth.18.1.401.

Zihao L., Purcell, D. W., Sansom, S. L., Hayes, D., Hall, H. I., & Li, Z. (2019). Vital signs: HIV transmission along the continuum of care - United States, 2016. *MMWR: Morbidity & Mortality Weekly Report, 68*(11), 267–272. https://doi-org.links.franklin.edu/10.15585/mmwr.mm6811e1

Zingmond, D. S., Arfer, K. B., Gildner, J. L., & Leibowitz, A. A. (2017). The cost of comorbidities in treatment for HIV/AIDS in California. *PLOS ONE, 12*(12), e0189392. https://doi.org/10.1371/journal.pone.0189392

Zingmond, D. S., Wenger, N. S., Crystal, S., Joyce, G. F., Liu, H., Sambamoorthi, U., Lillard, L. A., Leibowitz, A. A., Shapiro, M. F., & Bozzette, S. A. (2001). Circumstances at HIV diagnosis and progression of disease in older HIV-infected Americans. *American Journal of Public Health, 91*(7), 1117–1120. doi:10.2105/ajph.91.7.1117

Appendix A

CODE SHEET FOR VARIABLES IN 2018 NHIS

Original Question	Instrument Variable Name	Question ID	Recoded Variables
Are you male or female? **1** Male **2** Female	SEX	HHC.110_00.000	1-Male 2-Female
Except for tests you may have had as part of blood donations, have you ever been tested for HIV? **1** Yes **2** No	ASIHIVT	ASI.410_00.000	HIV Testing 1-Yes 2-No
Which one of these would you say is the MAIN reason why you have not been tested? **1** It's unlikely you've been exposed to HIV **2** You were afraid to find out if you were HIV positive (that you had HIV) **2** You didn't want to think about HIV or about being HIV positive **2** You were worried your name would be reported to the government if you tested positive **2** You were afraid of losing job, insurance, housing, friends, family, if people knew you were positive for AIDS infection	ASIHIVWN	ASI.420_00.000	HIV Risk Perceptions 1-No 2-Any (at least one)
Have you EVER had hepatitis? **1** Yes **2** No	AHEP	AAU.350_00.000	HIV Risk 1-Any (at least one) 2-No

Which of the following best represents how you think of yourself? **1** Gay **1** Bisexual	ASISIM	ASI.220_00.000	
In your ENTIRE LIFE, have you had at least 12 drinks of any type of alcoholic beverage? **2** Lifetime abstainer **2** Former infrequent **1** Former regular **2** Former, unknown frequency **2** Current infrequent **1** Current light **1** Current moderate **1** Current heavier **1** Current drinker, frequency/level unknown	ALCSTAT	AHB.170_00.000	
Have you had a pap or HPV test in the LAST 3 Years where the results were not normal? **1** Yes, Pap test not normal **1** Yes, HPV test not normal **1** Yes, both were not normal **2** No	PAPABN3	NAF.180_00.000	

Appendix B

SURVEY INSTRUMENT (NHIS 2018, ADULT SAMPLE FILE)

Question ID: HHC.110_00.000

Instrument Variable Name: SEX
Final Documentation Name: SEX

[Are/Is] [you/person] male or female?

Universe: HHSTAT NE 'D'
Description: All non-deleted persons

Sources: None
Recodes: None
Keywords: None
Notes: None

Sex

1	Male
2	Female

Question ID: ASI.410_00.000

Instrument Variable Name: ACIHIVT
Final Documentation Name: ASIHIVT

The next question is about the test for HIV, the virus that causes AIDS. Except for tests you may have had as part of blood donations, have you ever been tested for HIV?

Universe: ASTATFLG = '1' and (AGE GE '018' and AGE not IN ('997','999'))
Description: Sample adults 18+

Sources: None
Recodes: None
Keywords: access; AIDS test; HIV test; blood test
Notes: 2013 permanent variable. In 2012, this variable was located in the Adult Access to Health Care & Utilization Section (AAU) on the Sample Adult file (HIVST1, AAU.700_00.000).
Test: Find testing evaluation report at https://wwwn.cdc.gov/qbank/Surveys/NHIS.aspx

Ever been tested for HIV

1	Yes
2	No
7	Refused
8	Not ascertained
9	Don't know

Question ID: ASI.420_00.000 Instrument Variable Name: ACIHIVWN
Final Documentation Name: ASIHIVWN

I am going to show you a list of reasons why some people have not been tested for HIV (the virus that causes AIDS). Which one of these would you say is the MAIN reason why you have not been tested?

Universe: ASTATFLG = '1' and (AGE GE '018' and AGE not IN ('997','999')) and ASIHIVT='2'

Description: Sample adults 18+ who have never been tested for HIV

Sources: None

Recodes: None

Keywords: AIDS test; HIV test; blood test

Notes: This variable had appeared in 2001-2009 in the AIDS Knowledge & Attitudes Section (ADS) on the Sample Adult file (WHYTST_R, ADS.050_00.000).

Test: Find testing evaluation report at https://wwwn.cdc.gov/qbank/Surveys/NHIS.aspx

Main reason not tested for HIV

01	It's unlikely you've been exposed to HIV
02	You were afraid to find out if you were HIV positive (that you had HIV)
03	You didn't want to think about HIV or about being HIV positive
04	You were worried your name would be reported to the government if you tested positive
05	You didn't know where to get tested
06	You don't like needles
07	You were afraid of losing job, insurance, housing, friends, family, if people knew you were positive for AIDS infection
08	Some other reason
09	No particular reason
97	Refused
98	Not ascertained
99	Don't know

Question ID: NAF.180_00.000 Instrument Variable Name: PAPABN3
Final Documentation Name: PAPABN3

Have you had a [fill1: Pap/Pap or HPV] test in the LAST 3 YEARS where the results were NOT normal?

Universe: ASTATFLG='1' and (AGE GE '018' and AGE not IN ('997','999')) and SEX='2' and PAPNNFLG = '1'

Description: Female sample adults 18+ who have had a Pap test in the past 3 years

Sources: None

Recodes: None

Keywords: None

Notes: None

Test: Find testing evaluation report at https://wwwn.cdc.gov/qbank/Surveys/NHIS.aspx

Had abnormal Pap test results in last 3 years

1	Yes, Pap test not normal
2	Yes, HPV test not normal
3	Yes, both were not normal
4	No
7	Refused
8	Not ascertained
9	Don't know

Question ID: AAU.350_00.000 Instrument Variable Name: AHEP
Final Documentation Name: AHEP

Have you EVER had hepatitis?

Universe: ASTATFLG = '1' and (AGE GE '018' and AGE not IN ('997','999'))
Description: Sample adults aged 18+ years

Sources: None
Recodes: None
Keywords: access; source; hepatitis; liver
Notes: None

Ever had hepatitis

1	Yes
2	No
7	Refused
8	Not ascertained
9	Don't know

Question ID: ASI.220_00.000 Instrument Variable Name: ACISIM
Final Documentation Name: ASISIM

Which of the following best represents how you think of yourself?

Universe: ASTATFLG = '1' and (AGE GE '018' and AGE not IN ('997','999')) and SEX='1'
Description: Male sample adults 18+

Sources: None
Recodes: None
Keywords: Sexual orientation
Notes: None
Test: Find testing evaluation report at https://wwwn.cdc.gov/qbank/Surveys/NHIS.aspx

How you think of yourself (sexual orientation; male)

1	Gay
2	Straight, that is, not gay
3	Bisexual
4	Something else
5	I don't know the answer
7	Refused
8	Not ascertained

Question ID: AHB.170_00.000 R01 RECODE Instrument Variable Name:
Final Documentation Name: ALCSTAT

Universe: ASTATFLG = '1' and (AGE GE '018' and AGE not IN ('997','999'))

Description: Sample adults aged 18+ years

Sources: ALC1YR; ALCLIFE; ALC12MYR; ALCAMT; SEX

Recodes: None

Keywords: alcohol; drinking

Notes: Lifetime abstainer: <12 drinks in lifetime; Former infrequent: 12+ drinks in lifetime but never as many as 12 in 1 yr and none in past yr; Former regular: 12+ drinks in lifetime, 12+ drinks in 1 yr, but none in past yr; Former unknown frequency: 12+ drinks in lifetime, none in past year, don't know if 12+ in any 1 yr; Current infrequent: 12+ drinks in lifetime, and 1-11 drinks in past yr; Current light: 12+ drinks in lifetime, and <=3 drinks per week in past yr; Current moderate: 12+ drinks in lifetime, and (male) >3 drinks per week up to 14 drinks per week OR (female) >3 drinks per week up to 7 drinks per week; Current heavier: 12+ drinks in lifetime, and (male) >14 drinks per week in past year OR (female) >7 drinks per week in past yr. (Average consumption)

Alcohol drinking status: Recode

01	Lifetime abstainer
02	Former infrequent
03	Former regular
04	Former, unknown frequency
05	Current infrequent
06	Current light
07	Current moderate
08	Current heavier
09	Current drinker, frequency/level unknown
10	Drinking status unknown