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## Perceived Health and Preventative Care in the Transgender Population

Gregory Page Carpenter  
*Walden University*

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# Walden University

College of Health Professions

This is to certify that the doctoral study by

Gregory Carpenter

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## Review Committee

Dr. Vasileios Margaritis, Committee Chairperson, Public Health Faculty

Dr. Gwendolyn Francavillo, Committee Member, Public Health Faculty

Dr. W. Sumner Davis, University Reviewer, Public Health Faculty

Chief Academic Officer and Provost  
Sue Subocz, Ph.D.

Walden University  
2021

Abstract

Perceived Health and Preventative Care in the Transgender Population

by

Gregory Page Carpenter

MHA, Seton Hall University, 2002

BS, Colorado Christian University, 1993

Doctoral Study Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Public Health

Walden University

May 2021

## Abstract

Historically, the transgender community has been treated and studied myopically, using the lens of psychological illness. As treatment and research efforts have expanded in the past decade, the transgender population is becoming better understood. The purpose of the study was to examine the relationship between perceived health and preventative care in the transgender community. The health belief model was the theoretical framework for this cross-sectional study, which included data from the 2014–2018 Behavioral Risk Factor Surveillance System Survey. Chi-square tests and binomial logistic regressions were performed to investigate associations between perceived health and preventative care in the transgender community. The results revealed a significant association between the cisgender group and influenza vaccination status ( $p = .033$ ) and between male to female (MtF) individuals and pneumonia vaccinations ( $OR = 2.231$ , 95%  $CI = 1.182-4.211$ ), respectively. Further, chi-square results showed a significant association between female to male (FtM) individuals and the following diseases, arthritis ( $p = .001$ ), depressive disorder ( $p = .009$ ), and diabetes ( $p = .045$ ). This project supports positive social change by helping healthcare professionals better understand the specific preventative healthcare needs in the subgroups of the transgender community and to design customized preventative programs for them.

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## Section 1: Foundation of the Study and Literature Review

In the past decade, the available literature on transgender people has grown; however, it was still scarce when these individuals perceived health and preventative care was explicitly addressed because this was an emerging demographic group. The literature focused on the treatment aspect and refining processes and procedures. The National Institutes of Health (NIH) has funded numerous studies on the transgender population; but primarily focused on HIV status, psychological distress, and risky health behaviors (Coulter et al., 2014; Downing & Przedworski, 2018). The literature was more robust when defining the current health and health outcomes of transgender and cisgender populations with a caution that the numbers were relatively low and may underrepresent this population (Meerwijk & Sevelius, 2017).

Historically, transgender persons were not uniquely identified and were only substantively chronicled for analysis since roughly 2006 (Meerwijk & Sevelius, 2017). The notion of “gender,” at its genesis, was distinguished from the conventional notion of sex and represented the social, emotional, and psychological differences people faced, including how people understood these differences between men and women in a cultural context, not based on biology (Lambert, 2019). Initially conflated with homosexuality (Ulrichs, 1864), transgenderism became a more well-defined population in the mid-1950s. Karl Ulrichs was a pioneer in defining homosexual behavior and, in doing so, defined the transgender population as well (Kennedy, 2002). From Ulrich's publications

in the 1860s and over the next century, the lexicon became more nuanced and specific terms became associated with the transgender population as they became better defined.

As the transgender population became more clearly defined, specific psychological and physical health outcomes and behaviors were researched and became more evident; this warrants further investigation. The transgender community has a wide variety of needs, including hormone treatment, mental health services, and sex-confirming surgery (Arora et al., 2020). These services focus on long-term solutions, potentially lasting a lifetime (Meyer et al., 2020); once a decision is made, there is no routinely successful path to reversing it. Making these decisions to undergo treatments makes for some tough decisions that impact the individual, their family and friends, and the underlying relationships they have with each of those people. However, critical components reported as part of long-term success, such as health, and renormalization of relationships after surgeries, include all of the factors listed above (Ruppin & Pfäfflin, 2015).

There is evidence of a relationship between transgender thoughts and feelings in individuals and white matter microstructure in the brain; however, there is no definitive evidence that transgenderism is congenital, learned behavior, or possibly both (Kreukels & Guillamon, 2016). Additional research suggests one of the different possibilities for a medical explanation of transgenderism includes genetic expression (Fernandez et al., 2018). Nevertheless, most researchers believe there is no clear correlation between a medical genesis and being transgender (Foreman et al., 2018). More research is needed to



support the overall understanding of the transgender population and the medical community's ability to meet its needs.

In defining the medical and public health needs of the transgender community, Cruz (as cited in Lerner & Robles, 2017) discovered that perceived barriers to care prohibited the transgender population from pursuing healthcare at a rate two-and-a-half times greater than the cisgender population. Downing and Przedworski (2018) reported that the transgender population performed poorly in many health outcomes historically associated with some type of preventative medicine. However, the authors drew no comparison on perceived barriers to, and actions to seek preventative care because they focused on the current state of transgender care, including health services, health behaviors, and quality of life. More information is needed to improve transgender healthcare and fill the gap in the literature on potential differences between the cisgender and transgender populations in their perceptions of barriers to care and the impact of those barriers on pursuing preventative health care. Not dissimilar to other diagnostic research groups, the transgender population is relatively new and requires targeted treatment to address their specific population health and individual medical needs. Additionally, there is a marked disadvantage in treating the transgender population, as the precise etiology of transgenderism has not been identified or isolated to date.

### **Nature of the Study**

This quantitative cross-sectional study investigated data from adult participants, aged 18 and older, in a national study. It explored potential differences in perceived health and the receipt of preventative care (such as a mammogram, PAP. test, influenza vaccination, pneumonia vaccination, tetanus vaccination, human papilloma vaccination, sigmoidoscopy/colonoscopy) between transgender and cisgender adults in the United States. The independent variable was the type of the population (transgender/cisgender); the dependent variables were perceived health and received preventative care, and the control variables were the population demographics. Examining transgender persons' behaviors relative to current health perceptions identified potential differences between the transgender and cisgender groups and any difference from within the transgender population.

Characterizing the transgender population was a difficult task. There were no current standardized demographic data on transgender individuals (Trinh et al., 2017). The most widely accepted estimation was roughly 1 million individuals in the U.S., or 0.3% of the population (Stroumsa, 2014). Researchers noted that the number of individuals with gender identity disorder in a Veterans Administration sample of U.S. veterans nearly doubled over a ten year period from 2000 to 2010; however, the researchers believed that the actual number of individuals in the transgender sample was low, suggesting underreporting (Blosnich et al., 2013). Conflated terms and taxonomy still retarded the ability to clarify the definition of transgender (Stroumsa, 2014). Since

this characterization has been a significant issue, even the above number of transgender individuals was highly contested (Blosnich et al., 2013).

### **Research Questions and Hypotheses**

The purpose of this study was to investigate whether there were any differences in the transgender and non-transgender populations regarding perceived health and receipt of preventative care while controlling for demographics.

RQ1: Quantitative: Is there a significant difference regarding perceived health and receipt of preventative care (such as mammograms, PAP test, influenza vaccination, pneumonia vaccination, tetanus vaccination, human papilloma vaccination, sigmoidoscopy/colonoscopy) between transgender and non-transgender adults in the U.S.?

H01: There is no significant difference regarding perceived health and receipt of preventative care (such as mammograms, PAP test, influenza vaccination, pneumonia vaccination, tetanus vaccination, human papilloma vaccination, sigmoidoscopy/colonoscopy) between transgender and non-transgender adults in the U.S.

Ha1: There is a significant difference regarding perceived health and receipt of preventative care (such as mammograms, PAP test, influenza vaccination, pneumonia vaccination, tetanus vaccination, human papilloma vaccination, sigmoidoscopy/colonoscopy) between transgender and non-transgender adults in the U.S.

Independent variable: being transgender (yes/no).

Dependent variables: perceived health and receipt of preventative care.

Control variables: age, race/ethnicity, income

RQ2: Quantitative: Is there a significant difference regarding perceived health and receipt of preventative care (such as mammograms, PAP test, influenza vaccination, pneumonia vaccination, tetanus vaccination, human papilloma vaccination, sigmoidoscopy/colonoscopy) between transgender male-to-female (MtF) and female-to-male (FtM) transgender adults?

H<sub>0</sub>2: There is no significant difference regarding perceived health and receipt of preventative care (such as mammograms, PAP test, influenza vaccination, pneumonia vaccination, tetanus vaccination, human papilloma vaccination, sigmoidoscopy/colonoscopy) between transgender male-to-female (MtF) and female-to-male (FtM) transgender adults.

H<sub>a</sub>2: There is a significant difference regarding perceived health and receipt of preventative care (such as mammograms, PAP test, influenza vaccination, pneumonia vaccination, tetanus vaccination, human papilloma vaccination, sigmoidoscopy/colonoscopy) between transgender male-to-female (MtF) and female-to-male (FtM) transgender adults.

Independent variable: transgender type [male-to-female (MtF)/female-to-male (FtM)]

Dependent variables: perceived health and receipt of preventative care.

Control variables: age, race/ethnicity, income

RQ3: Quantitative: Are there significant differences between the MtF and FtM transgender adults in the frequency of medical treatments pursued by those with substantial chronic medical issues (such as asthma, stroke, heart attack, diabetes, cancer, HIV/AIDS)?

H<sub>0</sub>3: There are no significant differences between the MtF and FtM transgender adults in the frequency of medical treatments pursued by those with substantial chronic medical issues (such as asthma, stroke, heart attack, diabetes, cancer, HIV/AIDS).

H<sub>a</sub>3: There are significant differences between the MtF and FtM transgender adults in the frequency of medical treatments pursued by those with substantial chronic medical issues (such as asthma, stroke, heart attack, diabetes, cancer, HIV/AIDS).

Independent variable: transgender type [male-to-female (MtF)/female-to-male (FtM)]

Dependent variable: frequency of medical treatments.

Control variables: age, race/ethnicity, income

RQ4: Quantitative: In the adult population, is there a significant difference regarding perceived satisfaction of care and the number of medical appointments conducted between MtF transgender, the FtM transgender, and the non-transgender communities?

H<sub>0</sub>4: There is no significant difference regarding perceived satisfaction of care and the number of medical appointments conducted between MtF transgender, the FtM transgender, and the non-transgender communities.

H<sub>a</sub>4: There is a significant difference regarding perceived satisfaction of care and the number of medical appointments conducted between MtF transgender, the FtM transgender, and the non-transgender communities.

Independent variable: transgender status (MtF transgender, the FtM transgender, non-transgender)

Dependent variables: perceived satisfaction of care and the number of medical appointments.

Control variables: age, race/ethnicity, income

#### Literature Search Strategy

Six databases were analyzed (PubMed, Medline, SocIndex, CINAHL Plus, Google Scholar, and ScholarWorks) to identify scholarly works for review. Keywords were used in the analysis, meta-analyses, and references to help find and search within pertinent literature for the most relevant information to the subject matter. Searches were limited to the years 2015-2021. During the research, older works were discovered, reviewed, and cited as they are still the authoritative documents in the field.

All keywords were used in combinations with each other and with more general terms. The keywords used in this literature review were transgender, transsexual, transsexual, non-gender specific, gender, gender fluid, variant, minority, gender non-

*binary, cisgender, perception, perceived health, preventative care, determinants, nonbinary, sex, natal, insurance, ethics, access, and health outcomes.*

### Literature Review

In this subsection, the literature on transgender and cisgender people in the U.S.; their individual perceived health status, accurate reporting of transgender persons in research and surveys, current research, and understanding of the genesis of transgenderism, determinants of health and health outcomes was examined. Additionally, numerous covariates were researched, including ethics, fiduciary barriers, HIV/AIDS, substance abuse, religion, and access to medical care. Finally, gaps in the research were illuminated that focused on transgender peoples' perceived health status and their actions relative to seeking preventative care.

### Transgender and Cisgender Population Datasets

There were some noticeable differences between the transgender and cisgender populations. There were relatively few datasets available to study the data at a national level from the general population; this was a literature gap little addressed that needed further investigation (Institute, 2011). Several state-level studies were identified as well as ones from other countries; however, their use was sparing because the focus of this research was for data collected for U.S. adults at a national level. Given these predetermined limitations, few papers in the research databases focused on analyzing this diagnostic research group of transgender people.

Meerwijk and Sevelius (2017) conducted the first broadscale meta-analysis identifying national-level studies, which included the transgender category making it a gender identity study contrasting with a traditional binary gender data collection and only included the questioning of sexual orientation. Meerwijk and Sevelius (2017) identified three qualifying sources for their data; they included the Behavioral Risk Factor Surveillance System (BRFSS) with two datasets, National College Health Assessment with eight datasets, and the National Inmate Survey with three datasets. Each of the studies mentioned above was an annual data collection (2017). In 2018, Downing and Przedworski conducted the first comprehensive large sample investigation into current transgender health conditions and prospects for improving health outcomes. Three years of data were examined by Downing and Przedworski, which included 525,301 respondents containing 0.48% (95% CI = 0.44, 0.53) identifying as transgender (2018).

### **Transgender Perceived Health**

There was limited literature regarding the transgender population's perception of their health; however, research efforts gauged perceptions of several different groups of individuals. Approximately half of the known transgender population delayed getting needed healthcare; the cisgender population only delayed at a rate of roughly 20%; this lack of transgender people seeking care was related to perceived barriers to treatment (Cruz, as cited in Lerner & Robles, 2017). Additionally, there was a link between a transgender persons' high level of depression and their perception of expected domestic abuse and personal injury (Owen-Smith et al., 2017).



A study of providers regarding transgender youth health illuminated provider perceptions that transcend age; most providers understood the term transgender was congruent with homosexuality and mistakenly conflated the two terms (Lefkowitz & Mannell, 2017). This misconception was a theme that needed delineation as transgender persons were of gender identity, and homosexuals were of sexual orientation.

These groups of people, both transgender and homosexual, relied on different social support structures. Regarding transgender individuals, their perceived level of attributed stigma due to misgendering required low social support levels; however, as their perception of misgendering became more frequent, their social support needs likewise increased (McLemore, 2018). Mitigating the social support needs has proven to reduce barriers to care and has been beneficial in stigma reduction and negative perceptions in the transgender population (Holt et al., 2019; Reisner et al., 2017).

### **Accurate Reporting of Transgender Population in Research and Surveys**

Discerning an accurate representation of transgender people in any specific population has been difficult (Meerwijk & Sevelius, 2017) and required focus in two specific areas of data collection. Frequently, the transgender population was researched as a disease outcome in public health and epidemiological investigations, most specifically in the case of HIV (Dinno et al., 2013), and not as a distinct and exclusive population. This myopic approach made accurately accounting for the overall population of transgender persons challenging as the population was often underrepresented or omitted.

Secondly, the accurate categorization of people within the transgender community was problematic. One available solution for a statistical standard was from New Zealand and comprehensively addressed the gender identity questions facing individuals (Pega et al., 2017). This solution was versatile in that it considered the fluidity of gender identity because it allowed for change over time (Pega et al., 2017; Statistical standard, 2015).

### **Potential Etiology of Transgenderism**

The belief to date was that the etiology of gender dysphoria was still undetermined (Foreman et al., 2018). Gender dysphoria is the feeling a person experiences when their psychological and social expression of identity does not align with their natal sex (American Psychiatric Association, 2013). Literature investigating the genetic aspect of gender identity illuminates concordance of a higher rate with monozygotic as opposed to dizygotic twins in both MtF (Male-to-Female) and FtM (Female-to-Male) people (Heylens et al., 2012), this pointed to a genetic basis in underlying gender incongruent development. There was evidence that polymorphism associated with the roles of androgen receptor (AR), estrogen receptors alpha (ER $\alpha$ ) and beta (ER $\beta$ ), and aromatase (CYP19A1) were implicit in the genetic aspect related to gender identity and gene expression (Fernández et al., 2018). These bodies of research suggested that sex hormone signaling had an oligogenic component as gene expression of a few genes had an enormous impact on gender identification. Research also supported that sexual distinction in the brain, and the genitals developed at different times; in the brain, this developed before it did in the genitals, making it feasible there could have

been a difference (Roselli, 2018). Additionally, when testosterone was introduced in female rats within a short time after birth, they presented with masculine traits (McCarthy et al., 2012); in humans, a prenatal nontypical introduction to hormones changed the gender identity in some and sexual orientation in others, but this was the minority response (Roselli, 2018).

However, it was not just that the manner of genetic expression; an essential component includes the genotype, specifically the ER $\beta$ , ER $\alpha$  and AR, and their allele as crucial in the categorical identification and prediction of gender identity probability (Fernández et al., 2018) that was important. Additional information explained that global haplotype, a set of DNA polymorphisms, was prevalent amongst FtM ( $p = .017$ ); however, it was not a factor in MtF individuals (Cortés-Cortés et al., 2017; Zubiaurre-Elorza et al., 2013) researched twins and found that 23-33% of monozygotic twin pairs in the study were concordant for gender dysphoria, further suggesting a genetic component (Foreman et al., 2018).

Brain development was another potential location where science could identify the etiology of gender dysphoria. Additional investigations by Kreukels and Guillamon (2016) revealed through neuroimaging that specific regions in the brains of MtF people appeared more similar to the brains of women as opposed to that of a man. This research was consistent with Hoekzema et al. (2015), based on the specificity of the location of the volume of gray matter. However, there was one stark contrast, Hoekzema et al. (2015) found that through voxel-based morphometry, the left superior medial frontal cortex

displayed a larger volume of gray matter in FtM people, making them consistent with findings of the control group of their natal sex. Furthermore, boys displayed more gray matter in the bilateral superior posterior hemispheres of the cerebellum and the hypothalamus; this was consistent with MtF people making both sexes and both gender dysphoric groups consistent with gray matter volume of their natal sex (Hoekzema et al., 2015). Shiino et al. (2017) recorded a statistically significant difference in regionally specific white matter and corpus callosum based on the bivariate of sex. Mueller et al. (2017) achieved similar results, noting that results were specific to subtype in the demographic group and were not the same or consistent outside groups.

### **History and Demographics of the Transgender Population**

Historically, the transgender and homosexual populations were considered the same (Ulrichs, 1864). It was only recently that researchers and clinicians acknowledged a clear differentiation between the populations; this new mindset started in the mid-1950s. Transgenderism was defined only as gender dysphoria for years; this was not a correct depiction of the population as there was information that suggested there were many contributing factors that influence gender expression and that it was not just a mental illness or disorder (Joseph et al., 2017).

Another inhibitor to understanding and medically treating the transgender population was the fundamental comprehension of the number of transgender people as most survey tools did not capture the data for years. It has only been within the past ten years that researchers started to more comprehensively measure the transgender

population because, for decades, the number of transgender people was misjudged too low (Marshall, 2017).

Discerning an accurate representation of transgender people in any specific population has been difficult (Meerwijk & Sevelius, 2017). It was estimated by Crissman, et al. (2017) that transgender people comprise 0.53% (95% confidence interval [CI] = 0.46, 0.61) of the U.S. population. The calculations from Flores et al. (2016) estimated a bit higher; the transgender adult population in the U.S. was roughly 560 per 100,000, which translated to 0.6% of the adult population. The data they used came from the Behavioral Risk Factor Surveillance System (BRFSS) (Meerwijk & Sevelius, 2017). This questionnaire is yearly and is now more widely used, collecting more valuable information, including valuable information from transgender adults. Doan (2016) suggested a comprehensive methodology was needed to gain an accurate count of the transgender population. The BRFSS looked to be a good start in that direction.

Obtaining an accurate number of transgender people worldwide was difficult as some countries acknowledge and count them, others acknowledge and do not count them, and still, others did not acknowledge them at all. Other barriers included the basic definition of transgender, where the definition could have been people who had undergone complete sexual reassignment to those who cross-dressed or identified as gender fluid or even intersex (Doan, 2016). Another difficulty in counting the number of transgender people was in the definition people assign to themselves as some transgender people did not refer to themselves as transgender; they only referred to themselves by

their assumed gender and never referred to themselves by their natal gender (Meier & Labuski, 2013a). In some countries, identification as transgender was illegal, and some transgender people feared for their lives if anyone found out their gender identity (Kritz, 2014).

In 2013b, Meier and Labuski conducted a broad calculation of data collected from 18 different countries to date focused on transgender data. The prevalence of transgender individuals varied very broadly from country to country, and that was partially because of definitions again; however, Meier and Labuski (2013b) reported that if all forms of transgenderism were counted in the definition to include everything from cross-dressers to completed surgical transitions, the rate would be roughly 1:500. They cautioned that as healthcare and diagnostics reforms moved forward, the landscape and numbers could change substantially and would be different from what they reported (2013a).

### **The Transgender Population and Health Outcomes**

Numerous factors affected people's health and their corresponding health outcomes (Office of Disease Prevention and Health Promotion [ODPHP], 2018). Social determinants of health covered various environmental, personal, economic, and social factors that have impacted health outcomes (ODPHP, 2018). Controlling for these variables was essential as health outcomes and behaviors differed by race and demographic group (Trinh et al., 2017). General health and health outcomes studies in the transgender community had recently increased as only 7% of studies in the six years

leading up to 2014 focused on these issues instead of primarily mental health and HIV (Downing & Przedworski, 2018).

Research showed that transgender males had an increased risk for polycythemia, potentially for hyperlipidemia, and increased potential for cardiovascular disease and hypertension (Rahman & Linsenmeyer, 2019). Gender nonconforming, a group that did not comply with traditional definitions of sex and gender, in almost all cases, had the least favorable health outcomes. Downing and Przedworski (2018) stated that gender nonconforming persons reported the most multiple medical conditions (50.7%) and had the highest rates of asthma and depression (19.1% and 38.2%). Gender nonconforming also reported the highest category with more than one disability (45.6%) cognitive disability and also mental distress (32.2% & 28.1%) (Downing & Przedworski, 2018). MtF people had diminished physical functioning ( $p < 0.001$ ) because of physical health issues ( $p = 0.015$ ) (Valashany & Janghorbani, 2018). However, MtF persons displayed disproportionately poorer health outcomes and behaviors in two categories, diabetes (14.5%) and had more than one disability (33%) (Downing & Przedworski, 2018). They additionally led all other gender categories in heavy episodic drinking (42.6%), lack of annual dental visits (47.6%), and obesity (31.3%). Whereas females, on the other hand, had an increased risk for venous thromboembolic disease and hypertriglyceridemia as well as an increased risk for hypertension (Rahman & Linsenmeyer, 2019).

All three categories of MtF, FtM, and gender nonconforming reported the reason for no primary health care or provider was cost at a rate higher than cisgender

participants; they also had the highest rates for having HIV testing done (Downing & Przedworski, 2018). Identification that transgender people, regardless of MtF or FtM, generally have a lower quality of life than cisgender people with MtF having a lower quality of life than FtM persons (Valashany & Janghorbani, 2018) was evident.

### **Mental Health**

Rowe et al. (2019) reported that there was a high prevalence of low self-esteem amongst transgender people. Many factors may have contributed to these feelings. Results of another study demonstrated significant risk factors for worse mental health outcomes among FtM transgender individuals, including low income, less education, discrimination, and intimate partner violence (McDowell et al., 2019). Poor mental health outcomes compound underlying issues. FtM transgender participants with low income and limited education were associated with the heightened odds of depression and anxiety (McDowell et al., 2019). Freese et al. (2018) identified three predominant coping profiles for people and demonstrated in their research the overrepresentation of people in the transgender community in coping profiles which had the most significant prevalence of dealing with issues in an unhealthy manner, specifically with denial and substance abuse.

There were several factors associated with positive mental health outcomes prevalent in the transgender community. FtM transgender people in good, committed relationships who were older and maintained high personal resilience experienced good mental health outcomes (McDowell et al., 2019). Additionally, when people perceived a FtM transgender person's voice as more masculine, they experienced less depression or



anxiety along with several other positive health outcomes (Watt et al., 2018). These results were comparable to a similar study in MtF transgender people when others perceived their voice as effeminate (Hancock et al., 2011)

Rodriguez et al. reported that over 50% of the participants in their study received a mental health diagnosis associated with their gender (2018). As discrimination is associated with poor mental health outcomes (McDowell et al., 2019), it was highly ironic that most transgender people faced discrimination at mental health clinics (Rodriguez et al., 2018)

Turban et al. stated that despite an ongoing higher prevalence of mental health issues, providers throughout the U.S. had engaged in psychological attempts to change a person's gender identity from transgender to cisgender (PACGI) (2019). This practice of PACGI was understood as ineffective and unethical and may have long-term effects as roughly 5% of transgender patients reported exposure to PACGI from 2010 to 2015 (Turban et al., 2019). Additionally, the researchers found associations between recalled lifetime exposure of attempting to turn a transgender person back to their natal gender through counseling and higher odds of lifetime suicide attempts (Turban et al., 2020).

According to Libman et al., recommendations of clinical practice guidelines for treating transgender adults from the Endocrine Society suggested clinicians include a mental health professional who was current with transgender needs (2020). Selvaggi and Giordano, however, argue that just the opposite is a legitimate treatment option (2014).

## **Substance Abuse**

Transgender and gender-nonconforming people in the United States face disproportionate substance abuse rates than their cisgender counterparts (Safer & Tangpricha, 2019; White & Fontenot, 2019). Lombardi (as cited in Rowe et al., 2019) reported that nearly 30% of transgender participants abused both legal and illicit drugs at a rate three times higher than the cisgender population. Clements-Nolle et al. found (as cited in Weir & Piquette, 2018) that 28% of the participants received treatment for abusing either drugs or alcohol. Transgender men use cannabis, alcohol, or cocaine at a rate four times greater than cisgender men (Nuttbrock et al., 2014b).

A correlation between substance abuse and violence was also documented (Clements-Nolle et al., Testa et al., as cited in Weir & Piquette, 2018). A correlation between FtM victims of physical violence experiencing higher alcohol abuse rates (Testa et al., as cited in Weir & Piquette, 2018). There was also an association between transgender individuals who suffered from sexual abuse with alcohol and illicit drug abuse (Nuttbrock et al., 2014a; Testa et al., as cited in Weir & Piquette, 2018).

Substance abuse in the transgender community was a significant problem, and social service counselors help address this issue. Counselors must be more aware of the individual and social aspects of the transgender community. Oberheim et al. (2017) recommended that counselors address an individual's gender identity and what it meant to that person during counseling. This approach allowed for an open session of excellent communication, where the participants achieved real progress (Oberheim et al., 2017).

## **HIV/AIDS**

The prevalence of HIV within the transgender population, specifically MtF transgender people, was significantly higher than the cisgender population (Gianella et al., 2018; Habarta et al., 2015; Martinez et al., 2019). The ODPHP (2019) highlighted that the prevalence of HIV in the transgender community was significantly higher than in the cisgender population and all other LGBTQ groups. New confirmed cases of HIV were at the highest rate in the transgender community (Habarta et al., 2015).

These points were vital because they illustrated the need for effective prophylaxis and associated HIV treatment which focused on the needs of the transgender community (Becasen et al., 2019; Gianella et al., 2018; Habarta et al., 2015; Martinez et al., 2019). MtF transgender people and men who had sex with men comprise over 50% of HIV/AIDS cases existing in the U.S. today (Rowe et al., 2019). According to Becasen et al. (2019), the number of MtF transgender people living with HIV is historically underestimated.

To improve awareness, testing, and care for the transgender community, a new approach, including personalized treatment programs, was necessary (Pitasi et al., 2020). Researchers must do more to understand HIV testing practices within the transgender community (Habarta et al., 2015). In one study, the researchers reported that testing for HIV did not necessarily lead to or imply patients were aware of their HIV status or gained access to treatment and care (Vaitses Fontanari et al., 2019). However, when

tested on-site in a clinical setting, MtF transgender people regularly received treatment much faster than those not treated on a clinical site (Pitasi et al., 2020).

Mandsager et al. report that disparities in HIV prevalence between cisgender men and transgender individuals are declining (2018). Conversely, Pitasi et al. report that MtF transgender individuals in treatment plans fell short of established goals (2020). Martinez et al. describe some community efforts that immensely helped match HIV positive transgender people with effective treatment options (2019). Mandsager et al. cited success in data collected from nine geographically distinct sites equipped to evaluate the treatment and long-term care for HIV positive MtF transgender women of color (2018).

### **Ethics in Transgender Health**

Drescher and Pula (2014) posed an ethical dilemma; evidence-based medical research necessitates comprehensive data that may constrain efforts to address the needs of the transgender population clinically. Transgender people, families, and clinicians must sometimes make tough ethical without research-based conclusions (Drescher & Pula, 2014). How do the community of researchers and medical professionals collect data to enable clinicians to provide high-quality care to the transgender community while operating within ethical guidelines? Principlism, explained by LaSala and Goldblatt Hyatt (2019), embodied the ethical standards and values of factors that were predominantly significant to the transgender community when they sought care. Four factors comprised principlism: autonomy, beneficence, nonmaleficence, and social justice.

Data suggested that most patients did well post gender-reassignment and that adverse outcomes are rare; these data's reliability are weak (D'Angelo, 2018).

Additionally, as a matter of moral integrity in clinical encounters, informed consent must be obtained for body modifications for gender expression, as it must be for any clinical intervention (Murphy, 2016).

Children who were transgender themselves or of transgender parents presented some of the most significant ethical issues facing the transgender community. Murphy (2018) found that bioethics language, concerning having children in a home, through adoption or birth, with one or more transgender parents, intentionally worked against status equality for those parents. One detractor for this language may have been a result of domestic stability and security. Transgender people experienced a higher prevalence of discrimination, mental health issues, and suicide (Casey et al., 2019) related to cisgender people.

Providers must be very cautious and promote a transition in children as the research shows a comparatively small percentage of children maintain their new gender, most transition back to their natal gender (Drescher & Pula, 2014).

A problematic ethical issue in children was identifying the facts; a child's desire to become transgender may have been one way to deal with severe trauma and may have meant the child was not transgender at all (Drescher & Pula, 2014). The correct diagnosis was critical for medical providers, and they must ensure, as best they can, that there are no changes back to an individual's natal gender later in life. A child's perspective of what

defined gender varied according to their age (Drescher & Pula, 2014). To ensure nonmaleficence, when a child was permitted gender-confirming surgery, they must become aware that there was a high likelihood that they would be left sterile if they return to their natal gender (Abel, 2014). However, children who identified as transgender and carried that into adolescence were more apt to maintain that identity as adults (Drescher & Pula, 2014).

The primary responsibility and moral obligation of all health care providers was in offering a patient the most excellent quality health care they can, and that the basis of care must be on a complete and total assessment of a patient's condition (Selvaggi & Giordano, 2014). This ethical standard was essential, so clinicians must consider all factors when identifying a young person as transgender because it can be difficult without first eliminating a myriad of other variables (Drescher & Pula, 2014). Barkai (2017) found that an analyst's focus on pathological gender expression was defined subjectively by the analyst. Without strict medical and ethical guidelines, there was a higher level of potential error.

Ethically, all providers should seek a holistic approach to transgender care. When faced with the request for treatments of unproven effectiveness and safety, mental health practitioners must seek counsel from other medical professionals to gain a complete understanding of informed consent ethics (Drescher & Pula, 2014). One path to providing exceptional care was not to require a transgender individual to participate in mental health counseling before reassignment surgery; this approach did not compromise a

patient's autonomy (Selvaggi & Giordano, 2014). Historically, psychiatrists tried to cure homosexuality; this activity raised the question of whether treating an individual's search of one's gender identity was a benevolent activity or an attack on an individual's autonomy (Drescher & Pula, 2014).

Clinicians also have some moral dilemmas when sharing information with transgender individuals, but they should present the beneficial and adverse outcomes from evidence-based research. The most concerning result of one study was that after gender-confirming surgery, the patients had higher rates of mortality and suicide compared with the age-matched, cisgender control group (D'Angelo, 2018). Some research also offered ethical issues in that drop-out rates for follow-ups were high; this resulted in selection bias meaning an underrepresentation of people who had gender reassignment surgery because those who believe it was a failure are less likely to follow up (D'Angelo, 2018).

### **Preventative Health Care**

Defining and prioritizing vital preventative care for transgender people was essential. Taksler et al. (2018) found that as the number of recommended preventative services for any demographic group increased the compliance with those recommendations dropped. A sample of adults in the U.S. over the age of thirty-five demonstrated that fewer than 8% had received all top-priority preventative clinical services for their demographic group, and almost 5% received no preventative clinical

services at all (Borsky et al., 2018). Prioritization within demographic groups of the preventative care recommendations might improve the utilization of high-value services.

Additionally, medical professionals recognized that unique health considerations were present in the transgender community. The transgender population was at the highest risk for STD because of risky behavior, and prevention was imperative (Qureshi et al., 2017). Since there was a lack of prevention, there was a significant prevalence of sexually transferred diseases within this population; however, less than half of the transgender population report personal testing for STDs (47%), but most (71%) would test for STDs at home (McRee et al., 2018).

The transgender community was exclusive in preventative health care treatment for metabolic screening, cancer screening, immunizations, and prophylactic management secondary to cross-sex hormone therapy, gender-confirming surgical procedures, and other high-risk behaviors prevalent in the population (Imborek et al., 2017). Participation in basic preventative services such as an annual exam was just as important; however, only 35% acknowledged getting a routine examination (McRee et al., 2018). Preventative annual dental services were used even less ( $OR = 0.7$ ;  $95\% CI = 0.5, 1.0$ ) (Meyer et al., 2017). Additionally, information related to the nutrition and diet of the transgender population was significant. Researchers must examine diet and focus on the different demographic groups instead of the traditional collective diagnostic group analysis for all transgender people (Smalley et al., 2016).



Because the transgender population had historically been invisible and lacking in primary care services, Mayfield and Fancovic (2017) developed a preventative care handbook for primary care clinicians who treated transgender or suspected transgender patients. Many transgender people did not share their situation with clinicians meaning; some transgender people do not refer to themselves as their former gender or choose not to share that information with the clinician (Meier & Labuski, 2013a). This secretive environment and other factors led to transgender people facing negative experiences in preventative health care treatment (Imborek et al., 2017). A patient presents an incomplete picture by not sharing information with the provider, and the clinician can only treat someone from the information the clinician has available; this has led to an incorrect diagnosis, testing, or treatment.

Historically considered one population, the transgender community had only been identified in subgroups, as in any other population, within the last decade. Understanding this, we can see that the collective youths' preventative health practices impact adult preventative care. When research focusing on transgender young adult's health concentrates on gender-related care while ignoring vital preventative healthcare services like annual check-ups and vaccination (McRee et al., 2018), the research community should take note and investigate further.

### **Violence/Discrimination**

There was a broad range of violence that transgender individuals experience, which was affected by determinants of health explicit to the transgender community,

including domestic, sexual violence and suicide or self-harm (Dinno, 2017). Being a gender minority, the transgender population were the victims of ongoing discrimination. Over 90% of gender minority people believed they were discriminated against, while another 51% have been the victims of violent episodes against their person (Casey et al., 2019). Despite this, participants and practitioners both believed that the increased availability of comprehensive domestic abuse programs, including resources geared towards transgender people, was beneficial (Rogers, 2016).

As a transgender person sought help from being a victim of violence, they faced substantial problems obtaining the appropriate care from the beginning. We saw significant levels of depression in the transgender and gender-nonconforming communities were associated strongly with an individual's perception of community tolerance (Owen-Smith et al., 2017). When someone identified an individual as transgender, research showed a significant association with discrimination when trying to obtain services from the rape crisis and domestic violence centers as well as other health care facilities (Rodriguez et al., 2018).

The subjectivity of gender identity has also been a factor in perpetuating violence focused on the transgender community. In some instances, just the perception of another person's gender identity was enough in motivating violence against the transgender individual (Blondeel et al., 2018). With substantial domestic and self-violence in the transgender community, it was interesting to observe fewer homicides recorded of transgender people than the average in the U.S. for the cisgender community (Dinno,

2017). However, homicide rates for black or Latina MtF transgender individuals were much higher than the national average (Dinno, 2017).

Suicidal ideation and attempts were seen at higher numbers in the transgender population than in the general U.S. population (García-Vega et al., 2018). Understanding suicide was essential because, in the transgender population, the prevalence of suicide attempts had been cited as high as 41% (Haas et al., 2014), as opposed to less than 9% in the general U.S. population (Nock et al., as cited in Perez-Brumer et al., 2015). Tebbe and Moradi (2016) assessed the elevated rates of suicide in the transgender community using the Minority Stress Theory and concluded factors such as fear of bias, stigma, transphobia, and other prejudices were very influential. Additionally, research supported that when a transgender individual had extensive exposure to gender identity conversion efforts, it was negatively associated with an adult's mental health outcomes (Turban et al., 2020). The findings were congruent with numerous professional organizations' posture that discouraged this practice (Turban et al., 2020).

### **Access to Care**

Access to care was a significant issue for anyone, but more so for people in the transgender population who face numerous challenges (Kattari et al., 2019). Some limitations were created internally by the patient, while others were purely existential. However, regardless of the limitations, they all harmed an individual's efforts to access care.

First, discrimination may have resulted from social stigma on a person's perceived characteristics, including thoughts and behaviors of the transgender community (Cruz, 2014; Gonzales et al., 2017). These generalizations were dangerous and led not only to a limitation of access to healthcare but to more aggressive harassment and victimization of targeted individuals (Kattari et al., 2019). In some situations, this discrimination became so problematic that healthcare providers and clinicians refused treatment of transgender patients (Qureshi et al., 2017). Ongoing fear of discrimination and potential problems with office visits by transgender individuals kept significant numbers of patients out of their provider's office (Kattari et al., 2019). Providers cited repercussions from their local community and lack of education of the population as reasons to refuse treatment (Qureshi et al., 2017).

Coverage, insurance, and, as mentioned above, a provider who understood transgender health (Bakko & Kattari, 2019; Dickey et al., 2016; Gonzales et al., 2017; Meyer et al., 2017; Qureshi et al., 2017) were some of the additional vital components which affected access to care more than any others. Conversely, Seelman et al. (2018) found no differences in access to care for transgender men when controlled for sociodemographic factors. Gonzales et al. (2017) identified that transgender women had less coverage in terms of insurance than cisgender women, and transgender men have less coverage than any other group in their research group.

Providers self-identified the need for enhanced education resources related to the unique needs of the transgender community in totality (Arora et al., 2020). Additionally,

transgender individuals agreed with this crucial point that better education was needed, and they believed it was imperative for clinicians and all who are in contact and deal with transgender patients (Arora et al., 2020; Qureshi et al., 2017). It was imperative to make educational material available, especially to nursing staff, because it positively impacts clinicians' interactions (Yingling et al., 2017).

The Veterans Health Administration (VHA) had noted an increase in transgender people seeking health care; because of this increase, the VHA had implemented a coherent national policy, which included training for all staffers, this empowered them to provide high-quality care to transgender veterans (Kauth et al., 2014). Providing access to primary care providers with education in transgender health had significant benefits and was among the most reliable indicators for feeling safe and seeking immediate care when needed and not delaying it (Kattari et al., 2019). Health care providers also displayed a substantial degree of confidence in the care and treatment of transgender people when provided educational and informational materials (Arora et al., 2020).

Yingling et al. identified that the nurse's role in transgender access to care was unique and pivotal (2017). Nurses were the single largest group of clinicians and healthcare providers. They serve in every discipline and every department in a medical facility from triage to surgical. This diversity puts nurses in a position to identify and address the health disparities of transgender people and be able to follow their health needs long-term. Kauth et al. (2014) found that more transgender servicemembers sought health care services with more primary care staff education. Because of the unique

positioning nurses have, they would benefit the most from transgender health education, and they would provide the most return on investment in health services. Educational material must be made available to accomplish this goal on transgender health and enlist professional nursing organizations' support (Yingling et al., 2017).

### **Fiduciary Barriers**

Much like the cisgender community, money plays a significant role in access to care and sometimes causes barriers to care. Intangibles such as the belief or fear of discrimination can cause transgender adults to delay care (Kattari et al., 2019); in that same way, finances form a tangible barrier. Gender nonconforming individuals faced the most significant challenges in paying for care and, because of that, were most likely to forego care (Gonzales et al., 2017).

Shires and Jaffee (2015) reported that people in the transgender community who were 45 or older and making over \$60,000 a year were indicators that an individual would have better access to care. Only 29.7% reported being over 50, and in the cisgender community, the number neared 50% (Seelman et al., 2018). Household income also revealed significant differences from the cisgender population; only 26.7% claimed an income over \$50,000 and in the cisgender community, that number was 49.8% (Seelman et al., 2018). All transgender people of low income faced difficulties obtaining or being refused care; the refusal of care was highest for MtF transgender women of lower income (White Hughto et al., 2016).

## **Religion**

The transgender community consisted of people from all aspects of religiosity: some were ardent, others are not religious but spiritual, while still others professed to be agnostic or atheistic (Toscano, 2017). At almost every turn, transgender people were treated differently from the cisgender population. Schools run by those of different religions were not exempt from their beliefs too.

In Christianity, one parochial school was committed to the belief that it is transsexuality and all forms of homosexuality, which were "not of God" and were a reason for expulsion (Ross & Dunkerly-Bean, 2018). This one school was not uncommon, as roughly 75% of middle and high school students did not feel safe because of their gender expression (GLSEN, 2017).

Kanamori et al. (2019) found that on the other hand, people that believed that God was in control of everyone's life viewed transgender people as "the way God made them" and are more willing to accept them the way they are. Consistent data indicated a higher level of prejudice against transgender people in the cisgender population, who identified as being more religious in the sense that they believed themselves more literate in their religion and had increased attendance of services more than others (Campbell et al., 2019). Regardless of how religious men and women saw themselves, research supported the perspective that women place higher human value in a transgender person than men. (Apperson et al., 2015; Bowers et al., 2015; Hill & Willoughby, 2005; Kanamori et al., 2017).

In Islam, some analyzed the Qur'an and understood the term fitna (social discord) and the term fasad (personal corruption) as predestined phenomena in the Muslim world. The second term is sometimes interpreted as the lesser evil; therefore, choosing the fasad (living as a transgender person) rather than causing fitna (getting married to a woman) is acceptable (Alipour, 2015). In Islam, the prevailing thought was that sexual activity, which is not limited to man-woman, was against actual Islamic teaching (Shah, 2016). An invitation to Islamic tolerance towards transgender people was made with Ayatollah Khomeini's fatwas in Iran and Sheikh Muhammad al-Tantawi in Egypt when they expressed their support for sex reassignment surgery by saying it was not forbidden (Alipour, 2017).

In Hinduism, the transgender community was treated as equals with all others throughout history, and it was only after the British colonization that transgender people became condemned in society (Agoramoorthy & Hsu, 2015). Within recent years, a staunch Hindu nationalist movement had fueled a partial acceptance of the transgender community, but this only pertains to gender and does not apply to sexual preference (Ung Loh, 2018). The theme of accepting transgender people as a distinct culture was strong in Hindu. Shiva, the Hindu's principal deity, had one manifestation: half woman and half man named Ardhanari, seen in numerous temples today (Agoramoorthy and Hsu, 2015). No literature regarding Hinduism and transgender people was found outside of studies from India.



### **Theoretical Framework**

The Health Belief Model (Rosenstock et al., 1988) was one of the first frameworks to address health behavior and is the theoretical framework used in this research. The model estimates that modifying variables such as age, race, economy, and gender impact a person's perception of severity and influenced by barriers were a predictor of future behavior. The health belief model was developed by four scientists, Irwin Rosenstock, Godfrey Hochbaum, S. Stephen Kegeles, and Howard Leventhal, who worked for the U.S. Public Health Service in the 1950s (Carpenter, 2010). The health belief model was applied frequently regarding preventative health concerns. Researchers used the health belief model to address people's perceived susceptibility regarding their risk for disease or health problems coupled with their perceived benefits of initiating care to discover any influence on their willingness to engage in preventative care. Action, it was found, was only weakly correlated with behavior (Armitage & Conner, 2000). Carpenter (2010) suggested that the health belief model's theoretical constructs were not specific and only roughly defined. Glanz et al. (2008) explained that this limitation was a function of the construction of the health belief model because it did not stipulate the relationships of its constructs.

According to Janz and Becker (1984), they reported evidence that barriers, benefits, and susceptibility were good predictors of behavior; however, they found that severity was not a good predictor of behavior. Carpenter (2010) similarly reported that benefits and barriers were strong and consistent predictors of behavior. Kok et al. (2014)

stated that the health belief model was an applicable theoretical framework in evaluating a person's self-efficacy and how their outcome expectations manipulate their behavior to act regarding the fear they experience related to the health situation.

Cross-sectional data was not a proper application for selecting the health belief model because, over time, perceptions change, which could affect behavior, this produces inaccurate estimates of the relationship between the different components and the behavior of self-efficacy (Rosenstock, 1974). Janz and Becker (1984) presented a contrary perspective and suggested that some of the cross-sectional relationships would not be as strong, more specifically, they would become weaker.

This research focused on transgender individual's perceived health status and attempted to address if this was a significant factor in prompting an individual to engage in preventative care. The health belief model provided a baseline of demographic and psychosocial factors included in this research as the control variables and included age, race, sex, marital status, current health behaviors, and numerous others. Perceived susceptibility in this research, an individual's perceived health was a dependent variable. It was analyzed along with the other dependent variable of receipt of preventative care and their association with the independent variable. The independent variable for the research effort was an individual's gender, specifically transgender or cisgender. Additionally, when an individual identified as transgender, they were further evaluated as MtF or FtM. Upon completing this research, future research should focus on this detail,

whether the individual believes in the benefit of their action to seek preventative care or are frightened into acting.

### **Literature Review Summary**

This review highlighted population access to health care, quality of care, and social determinants of health disparities for transgender individuals living in the U.S., as well as evidence gaps that exist. Because of their unique physical and mental health needs, encouraging the use of and access to preventative services, customized programs, and services for the transgender population needs to be developed and socialized throughout the community. These programs must include patient education and provide education modules to bridge the knowledge gap and foster understanding from both perspectives of health issues.

The theoretical framework chosen for this research was the health belief model, which applied to the construct of the study. To determine if the perception of one's health was a factor to action, the health belief model provided the framework to track and outline the steps of this research effort.

### **Definitions**

**Assigned gender:** Natal sex (LGBTQIA, 2020).

**Cisgender:** An individual whose chosen expression of sexuality aligns with their natal biological sex and gender, conforming to societal expectations for that natal gender (Buck, 2016).

*FtM*: A biological natal female who identifies as a male individual. (Parents and Friends of Lesbians and Gays [PFLAG], n.d.).

*Gender*: The awareness and identification of different social, psychological, and emotional behaviors often prejudiced by societal expectations (PFLAG, n.d.).

*Gender-Affirming Surgery (GAS)*: Also known as Sex Reassignment Surgery (SRS). The assemblage of surgeries undertaken under the direction of numerous medical professionals by an individual to align their chosen sexual orientation with their gender and not their natal biological sex (PFLAG, n.d.).

*Gender Dysphoria*: The mental anguish caused by an inconsistency between a person's subjective identification of gender and their biological natal sex (Bonifacio et al., 2019).

*Gender expression*: A manner in which a person demonstrated, both visually and verbally within a specific culture, their gender (LGBTQIA, 2020).

*Gender Identity*: A person's subjective interpretation of what their sexual orientation and sex are based on biological, social, psychological, and emotional factors (Buck, 2016).

*MtF*: A biological natal male who identifies as a female (PFLAG, n.d.).

*Sexual orientation* (noun) – How an individual characterizes the romantic, emotional, and sexual feelings they possess towards other individuals regardless of sex. (LGBTQIA, 2020; PFLAG, n.d.).

*Transgender*: An individual self-identification of a chosen gender which may be different from that of their natal sex (Buck, 2016)

#### Assumptions

Four assumptions were made during the creation and analysis of this research. The first assumption was that all questionnaires were answered truthfully and accurately. The second assumption was that the number of transgender people was measured accurately in the BRFSS. Understanding this population's traditional underrepresentation was essential and considered in the analysis portion of the study (Meerwijk & Sevelius, 2017; D'Angelo, 2018). The third assumption was the possibility of self-reporting bias (Rosenman et al., 2011), which is common in research. However, self-reporting bias is still to be studied in the transgender population. Fourth, it was assumed that the data used generally avoided reporting bias even though reporting bias has been demonstrated within transgender survey results (McCullough et al., 2019).

#### Scope and Delimitations

The scope of this study was the transgender community and quantitative analysis was conducted with measurable results using the data collected from the Behavioral Risk Factor Surveillance System (BRFSS). The BRFSS was a telephone survey including more than 400,000 people yearly in the U.S. It is conducted annually by the Centers for Disease Control and Prevention (CDC) and addresses behavioral risks to health outcomes (2014). The datasets used for this project contain weighted data from the three cross-sectional studies of 2014, 2015, 2016, 2017, and 2018. This research focused on the

general population of the U.S. yet included the most extensive samples of transgender individuals (both MtF and FtM) collected to date. It pertained to engaging different types of preventative health care by transgender and cisgender people based on their perceived health status; it measured those actions between the transgender and cisgender populations and the actions between MtF and FtM transgender people. This research focused solely on the actions that led people to pursue preventative healthcare within the U.S. population and any associations among transgender people and cisgender people. This research addressed the gap in the literature where a transgender person's perceived health was analyzed to predict if it would lead a person to seek preventative care.

This project did not distinguish between transgender people in a pretransition, post-transition, or declined transition status. Some transgender people elect gender-confirming treatment, including hormonal and surgical support, but this study did not differentiate among them because that information was not available.

This research is generalizable throughout the United States because the BRFSS is a telephonic, cross-sectional study that derives its sample from calls made on landlines and cellular devices to U.S. citizens from all 50 states (CDC, 2014) and the District of Columbia and three U.S. territories (CDC, 2014). The focus for the scope of this investigation was to address if an individual's self-perception of their health was an influencing factor for them to pursue preventative care and identify associations between transgender and the cisgender population regarding perceived health and receipt of preventative care, controlled for demographics. The research.

## **Significance and Conclusions**

### **Significance of the Study**

The significance of this study was that it addresses a gap in the literature and that it offers functional knowledge about the perceptions of the current health status of individuals in the transgender community and their engagement with pursuing appropriate preventative care. Several studies have used some of the data used for this research to examine health outcomes by assessing barriers to care. However, no studies were located in the literature investigating individuals who engaged in preventative care by assessing their health perceptions.

This project supports the mission of positive social change by explaining the determinants that impact different types of preventative care. The goal was to better understand the factors that lead people in the transgender community to seek preventative medical care. Findings may assist policymakers, epidemiologists, community planning groups, and other stakeholders in determining at-risk subpopulations.

### **Significance to Practice**

Compared to the cisgender population, the transgender community disproportionately lacks obtaining preventative care (Safer et al., 2016). In several cases, the barriers to care are understood, while an individual's subjective perception of their current health status and their willingness to seek preventative care was not studied. The transgender community suffers from higher rates of sexually transmitted diseases (including HIV/AIDS), depression, self-harm, domestic abuse, and many other health

maladies (Dinno, 2017). In pursuing this research effort, the community achieved a better understanding of an unknown factor, which could be essential in increasing access to preventative health care and thus the number of transgender people seeking and receiving preventative health care.

### *Significance to Social Change*

This project supports positive social change in how healthcare providers support transgender people with timely access to care. Its findings support the ODPHP strategy of identifying and clarifying health needs by focusing on transgender people's perceptions about subscribing to preventative care (2019). Finally, this project may improve understanding of the determinants that impact different types of preventative care to better understand the factors that lead people in the transgender community to seek preventative medical care.

### Summary

This section included several components. The first part was a look at the nature of the study. This study was a quantitative cross-sectional study investigation that analyzed data from adult participants, aged 18 and older, in a national study. The national study was the BRFSS and the data included the years 2014 through 2018.

The second component included the Research Questions and hypothesis associated with each Research Question. There are four research questions that are tooled to investigate the differences between transgender and cisgender people and the differences between MtF and FtM individuals in the transgender subgroup. The



differences being investigated include perceived health and if an individual's perceived health is an indicator of obtaining medical care.

Thirdly, a complete review of the literature associated with transgender people was conducted. In this review, an investigation of the available research that continues to accumulate related to healthcare barriers for the transgender population was conducted. In this section, numerous potential influencers on preventative care in the transgender population were discussed. Additionally, the health belief model's application as the theoretical framework to the research was explained and shown how it guides this research effort.

The literature review highlighted the numerous variables relevant to health outcomes and preventative care in the transgender community; however, a gap in the literature existed when investigating a transgender person's perceived health status and that relationship to that individual either implementing or not implementing some preventative care. To date, research does not address if a transgender man who has completed gender reassignment surgery believed, for example, that a mammography is essential for health. This study attempted to answer these types of questions related to preventative medicine use by the transgender community.

## Section 2: Research Design and Data Collection

The methodology section included several subheadings (a) research design and rationale, (b) data collection techniques, and (c) the methodology used in this research project. These sections included information concerning the sample population and analytical requirements; they addressed inclusion and exclusion parameters in the sample and the sampling population. Additionally, this section included an a priori power analysis to assist in detecting type II errors. This section also included the sample and sampling techniques, data collection methods, and the instrumentation and operationalization of variables. The chosen data analysis techniques used in this study were discussed. Next, threats to internal validity and external validity were analyzed. Finally, ethical considerations were also presented, followed by a summary.

### **Research Design and Rationale**

The purpose of this study was to investigate if there were differences between members of the transgender and non-transgender population regarding perceived health and the receipt of preventative care when controlled for demographics. Also, potential differences in perceived health and the receipt of preventative care investigated by transgender type when controlled for demographic variables. This quantitative study used cross-sectional secondary data (BRFSS, 2014-2018) from the general population of adults in the U.S. It was the most extensive annual cross-sectional data collection of the U.S. population that included the variable of gender identity. The cross-sectional design was chosen because it allowed (a) for the inclusion of the BRFSS data from several years,

which enabled extensive analysis of the transgender population and cisgender population and (b) for the calculation of the odds ratio, which quantifies the strength of the association between the independent and dependent variables (Szumilas, 2010).

## **Methodology**

### **Population**

The BRFSS data were collected annually from 2014-2018 and included an annual sample of over 435,000 each year. The BFRSS used a health-related telephone survey where researchers called both landlines and cell phones. The survey included core questions with optional modules and an opportunity for questions to be added by the state. The sampling population was the U.S. and several of her territories and her possessions.

### **Sampling and Sampling Procedures**

Researchers collected data using the instrumentation of their BRFSS annual questionnaire (About BRFSS, 2014). Researchers then used the BRFSSS Questionnaire (2014-2018) at the CDC during telephone interviews in a longstanding data collection policy established in the mid-1980s (BRFSS - Survey Data, 2019). Researchers collect data, interpret the data, and utilize it to improve public health beginning in 1984 at the inception of the project (BRFSS - Survey Data, 2019). The CDC staff stored the data in an online archive by year separated by calendar year. The data were publicly accessible and open for use by the public. The administrators of the BRFSS obtain informed consent during the survey either on landline or cell phone. The data were weighted, anonymized,

and publicly available at the BRFSS Survey Data and Documentation website (BRFSS - Survey Data, 2019). CDC staff used the BRFSS questionnaire to collect data about U.S. residents' concerning their health-related risk behaviors, chronic health conditions, and what preventative services they used (About BRFSS, 2014).

The annual sample size for the BRFSS consists of over 435,000 U.S. adults who participated in the survey each calendar year. Cicero et al. (2020) agreed that the questionnaire was the most comprehensive data collection tool to date and a good start. The questions pertaining to transgender people may not be weighted precisely correct and did not fully reflect the accuracy needed for correct health interventions. Rolle-Lake (2020) suggested that low response rates, needed adaptations to change in means of communication, and reaching a multi-language diverse population were all limiting factors to the survey.

## **Instrumentation and Operationalization of Constructs**

### **Instrumentation**

The instrument for data collection was the BRFSS survey administered telephonically by researchers at the CDC. Data were captured by the researchers and input when they received answers from the individuals they interviewed. The survey was conducted on either a landline or a cell phone with adults, 18 years old or higher, in the U.S. and several of her territories.

### **Operationalization of Constructs**

This study leverages surveys covering the period of 2014 through 2018. Each survey was constructed similarly. There were three sections for these surveys (a) the core component, inclusive are the fixed core, rotating core, and emerging core (b) optional modules, and (c) state-added questions (About BRFSS, 2014).

The fixed core containing standardized questions asked by all states included questions on demographics and questions on current health behaviors, such as tobacco use and seatbelt use (About BRFSS, 2014). The rotating core was comprised of two unique sets of questions; each group was presented in alternating years in every state and territory, addressing different topics. In years rotating core topics go unused, they were recommended as optional modules (About BRFSS, 2014). The emerging core section included up to five questions that were added to the fixed and rotating cores. Emerging core questions usually addressed “late-breaking” issues. This group of questions were included in the core section for one year and were analyzed to identify potential value in future surveys.

### **Data Accessibility and Permissions**

The datasets used in this research project were publicly available and easily accessible to anyone at the Centers for Disease Control and Prevention website (BRFSS - Survey Data, 2019). There were no special permissions or requirements for accessing the BRFSS data. CDC officials managed the data by calendar year, and each completed core questions and two optional sections as part of the data collection (BRFSS - Survey Data, 2019).

## Power Analysis

The statistical significance level, or alpha, for this research was .05. A confidence level of 95% was used with a confidence interval of +/- 3% as a measure of reliability. When a true null hypothesis is rejected, it is a Type I error, with a probability symbolized by  $\alpha$ , but when there is a difference between the means and the null hypothesis is accepted, then a type II error, symbolized by  $\beta$ , has been committed (Hoffman, 2019). Also, calculating the optimal sample size in research was essential because it spoke directly to the study's power calculations (Melnik & Morrison-Beedy, 2019). A larger sample size leads to greater statistical power.

A statistical test's power is represented as  $1-\beta$ , where  $\beta$  represents the size of a type II error (Hoffman, 2019). Additionally, Hoffman (2019) indicated that the power test enabled a researcher to determine if the null hypothesis was rejected correctly.

The  $\chi^2$  sample size was calculated on the G\*power version 3.1.9.4 to obtain the sample size for this study. The table below included the results of the sample size calculation. The calculated sample size for this study was 145, when an equal sample size for each group is used, the total sample size from the population is 290.

### Table 1

#### G\*Power Analysis for $\chi^2$

Input

## Research Question and Hypotheses

RQ1–Quantitative: Is there a significant difference regarding perceived health and receipt of preventative care (such as mammograms, PAP test, influenza vaccination, pneumonia vaccination, tetanus vaccination, human papilloma vaccination, sigmoidoscopy/colonoscopy) between transgender and non-transgender adults in the U.S.?

H<sub>0</sub>: There is no significant difference regarding perceived health and receipt of preventative care (such as mammograms, PAP test, influenza vaccination, pneumonia vaccination, tetanus vaccination, human papilloma vaccination, sigmoidoscopy/colonoscopy) between transgender and non-transgender adults in the U.S.

H<sub>a</sub>: There is a significant difference regarding perceived health and receipt of preventative care (such as mammograms, PAP test, influenza vaccination, pneumonia vaccination, tetanus vaccination, human papilloma vaccination, sigmoidoscopy/colonoscopy) between transgender and non-transgender adults in the U.S.

Independent variable: being transgender (yes/no).

Dependent variables: perceived health and receipt of preventative care.

Control variables: age, race/ethnicity, income

RQ2–Quantitative: Is there a significant difference regarding perceived health and receipt of preventative care (such as mammograms, PAP test, influenza vaccination, pneumonia vaccination, tetanus vaccination, human papilloma vaccination, sigmoidoscopy/colonoscopy) between transgender male-to-female (MtF) and female-to-male (FtM) transgender adults?

H<sub>0</sub>2: There is no significant difference regarding perceived health and receipt of preventative care (such as mammograms, PAP test, influenza vaccination, pneumonia vaccination, tetanus vaccination, human papilloma vaccination, sigmoidoscopy/colonoscopy) between transgender male-to-female (MtF) and female-to-male (FtM) transgender adults.

H<sub>a</sub>2: There is a significant difference regarding perceived health and receipt of preventative care (such as mammograms, PAP test, influenza vaccination, pneumonia vaccination, tetanus vaccination, human papilloma vaccination, sigmoidoscopy/colonoscopy) between transgender male-to-female (MtF) and female-to-male (FtM) transgender adults.

Independent variable: transgender type [male-to-female (MtF)/female-to-male (FtM)]

Dependent variables: perceived health and receipt of preventative care

Control variables: age, race/ethnicity, income

RQ3-Quantitative: Are there significant differences between the MtF and FtM transgender adults in the frequency of medical treatments pursued by those with



substantial chronic medical issues (such as asthma, stroke, heart attack, diabetes, cancer, HIV/AIDS)?

H<sub>0</sub>3: There are no significant differences between the MtF and FtM transgender adults in the frequency of medical treatments pursued by those with substantial chronic medical issues (such as asthma, stroke, heart attack, diabetes, cancer, HIV/AIDS).

H<sub>a</sub>3: There are significant differences between the MtF and FtM transgender adults in the frequency of medical treatments pursued by those with substantial chronic medical issues (such as asthma, stroke, heart attack, diabetes, cancer, HIV/AIDS).

Independent variable: transgender type [male-to-female (MtF)/female-to-male (FtM)]

Dependent variable: frequency of medical treatments.

Control variables: age, race/ethnicity, income

RQ4- Quantitative: In the adult population, is there a significant difference regarding perceived satisfaction of care and the number of medical appointments conducted between MtF transgender, the FtM transgender, and the non-transgender communities?

H<sub>0</sub>4: There is no significant difference regarding perceived satisfaction of care and the number of medical appointments conducted between MtF transgender, the FtM transgender, and the non-transgender communities.

H<sub>a4</sub>: There is a significant difference regarding perceived satisfaction of care and the number of medical appointments conducted between MtF transgender, the FtM transgender, and the non-transgender communities.

Independent variable: transgender status (MtF transgender, the FtM transgender, non-transgender)

Dependent variables: perceived satisfaction of care and the number of medical appointments.

Control variables: age, race/ethnicity, income

#### Operationalization of Variables

The variables explored in the study were numerical variables. The independent variable was gender identification (categorical/nominal variable). The dependent variable's levels of measurement were nominal, and each variable contained multiple groups. Table 2 aligned research questions and variables, while Table 3 showed the variables and indicated each variable's definition, measurement level, and attributes.

#### Table 2

Research Questions and Variables Crosswalk  
Variable name

PHYSHLTH

1,2

**Table 3****Operational Definitions of Variables**

Name

IMPRACE

Race/Ethnicity

INCOMG

Computed income  
categories

INCOME2

Income Level

How Long since  
Last Mammogram

LASTPAP2

How Long Since  
Last Pap Test

HPLSTTST

How long since  
your last HPV test

PSATIME

Time Since Last  
PSA Test

CARERCVD

FLUSHOT6

PNEUVAC4

HADMAM

HADPAP2

HPVTEST

PATEST1

BLDSTOOL

HADSIGM3	Ever had sigmoidoscopy / colonoscopy
HIVTST6	Ever tested HIV
PROFEXAM	Ever had breast physical exam by doctor
HPVADVC2	Have you ever had the HPV vaccine
TETANUS1	Tetanus shot since 2005
DRVISITS	Doctor visits past 12 months
CVDINFR4	Ever told you had a heart attack
CVDCRHD4	Ever told you had coronary heart disease
CVDSTRK3	Ever told you had a stroke
ASTHMA3	Ever told you had asthma



ASTHNOW

CHCSCNCR

CHCOCNCR

CHCCOPD1

HAVARTH3

ADDEPEV2

CHCKDNY1

DIABETE3

4 – No, prediabetes or borderline diabetes

7 – Don't know/Not sure

9 – Refused

Pearson's Chi-square test for independent samples for categorical variables for all RQs. Pearson's chi-square test was administered to analyze the difference in proportions between two independent samples and test whether there was an association between the variables. Second, multivariable analysis (binomial logistic regression [BLR]) was conducted per RQ also to assess the effect of confounders of race/ethnicity, age, education, and income. Each dependent variable per RQ was recoded into a binary categorical variable to accomplish this analysis. The selected statistical significance level was a  $p$ -value  $< 0.05$ .

### Threats to Validity

This section focused on things that can affect the validity, both internal and external. Cicero et al. (2020) noted that in the 2015 BRFSS methodology, interviewers assessed an individual's sex based on that individual's vocal timbre. This subjective assumption created a misclassification bias and is essential because 74% of MtF and 66% of FtM individuals had a conflict between their stated gender identity and what the interviewers recorded. Subsequent years questionnaires specifically direct the interviewers in gaining sex and gender identification information from the individual surveyed and not have that information come from the interviewed.

### External Validity

Threats to external validity included selection bias; this was from improper or lack of randomization, it led to a sample that did not appropriately represent the population. The dataset only contained people called on a landline or a cell phone,

meaning that the study was generalizable to this greater population. The U.S. had a cell phone saturation at 129 subscriptions per 100 people and 34 landlines per 100 people, meaning there are more telephones than people (The World Factbook, 2018).

### **Internal Validity**

Several factors affect internal validity in a study. Lack of statistical power was an essential threat to statistical conclusion validity, a type of internal validity, leading a researcher to draw inaccurate conclusions from the data (Creswell, 2009). Another threat to the internal validity of a study was events that were external to the experiment; these factors fell under the heading of history. We must consider history because various events may influence the study's many variables differently (Melnyk & Morrison-Beedy, 2019). Other threats to internal validity include instrumentation, maturation, regression, selection, and testing (Melnyk & Morrison-Beedy, 2019). Because this study includes cross-sectional data from the BRFSS, there was no issue of maturation or attrition. The instrumentation from the CDC was a reliable tool under constant scrutiny and improvement. Only the validity question is related to the 2015 BRFSS methodology previously mentioned where interviewers assumed an individual's sex based on voice recognition alone.

### **Ethical Procedures**

The Walden University IRB had defined specific processes for students to follow when considering any data for inclusion in a project (Research ethics and compliance, n.d.). This process is intended to closely monitor for inappropriate or inadvertent use of

human subject data. The U.S. Federal Government had requirements and restrictions outlined in the U.S. Code of Federal Regulations (CFR). It was explicit what compliance was needed for researchers when they used data related to human subjects. The U.S. law categorized the use of BRFSS data as public data because these are de-identified data. Prior to the conduction of the study, Walden IRB approval was applied for and received (Approval No. 08-05-20-0540538).

### **Summary**

This section outlined the research design and rationale and the data collection techniques and methodology used in this research project. The methodology section included material characterizing the population, samples, and analytics. This section additionally included the data collection methods and the instrumentation and operationalization of variables along with statistical tests used with an overview of the population. Next, threats to internal validity and external validity were analyzed. Finally, ethical considerations associated with this effort were addressed, followed by a summary. Section 3 included the findings from this research effort.

### Section 3: Presentation of the Results and Findings

The purpose of this cross-sectional study was to explore potential differences between the transgender and the cisgender population regarding perceived health and receipt of preventative care after controlling for demographics.

For each research question, descriptive statistics were examined first to investigate the trends of the sample. Inferential statistics were completed in two phases. First, bivariate analyses were explored using Pearson's chi-square test for association between categorical variables. The chi-square test was also used to analyze the difference in proportions between two independent samples; it tested whether there was an association between the variables. Second, multivariable analysis (binomial logistic regression) was conducted to assess the effect of potentially confounding variables: race/ethnicity, age, education, and income. Each dependent variable was recoded into a binary categorical variable to achieve the logistic regression. The selected statistical significance level was  $p < 0.05$ .

#### Research Question

RQ1–Quantitative: Is there a significant difference regarding perceived health and receipt of preventative care (such as mammograms, PAP test, influenza vaccination, pneumonia vaccination, tetanus vaccination, human papilloma vaccination, sigmoidoscopy/colonoscopy) between transgender and non-transgender adults in the U.S.?

H<sub>0</sub>1: There is no significant difference regarding perceived health and receipt of preventative care (such as mammograms, PAP test, influenza vaccination, pneumonia vaccination, tetanus vaccination, human papilloma vaccination, sigmoidoscopy/colonoscopy) between transgender and non-transgender adults in the U.S.

H<sub>a</sub>1: There is a significant difference regarding perceived health and receipt of preventative care (such as mammograms, PAP test, influenza vaccination, pneumonia vaccination, tetanus vaccination, human papilloma vaccination, sigmoidoscopy/colonoscopy) between transgender and non-transgender adults in the U.S.

RQ2–Quantitative: Is there a significant difference regarding perceived health and receipt of preventative care (such as mammograms, PAP test, influenza vaccination, pneumonia vaccination, tetanus vaccination, human papilloma vaccination, sigmoidoscopy/colonoscopy) between transgender male-to-female (MtF) and female-to-male (FtM) transgender adults?

H<sub>0</sub>2: There is no significant difference regarding perceived health and receipt of preventative care (such as mammograms, PAP test, influenza vaccination, pneumonia vaccination, tetanus vaccination, human papilloma vaccination, sigmoidoscopy/colonoscopy) between transgender male-to-female (MtF) and female-to-male (FtM) transgender adults.

H<sub>a2</sub>: There is a significant difference regarding perceived health and receipt of preventative care (such as mammograms, PAP test, influenza vaccination, pneumonia vaccination, tetanus vaccination, human papilloma vaccination, sigmoidoscopy/colonoscopy) between transgender male-to-female (MtF) and female-to-male (FtM) transgender adults.

RQ3-Quantitative: Are there significant differences between the MtF and FtM transgender adults in the frequency of medical treatments pursued by those with substantial chronic medical issues (such as asthma, stroke, heart attack, diabetes, cancer, HIV/AIDS)?

H<sub>o3</sub>: There are no significant differences between the MtF and FtM transgender adults in the frequency of medical treatments pursued by those with substantial chronic medical issues (such as asthma, stroke, heart attack, diabetes, cancer, HIV/AIDS).

H<sub>a3</sub>: There are significant differences between the MtF and FtM transgender adults in the frequency of medical treatments pursued by those with substantial chronic medical issues (such as asthma, stroke, heart attack, diabetes, cancer, HIV/AIDS).

RQ4- Quantitative: In the adult population, is there a significant difference regarding perceived satisfaction of care and the number of medical appointments conducted between MtF transgender, the FtM transgender, and the non-transgender communities?



H<sub>0</sub>4: There is no significant difference regarding perceived satisfaction of care and the number of medical appointments conducted between MtF transgender, the FtM transgender, and the non-transgender communities.

H<sub>a</sub>4: There is a significant difference regarding perceived satisfaction of care and the number of medical appointments conducted between MtF transgender, the FtM transgender, and the non-transgender communities.

#### Time Frame of Data Collection and Response Rates

Each year, from 2014-2018, a survey was conducted by the CDC—the BRFSS. People in the 50 states, the District of Columbia, and the territories were randomly telephoned about their health-related behavior and chronic diseases. Sampling involved both land and cellular calls to adults who were 18 or older. This study used these annual data.

#### Discrepancies in the Dataset

##### Duplicate variables

Two variables (INCOMG, INCOME2) for income status were identified for inclusion; however, because they were closely related, one was removed (INCOME2), so only one income-related demographic was used in this research project. INCOMG is the demographic variable that is used for all analyses.

##### Missing data

The BRFSS data were incomplete, and certain limitations were identified. In 2017, 12 dependent variables used in this project were not collected. In 2015 three dependent variables were also not collected.

**Table 5****Missing Variables**

*Renamed Variables*

For five variables, which included fourteen instances, data were renamed to the 2018 codebook category. This renaming allowed for the consistent use of data for all five years of the BFRSS. The data were characterized the same in each of the different codebooks; it was only the category name that was changed.

Table 7

*Renamed and Merged Variables*

Recoded	RQ1	RQ2	RQ3	RQ4
Yes, MtF	1	1	1	1
Yes, FtM	1	2	2	2
Yes, Non-conforming	1	-	-	-
Cisgender	0	-	-	0

PHYSHLTH was converted from a string value to a categorical data item consisting of two categories for RQ 1 and 2.

Table 9

*PHYSHLTH Recodes*

Variable Name

**Table 12****GENHLTH Recodes**  
Variable Name

Variable Name	Recoded	Code
CHECKUP1	Within the past year	1
	Within the past 2 years	1
	Within the past 3 years	0
	Within the past 5 years	0
	5 or more years ago	0

TETANUS1 was converted from 6 values into two categories for RQ 1 and 2.

Table 16

TETANUS1 Recodes  
Variable Name

Data were used starting with 2014, the first-year transgender information was recorded, up to and including 2018, which was the latest data available. The total of interviews from these five years was 2,278,508.

**Table 18**

**Population and Sample Size by Year**

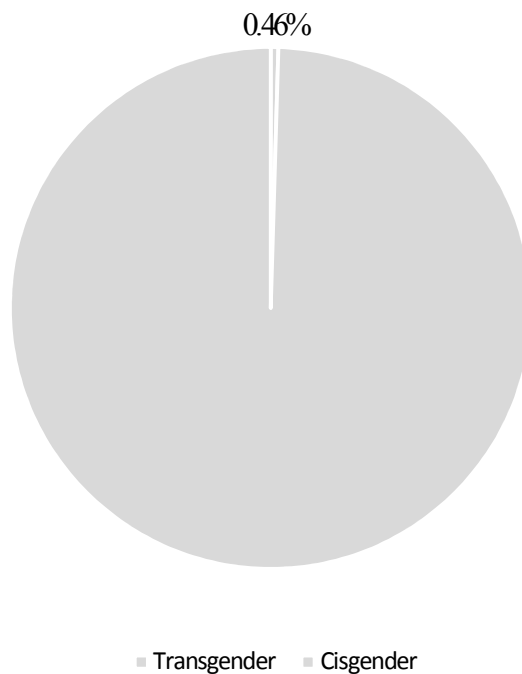
subgroup of transgender, MtF participants ( $n = 1,874, 45.75\%$ ) represented nearly half of the sample with FtM transgender ( $n = 1,340, 32.71\%$ ) and gender-non-conforming with the least number of participants ( $n = 882, 21.53\%$ ).

Table 20

*Transgender frequencies per year*



**Figure 1**  
**Distribution of Participant's by Gender in Research Question 1**



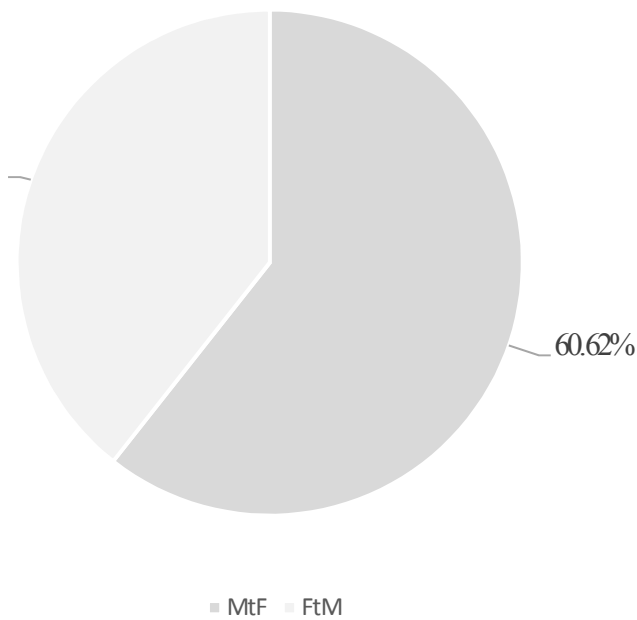
In Research Question 2, 332 individuals surveyed in BRFSS identified a specific transgender status and had all variable data needed for this analysis included in their profile. From that sample, 194 adults (58.43%) were identified as MtF transgender, while 138 adults (41.57%) were recorded as FtM transgender as shown in Figure 2.

99.54%

Figure 2

Distribution of Participant's by Gender in Research Question 2

In Research Question 3, 513 individuals surveyed in BRFSS identified a specific transgender status and had all variable data needed for this analysis included in their profile. From that sample, 311 adults (60.62%) were identified as MtF transgender, while 202 adults (39.38%) were recorded as FtM transgender as shown in Figure 3.

**Figure 3****Distribution of Participant's by Gender in Research Question 3**

In Research Question 4, 174,591 individuals surveyed in BRFSS identified a specific transgender status (MtF or FtM) or were listed as cisgender and had all variable data needed for this analysis included in their profile. From that sample, 390 adults (0.22%) were identified as MtF transgender, while 263 adults (0.15%) were recorded as FtM transgender and 173,938 adults (99.63%) were listed as cisgender as shown in Figure 4.

**Figure 4****Distribution of Participant's by Gender in Research Question 4****Representativeness of the Sample**

To maintain representativeness, the CDC included cell phone and landline participants in their surveys because they represented different demographics of people. (BRFSS, n.d.) Furthermore, the change from a post-stratification weighting methodology to a raking weighting method in BRFSS happened in 2014. This change accounted for the continually changing proportions of known demographic characteristics (i.e., age, race, income, ethnicity, sex, telephone source, and region) and allowed for the inclusion or expansion of analysis of other characteristics (marital status, education level, and homeowner status) while adjusting for nonresponse bias.

It was reported that the transgender population had been traditionally underrepresented; Crissman et al. (2017) surmised that transgender people comprise 0.53% (95% confidence interval [CI] = 0.46, 0.61) of the U.S. population. Flores et al. (2016) estimated using the BRFSS data from 2016 that the transgender adult population was calculated at 0.6% of the adult population. Demographics of the group specific to age, socioeconomic status, marital status, education level, and healthcare access were all generalizable to nationally reported data for this population.

### **Study Results**

The following subsections included statistical assumptions and results of the four research questions as well as explorative analysis.

#### **Statistical Assumptions**

Data for each RQ were analyzed using crosstabs and Pearson's chi-square test. The five assumptions of a chi-square test included (a) individual level data, (b) mutually exclusive categories, (c) independence, (d) nominal or ordinal categories, and (e) variables are dichotomous and categorical and there should be five or more cases in 80% of the cells (McHugh, 2013). All the chi-square test assumptions were met because the groups are nominal or ordinal, mutually exclusive, independent, and had cell counts with more than five individuals.

Five assumptions existed for Binomial Logistic Regression (BLR), which were (a) dependent variable must be binary, (b) independent observations, (c) little or no multicollinearity in the independent variable, (d) linearity of the independent variable,

and (e) a large sample size (minimum of 500) (Statistic Solutions, 2019). All the necessary assumptions for this methodology were met because the dependent variables are dichotomous, cases are independent with no multicollinearity and for RQ1,  $n = 96,718$ ; RQ2,  $n = 332$ ; RQ3,  $n = 513$ .

Three assumptions existed for exact test for goodness of fit for the Hosmer Lemeshow test, which were (a) variable must be binary, (b) each of the observations were independent, and (c) groups of the categorical variable must be mutually exclusive (Exact, 2020). All the exact test for goodness of fit assumptions were met because the variables are binary, observations were independent, and all categorical variables were mutually exclusive.

#### Research Question 1

RQ1–Quantitative: Is there a significant difference regarding perceived health and receipt of preventative care (such as mammograms, PAP test, influenza vaccination, pneumonia vaccination, tetanus vaccination, human papilloma vaccination, sigmoidoscopy/colonoscopy) between transgender and non-transgender adults in the U.S.?

#### *Univariate Analysis*

Descriptive Statistics. The majority of this sample was comprised of White only, non-Hispanic participants ( $n = 75,451$ , 78.0%). The least in representation by percentage are Native Hawaiian or other Pacific Islander ( $n = 422$ ) and Other Race only, non-Hispanic ( $n = 367$ ). Both were 0.4%.

**Figure 5****Ethnicity by Percent**

Age was more heavily distributed towards 60–64-year-olds (n = 12,159, 12.6%), 55–59-year-olds (n = 11,454, 11.8%), and 65–69-year-olds (n = 10,841, 11.2%).

**Figure 6****Sample by Age**

Income was disproportionately distributed among participants. The greatest distribution was in the highest income bracket of \$75,000 or more (n = 27,007, 27.9%), descending in number - by income level to the lowest income bracket (Less than \$10,000: n = 5,744, 5.9%).



**Figure 7****Sample by Income Level**

Natal sex was more distributed towards male participants (59,224, 61.2%).

**Figure 8****Sample by Natal Sex**

Finally, FIPS Code (representing locality) characterized significant participation from New York (12,285, 12.7%) and Virginia (10,245, 10.6%). The least participation was from North Carolina (69, 0.1%), Montana (104, 0.1%), and Tennessee (91, 0.1%). All other locations represented between 0.2% (Kansas) and 5.1% (Minnesota).

**Figure 9****Sample by Location**

Nominal level frequencies and coding of the demographic variables were presented in Table 20.

**Table 21****Frequency Table for Demographic Variables in Research Question 1**

Variable

Age 30 to 34

Reported age in five-  
year age categories  
calculated variable

Missouri

4147

higher the strength of the association. Based on this effect size analysis, the only significant chi-square value result of influenza vaccination was a weak association described by Cohen (1988).

**Table 22**

**Research Question 1 Combined Chi-Square Table**

Post Hoc Analysis. A post hoc power analysis was conducted for the chi-square test results using the G\*Power software package. A sample size of 96,718 was used. The recommended effect sizes used for this assessment was medium ( $r = .3$ ) (Cohen, 1988). The alpha level used for this analysis was  $p < .05$ . The post hoc analyses revealed that this study's statistical power was 83.63% for detecting a medium effect, whereas the power exceeded .99 to detect a moderate to large effect size. Thus, there was more than adequate power (i.e., power  $> .80$ ) at the medium effect size level.

**Table 23**

**Research Question 1 Post Hoc G\*Power Analysis for  $\chi^2$   
Input**

identify as transgender when compared to White only, non-Hispanic [ $OR = [3.616]$ , 95%  $CI (1.413, 9.252)$ ].

Table 24

*Binomial Logistic Regression for Influenza Vaccination with Predictors Locality, Sex, Income, Age, and Race*



Washington

.769

Analysis of the chi-square test results showed the association of the cisgender group and influenza vaccination status as statistically significant. In the logistic regression, influenza status was shown not to be significant when analyzed within the demographics. However, the regression model also indicated that one of the demographic groups in the race variable (Other race only, non-Hispanic) was statistically significant. This finding, however, was not in the scope of the research question, so therefore the null hypothesis should be rejected.

### **Research Question 2**

Is there a significant difference regarding perceived health and receipt of preventative care (such as mammograms, PAP test, influenza vaccination, pneumonia vaccination, tetanus vaccination, human papilloma vaccination, sigmoidoscopy/colonoscopy) between transgender male-to-female (MtF) and female-to-male (FtM) transgender adults?

Univariate Analysis

**Descriptive Statistics.** Nearly seven out of ten records in this sample consisted of White only, non-Hispanic participants (n = 230, 69.9%).

**Figure 10****Sample by Race**

Age was more heavily distributed towards older adults, with more respondents aged 55 to 59-years old (n = 49, 14.9%) then 50–54-year-olds (n = 42, 12.8%) and 60–64-year-olds (n = 40, 12.2%).

**Figure 11****Sample by Age Group**

Income brackets were distributed relatively equally. There was a similar number of people in the highest income bracket of \$75,000 or more (n = 52, 15.8%) as in the lower-income bracket of \$15,000 to less than \$20,000: (n = 52, 15.8%). Otherwise, the sample was focused in the remaining lower income categories of less than \$10,000: (n = 45, 13.7%) and \$20,000 to less than \$25,000 (n = 44, 13.4%).

**Figure 12****Sample by Income Level**

Natal sex was nearly evenly distributed with seven more male participants (n = 168, 51.1%) than female participants (n = 161, 48.9%).

**Figure 13****Sample by Natal Sex**

Finally, FIPS Code (representing locality), represented significant participation from New York (n = 56, 17.0%) and Virginia (n = 50, 15.2%). The least frequency was from Florida, Kansas, Maryland, North Carolina, and Tennessee, all providing one participant per state (n = 1, 0.3%).

**Figure 14****Sample by Location**

Nominal level frequencies and percentages of the demographic variables were presented in Table25.

**Table 26****Frequency Table for Demographic Variables in Research Question 2**  
Variable

Kansas

1



Age 45 to 49

25

result of pneumonia vaccination was with MtF and was a weak association as described by Cohen (1988).

**Table 27**

**Research Question 2 Combined Chi-Square Table**

Independent variable:  
Transgender

**Post Hoc Analysis.** A post hoc power analysis was conducted for the chi-square test results using the G\*Power software package. A sample size of 332 was used. The recommended effect sizes used for this assessment was medium ( $r = .3$ ) (Cohen, 1988). The alpha level used for this analysis was  $p < .05$ . The post hoc analyses revealed that this study's statistical power was 99.98% for detecting a medium effect, whereas the power exceeded .99 to detect a moderate to large effect size. Thus, there was more than adequate power (i.e., power  $> .80$ ) at the medium effect size level.

**Table 28**

**Research Question 2 Post Hoc G\*Power Analysis for  $\chi^2$   
Input**

Delaware	1.749	1.976	.784	1	.376	5.751	.120	276.587
Florida	- 40192.97 20.67 4	0	.000	1	1.000	.000	.000	.
Georgia	.550	1.587	.120	1	.729	1.734	.077	38.870
Hawaii	1.421	1.552	.838	1	.360	4.141	.198	86.727
Idaho	2.322	1.979	1.377	1	.241	10.197	.211	492.858
Illinois	- 1.036	1.770	.343	1	.558	.355	.011	11.391
Indiana	.419	1.859	.051	1	.822	1.520	.040	58.125
Iowa	.631	2.071	.093	1	.761	1.880	.032	108.911
Kansas	20.828	40192.969	.000	1	1.000	1110028736.668	.000	.
Kentucky	1.305	1.503	.754	1	.385	3.686	.194	70.071
Louisiana	2.385	1.696	1.979	1	.160	10.863	.391	301.533
Maryland	- 21.327	40192.970	.000	1	1.000	.000	.000	.
Massachusetts	2.918	1.814	2.588	1	.108	18.512	.529	647.982
Minnesota	1.266	1.458	.755	1	.385	3.548	.204	61.757
Mississippi	- 20.049	11614.529	.000	1	.999	.000	.000	.
Missouri	2.617	1.552	2.844	1	.092	13.692	.654	286.517
Nevada	.913	1.836	.247	1	.619	2.491	.068	90.948
New York	.703	1.372	.262	1	.609	2.019	.137	29.740
North Carolina	- 20.987	40192.970	.000	1	1.000	.000	.000	.
Ohio	2.042	1.468	1.935	1	.164	7.705	.434	136.834

Pennsylvania	-.632	1.634	.149	1	.699	.532	.022	13.088
Rhode Island	-	14697.44	.000	1	.999	.000	.000	.
	19.76	1						
	5							
South Carolina	1.606	1.499	1.147	1	.284	4.983	.264	94.141
Tennessee	-	40192.97	.000	1	1.00	.000	.000	.
	18.99	0			0			
	8							
Texas	1.830	1.475	1.538	1	.215	6.234	.346	112.38
								9
Vermont	1.527	1.503	1.032	1	.310	4.603	.242	87.573
Virginia	.545	1.391	.153	1	.695	1.724	.113	26.330
Washington	1.444	1.491	.938	1	.333	4.239	.228	78.744
West Virginia	-.447	1.617	.076	1	.782	.639	.027	15.212
Wisconsin	-.254	1.954	.017	1	.897	.776	.017	35.725
Guam	1.608	1.914	.706	1	.401	4.992	.117	212.50
								2
Male	2.433	.325	55.97	1	.000	11.398	6.025	21.561
			8					
Income	.004	.063	.003	1	.956	1.004	.886	1.136
Age in years	-.038	.048	.649	1	.420	.962	.877	1.056
White only, non-Hispanic			5.318	7	.621			
Black only, non-Hispanic	.242	.508	.228	1	.633	1.274	.471	3.447
American Indian or Alaskan Native Only	-.650	1.019	.407	1	.524	.522	.071	3.846
Asian only, non-Hispanic	.698	.832	.703	1	.402	2.009	.394	10.256
Native Hawaiian or other Pacific Islander only	-	1.113	1.993	1	.158	.208	.023	1.840
	1.571							

Other race only, non-Hispanic	-.241	1.943	.015	1	.901	.786	.017	35.396
Multiracial, non-Hispanic	.369	.722	.261	1	.609	1.446	.351	5.950
Hispanic	-.678	.596	1.294	1	.255	.508	.158	1.633
Pneumonia Vaccine	.802	.324	6.126	1	.013	2.231	1.182	4.211
Constant	-	1.577	14.19	1	.000	.003		
	5.943		6					

a. Variable(s) entered on step 1: FIPS Code, Sex at birth, Income Level, Reported age in five-year age categories calculated variable, Race/Ethnicity, Pneumonia Vaccine.

**Goodness of Fit.** The Hosmer and Lemeshow goodness of fit test was not significant ( $p > .05$ ), indicating the model is correctly fitted although it had a relatively poor predictive ability (Nagelkerke  $R^2 = .429$ ).

**Table 30**  
**Hosmer and Lemeshow Test**

**Research Question 3**

Are there significant differences between the MtF and FtM transgender adults in the frequency of medical treatments pursued by those with substantial chronic medical issues (such as asthma, stroke, heart attack, diabetes, cancer, HIV/AIDS)?

Univariate Analysis

**Descriptive Statistics.** Most of this sample consisted of White only, non-Hispanic participants (n = 399, 77.8%).

**Figure 15****Sample by Race**

Participants in the age range from 50-69-years-old were most frequent (n = 264, 51.46%) Specific categories with the most participants were all within the aforementioned age range and included 60–64-year-olds (n = 72, 14.0%) and 55-59-year-olds (n = 68, 13.3%).



**Figure 16****Sample by Age**

Income increased by category such that those who made the least (less than \$10,000) were the least represented (n = 38, 7.4%). The distribution of participants was heaviest in the category of \$75,000 or more (n = 96, 18.7%).

**Figure 17****Sample by Income Level**

Natal sex was distributed towards male participants (n = 296, 57.7%).

**Figure 18****Sample by Natal Sex**

Finally, FIPS Code (representing locality) showed the greatest participation from Minnesota (102, 19.9%). States with the least participation had only a single participant per location: Illinois, Missouri, North Carolina, Rhode Island, South Carolina, Texas, and Guam (n = 1, 0.2%).

**Figure 19**

**Sample by Location**

**Table 31**

**Frequency Table for Demographic Variables in Research Question 3**



Reported age in  
five-year age  
categories  
calculated  
variable

Nominal level frequencies and percentages of the demographic variables were presented in Table 30.

#### *Statistical Analysis*

*Chi-Square Analysis.* The results of the chi-square analysis revealed a significant association between the FtM transgender group and three variables: arthritis, depressive disorder, and diabetes. FtM people experienced higher percentages with all three variables when compared to MtF people, arthritis is recorded at FtM (43.1%) more than MtF (26.2%), depressive disorder is FtM (27.7%) and MtF (18.0%), finally diabetes is FtM (21.3%) and MtF (14.5%). These three relationships all reached statistical significance ( $p < .05$ ); arthritis  $\chi^2(1, N = 513) = 11.349, p = .001$ , depressive disorder  $\chi^2$

(1,  $N = 513$ ) = 6.774,  $p = .009$ , and diabetes  $\chi^2(1, N = 513) = 4.005, p = .045$ . There was a statistically significant association between the FtM transgender group and the three variables mentioned therefore the null hypothesis was rejected. No other statistically significant associations were identified.

Cramer's  $V$  value for arthritis was statistically significant (Cramer's  $V = .149, p < .001$ ). It indicated a small effect of the association of the FtM group and arthritis. This value was close to 0 and more than .10 but less than .30. Cramer's  $V$  value for depressive disorder was significant (Cramer's  $V = .115, p < .009$ ), and it indicated a small effect of the association of the FtM group and depressive disorder. Cramer's  $V$  value for diabetes was also significant (Cramer's  $V = .088, p < .045$ ) and indicated a trivial effect ( $< .10$ ) of the association of the FtM group and diabetes.

Table 32

*Research Question 3 Combined Chi-Square Table*

Independent variable:  
Transgender



Yes

**Post Hoc Analysis.** A post hoc power analysis was conducted for the chi-square test results using the G\*Power software package. A sample size of 513 was used. The recommended effect sizes used for this assessment was medium ( $r = .3$ ) (Cohen, 1988). The alpha level used for this analysis was  $p < .05$ . The post hoc analyses revealed that this study's statistical power exceeded 99.99% for detecting a medium or large effect.

Thus, there was more than adequate power (i.e., power > .80) at the medium effect size level.

**Table 33**

**Research Question 3 Post Hoc G\*Power Analysis for  $\chi^2$   
Input**

Idaho	.435	1.115	.152	1	.697	1.545	.174	13.74
								2
Illinois	20.21	40192.96	.000	1	1.00	599433090.837	.000	.
	1	9			0			
Iowa	-.918	1.276	.518	1	.472	.399	.033	4.864
Kansas	-	21491.03	.000	1	.999	.000	.000	.
	20.53	3						
	2							
Kentucky	.566	.999	.321	1	.571	1.761	.249	12.47
								2
Louisiana	-.044	1.037	.002	1	.967	.957	.125	7.314
Maryland	-.272	1.025	.070	1	.791	.762	.102	5.686
Minnesota	.507	.965	.277	1	.599	1.661	.251	11.00
								1
Mississippi	22.32	14036.46	.000	1	.999	4962175355.40	.000	.
	5	6				3		
Missouri	20.89	40192.96	.000	1	1.00	1185556089.42	.000	.
	3	9			0	2		
Montana	.254	1.253	.041	1	.839	1.289	.111	15.01
								7
Nevada	-.075	1.275	.003	1	.953	.927	.076	11.29
								4
New York	.008	1.051	.000	1	.994	1.008	.129	7.903
North Carolina	-	40192.97	.000	1	1.00	.000	.000	.
	22.41	0			0			
	4							
Ohio	.226	1.033	.048	1	.827	1.254	.166	9.495
Pennsylvania	.006	1.018	.000	1	.996	1.006	.137	7.394
Rhode Island	-	40192.97	.000	1	1.00	.000	.000	.
	19.90	0			0			
	3							
South Carolina	-	40192.97	.000	1	1.00	.000	.000	.
	19.67	0			0			
	0							
Texas	20.81	40192.96	.000	1	1.00	1099928710.45	.000	.
	9	9			0	4		

Vermont	-.635	1.125	.318	1	.573		.530	.058	4.811
Virginia	.087	1.019	.007	1	.932		1.090	.148	8.032
Washington	.616	1.374	.201	1	.654		1.852	.125	27.354
West	1.335	1.712	.608	1	.436		3.800	.133	108.94
Virginia									31
Wisconsin	-.488	1.149	.180	1	.671		.614	.065	5.836
Guam	20.084	40192.969	.000	1	1.000	527810030.328	.000		.
Natal Sex	1.896	.224	71.376	1	.000		6.659	4.289	10.338
Income	-.046	.053	.772	1	.380		.955	.861	1.059
Age	.020	.037	.279	1	.597		1.020	.948	1.097
White only, non-Hispanic			7.622	6	.267				
Black only, non-Hispanic	-.233	.367	.404	1	.525		.792	.386	1.626
American Indian or Alaskan Native Only	-2.099	1.201	3.052	1	.081		.123	.012	1.291
Asian only, non-Hispanic	-.700	1.298	.291	1	.590		.497	.039	6.327
Other race only, non-Hispanic	-20.877	20796.721	.000	1	.999		.000	.000	.
Multiracial, non-Hispanic	1.396	1.026	1.852	1	.174		4.039	.541	30.168
Hispanic	.568	.478	1.409	1	.235		1.764	.691	4.504
Ever told you have a depressive disorder	-.306	.274	1.247	1	.264		.736	.430	1.260

Constant	-.846	1.105	.586	1	.444	.429
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a. Variable(s) entered on step 1: FIPS Code, Sex at birth, Income Level, Reported age in five-year age categories calculated variable, Race/Ethnicity, Ever told you have a depressive disorder.

**Table 35**

**BLR for Arthritis with Predictors Locality, Sex, Income, Age, and Race**

Montana	.299	1.284	.054	1	.816		1.348	.109	16.70
									4
Nevada	-.061	1.300	.002	1	.962		.941	.074	12.03
									2
New York	.020	1.077	.000	1	.985		1.020	.124	8.418
North Carolina	-	40192.97	.000	1	1.00		.000	.000	.
	22.13	0			0				
	5								
Ohio	.248	1.060	.055	1	.815		1.282	.160	10.23
									8
Pennsylvania	.055	1.043	.003	1	.958		1.056	.137	8.158
Rhode Island	-	40192.97	.000	1	1.00		.000	.000	.
	19.48	0			0				
	9								
South Carolina	-	40192.97	.000	1	1.00		.000	.000	.
	19.59	0			0				
	1								
Texas	20.79	40192.96	.000	1	1.00	1072894671.02	.000		.
	4	9			0		5		
Vermont	-.565	1.146	.243	1	.622		.568	.060	5.366
Virginia	.158	1.044	.023	1	.880		1.171	.151	9.059
Washington	.688	1.384	.247	1	.619		1.989	.132	29.97
									1
West Virginia	1.028	1.734	.351	1	.553		2.794	.093	83.53
									0
Wisconsin	-.514	1.182	.189	1	.664		.598	.059	6.064
Guam	20.37	40192.96	.000	1	1.00	705332905.594	.000		.
	4	9			0				
Natal Sex	1.870	.226	68.72	1	.000		6.490	4.170	10.09
			2						8
Income	-.052	.051	1.017	1	.313		.950	.859	1.050
Age	.001	.038	.000	1	.984		1.001	.929	1.078
White only, non-Hispanic			7.844	6	.250				

Black only, non-Hispanic American Indian or Alaskan Native Only	-.267	.366	.532	1	.466	.766	.374	1.568
Asian only, non-Hispanic	-2.134	1.197	3.182	1	.074	.118	.011	1.235
Other race only, non-Hispanic	-.790	1.305	.367	1	.545	.454	.035	5.853
Multiracial, non-Hispanic	-	21432.23	.000	1	.999	.000	.000	.
Hispanic	20.625	0						
Ever told you have some form of arthritis, rheumatoid arthritis, gout, lupus or fibromyalgia	1.338	1.042	1.649	1	.199	3.811	.495	29.372
Constant	.575	.478	1.445	1	.229	1.776	.696	4.534
	-.350	.237	2.181	1	.140	.705	.443	1.121
Constant	-.659	1.142	.333	1	.564	.517		

a. Variable(s) entered on step 1: FIPS Code, Sex at birth, Income Level, Reported age in five-year age categories calculated variable, Race/Ethnicity, Ever told you have some form of arthritis, rheumatoid arthritis, gout, lupus or fibromyalgia.

**Table 36**

**BLR for Diabetes with Predictors Locality, Sex, Income, Age, and Race**

Lower Upper



Natal Sex  
(Male) 1.935

Step	Step	4.565	3	.207
1	Block	4.565	3	.207
	Model	149.604	41	.000

**Goodness of Fit.** The Hosmer and Lemeshow goodness of fit test was not significant ( $p > .05$ ), indicating the model was correctly fitted although it had a relatively poor predictive ability (Nagelkerke  $R^2 = .349$ ).

### Table 38

#### Hosmer and Lemeshow Test

**Descriptive Statistics.** This sample was predominately White only, non-Hispanic participants ( $n = 143154$ , 82.0%). The Native Hawaiian or other Pacific Islander group was least represented ( $n = 378$ , 0.2%).

## **Figure 20**

### **Sample by Race**

Age was concentrated between the thirteen options in the 50 to 69-year-old groups ( $n = 78,146$ , 44.76%). Individually, the 60–64-year-olds ( $n = 20,981$ , 12.0%) contained the greatest number of participants.

**Figure 21****Sample by Age Group**

Income was disproportionately distributed among participants, with the greatest numbers in the highest income bracket \$75,000 or more (n = 55,525, 31.8%) and descending in number, by income level to the lowest income bracket Less than \$10,000: (n = 7,504, 4.3%).

**Figure 22****Sample by Income Level**

Natal sex was distributed towards female participants (n = 98,719, 56.5%) while natal males comprised 43.5% (n = 75872) of the sample.

**Figure 23****Sample by Natal Sex**

Finally, FIPS Code (representing locality) showed significant participation from Minnesota (n = 26,692, 15.3%). The least participation came from Guam (n = 148, 0.1%). The States with the least participants in this sample came first from North Carolina (0.2%, n = 420) then a group consisting of Illinois (n = 549), Mississippi (n = 542), Missouri (n = 577), Oklahoma (n = 556), Rhode Island (n = 593), Tennessee (n = 477), and West Virginia (n = 544) all at 0.3%.

**Figure 24**  
**Sample by Location**

Nominal level frequencies and percentages of the demographic variables were presented in Table 36.

**Table 39**

**Frequency Table for Demographic Variables in Research Question 4**  
Variable

Minnesota

26692



Age 60 to 64

20981

**Post Hoc Analysis.** A post hoc power analysis was conducted for the chi-square test results using the G\*Power software package. A sample size of 174,591 was used. The recommended effect sizes used for this assessment was medium ( $r = .3$ ) (Cohen, 1988). The alpha level used for this analysis was  $p < .05$ . The post hoc analyses revealed that this study's statistical power was 100.00% for detecting a medium effect. Additionally, the power exceeded .99 for the detection of a moderate to large effect size. Thus, there was more than adequate power (i.e., power  $> .80$ ) at the medium effect size level.

**Table 41**

**Research Question 4 Post Hoc G\*Power Analysis for  $\chi^2$   
Input**

Because none of the indicators reached significance in the Chi-square tests, no binomial logistic regression was conducted to test whether those variables remained significant after accounting for demographics.

#### *Answers to Research Question 4*

Analysis of the results of the chi-square test showed no association between the transgender group and either of the variables, thus no multivariable analysis (logistic regression) was conducted. This evidence suggests that the null hypothesis should not be rejected.

#### Summary

Section 3 included the results and findings of this research project. This section included an introduction, organization overview, data descriptive statistics and demographics, statistical assumptions, statistical analysis, and question summaries. This research analyzed the BRFSS datasets from 2014 to 2018 and focused on the transgender population's health and receipt of care including several dependent variables and covariates.

#### *Research Question 1*

RQ1– Is there a significant difference regarding perceived health and receipt of preventative care between transgender and non-transgender adults in the U.S.?

Analysis of the chi-square test showed statistical significance in the association of the transgender group and influenza vaccination status (Cramer's  $V = .007, p < .033$ ) where more cisgender (46.5%) than transgender (41.5%) had received an influenza

vaccination within the past twelve months. However, the logistic regression revealed that influenza status was not significant when analyzed within demographics. The regression model indicated that *Other race only, non-Hispanic* in the demographic group was statistically significant. Citing these results, the null hypothesis should be rejected for this research question.

### *Research Question 2*

RQ2– Is there a significant difference regarding perceived health and receipt of preventative care between transgender male-to-female (MtF) and female-to-male (FtM) transgender adults?

Results of this chi-square test demonstrated a statistically significant association between transgender groups and pneumonia vaccination status (Cramer's  $V = .134$ ,  $p < .015$ ) and the BLR showed that the MtF group (49.0%) was more than twice as likely [ $OR = [2.231]$ , 95%  $CI (1.182, 4.211)$ ] to receive a pneumonia vaccination than someone in the FtM group (35.5%). This evidence suggests that the null hypothesis should be rejected.

### *Research Question 3*

RQ3- Are there significant differences between the MtF and FtM transgender adults in the frequency of medical treatments pursued by those with substantial chronic medical issues?

The results of the chi-square test suggested the association of the transgender group and three variables were statistically significant in that the MtF group consistently

reported lower rates for all three chronic condition dependent variables; arthritis (28.6%), depression (18.0%), and diabetes (14.5%), and the FtM rates for the same were higher: arthritis (43.1%), depression (27.7%), and diabetes (21.3%). The regression analysis suggested that none were significant past demographics: arthritis, (beta =  $-.350$ , Wald =  $2.181$ , N.S.); depression, (beta =  $-.306$ , Wald =  $1.247$ , N.S.); and diabetes, (beta =  $.425$ , Wald =  $2.184$ , N.S.). Therefore, the null hypothesis should be rejected.

#### *Research Question 4*

RQ4- In the adult population, is there a significant difference regarding perceived satisfaction of care and the number of medical appointments conducted between MtF transgender, the FtM transgender, and the non-transgender communities?

Analysis of the chi-square test results suggests no association between the transgender group and either of the variables. This evidence implies that the null hypothesis should not be rejected.

A complete analysis and interpretation of results will be included in Section 4. This final section includes an overview of the analyses, limitations of the study, recommendations, applications to theory and literature, and social change opportunities.

#### Section 4: Application to Professional Practice and Implications for Social Change

##### **Purpose and Nature of the Study and Why it was Conducted**

This research focused on transgender individuals' perceived health status and whether perceived health was a significant factor in prompting an individual to engage in preventative care. The transgender population has increased over time, which could be due to surveys that now include transgender questions or an actual increase in the transgender population. Either way, more transgender people are counted annually, and no studies have addressed the perception of care and individual actions based on those perceptions. This research effort investigated this situation in an attempt to address the following four research questions.

##### **Concise Summary of Key Findings**

In RQ1, the chi-square test indicated statistical significance in the association of the cisgender group and influenza vaccination status, but the logistic regression did not confirm that beyond demographics. In RQ2, the chi-square test showed a statistically significant association between the MtF group and pneumonia vaccination status, which was confirmed with the BLR. RQ3 yielded an association between the FtM group and three variables: Arthritis, depressive disorder, and diabetes were statistically significant, but the regression analysis suggested that none were significant beyond demographics. Finally, RQ4 suggested no statistically significant associations among any of the three gender groups and either of the variables.

## **Interpretation of Findings**

This study provides insight into how the perception of their health affects transgender people in pursuit of preventative care. Results by research question provide unique insights as each research question worked from different sample sizes as seen in Table 19 within the BRFSS data.

### **Transgender Perceived Health**

In research question one, where perceived health and treatment sought between the cisgender and transgender community was investigated, there was a significant difference in the uptake of the preventative measure of Flu Vaccine within the Past 12 Months, that is significantly more cisgender individuals received the influenza vaccine compared to transgender participants. Between the MtF and FtM subgroups, the same question was pursued in RQ2, and there is evidence that although none of the perceived health variables were significant, there was one significant association, MtF individuals obtaining a pneumonia vaccination. Cruz (2014) identified that nearly half of the transgender people surveyed failed to seek healthcare in contrast to the cisgender population that delayed at a rate of approximately 20%.

Hobster and McLuskey (2020) reported that transgender people generally avoid healthcare. Additionally, there is a gap in the literature on transgender individuals and their perception of vaccinations. These results suggest congruence with the current literature.

### **Transgender and Mental Health**

Research questions one and two addressed perceived mental health. In the literature, Rowe et al. (2019) stated a high prevalence of low self-esteem amongst transgender people; however, this was not supported by the present investigation. The results suggest no statistically significant difference between MtF and FtM transgenders and transgender and cisgender people regarding perceived mental health. This research also supports that there is no statistically significant difference between MtF, FtM, and cisgender people in the pursuit of healthcare of any kind, which includes both physical and mental health needs.

Other research efforts support the association of worse mental health outcomes for FtM transgender people with low income, less education, discrimination, and intimate partner violence (McDowell et al., 2019). However, these same determinants affect the general population (Chenyu Zhou et al., 2018), which aligns with the results presented here. These findings suggest that the determinants mentioned above are not significant factors in determining mental health conditions in transgender people.

### **Preventative Health Care**

The transgender community has traditionally been seen as one population but is now studied like other groups in our population, as subgroups with specific needs and behaviors. This research sought to examine a specific gap in the community, the preventative care behaviors of transgender individuals by subgroup. One aspect of this research, vaccinations, had yielded insight into the communities' preventative healthcare



behaviors. Study results revealed that significantly fewer transgender participants received influenza vaccination compared to cisgender participants.

Likewise, in research question two, MtF group (49.0%) was more than twice as likely [ $OR = [2.231]$ , 95%  $CI (1.182, 4.211)$ ] to receive a pneumonia vaccination than someone in the FtM group (35.5%). These conclusions highlight the community's need to address preventative health needs as subgroups and not one mass of people. The research suggests different preventative health behaviors associated with various transgender subgroups and clinicians need to understand these differences to adequately address an individual's healthcare needs. This finding is supported by McRee et al. (2018) in that preventative care is unique to transgender subgroups and a necessary part of an individual's overall healthcare needs.

#### Transgender and HIV/AIDS

Rowe et al. (2019) argue that more than 50% of HIV cases in the U.S. are among MtF individuals and men who have sex with men. The prevalence of HIV in the transgender community is substantial. However, the present study revealed no statistically significant testing behaviors among MtF, FtM, and cisgender individuals. This finding suggests further research into Mandsager et al.'s (2018) findings, who observed that disparities in HIV prevalence between cisgender men and transgender individuals are in decline.

### **Interpretation of Results within the Theoretical Framework**

The health belief model was used in this research effort to investigate whether health-related behavior in the transgender population was associated with perceived health conditions. The perceived health condition could be any, any combination of, or all four of the HBM components of perceived susceptibility, perceived severity, perceived benefits, or perceived barriers. The independent variable for this research effort was gender, specifically MtF, FtM, or cisgender. The study was controlled for the demographic variables.

#### **Research Question 1**

The findings in RQ1 support the HBM because the analysis of the chi-square test results showed the association of the cisgender group and influenza vaccination status as statistically significant. The perceived health status in the cisgender group was a significant predictor for action. The HBM requires one, or all, of the perception factors to influence an individual and lead them to take action in their health. The components in the HBM significantly predicted the likelihood that a cisgender individual would seek preventative care based on their perceived health situation.

#### **Research Question 2**

The findings of RQ2 supported the HBM. One preventative measure, pneumonia vaccination, was statistically significant in the MtF group with (n = 95, 49%) compared to the FtM group (n = 49, 35.5%). This result was confirmed for demographics through the completion of the BLR. The components in the HBM significantly predicted the

likelihood that a MtF person would seek preventative care based on their perceived health situation.

### *Research Question 3*

Analysis of the results of the chi-square test showed the association of the FtM group and three severe disease measures, arthritis  $\chi^2(1, N = 513) = 11.349, p = .001$ , depressive disorder  $\chi^2(1, N = 513) = 6.774, p = .009$ , and diabetes  $\chi^2(1, N = 513) = 4.005, p = .045$ . The perceived health status in the FtM group was a significant factor. All other diseases for FtM and all disease categories for MtF were found not significant. The HBM requires one, or all, of the perception factors to influence an individual and lead them to take action in their health. The variables that represent the actions for RQ3 included Length of time since last routine checkup and Doctor visits past 12 months.

Length of time since last routine checkup between MtF ( $n = 271, 87.1\%$ ) and FtM ( $n = 180, 89.1\%$ ) was not significant. Doctor visits past 12 months was also not significant between MtF ( $n = 277, 89.1\%$ ) and FtM ( $n = 180, 89.1\%$ ). The results do not support nor rule out an individual's perceived health situation as a factor in them seeking care.

### *Research Question 4*

The findings of RQ4 did not support the HBM. Both variables were related to perceived barriers and were not significant in either the MtF, FtM, or cisgender populations. The components in the HBM did not significantly predict the likelihood that

a transgender individual would seek preventative care based on the perceived barriers in the HBM.

### **Limitations of the Study**

The BRFSS datasets are the most comprehensive and current data to include the latest demographic data on the transgender community. These data represent adults in the U.S. who are over 18 years old who responded to the survey on either a landline or cell phone. The BRFSS is considered the best representative sample that addresses behavioral health risk today. Therefore, this research project is representative of the transgender community to the point of a general subgroup. That means MtF, FtM, or gender non-conforming without regard to gender-confirming surgery or gender-confirming medical treatment. Another limitation is that this research cannot account for nor properly represent an individual who is gender fluid and has identified as more than one gender in the BRFSS in any year.

Additionally, this project does not distinguish between transgender people in either a pretransition, post-transition, or declined transition status. Some transgender people elect gender confirming treatment, including hormonal and surgical support, but this study does not differentiate these individuals as that information is not available in the data.

### **Recommendations**

Based on the results of this study, I would recommend that additional research be

conducted to determine if similar or differing results can be established within the transgender community throughout the United States and abroad. Many countries worldwide use the BRFSS template and format; this creates an excellent opportunity to use it as a source for data that would invite a standardized approach to research the transgender community. Additionally, future research would be better served through the inclusion of additional transgender subgroup clarification.

An example of this additional clarification includes defining distinct subgroups, including defining anatomical and physiological distinctions as pre- or post-gender confirming surgery. Another distinction should include individuals who receive gender-confirming hormone therapy and how far along they are in the treatment. Additionally, subgroups should detail a chronology and gender an individual has identified as throughout their lifetime. At a minimum, it would be necessary for a researcher to understand how many genders an individual has identified as and if they have undergone one or more confirming surgeries.

It would be advantageous for future researchers to conduct a mixed-methods study to include quantitative and qualitative variables to assess perceived health within a subjective context. Researchers would benefit from individual interviews where they could query participants about their motivation for seeking preventative care, highlighting the self-efficacy component to give insight to an individual's cue to action in context with the other components of the health belief model.

A final recommendation is to evaluate transgender people with both natal sexes in both physical and mental health issues. For example, MtF should be researched not only with female, but male and FtM should be evaluated with not only natal male, but female at the same time. Much research pairs MtF with women and FtM with men, but this limits the insights to be gleaned through a more in-depth analysis. Transgender subgroup analysis can benefit from pairing with cisgender subgroups.

### **Implications for Professional Practice and Social Change**

This section provides recommendations to professional practice and positive social change implications relevant to perceived health in the transgender community. A growing count of transgender people offers an opportunity to engage a broader population and better understand minority health.

### **Implications for Professional Practice**

The findings include a significant association between the cisgender group and influenza vaccination status in RQ1 and a significant positive association between MtF individuals and pneumonia vaccinations in RQ2. Edmiston et al. (2016) identified in their meta-analysis that they included no studies of transgender individuals and influenza vaccinations and none were found during the literature review. These findings also help to address the unique immunization needs faced by the transgender community (Imborek et al., 2017).

Additionally, the association between FtM individuals and the following diseases, arthritis, depressive disorder, and diabetes, was significant. These results confirm

previous work in the association of FtM individuals with arthritis and depression but is different in previous research where MtF with diabetes have been identified as more prevalent, but the difference referenced in that research was not significant (Downing & Przedworski, 2018). These results are also important because these significant results expand professional knowledge regarding limited research pertaining to transgender preventative healthcare (McRee et al., 2018).

As a new and emerging demographic group, not many resources are available to conduct public health research, but the BRFSS is one resource that could be of assistance. The BRFSS is an excellent resource for secondary data, allowing researchers to research the transgender community. The BRFSS is the largest and most extensive survey conducted that collects data on transgender individuals. Many countries around the world use the BRFSS format and are becoming more comprehensive in their collection.

This vast resource is a very cost effective manner in conducting meaningful research to better understand the behaviors, perceptions, and health outcomes of the transgender population. This annual survey is valuable because future surveys offer insight into today's interventions and procedures' effectiveness. New questions are added, and new gender categories can be added to better specify individuals in the subgroups, allowing practitioners to better target treatments and interventions.

#### *Implications for Theoretical Framework*

In this project, the HBM was used as a theoretical framework. Rosenstock (1974) observed that this framework is not a good fit for cross-sectional data because

perceptions change over time. This change may impact behavior, thereby supply inconsistent results. Additionally, the complication of the fluidity of gender identification was not controlled and may play an essential factor in this research. Gender fluidity is where an individual identifies as one transgender subgroup in one year of the BRFSS, followed by another year where that same individual identifies as a different subgroup. The unknown history of an individual is potentially disruptive in collecting accurate data.

Patrão et al. (2018) report health-related perceptions are associated with gender. Researchers must consider the fluidity of gender for future investigations and include that variable appropriately or control for it as required. Gender fluidity was not measured in this research and because research supports that perceived health is associated with gender, the changing perceptions would supply inconsistent results in this research that would not be identified. Tacikowski and Ehrsson (2020) noted that gender is a dynamic element and considered it robust. Gender fluidity must be included in future iterations of the BRFSS and other surveys.

This research effort did not identify individuals as having completed gender-confirming surgery or the utilization of gender-specific hormone therapy. Both of these gender-confirming factors have considerable impacts on anatomy and physiology, respectively. These factors may also play a significant role in an individual's perception of their health situation and should be considered for future research as no supporting research is available.

*Positive Social Change*



The HBM was selected as a theoretical framework for this research to illustrate the specific healthcare needs within the transgender community. To properly identify interventions and best health practices for a community, professionals must become educated and understand the specifics of the subgroups in the population and the unique perceived barriers and modifying variables they experience to correctly provide the most beneficial treatments. This project supports positive social change by assisting healthcare professionals better understand the specific preventative healthcare needs in the subgroups in the transgender community. A better understanding of health behaviors and needs helps healthcare professionals better design prophylaxis and preventative treatments built into health policy and proliferated throughout the community. In this way, the findings will assist policymakers, epidemiologists, community planning group members, and other key stakeholders in determining at-risk transgender people by subgroup in the population.

### **Conclusion**

This study identified significant differences in preventative healthcare needs and treatment between the transgender and cisgender communities or transgender subgroups. These findings are consistent with recent conclusions for HIV-positive transgender and cisgender males (Mandsager et al., 2018). Perceived health and preventative care measures were analyzed in a binomial logistic regression model; only pneumonia vaccination remained statistically significant between MtF and FtM adults. All others were not statistically significant.

This research included five years of data from the BFRSS; however, the CDC first collected data pertaining to the transgender group in the BRFSS in 2014 and should continue to mature and become better defined. A highly demarcated sample with other transgender subgroups can offer additional insight into the perceived health concerns within the transgender community. Many countries use the BRFSS as a template for their behavioral and health data collection; the opportunity to glean insights at the international level is possible.

The transgender community is still being defined because of numerous factors, including the fluidity of gender, which necessitate that when researchers address analysis, they consider innovative ways to capture unpredictable data sources. This research project was limited in this manner as the BRFSS does not have the needed subgroup variables to achieve that granularity of analysis. Future research must address the need to collect multiple gender data points on some people. In this manner, researchers and health care professionals can offer opportunities to improve their understanding and health care treatment for this emerging group.

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## Appendix A: Health Belief Model

