Depression Experienced by US Adults with Disabilities During COVID-19: Implications of Pre-Pandemic and Pandemic Data from National Surveys

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A Capstone Project submitted to the faculty of Radford University Carilion
in partial fulfillment of the requirements for the degree of
Doctor of Health Sciences

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Abstract

Introduction: This study examines whether the presence of depression symptoms increased in individuals with disabilities surrounding major announcements of relaxation of masking protocols in the US out of alignment with peers without disabilities.

Methods: Pre-pandemic baseline data from the 2019 National Health Interview Survey and pandemic-era data from the Household Pulse Survey surrounding dates of two major announcements on masking protocol relaxations were analyzed. Disability status, age grouping, educational attainment, race/Hispanic ethnicity, and sex variables were considered. The 2012 Integrated Perspective on Prejudice and Depression developed by Cox and colleagues is used as a lens for interpreting how perceived discrimination may lead to increases in the presence of depression symptoms.

Results: Individuals with disabilities, as a group and when considered according to age grouping, educational attainment, race/Hispanic ethnicity, and sex, experienced increases in the presence of depressive symptoms following relaxations of masking mandates while individuals without disabilities experienced decreases in these symptoms.

Discussion: Pushes for return to pre-pandemic normalcy in the form of masking protocol relaxations may have been interpreted as meaning the lives of individuals with compromised immune systems, many of whom have disabilities, were worth risking for greater economic stability and personal choice. Individuals with disabilities may have internalized these messages as discrimination, leading to increases in the presence of depression symptoms. Findings indicate future public health campaigns and communications, even in times of crisis, should take care to avoid actions and messaging that discount the needs of individuals with disabilities and other groups experiencing oppression.

Acknowledgements

For their time, expertise, patience, and direction, I would like to express my deepest thanks to my Radford University Capstone Committee: my Committee Chair and Academic Advisor, Dr. Lisa Allison-Jones from the Department of Public Health and Healthcare Leadership; Dr. Susan Schoppelrey from the School of Social Work; and Dr. Diana Willeman-Buckelew, also from the Department of Public Health and Healthcare Leadership. I must also thank Dr. Kong Chen from Western Carolina University's Coulter Faculty Commons for his statistical expertise, guidance, and good humor. In addition to these individuals, I wish to express my appreciation to: my life partner, Chad Hallyburton, for his love, commitment, thoughtfulness, and respect; my Mama Jo Ann, for sticking with me; my best friend, Brandon Loy, for listening to my complaints, fears, and joys in the process and providing needed wisdom; my knowledgeable and committed students and colleagues at Western Carolina University who continue to teach me so very much; and my canine manager, Jolene, and her dearly missed predecessors, Lola and Smitty.

Chapter One: Introduction

Despite the May 11, 2023 official end date of the COVID-19 Public Health Emergency in the United States (US Department of Health and Human Services Assistant Secretary for Public Affairs, 2023), the health and societal issues surrounding the COVID-19 pandemic and its endemic phase will likely be long-lasting (Furceri et al., 2022; Lugo et al., 2023). Individuals with disabilities comprise one group disproportionately affected by the wide-ranging COVID-19 pandemic (National Council on Disability, 2021). While approximately one in four, or 61 million, people in the United States (US) have a disability (Centers for Disease Control and Prevention, n.d.), this number has likely grown in the wake of the COVID-19 pandemic as a proportion of individuals who recover from the virus acquire new, long-term limitations (C. E. Barrett et al., 2022; Du et al., 2021; Hodgson et al., 2021; Roberts et al., 2022). Though such physical issues have great impact, psychological issues spurred by fear, isolation, and often divisive rhetoric surrounding COVID-19 continue to have long-lasting implications as well (Bozdağ, 2021; Galea & Ettman, 2021; Jones et al., 2023; Mukhtar, 2023).

Household Pulse Survey: Measuring Household Experiences During the Coronavirus Pandemic

Since its inception in April 2020, the multi-phase Household Pulse Survey has provided an ongoing assessment of key social, economic, and wellbeing indicators experienced by adults (18 years of age and older) in the US during the COVID-19 pandemic (US Census Bureau, 2023b). The US Census Bureau leads the survey in partnership with 13 other federal entities, including the National Center for Health Statistics. The National Center for Health Statistics manages health-focused sections of the survey that include mental health-related measures. The National Center for Health Statistics drew queries from the widely used Patient Health

Questionnaire (PHQ), developed and validated by Kroenke and colleagues (2003), to produce depression symptom-related questions for the Household Pulse Survey (National Center for Health Statistics, 2022a). Household Pulse Survey depression-related questions originally measured symptoms experienced within the past seven days; in July 2021, the survey switched to assessing symptoms experienced within the past 14 days in alignment with the original questionnaire (Kroenke et al., 2003; National Center for Health Statistics, 2022a).

Echoing other research conducted during the pandemic (Ettman et al., 2023), Household Pulse Survey findings indicate adults experienced a heightened presence of depression symptoms throughout the pandemic (C. Cai et al., 2021; Jia et al., 2021; National Center for Health Statistics, n.d.-b; Twenge et al., 2021). Factors including age, disability status, education level, race/Hispanic ethnicity, and sex may correlate with differences in the presence of depression symptoms (Blanchflower & Bryson, 2022; Dal Santo et al., 2022; Nguyen et al., 2023; Thomeer et al., 2023; Vahratian et al., 2021; Wang et al., 2022).

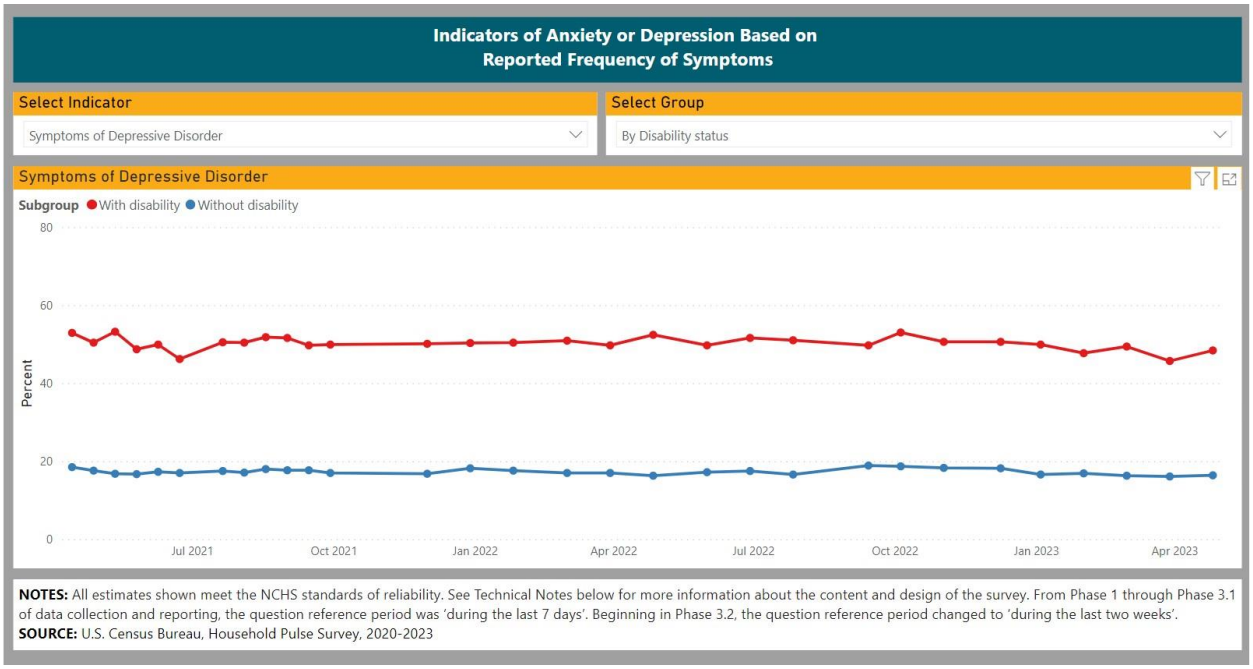
The Household Pulse Survey did not include measurement of respondents' disability status as a variable until April 2021, one year into the survey (National Center for Health Statistics, 2022b). To determine disability status, the National Center for Health Statistics added questions from the Washington Group Short Set on Functioning, a set of six questions covering the following four domains of functioning: cognition, hearing, mobility, and vision (National Center for Health Statistics, 2022b; Washington Group on Disability Statistics, 2022).

A review of Household Pulse Survey tabular data provided by the National Center for Health Statistics (n.d.-b) indicates that, according to survey participants' responses to questions drawn from the Patient Health Questionnaire-2 (Kroenke et al., 2003), individuals with disabilities (red line; Figure 1) consistently experienced the presence of depression symptoms

above 40% from April 14, 2021, through March 13, 2023. This amount exceeds that of individuals without disabilities (blue line; Figure 1) whose reported presence of depression symptoms remained below 20% during the time (National Center for Health Statistics, n.d.-b). Drawn directly from the National Center for Health Statistics' presentation of Household Pulse Survey data on the presence of depression symptoms in individuals by disability status, Figure 1 offers a visual representation of this stark contrast.

Figure 1

National Center for Health Statistics (n.d.-b) Graph of Presence of Symptoms of Depression by Disability Status: April 14, 2021 through May 8, 2023. Individuals With Disabilities in Red. Individuals Without Disabilities in Blue.



Such pandemic-era reports far surpass the 6.5% of the overall US population reporting the presence of depression symptoms in the 2019 National Health Interview Survey (Terlizzi et al., 2021). While this percentage groups individuals with disabilities with the majority of individuals without disabilities, evidence suggest both groupings have experienced notable

increases in depression-related symptoms since the onset of the pandemic (Dal Santo et al., 2022; Wang et al., 2022).

Depression Symptoms in Individuals with Disabilities and the Role of Prejudice

Factors contributing to the development of depression symptoms during the pandemic vary from loneliness and income uncertainties (Ciuffreda et al., 2021), to post-COVID-19 illness-related depression (Mazza et al., 2023), to profession-related depression in healthcare workers (Nguyen et al., 2023; Ślusarska et al., 2022) and educators (Santiago et al., 2023). An issue that may particularly impact individuals with disabilities is the influence of prejudice and resulting discriminatory behaviors. As a societal factor, prejudice resides outside of, though not wholly separate from, physical concerns like those affecting people having disabilities that increase their risk of serious illness and death from COVID-19 (Perry et al., 2020). One Centers for Disease Control and Prevention website directed at individuals with disabilities and their caregivers states, “Most people with disabilities are not more likely to become infected with or have severe illness from COVID-19” (2022b, para. 2). The site clarifies that *some* individuals with disabilities may have a greater likelihood of infection or serious illness from the virus due to medical conditions, living situations, and systemic inequities (Centers for Disease Control and Prevention, 2022b).

Another US government entity, the National Council on Disability (2021), provides a less hopeful analysis of data collected during the height of the pandemic. While the National Council on Disability’s (2021) findings are based on limited data from early points in the pandemic, their assertions are notable. The National Council on Disability’s (2021) work indicates that the following troubling issues occurred for individuals with disabilities in the US: widespread denial of care due to discriminatory resource allocation metrics, restrictions on movement in care

settings to mitigate COVID-19 risk, lack of priority for vaccination, disproportionate effects from healthcare worker shortages, denial of education and employment opportunities, and measurable deterioration for individuals with existing psychological disabilities (National Council on Disability, 2021).

Indeed, increased susceptibility to negative effects of COVID-19 is not limited to those whose disabilities affect their immune, respiratory, or circulatory systems. These negative outcomes stretch across disability type from intellectual, to physical functioning, to mental health (National Council on Disability, 2021). This dispersal of more negative effects of COVID-19 across disability types is supported by the research of Murphy and colleagues (2021) which finds people with mental illness have a greater likelihood of hospitalization and death from COVID-19 than individuals without psychological impairment.

As individuals with disabilities appeared to bear an outsize risk from the lifting of COVID-19 protective measures, like required wearing of masks in public, it is hypothesized that individuals with disabilities internalized societal messages demanding return to pre-pandemic normalcy despite possible dire impacts to their well-being (A. E. Barrett et al., 2021; Garrett, 2020; Grunawalt, 2021; Rabheru & Gillis, 2021; Underwood et al., 2021). Findings from smaller-scale surveys support this tie between pandemic-related prejudice and feelings of depression in individuals with disabilities (Arcieri, 2021; Wang et al., 2022). The current research seeks to assess whether such implications may exist within the much larger and nationally representative population covered by the Household Pulse Survey.

Research Questions and Related Hypotheses

To explore the extent to which individuals with disabilities may have experienced the presence of depression symptoms during the COVID-19 pandemic and the possible role of

perceived discrimination in contributing to those symptoms, the current research tests the following research questions (RQ) and related hypotheses (H). Note that the phrases “presence of depression symptoms” and “presence of symptoms of depression” are used in accordance with reduced specificity resulting from division of Patient Health Questionnaire-2 scoring to two score possibilities for depression-related category assignment. Chapter Three’s description of research methods further covers this aspect.

RQ1: Does the presence of depression symptoms reported by individuals with disabilities and individuals without disabilities show a significant change in the Household Pulse Survey reporting period following the two instances of widespread relaxing of COVID-19 masking recommendations by the Centers for Disease Control and Prevention (5/13/2021 and 3/3/2022) in comparison to the presence of such symptoms during the prior reporting period?

H1.0: Individuals with disabilities experienced no significant change in the presence of depression symptoms compared to individuals without disabilities following COVID-19 masking recommendation lessening or removal.

H1.1: Individuals with disabilities experienced significant elevations in the presence of depression symptoms compared to individuals without disabilities following May 13, 2021, COVID-19 masking recommendations lessening or removal.

H1.2: Individuals with disabilities experienced significant elevations in the presence of depression symptoms compared to individuals without disabilities following March 3, 2022, COVID-19 masking recommendations lessening or removal.

RQ2: Does the presence of depression symptoms reported by individuals with and without disabilities in Household Pulse Survey data pre- and post-May 13, 2021, and pre- and post-March 3, 2022, differ according to age, educational attainment, race, or sex?

H2.0: Individuals with and without disabilities did not differ in the presence of depression symptoms reported pre- and post-May 13, 2021, and pre- and post-March 3, 2022, according to age, educational attainment, race/Hispanic ethnicity, or sex.

H2.1: Individuals with and without disabilities differed in the presence of depression symptoms pre- and post-May 13, 2021, and pre- and post-March 3, 2022, according to age, educational attainment, race/Hispanic ethnicity, or sex.

RQ3: Is the pandemic era presence of depression symptoms reported in Household Pulse Survey data from individuals with disabilities and individuals without disabilities at the four masking announcement-relevant observation points significantly different than pre-pandemic 2019 symptom presence (National Health Interview Survey) reported by both groups?

H3.0: Individuals with and without disabilities experienced no change in the presence of depression symptoms at the four masking announcement-relevant observation points in comparison to pre-pandemic symptom presence as indicated by 2019 National Health Interview Survey data.

H3.1: Individuals with and without disabilities experienced significant change in the presence of depression symptoms at the four masking announcement-relevant observation points in comparison to pre-pandemic symptom presence as indicated by 2019 National Health Interview Survey data.

Integrated Perspective on Prejudice and Depression

To investigate the role prejudice may play in pandemic-related depression symptoms, the present research uses Cox and colleagues' (2012) Integrated Perspective on Prejudice and Depression, a theoretical framework for understanding relationships between prejudice and depression. Cox and coauthor Devine are noted for their ongoing research on societal bias, lending support to the broader expertise of the Integrated Perspective's originators in this area (Cox & Devine, 2019; Devine et al., 2012; University of Wisconsin-Madison Department of Psychology, 2022; Washington Regional Association of Grantmakers, 2018).

Baseline Data and Research Variables

Baseline pre-pandemic data for depression symptoms in individuals with and without disabilities are drawn from 2019 National Health Interview Survey data (National Center for Health Statistics, n.d.-d). The National Health Interview Survey bases its depression-related questions on the eight-item Patient Health Questionnaire depression scale (Kroenke et al., 2009). As noted, depression-related questions used in the Household Pulse Survey come from the two-item Patient Health Questionnaire depression scale (Kroenke et al., 2003; National Center for Health Statistics, 2022a). Analyses of 2019 National Health Interview Survey data used the first two Patient Health Questionnaire-8 questions, thereby utilizing the Patient Health Questionnaire-2, the measure employed in the Household Pulse Survey.

This relationship enables greater homogeneity in comparisons across the Household Pulse Survey and the National Health Interview Survey (Warren et al., 2016). The National Center for Health Statistics specifically calls out 2019 National Health Interview Survey data as appropriate baseline comparison depression data for the Household Pulse Survey (National Center for Health Statistics, n.d.-b). In addition, the National Health Interview Survey employs

the Washington Group Short Set, the same measure used by the Household Pulse Survey, to identify respondents with disabilities (National Center for Health Statistics, 2021b).

Variable definitions within the present study include respondents' reported disability status as the independent variable. The dependent variable is defined as respondents reporting the presence of depression symptoms in the past seven to 14 days. Control and intervening variables considered are respondents' age, educational attainment, race/Hispanic ethnicity, and sex.

Chapter Two: Review of the Literature

To provide parameters for understanding where research populations and outcomes fit within the primary hypothesis (individuals with disabilities experience increased presence of depression symptoms following decreases in COVID-19 protections), definitions of several key concepts must be established. Along with these definitions, the scope of issues they define and how those issues fit within the research are addressed.

Definitions

Disability

The term "disability," a key descriptor applied to the primary study population, is the first concept requiring exploration. As noted in the Introduction, disabilities affect approximately one quarter of the US population (Centers for Disease Control and Prevention, n.d.). The American Psychological Association (n.d.-b) goes so far as to state "almost everyone will temporarily or permanently experience disability at some point in their life" on their "Disabilities" general topic page. Despite disabilities' prevalence, they are not well understood within society and often viewed with skepticism (Dorfman, 2019).

Defining what disability encompasses may aid in clarifying its scope. The Centers for Disease Control and Prevention (2020b) describe disability as "any condition of the body or mind (impairment) that makes it more difficult for the person with the condition to do certain activities (activity limitation) and interact with the world around them (participation restrictions)" (para. 1). A simpler definition, though no less comprehensive, explains disability as "difficulty with activities of daily living" (Montez et al., 2017, p. 1101).

In their research, Centers for Disease Control and Prevention and US Census Bureau employees Theis and colleagues (2019) explore disability categories. These five descriptive

categories cover both visible and non-visible disabilities and include: difficulties performing activities of daily living like feeding, toileting, other self-care actions, etc.; “instrumental” activities such as preparing meals and managing finances and prescriptions; cognitive issues including developmental, intellectual, dementia-related, and mental impairments; physical difficulties requiring use of mobility aids including canes, scooters, walkers, and wheelchairs; and limitations in accomplishing one’s daily work (Theis et al., 2019).

With such a wide range of disabilities affecting individuals, establishing standardized criteria for use in surveillance systems can be challenging (Havercamp & Krahn, 2019). Lauer and colleagues (2019) highlight this difficulty when comparing disability prevalence data derived with two frequently used scales: American Community Survey and Washington Group Short Set. While Laurer and colleagues (2019) find the American Community Survey and the Washington Group Short Set questions closely align, answer options differ due to the American Community Survey’s use of dichotomous (yes or no) responses while the Washington Group Short Set relies upon a rating scale. Differences in disability classification may increase or decrease reported population prevalence, depending upon the cutoff point set for the Washington Group Short Set (Lauer et al., 2019). National Center for Health Statistics researchers investigated alignment of these two frequently used scales and in 2021 disseminated findings via a National Health Statistics Report (Weeks et al.). These results agree with the earlier work of Lauer and colleagues (2019), finding the American Community Survey and Washington Group Short Set differ in prevalence outcomes. However, the report finds overall agreement between the measures to be high (Weeks et al., 2021). Results from both measures across separate administrations of the National Health Interview Survey found 87% of respondents received the

same disability classification from the American Community Survey and the Washington Group Short Set, indicating a high level of homogeneity outside of prevalence (Weeks et al., 2021).

The two surveys used in the research, the 2019 administration of the National Health Interview Survey and the Household Pulse Survey, use the Washington Group Short Set questions to determine participants' disability status (National Center for Health Statistics, n.d.-c, 2020c). An exploration of the wording used by Washington Group Short Set within these surveys may help to further clarify the concept of disability. The Household Pulse Survey (National Center for Health Statistics, n.d.-c) and the National Health Interview Survey (National Center for Health Statistics, 2020c) employ the following four disability determination questions adapted from the Washington Group Short Set (Washington Group on Disability Statistics, 2023a):

> *Seeing – Do you have difficulty seeing, even when wearing glasses? Response options: no – no difficulty, yes – some difficulty, yes – a lot of difficulty, or cannot do at all. Select only one answer.*
>
> *Hearing – Do you have difficulty hearing, even when using a hearing aid? Response options: no – no difficulty, yes – some difficulty, yes – a lot of difficulty, or cannot do at all. Select only one answer.*
>
> *Cognition – Do you have difficulty remembering or concentrating? Response options: no – no difficulty, yes – some difficulty, yes – a lot of difficulty, or cannot do at all. Select only one answer.*
>
> *Mobility – Do you have difficulty walking or climbing stairs? Response options: no – no difficulty, yes – some difficulty, yes – a lot of difficulty, or cannot do at all. Select only one answer* (National Center for Health Statistics, 2022d, Technical Notes).

Respondents reporting “a lot of difficulty” or “cannot do at all” in at least one of the areas are considered to have a disability (National Center for Health Statistics, n.d.-c, 2020c).

Depression

As shown within disability definitions and Washington Group Short Set questions, disability takes myriad forms. One such form is depression when impairing individuals’ ability to think and/or interact with the world around them. The World Health Organization (2021) notes depression is a leading cause of disability worldwide, and the disorder is codified within US policy and research as a form of disability (Social Security Administration, 2022; US Department of Justice Civil Rights Division, 2022; Weinberger et al., 2018; Xiang et al., 2020).

Like the term disability, depression is not an easy concept to define. The American Psychological Association (2023) provides a basic definition of depression as “a negative affective state, ranging from unhappiness and discontent to an extreme feeling of sadness, pessimism, and despondency, that interferes with daily life” (definition 1).

Depression takes multiple forms. Two of the most common are major depression and persistent depressive disorder. Major depression is a disorder wherein consistent depression symptoms impact an individual for at least two weeks and interfere with activities such as sleeping, working, or eating. Persistent depressive disorder often presents with less severe symptoms than major depression but lasts much longer, usually for a period of two or more years (National Institute of Mental Health, 2022).

Depression diagnosis in the US is performed by trained mental health professionals, usually while consulting multi-faceted diagnostic criteria set forth by the American Psychiatric Association in the most recent edition of its *Diagnostic and Statistical Manual of Mental Disorders* (2022). Less stringent assessments are often used in screening for depression, a step

that may function as a preamble to formal diagnosis (Maurer et al., 2018). The process of screening for depression is critical to detecting and properly treating the issue (US Preventive Services Task Force, 2016). Use of depression screening tools in broader-focused surveys also enables health and policy organizations to gain perspective on the wellbeing of the populations they serve (National Center for Health Statistics, n.d.-b, 2022b).

One popular measure for depression is the Patient Health Questionnaire-2 developed by Kroenke and colleagues (2003). The Patient Health Questionnaire-2 (Kroenke et al., 2003) is a validated short screening tool for depression used in a number of practice settings and within various surveillance systems (Arroll et al., 2010; Chagas et al., 2011; Li et al., 2007; Manea et al., 2016; Seo & Park, 2015). The Household Pulse Survey (National Center for Health Statistics, n.d.-c) and the 2019 National Health Interview Survey (National Center for Health Statistics, 2020c) employ the Patient Health Questionnaire-2 (Kroenke et al., 2003). Patient Health Questionnaire-2 text appears with slight variation as follows:

> *How often have you been bothered by … having little interest or pleasure in doing things? Would you say not at all, several days, more than half the days, or nearly every day? Select only one answer.*
>
> *How often have you been bothered by … feeling down, depressed, or hopeless? Would you say not at all, several days, more than half the days, or nearly every day? Select only one answer* (National Center for Health Statistics, n.d.-c).

The 2019 National Health Interview Survey (National Center for Health Statistics, 2020c) maintains the two-week time period for symptom continuance recommended by Kroenke and colleagues (2003). During its earliest administrations in the COVID-19 pandemic, the Household Pulse Survey asked respondents to measure feelings within a one-week timeframe (National

Center for Health Statistics, n.d.-c). However, in Phase 3.2 (beginning July 21, 2021) of Household Pulse Survey administration, the reference period for these questions changed from 'last seven days' to 'last two weeks' to better align with original guidance for Patient Health Questionnaire-2 usage (Kroenke et al., 2003; National Center for Health Statistics, n.d.-b).

Discrimination

Discrimination is no less easy to define. The US government's *Healthy People 2030* defines discrimination as "a socially structured action that is unfair or unjustified and harms individuals and groups" (Office of Disease Prevention and Health Promotion & US Department of Health and Human Services, n.d.). Words such as "prejudice," "bias," and even "hate" are used in relation to, and sometimes interchangeably with, the term "discrimination" (Cox et al., 2012; Cox & Devine, 2019; Devine et al., 2012). Discrimination is usually carried out against individuals for characteristics or identities over which they often have no say. These characteristics include age, appearance, disability, gender identity, geographic origin, race, religion, sex, and sexual orientation (Craighead & Nemeroff, 2004).

How one perceives discrimination is a key issue within the concept of discrimination. Discriminatory actions and perceptions of them may differ depending upon the entity discriminated against, the entity carrying out the discrimination, and the context in which the discrimination occurs. The *Encyclopedia of Social Problems* provides the following description of discrimination: "As with all social constructions, the role of perception is central to the understanding of discrimination, as discriminatory practices differ according to the circumstances in which they occur" (De Jong et al., 2010, para. 2). "Perceived discrimination" is a term frequently seen within literature relevant to the topic of disability discrimination (Itzick et

al., 2018; Kilpatrick & Taylor, 2018; McClendon et al., 2021; Molero et al., 2019; Namkung & Carr, 2019, 2020; Ochoa-Morales et al., 2021; Pérez-Garín et al., 2018).

Disability and Discrimination

As noted within the Introduction, prejudicial beliefs and discriminatory rhetoric and actions impacting individuals with disabilities have been exacerbated during the COVID-19 pandemic (Arcieri, 2021; A. E. Barrett et al., 2021; Fuentes et al., 2021; Garrett, 2020; Grunawalt, 2021; Stone, 2022). However, individuals with disabilities already encountered discrimination in numerous aspects of their lives long before the pandemic (Joseph, 2016; Wang & Ashburn-Nardo, 2019).

Disability Discrimination in the Workplace

Employment discrimination markedly impacts individuals with disabilities (Yaghmaian et al., 2019). In one study of employment rates for individuals with disabilities and state-by-state disability prejudice, states with respondents expressing greater amounts of prejudice against individuals with disabilities had higher levels of unemployment for individuals with disabilities (Friedman, 2020). Limited employment of individuals with disabilities occurs even within human services-minded professions like social work (Kiesel et al., 2019), mental health services, and healthcare (Lawson, 2022). Individuals with disabilities who have employment encounter multiple forms of discrimination in the workplace including demotion and being overlooked for promotion, failure to provide lawful accommodation, harassment, intimidation, and unlawful firing (McMahon et al., 2017; Rumrill et al., 2019).

In addition, individuals with disabilities who are members of other groups experiencing bias may confront intersectional discrimination. In the US, women (Chowdhury et al., 2022), racial minorities (Kilpatrick & Taylor, 2018; Waldman et al., 2022), and adults at both the

youngest (Lindsay et al., 2018) and oldest (Cichy et al., 2015) ends of the age spectrum experience employment-associated prejudicial treatment related to both their individual disability and additional group identities.

Disability Discrimination in Education

Individuals with disabilities have long encountered disparate treatment within education (Artiles et al., 2016). In the US, inequity has continued despite passage of the wide-reaching Individuals with Disabilities Education Improvement Act (US Congress, 2004). Charter and private schools further complicate the issue as many receive public funding from states but do not offer full accommodation for students with disabilities (Mead et al., 2018). In addition, students with disabilities are more likely to experience corporal (physical) punishment across school settings (MacSuga-Gage et al., 2021). As with employment, students with disabilities encounter multiple forms of discrimination when they are also members of other marginalized groups (Artiles et al., 2016).

When students reach higher education, they may encounter inhospitable circumstances as well. While direct communications between students and faculty about health status and needed accommodations may be intended to promote self-efficacy, students with disabilities report stigmatization from instructors (Freedman et al., 2020; Lindsay et al., 2021).

Disability Discrimination During COVID-19 Pandemic

Discrimination against students with disabilities continued during the COVID-19 pandemic. Soon after students in primary and secondary education returned to in-person classes, parents and caregivers filed suits in the wake of state implementation of bans on school mask mandates (Coote, 2021; Foley, 2021; Golden, 2021). Such suits alleged discrimination against students with disabilities on the grounds that removal of masking protections put students with

underlying medical conditions at even greater risk from COVID-19 (O`Donnell & Villarreal, 2021; Turner & Martinez, 2021).

In addition, the research findings of Arcieri (2021) support the contention that prejudicial feelings against individuals with disabilities have increased during the COVID-19 pandemic. Arcieri (2021) employs Terror Management, a theory positing people prefer to view life as predictable and permanent to avoid recognizing their own vulnerability and mortality (Greenberg et al., 1986), to explain the surge of negative emotions against those at advanced age and/or with disabilities during the COVID-19 pandemic. Results of Arcieri's (2021) questionnaire-based research indicate significant associations between respondents' COVID-19 anxiety and ageist and ableist attitudes.

People with disabilities also encounter bias in healthcare (Agaronnik et al., 2021; Brownworth, 2021; Iezzoni, 2019). These issues multiplied during the COVID-19 pandemic. As the pandemic expanded, individuals with disabilities experienced care rationing at greater proportions than counterparts without disabilities (Lund & Ayers, 2020). In ventilator supply shortages, rationing included allotment of lower importance in ventilator supply algorithms (Andrews et al., 2021). In addition, individuals with disabilities encountered outsized care restrictions due to hospitals' reliance on life expectancy—a metric often biased against individuals with disabilities as well as other groups experiencing oppression (Ne'eman et al., 2021). Earlier stages of the pandemic featured preemptive placements of individuals with disabilities in skilled nursing facilities to free up hospital space; these moves were often detrimental, as such facilities experienced high virus transmission rates and were already stretched well past their limits (Twardzik et al., 2021). Though the crisis nature of the COVID-19 pandemic and other critical events may demand resource rationing, overly exclusionary metrics

that are not continually refined introduce biases more tied to perception than evidence (Auriemma et al., 2020).

Disability, Discrimination, and Depression

United States Context

Depression is a common and disabling condition worldwide (World Health Organization, 2021) and is a frequent comorbidity in individuals with other types of disability (Senra & McPherson, 2021). Individuals with disabilities, particularly those with more severe levels of disability, already experienced more depression-related symptoms on average than counterparts without disabilities before the pandemic (Cree et al., 2020; Moharić, 2017; Xiang et al., 2020). National Health Interview Survey estimates from 2019, the year prior to widespread outbreak of COVID-19, indicate that 9% of US adults have a disability that, even with aid (e.g., glasses, contacts, hearing aids, etc.), significantly impedes cognition, communication, hearing, mobility, or vision (National Center for Health Statistics, 2022c). A 2019 National Health Interview Survey estimates indicate 18.8% of this 9% of US adults with a significantly impactful disability report indicators of depression (National Center for Health Statistics, 2022b). In contrast, 3.3% of adults without a significantly impactful disability reported indicators of depression during this period (National Center for Health Statistics, 2022b). Though this measure emanates from a single National Health Interview Survey query outside of Patient Health Questionnaire-2 questions, the query offers a relevant insight into the presence of depression symptoms within the 2019 cohort (National Center for Health Statistics, 2022b).

In individuals experiencing depression or depression symptoms, causes may be chemical, environmental, or both (Rottenberg, 2022). For individuals with cognitive, physical, and mental disabilities, the environmental factor of perceived discrimination appears is an important element

(Conover et al., 2021; McClendon et al., 2021; Namkung & Carr, 2020). In their analysis of data from the Midlife in the United States survey, Namkung and Carr (2020) find that perception of interpersonal discrimination has significant impacts on the occurrence of depression symptoms in individuals with disabilities. These significant impacts only moderate somewhat once participants reach advanced age (65 years and older)—a time when disability becomes more of an expected part of life (Namkung & Carr, 2020).

Advancing age does not fully insulate individuals with disabilities from perceiving discrimination and experiencing depression, however. McClendon and colleagues (2021) present research on individuals in an advanced age group (average age of 63.7 years) in their study of US veterans with symptomatic osteoarthritis. Veterans with disabilities report having been discriminated against at a higher rate than most other populations in the sample, second only to African American veterans, independent of disability status. Within the veteran sample, the researchers note significant association between participants being part of a group receiving discrimination and depression (McClendon et al., 2021).

In another publication supporting ties between perceived discrimination and depression, Conover and colleagues (2021) find California-based participants having more visible or severe disabilities report experiencing more ableist microaggressions. These microaggressions are, in turn, associated with research participants' increased symptoms of depression (Conover et al., 2021).

International Context: Limited Exploration

The relationship between disability-related discrimination and resulting depression is explored well beyond US-based research publications. Analysis of data from South Korea's Panel Survey of Employment for the Disabled indicates that when it comes to workers with

disabilities "who experienced discrimination due to disability in their daily life, the more frequently they experienced discrimination, the more likely they reported symptoms of stress and depression" (Lee et al., 2022, p. 4). Trani and colleagues (2020) find South Africa-based individuals with disabilities report experiencing higher rates of discrimination and stigma; those associations in turn correspond with higher incidence of depression. In a study of Canadian college students with disabilities, Lett and colleagues (2020) also note significant correlation between experiences of disability-related discrimination and depression symptoms. Ochoa-Morales and colleagues (2021) likewise report associations between perceived discrimination and depression symptoms in their Mexico-based research of individuals with multiple sclerosis. In addition, Hackett and colleagues (2020) find respondents in the UK's Household Longitudinal Study with cognitive, physical, or sensory disabilities experience disability-related discrimination significantly related to their depression symptoms.

Disabling Depression and Discrimination

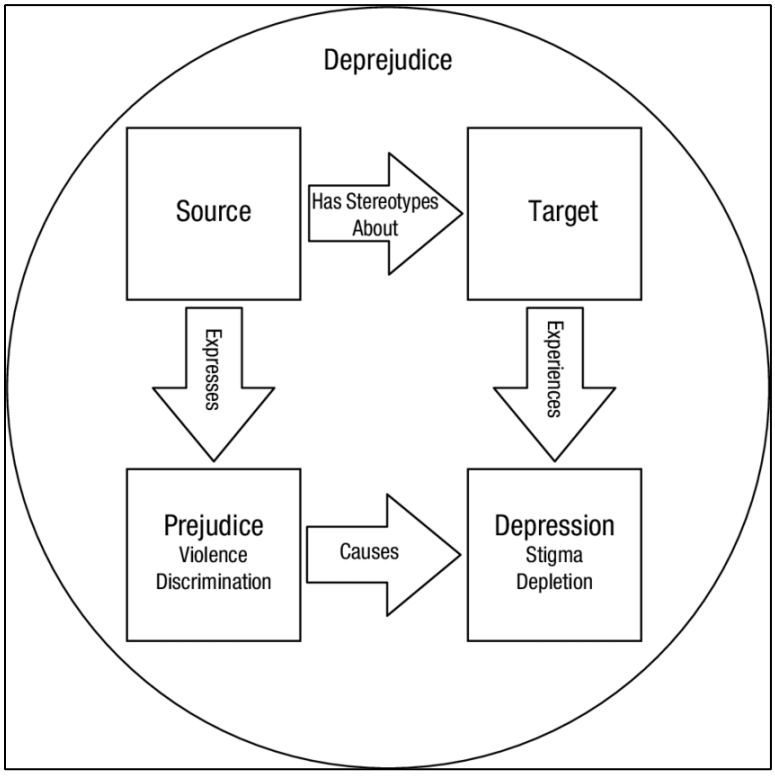
Having depression that reaches a disabling level in the absence of other disabilities does not protect individuals from disability-related discrimination. Individuals with depression frequently experience discrimination related to their diagnosis (Lasalvia et al., 2013). Research suggests individuals with depression are blamed for their disability more frequently than individuals with cancer or schizophrenia (Johansson & Kunst, 2017). This cycle of depression leading to perceived discrimination appears to worsen existing situations; anticipation of again experiencing discrimination due to their depression can lead individuals to forego opportunities for work and social experiences and further isolate (Lasalvia et al., 2013, 2015).

Integrated Perspective in Disability, Discrimination, and Depression

These findings align with the Integrated Perspective's contention that prejudice and its correlates lead to depression in targets (Cox et al., 2012). This theory seems particularly relevant to understanding associations between the presence of depression symptoms in individuals with disabilities and perceived discrimination before and during the pandemic. Cox and colleagues' (2012) Integrated Perspective maintains that one group, the Source, holds stereotypes about another group, the Target. These stereotypes lead the Source to express prejudice, violence, and discrimination against their Target. The Target then experiences depression, stigma, and depletion. Cox and colleagues (2012) term this cycle "deprejudice," comorbid depression and prejudice (Figure 2).

Figure 2

Cox et al.'s (2012) Integrated Perspective Deprejudice Cycle



Exemplars of the Integrated Perspective

Cox and colleagues (2012) cite, as examples to support this framework, depression experienced by Jewish people during the Holocaust as well as a gay man's depression when his community tells him he is immoral and dirty. As in McClendon and colleagues' (2021) research, Cox and colleagues (2012) also cite examples of negative impacts caused by racial stereotypes and how those stereotypes in turn lead to depression in their recipients. Though the Integrated Perspective (Cox et al., 2012) has been used to help explain depression symptoms in individuals experiencing racism (Russell et al., 2018), engaged in sex work (Stockton et al., 2020), internalizing stereotypes about their sexuality (Hinton et al., 2019), and having the sometimes disabling condition HIV (Kay et al., 2018; Turan et al., 2017), its use as a framework for interpreting results within a broader disability context appears thus far novel. However, this finding, as well as limited usage of the theory in other contexts, is to be expected as formal statement of the Integrated Perspective occurred in 2012, a comparatively short time in relation to other health-related theories.

Integrated Perspective Relevance

While multiple other attributional, biological, and psychological theories of depression have been formulated over decades (Roeckelein, 2006), Cox and colleagues' (2012) Integrated Perspective holds the greatest relevance for the present research. The Integrated Perspective deals with environmental rather than biological or chemical factors leading to depression. As the authors state, "We are neither addressing nor seeking to explain those depressions driven primarily by neurochemical, genetic, or inflammatory processes" (Cox et al., 2012, p. 428). The current research likewise focuses on relationships between incidents of perceived prejudice within individuals' environments and exacerbations in the presence of depression symptoms.

Gaps in the Evidence and Research Implications

Multiple publications have emerged analyzing Household Pulse Survey depression-related data. That research has thus far focused on such populations as: all adults within the Household Pulse Survey (C. Cai et al., 2021; Huato & Chavez, 2021); racial and ethnic groups (Bui et al., 2021; Daniels & Morton, 2023; Eichstaedt et al., 2021); individuals by sex (Spong, 2021; Zhang, Walkover, et al., 2021); varying age groups (Chen, 2021; Daniels & Morton, 2023; Ganson et al., 2021); individuals receiving pandemic-related child tax credits (Batra et al., 2023; Park & Kim, 2023); Twitter users (R. Cai et al., 2022); residents of specific states (Donnelly & Farina, 2021; Farina et al., 2023; Zhang, Wu, et al., 2021); and other respondent groupings by employment status (Asfaw, 2023) and workplace (Islam et al., 2023), factors not directly focused on survey respondents' disability status.

Friedman's (2022) Household Pulse Survey-based research does focus on individuals with disabilities. However, that research concentrates on Medicare beneficiaries under age 65, excluding much of the disability community in the US (Friedman, 2022). This research also lacks analysis of mental health data prior to the pandemic, an issue Friedman notes as a limitation of the study (2022). Pre-pandemic comparative analysis, a component of the present research, should offer better indication of whether pandemic-related changes in the presence of depression symptoms were indeed significant.

In research that bears greater similarity to the present project, Katie Wang and colleagues (2022) postulate on the impacts of pandemic increases in stigmatization and discriminatory actions against in individuals with disabilities and their symptoms of depression. Their research (Wang et al., 2022) focuses on forecasting patterns and uses as its study population a much

smaller group (441 participants) than the tens of thousands of respondents present in each Household Pulse Survey administration (US Census Bureau, 2023b).

Like the current research, Brucker and colleagues' (2023) study also makes use of Household Pulse Survey data dealing with depression and individuals with disabilities. Unlike the present research, however, Brucker and colleagues' (2023) research combines anxiety and depression variables under a larger category of "mental health" and focuses on receipt of mental health treatment as well as lesbian, gay, bisexual, and/or transgender identity among survey respondents with disabilities. The researchers control for variables including race/ethnicity, age, employment status, educational attainment, and insurance coverage in their analysis of factors related to anxiety, depression, and mental health treatment. Their findings indicate that individuals with disabilities show statistically significant increases in their odds of experiencing mental health issues, having sought treatment for such issues, and indicating unmet needs in receiving treatment in comparison to individuals without disabilities who were not lesbian, gay, bisexual, and/or transgender (Brucker et al., 2023).

In another similarly themed pandemic-era project, Utah State University researchers Brown and Ciciurkaite (2022) explore impacts of disability status on employment uncertainty, discrimination, and depression symptoms in more than two thousand adults with and without disabilities in the western United States. Their findings indicate no significant association between disability status and psychological distress, and discrimination and psychological distress, when considered separately. However, further analyses indicate individuals with disabilities do experience increased risk of poor mental health outcomes due to combined effects of work-related insecurity and discrimination (Brown & Ciciurkaite, 2022). Findings of this Brown and Ciciurkaite (2022) research differ from previously cited research by indicating a

disconnection between individuals' with disabilities experiences of discrimination and poor mental health outcomes. However, Brown and Ciciurkaite's (2022) results do support the intersectional nature of financial insecurity and prejudice in leading to emotional distress in individuals with disabilities.

The current research, in its examination of a comparatively large and diverse population, should enable further investigation of links between perceived discrimination and mental health in individuals with disabilities during the COVID-19 pandemic. The present study also uniquely employs the Integrative Perspective framework in its analysis of ties between large-scale incidents of perceived discrimination (e.g., removal of disease-prevention measures like masking requirements) and the presence of depression symptoms in individuals with disabilities. The following chapter describes research methods employed and steps taken to explore these themes.

Chapter Three: Methodology

Study Design

This research explores differences in reports of the presence of depression symptoms in US adults with and without disabilities at specific times in the COVID-19 pandemic. Pre-pandemic data are used to provide baseline measurements. The non-experimental observational study analyzes secondary, anonymous, quantitative data. The publicly available data were collected as part of the National Center for Health Statistics' and the US Census Bureau's Household Pulse Survey measuring aspects of life in the US during the COVID-19 pandemic. Detailed sample selection and study conduct information for the Household Pulse Survey is available through the Household Pulse Survey website (US Census Bureau, 2023b). Pre-pandemic baseline data come from information collected through the National Center for Health Statistics' 2019 National Health Interview Survey. Detailed survey and sample selection information is available through the 2019 National Health Interview Survey website (National Center for Health Statistics, n.d.-d). To align with Census Bureau population estimates, both the Household Pulse Survey and the National Health Interview Survey weighted estimates are used to adjust for nonresponse. While the two surveys follow different samples over time, the surveys are demographically equivalent as both employ the same weighting and random selection-based probability design (Twenge et al., 2021).

Data Sources and Sampling Methods

Household Pulse Survey.

The Household Pulse Survey began in April 2020 and continues to the present time. The Household Pulse Survey measures experiences of US households during the COVID-19 pandemic and recovery periods (US Census Bureau, 2023a). As part of the US Census Bureau's

Experimental Data Series, the agency warns data may fail to meet some US Census Bureau-specific quality standards and are subject to suppression (US Census Bureau, 2023a). US Census Bureau technical documentation further describes the Household Pulse Survey as a "20-minute online survey studying how the coronavirus pandemic is impacting households across the country from a social and economic perspective" (US Census Bureau, 2022c, para. 1). The web-based survey has thus far undergone three multi-part administration phases. Each phase includes changes related to emerging issues in the COVID-19 pandemic and endemic phases.

The Household Pulse Survey uses the US Census Bureau's Master Address File to identify eligible participants (US Census Bureau, 2022b). Household Pulse Survey sampling design uses a systematic sample of eligible housing units (US Census Bureau, 2022d), adjusting across sampling intervals to provide adequate sample sizes for state and metropolitan statistical area estimates (US Census Bureau, 2022c). All relevant datasets were gathered within Phases 3.1 through 3.4 of data collection encompassing April 14, 2021 through May 9, 2022 (US Census Bureau, 2023b). Respondents during these phases were sampled only once. The US Census Bureau adjusted overall sample sizes to yield an anticipated 9% response rate (US Census Bureau, 2022b).

2019 National Health Interview Survey.

As noted within the Review of the Literature, individuals with disabilities are significantly more likely to report experiencing depression than individuals without disabilities (Ayerbe et al., 2015; Battalio et al., 2018, 2020; Brown & Turner, 2010; Cree et al., 2020; Deschênes et al., 2015; Dong et al., 2020; Senra & McPherson, 2021; Xiang et al., 2020). A baseline measurement was therefore needed for the presence of depression symptoms prior to the pandemic for individuals with and without disabilities so that pandemic-related effects could be

more accurately evaluated. Data from the National Center for Health Statistics' 2019 administration of its National Health Interview Survey are used for this pre-pandemic measurement in alignment with recommendations from the National Center for Health Statistics (n.d.-b).

In contrast to the relatively new and quickly deployed internet-administered Household Pulse Survey, the in-person National Health Interview Survey has been conducted and updated regularly since 1957 with sampling plans revised following each decade's census. The National Health Interview Survey's website identifies this cross-sectional household survey as "the principal source of information on the health of the civilian noninstitutionalized population of the United States and is one of the major data collection programs" (National Center for Health Statistics, n.d.-c, para. 1). Prior to 2016, the National Health Interview Survey drew participant addresses from the US Census Bureau's Master Address File (Moriarity & Parsons, 2015), the resource used by the Household Pulse Survey (US Census Bureau, 2022a). Information sharing concerns led the National Center for Health Statistics to begin using commercially available address files (Moriarity et al., 2019). From 2019 to the next survey redesign, the survey aimed to produce data from 30,000 respondents aged 18 years and older and 9,000 child respondents during each survey year (National Center for Health Statistics, n.d.-a). Collected National Health Interview Survey totals for its 2019 administration exceeded this amount for adult respondents (National Center for Health Statistics, 2020c). For the present research, only adult respondent data are analyzed from the 2019 National Health Interview Survey. The Household Pulse Survey measures data solely from adult respondents 18 years of age and older insofar as they are able through online administration.

Observations

Data are analyzed for survey cycles immediately preceding and encompassing two dates when the Centers for Disease Control and Prevention announced national relaxation of COVID-19 mask recommendations. Though responses to masking announcements are not directly addressed in the Household Pulse Survey, the dataset offers valuable insight into societal response to national events. Eichstaedt and colleagues (2021) have already made similar use of Household Pulse Survey data in their research on Black and White Americans' anxiety and depression in the weeks following the May 2020 murder of George Floyd.

These analyses test the hypothesis that feelings of depression increase in individuals with disabilities due to perceived discrimination (Cox et al., 2012). Discrimination may be perceived in widespread relaxation of mask recommendations even as COVID-19 continues as a major threat to individuals with certain medical conditions including multiple types of disability (Centers for Disease Control and Prevention, 2022a). These major relaxations in Centers for Disease Control and Prevention mask recommendations occurred on May 13, 2021 (American Hospital Association, 2021; Reuters, 2021) and March 3, 2022 (US News and World Report, 2022).

In the May 13, 2021, announcement, the Centers for Disease Control and Prevention advised that individuals who were fully vaccinated no longer had to mask in any setting. The Centers for Disease Control and Prevention did continue its recommendation that masks should be worn in federally run settings (e.g., Social Security Administration offices) and when required by local government regulations. This recommendation also allowed for individual businesses to stipulate whether employees, customers, and visitors should mask while on their premises (American Hospital Association, 2021).

In the March 3, 2022, announcement, the Centers for Disease Control and Prevention relaxed its recommendations even further. The announcement indicated individuals, independent of vaccine status, in areas having what the Centers for Disease Control and Prevention deemed low or medium levels of COVID-19 infection, could stop masking indoors. While the Centers for Disease Control and Prevention still recommended individuals continue to mask indoors in areas with high community levels of COVID-19, there was little stringency in the recommendation. This second announcement reduced the percentage of individuals in the US who were recommended to continue masking to approximately 10% of the population at the time (US News and World Report, 2022).

Data Sources by Survey and Observation.

Statistical, basic, and detailed data for the Household Pulse Survey and the 2019 National Health Interview Survey are drawn primarily from the following resources. When available, relevant Household Pulse Survey and 2019 National Health Interview Survey statistics already tabulated by expert statisticians at the National Center for Health Statistics are used in calculations to ensure wider applicability of results. Such statistics, usually in the form of prevalence percentages, are made publicly available through interactive data query tools provided by the federal entities (National Center for Health Statistics, n.d.-c, n.d.-b, 2023a). In the case of the Household Pulse Survey, the US Census Bureau makes Public Use Files and Data Tables available as the survey's primary data administrator (US Census Bureau, n.d.-b). For 2019 National Health Interview Survey Public Use Files, general datasets are available via the National Center for Health Statistics (n.d.-d) and harmonized datasets through the Center's ongoing partnership with the IPUMS data archive (n.d.-a).

The researcher contacted the National Center for Health Statistics to request more information on background totals used to tabulate prevalence statistics presented on its Household Pulse Survey "Anxiety and Depression" page (National Center for Health Statistics, n.d.-b) as the researcher was unable to exactly match the National Center for Health Statistics' prevalence results using US Census Bureau (n.d.-b) Public Use Files. The National Center for Health Statistics and Centers for Disease Control and Prevention representatives recommended use of the weighted Data Tables to achieve these totals (personal communication, January 13, 2023). Specific Data Tables used are labeled "Table 2b. Symptoms of Depression Experienced in the Last 7 Days, by Select Characteristics" for the first two relevant times (US Census Bureau, n.d.-a). For the second two relevant observations taking place after the Household Pulse Survey altered its questioning to better align with Patient Health Question-2 time period recommendations (Kroenke et al., 2003), tables are labeled "Symptoms of Depression Experienced in the Last Two Weeks, by Select Characteristics" (US Census Bureau, n.d.-a). These four tables focus on Patient Health Questionnaire-2-derived questions dealing with the presence of depression symptoms in combination with disability status and other variables (US Census Bureau, n.d.-a).

Using these Data Tables (US Census Bureau, n.d.-a) and National Center for Health Statistics' published prevalence data (n.d.-b), the researcher extracted data appropriate for epidemiological statistical analyses using fourfold contingency tables. In addition, unweighted and weighted Public Use Files (US Census Bureau, n.d.-b) are used to create comparative calculations to ensure results do not deviate markedly (Appendix A). Table 1 provides information on the two Centers for Disease Control and Prevention mask protocol relaxation announcement dates; the Household Pulse Survey administrations preceding, encompassing, and

following these dates; sample sizes for these administrations; and corresponding US Census Bureau-provided Data Tables and Public Use Files.

Table 1

Data Tables, Public Use Files, and Sample Sizes for Relevant Household Pulse Survey Administrations

Announcement	May 13, 2021	March 3, 2022
Observation Preceding	Detailed Table April 28, 2021 – May 10, 2021, "Symptoms of Depression Experienced in the Last 7 Days, by Select Characteristics" (US Census Bureau, 2021b) Public Use File April 28, 2021 – May 10, 2021 (US Census Bureau, n.d.-b) Number of respondents: 78,467 (US Census Bureau, 2021a)	Detailed Table January 26, 2022 – February 7, 2022, "Symptoms of Depression Experienced in the Last 7 Days, by Select Characteristics" (US Census Bureau, 2022e) Public Use File January 26, 2022 – February 7, 2022 (US Census Bureau, n.d.-b) Number of respondents: 75,482 (US Census Bureau, 2022b)
Observation Encompassing	Detailed Table May 12, 2021 – May 24, 2021, "Symptoms of Depression Experienced in the Last 7 Days, by Select Characteristics" (US Census Bureau, 2021d) Public Use File May 12, 2021 – May 24, 2021 (US Census Bureau, n.d.-b) Number of respondents: 72,897 (US Census Bureau, 2021c)	Detailed Table March 2, 2022 – March 14, 2022, "Symptoms of Depression Experienced in the Last 7 Days, by Select Characteristics" (US Census Bureau, 2022f) Public Use File March 2, 2022 – March 14, 2022 (US Census Bureau, n.d.-b) Number of respondents: 84,158 (US Census Bureau, 2022a)

In the case of the 2019 National Health Interview Survey, data were gathered from the IPUMS data archive (n.d.-a). Data on responses to Patient Health Questionnaire-2-relevant queries by disability status were extracted using National Center for Health Statistics data processed through IPUMS (n.d.-b).

Scales and Scoring

To determine disability status, administrations of the Household Pulse Survey from March 2021 forward use Washington Group Short Set questions (National Center for Health Statistics, n.d.-c). The National Health Interview Survey also employs this measure (National

Center for Health Statistics, 2021). Groce and Mont (2017) note that ". . . the WGSS has been extensively tested and validated in all regions of the world, to ensure its accuracy and universality" (p. 649), attesting to consensus on the measure's quality. The Washington Group Short Set enables recording of gradations of ability ("no difficulty," "some difficulty," "a lot of difficulty," and "cannot do at all"). Both the Household Pulse Survey (National Center for Health Statistics, n.d.-c) and the 2019 National Health Interview Survey (National Center for Health Statistics, 2021) use respondents' reporting of "a lot of difficulty" or "cannot do at all" in one or more selected domains of functioning to consider respondents as having a disability. The present research applies the same criteria regarding disability status.

To measure the presence of depression symptoms, both the Household Pulse Survey (National Center for Health Statistics, n.d.-b) and the 2019 National Health Interview Survey (National Center for Health Statistics, 2021) use the first two questions of Kroenke and colleagues' (2003) Patient Health Questionnaire. This application of the Patient Health Questionnaire, the Patient Health Questionnaire-2 or PHQ-2, is a validated measure of indicators of depression (Kroenke et al., 2003) that has scored well across multiple national and international tests of both validity and reliability (Gelaye et al., 2016; Hitchon et al., 2020; Staples et al., 2019). Responses to both questions on the presence of depression symptoms receive numerical scores ("not at all" = 0, "several days" = 1, "more than half the days" = 2, and "nearly every day" = 3). For both the Household Pulse Survey and National Health Interview Survey, numerical scores from the two questions are added together and scores of three or greater indicate association with depressive disorder in accordance with Kroenke and colleagues' (2003) guidance. As descriptive statistics for the Household Pulse Survey tabulated by the National Center for Health Statistics (n.d.-b) simplify assignment of the Patient Health

Questionnaire-2's six-point scale to two options (less than three; equal to or greater than three), the present research employs the phrases "presence of depression symptoms" and "presence of symptoms of depression" in accordance with this reduced specificity. As noted, the first two Household Pulse Survey observations in this analysis employ a time measurement of seven days when querying respondents on their presence of depression-related symptoms. The second pairing of observations comes after the Household Pulse Survey's change to a "last two weeks" (National Center for Health Statistics, n.d.-b, sec. Technical Notes) time measurement for the presence of depression symptoms. The researcher provides data on these measurements together in some analyses in keeping with the practice of the National Center for Health Statistics (n.d.-c, n.d.-b).

For the present research, respondents' disability status functions as the independent variable. Depression symptoms function as the dependent variable. Original variable naming conventions as well as codebook/data dictionary information are retained within the datasets wherever possible to limit misattribution.

Participant Demographics

Survey administration practices differ between the Household Pulse Survey and the 2019 National Health Interview Survey. Throughout administration of the Household Pulse Survey, participants have completed the survey online due to the survey's focus: the impacts of the highly transmissible COVID-19 virus on US households (US Census Bureau, 2023b). The 2019 National Health Interview Survey was conducted via household interview using geographically clustered sampling techniques (National Center for Health Statistics, n.d.-d). Though the Household Pulse Survey and the National Health Interview Survey do not follow the same individuals over time, Twenge and colleagues (2021) assert that both employ "the same

probability design with random selection and . . . same weighting, rendering them demographically equivalent" (p. 2).

Household Pulse Survey.

Datasets and codebooks were downloaded for the four relevant Household Pulse Survey administrations. Each administration contains data from more than 70,000 adults residing within housing units (US Census Bureau, 2022d), thereby omitting individuals living in institutionalized settings in alignment with National Health Interview Survey data.

The large respondent pools generated by the Household Pulse Survey produce estimates for different geographic areas. The first geographic level encompasses 15 large Metropolitan Statistical Areas. The second geographic level provides state level data for the 50 states and the District of Columbia. The third geographic level offers national level estimates. The US Census Bureau (2022a) makes available additional detailed information on Household Pulse Survey methodologies for collecting and weighting participant information on sex, educational attainment, race, and other demographic factors.

2019 National Health Interview Survey.

The National Health Interview Survey population is made up of noninstitutionalized individuals living in all 50 states and the District of Columbia. The National Center for Health Statistics plans National Health Interview Survey administrations to insure samples gathered are nationally representative (National Center for Health Statistics, n.d.-a). For the year 2019, data from 31,997 adults aged 18 and over were obtained (National Center for Health Statistics, 2021).

Data Coding

Topics covered and information gathered about participants have evolved over the span of the Household Pulse Survey. Consequently, coding varies slightly between the first and

second pairings of analyzed study data. Two codebooks, drawn primarily from those supplied by the US Census Bureau, are presented here (Tables 2 and 3). These variables also underpin the relevant Household Pulse Survey Data Tables (US Census Bureau, n.d.-a) used in addition to the Public Use Files (US Census Bureau, n.d.-b). The recoded DISABWGSS variable denoting disability status has been added.

Table 2

Household Pulse Survey Codebook, April 28 – May 24, 2021 (US Census Bureau, n.d.-b)

Instrument Question #	Variable	Description		Question Wording
1	TBIRTH_YEAR	Description	Year of birth	What year were you born? Please enter a number.
		Values	1933-2003	
2	EGENDER	Description	1) Male 2) Female	Are you… Select only one answer.
		Values		
Recode of 3	RHISPANIC	Description	Hispanic origin	Are you of Hispanic, Latino, or Spanish origin? - Selected Choice
		Values	1) No, not of Hispanic, Latino, or Spanish origin 2) Yes, of Hispanic, Latino, or Spanish origin	
Recode of 4	RRACE	Description	Race	What is your race? Please select all that apply. - Selected Choice - White
		Values	1) White, Alone 2) Black, Alone 3) Asian, Alone 4) Any other race alone, or race in combination	
5	EEDUC	Description	Educational attainment	What is the highest degree or level of school you have completed? Select only one answer.
		Values	1) Less than high school 2) Some high school 3) High school graduate or equivalent (for example GED) 4) Some college, but degree not received or is in progress 5) Associate's degree (for example AA, AS) 6) Bachelor's degree (for example BA, BS, AB) 7) Graduate degree (for example master's, professional, doctorate)	
34	INTEREST	Description	Frequency of having little interest in things over previous 7 days	Over the last 7 days, how often have you been bothered by ... having little interest or pleasure in doing things? Would you say not at all, several days, more than half the days, or nearly every day? Select only one answer.
		Values	1) Not at all 2) Several days 3) More than half the days 4) Nearly every day -99) Question seen but category not selected -88) Missing / Did not report	
35	DOWN	Description	Frequency of feeling depressed over previous 7 days	Over the last 7 days, how often have you been bothered by ... feeling down, depressed, or hopeless? Would you say not at all, several days, more than half the days, or nearly every day? Select only one answer.
		Values	1) Not at all 2) Several days 3) More than half the days 4) Nearly every day -99) Question seen but category not selected -88) Missing / Did not report	
QD1	SEEING	Description	Limitations in seeing	

Instrument Question #	**Variable**	**Description**		**Question Wording**
		Values	1) No - no difficulty 2) Yes - some difficulty 3) Yes - a lot of difficulty 4) Cannot do at all -99) Question seen but category not selected -88) Missing / Did not report	Do you have difficulty seeing, even when wearing glasses? Select one.
QD2	HEARING	Description	Limitations in hearing	Do you have difficulty hearing, even when using a hearing aid? Select one.
		Values	1) No - no difficulty 2) Yes - some difficulty 3) Yes - a lot of difficulty 4) Cannot do at all -99) Question seen but category not selected -88) Missing / Did not report	
QD3	REMEMBERING	Description	Limitations in remembering or concentrating	Do you have difficulty remembering or concentrating? Select one.
		Values	1) No - no difficulty 2) Yes - some difficulty 3) Yes - a lot of difficulty 4) Cannot do at all -99) Question seen but category not selected -88) Missing / Did not report	
QD4	MOBILITY	Description	Limitations in mobility	Do you have difficulty walking or climbing stairs? Select one.
		Values	1) No - no difficulty 2) Yes - some difficulty 3) Yes - a lot of difficulty 4) Cannot do at all -99) Question seen but category not selected -88) Missing / Did not report	
Not Applicable	DISABWGSS	Description	Recode	The final recode variable created for Washington Group Adult Composite Disability Indicator SEEING HEARING REMEMBERING MOBILITY
		Values	1: Yes (Yes = 3 OR 4 for any disability indicator) 2: No (No disability indicator greater than 2) -99) Question seen but category not selected -88) Missing / Did not report	

Table 3

Household Pulse Survey Codebook, January 26 – March 14, 2022 (US Census Bureau, n.d.-b)

Instrument Question #	Variable	Description		Question Wording
D1	TBIRTH_YEAR	Description	Year of birth	What year were you born? Please enter a number.
		Values	1934-2004	
Recode of D2	RHISPANIC	Description	Hispanic origin	Are you of Hispanic, Latino, or Spanish origin? - Selected Choice
		Values	1) No, not of Hispanic, Latino, or Spanish origin 2) Yes, of Hispanic, Latino, or Spanish origin	
Recode of D3	RRACE	Description	Race	What is your race? Please select all that apply. - Selected Choice
		Values	1) White, Alone 2) Black, Alone 3) Asian, Alone 4) Any other race alone, or race in combination	
D4	EEDUC	Description	Educational attainment	What is the highest degree or level of school you have completed? Select only one answer.
		Values	1) Less than high school 2) Some high school 3) High school graduate or equivalent (for example GED) 4) Some college, but degree not received or is in progress 5) Associate's degree (for example AA, AS) 6) Bachelor's degree (for example BA, BS, AB) 7) Graduate degree (for example master's, professional, doctorate)	
D6	EGEND_Birth	Description	Gender at birth	What sex were you assigned at birth, on your original birth certificate?
		Values	1)Male 2)Female	
HLTH3	INTEREST	Description	Frequency of having little interest in things over previous 2 weeks	Over the last 2 weeks, how often have you been bothered by having little interest or pleasure in doing things? Select only one answer.
		Values	1) Not at all 2) Several days 3) More than half the days 4) Nearly every day -99) Question seen but category not selected -88) Missing / Did not report	
HLTH4	DOWN	Description	Frequency of feeling depressed over previous 2 weeks	Over the last 2 weeks, how often have you been bothered by feeling down, depressed, or hopeless? Select only one answer.
		Values	1) Not at all 2) Several days 3) More than half the days 4) Nearly every day -99) Question seen but category not selected -88) Missing / Did not report	
DIS1	SEEING	Description	Limitations in seeing	Do you have difficulty seeing, even when wearing glasses? Select one.
		Values	1) No - no difficulty 2) Yes - some difficulty 3) Yes - a lot of difficulty 4) Cannot do at all -99) Question seen but category not selected -88) Missing / Did not report	
DIS2	HEARING	Description	Limitations in hearing	

Instrument Question #	**Variable**	**Description**		**Question Wording**
		Values	1) No - no difficulty 2) Yes - some difficulty 3) Yes - a lot of difficulty 4) Cannot do at all -99) Question seen but category not selected -88) Missing / Did not report	Do you have difficulty hearing, even when using a hearing aid? Select one.
DIS3	REMEMBERING	Description	Limitations in remembering or concentrating	Do you have difficulty remembering or concentrating? Select one.
		Values	1) No - no difficulty 2) Yes - some difficulty 3) Yes - a lot of difficulty 4) Cannot do at all -99) Question seen but category not selected -88) Missing / Did not report	
DIS4	MOBILITY	Description	Limitations in mobility	Do you have difficulty walking or climbing stairs? Select one.
		Values	1) No - no difficulty 2) Yes - some difficulty 3) Yes - a lot of difficulty 4) Cannot do at all -99) Question seen but category not selected -88) Missing / Did not report	
Not Applicable	DISABWGSS	Description	Recode	The final recode variable created for Washington Group Adult Composite Disability Indicator SEEING HEARING REMEMBERING MOBILITY
		Values	1: Yes (Yes = 3 OR 4 for any disability indicator) 2: No (No disability indicator greater than 2) -99) Question seen but category not selected -88) Missing / Did not report	

As with Household Pulse Survey codebooks, the following codebook (Table 4) comes from the original supporting documentation supplied by the National Center for Health Statistics (National Center for Health Statistics, 2020b). The recoded DISABWGSS variable denoting disability status has again been added.

Table 4

National Health Interview Survey Codebook, 2019 (National Center for Health Statistics, 2020c, 2020b)

Question Text	Variables	Values	Data Type	Sources	Notes
Over the last two weeks, how often have you been bothered by ...Little interest or pleasure in doing things? Would you say not at all, several days, more than half the days, or nearly every day?	PHQ81_A	1) Not at all 2) Several days 3) More than half the days 4) Nearly every day 7) Refused 8) Not Ascertained 9) Don't Know	Numeric	Not Applicable	This question is part of the PHQ-8 scale.
Over the last two weeks, how often have you been bothered by ...Feeling down, depressed, or hopeless? Would you say not at all, several days, more than half the days, or nearly every day?	PHQ82_A	1) Not at all 2) Several days 3) More than half the days 4) Nearly every day 7) Refused 8) Not Ascertained 9) Don't Know	Numeric	Not Applicable	This question is part of the PHQ-8 scale.
Do you have difficulty seeing, even when wearing glasses or contact lenses? Would you say no difficulty, some difficulty, a lot of difficulty, or you cannot do this at all?	VISIONDF_A	1) No difficulty 2) Some difficulty 3) A lot of difficulty 4) Cannot do at all 7) Refused 8) Not Ascertained 9) Don’t know	Numeric	Not Applicable	This question is part of the Washington Group Composite Disability Indicator for adults.
Do you have difficulty hearing, even when using your hearing aid(s)? Would you say no difficulty, some difficulty, a lot of difficulty, or you cannot do this at all?	HEARINGDF_A	1) No difficulty 2) Some difficulty 3) A lot of difficulty 4) Cannot do at all 7) Refused 8) Not Ascertained 9) Don’t know	Numeric	Not Applicable	This question is part of the Washington Group Composite Disability Indicator for adults.
Do you have difficulty walking or climbing steps? Would you say no difficulty, some difficulty, a lot of difficulty, or you cannot do this at all?	DIFF_A	1) No difficulty 2) Some difficulty 3) A lot of difficulty 4) Cannot do at all 7) Refused 8) Not Ascertained 9) Don’t know	Numeric	Not Applicable	This question is part of the Washington Group Composite Disability Indicator for adults.
Do you have difficulty remembering or concentrating?	COGMEMDFF_A	1) No difficulty 2) Some difficulty 3) A lot of difficulty 4) Cannot do at all 7) Refused 8) Not Ascertained 9) Don’t know	Numeric	Not Applicable	This question is part of the Washington Group Composite Disability Indicator for adults.
Not Applicable	DISABWGSS	1: Yes (Yes = 3 OR 4 for any disability indicator) 2: No (No disability indicator greater than 2)	Numeric	VISIONDF_A HEARINGDF_A DIFF_A COGMEMDFF_A	Recoded Yes 3 OR 4 AND No 1 OR 2 For VISIONDF_A OR HEARINGDF_A OR DIFF_A OR COGMEMDFF_A

Research Questions

To explore the extent to which individuals with and without disabilities have experienced the presence of depression symptoms during the COVID-19 pandemic and the role lifting of masking-related restrictions may play in the presence of those symptoms, the project tests the following research questions (RQ) and related hypotheses (H).

RQ1: Does the presence of depression symptoms reported by individuals with disabilities and individuals without disabilities show a significant change in the Household Pulse Survey reporting period following the two instances of widespread relaxing of COVID-19 masking recommendations by the Centers for Disease Control and Prevention (5/13/2021 and 3/3/2022) in comparison to the presence of such symptoms during the prior reporting period?

H1.0: Individuals with disabilities experienced no significant change in the presence of depression symptoms compared to individuals without disabilities following COVID-19 masking recommendation lessening or removal.

H1.1: Individuals with disabilities experienced significant elevations in the presence of depression symptoms compared to individuals without disabilities following May 13, 2021, COVID-19 masking recommendations lessening or removal.

H1.2: Individuals with disabilities experienced significant elevations in the presence of depression symptoms compared to individuals without disabilities following March 3, 2022, COVID-19 masking recommendations lessening or removal.

RQ2: Does the presence of depression symptoms reported by individuals with and without disabilities in Household Pulse Survey data pre- and post-May 13, 2021, and pre- and post-March 3, 2022, differ according to age, educational attainment, race, or sex?

H2.0: Individuals with and without disabilities did not differ in the presence of depression symptoms reported pre- and post-May 13, 2021, and pre- and post-March 3, 2022, according to age, educational attainment, race/Hispanic ethnicity, or sex.

H2.1: Individuals with and without disabilities differed in the presence of depression symptoms pre- and post-May 13, 2021, and pre- and post-March 3, 2022, according to age, educational attainment, race/Hispanic ethnicity, or sex.

RQ3: Is the pandemic era presence of depression symptoms reported in Household Pulse Survey data from individuals with disabilities and individuals without disabilities at the four masking announcement-relevant observation points significantly different than pre-pandemic 2019 symptom presence (National Health Interview Survey) reported by both groups?

H3.0: Individuals with and without disabilities experienced no change in the presence of depression symptoms at the four masking announcement-relevant observation points in comparison to pre-pandemic symptom presence as indicated by 2019 National Health Interview Survey data.

H3.1: Individuals with and without disabilities experienced significant change in the presence of depression symptoms at the four masking announcement-relevant observation points in comparison to pre-pandemic symptom presence as indicated by 2019 National Health Interview Survey data.

Testing Methods

Research questions and accompanying hypotheses are addressed using the following analysis structure and statistical testing (Table 5). For Research Question 1, unweighted datasets and replicate weight datasets intended to make Household Pulse Survey sample sizes of different demographics analogous to the US population were extracted from US Census Bureau Public Use Files (n.d.-b) for each of the relevant Household Pulse Survey observations. These data were processed using IBM's SPSS statistical software with the guidance of the statistician at the researcher's place of employment.

The researcher primarily used totals derived from the weighted "Symptoms of Depression Experienced in the Last 7 Days, by Select Characteristics" and "Symptoms of Depression Experienced in the Last Two Weeks, by Select Characteristics" Household Pulse Survey Data Tables (US Census Bureau, n.d.-a). Use of these topic-specific, weighted tables should yield estimates that are "weighted to adjust for nonresponse and to match Census Bureau estimates of the population by age, sex, race/Hispanic ethnicity, and educational attainment" (n.d.-b, loc. Data Source, second paragraph).

The US Census Bureau's replicate weight data files (n.d.-b) did offer point prevalence estimates very close to, and within the confidence intervals of, the National Center for Health Statistics' (n.d.-b) own point prevalence estimates. However, it is hoped that use of the topic-specific Household Pulse Survey Data Tables compiled and weighted by US Census Bureau experts (n.d.-a) and cross-checked with prevalence estimates calculated by National Center for Health Statistics experts (n.d.-b) should provide greater credibility for calculations produced in the current research. This adaptation should also increase the likelihood research results more accurately reflect US population-wide estimates while better controlling for non-responses.

Appendix A offers fourfold contingency tables and related calculations drawn from unweighted and replicate weight Public Use Files (US Census Bureau, n.d.-b) and Data Tables (US Census Bureau, n.d.-a) for Household Pulse Survey relevant observations according to disability status and reporting of depression symptoms.

Absolute change (or absolute difference) relative to the point prevalence was calculated to detect basic differences between pre-masking announcement presence of depression symptoms and post-masking announcement presence of depression symptoms by disability status. Percent change (or percentage difference) was calculated to determine by what percentage post-masking announcement reports changed from pre-masking announcement reports (Curran-Everett & Williams, 2015).

Additional analyses were conducted in accordance with recommended statistical analyses of cross-sectional data (Tamhane et al., 2016). The prevalence ratio (PR) was calculated from these statistics to compare proportions of reported presence of depression symptoms in individuals with and without disabilities. The prevalence odds ratio (POR) was calculated to measure association between disability status and presence of symptoms of depression. Prevalence difference was calculated to measure difference in presence of depression symptoms by disability status.

Chi-square analyses were performed as the chi-square distribution offers "an optimal and general approach to assessing evidence of an association . . ." (Selvin, 2011, p. 9). The chi-square statistic was calculated to test whether differences between observed data and expected data were likely due to coincidence or existing variable relationships. Results were deemed significant if the *p* value, or "the probability of observing the sample data or something more extreme, assuming the null hypothesis is true" (Hayat, 2010, p. 221), was less than .001 or $p <$

.001. Calculations were conducted for each of the four relevant Household Pulse Survey observations.

For Research Question 2, point prevalence of presence of depression symptoms was drawn from estimates offered by the National Center for Health Statistics (n.d.-c) for the variables of age grouping, educational attainment, race/Hispanic ethnicity, and sex. The review of the literature identified these issues as areas of prejudice encountered by the focus population in addition to disability-related prejudice. Point prevalence calculations were drawn from National Center for Health Statistics-provided statistics for each of the relevant Household Pulse Survey observations for individuals by disability status and depression symptom presence according to age group, education, and race/Hispanic ethnicity demographics (n.d.-c).

Logistic regression modeling was also conducted to address Research Question 2. Logistic regression modeling offers a method for using a specific dataset comprised of independent variables to estimate the probability of an event taking place (IBM, n.d.). Logistic regression can be used to determine relevant odds ratios in the presence of multiple variables (Sperandei, 2014). The presence (or lack) of depression symptoms functions as the focal variable. The interaction between the presence of depression symptoms and other variables is examined to determine whether an effect on one variable depends on the effect of another variable. Due to the dichotomous nature of this depression symptom variable, logistic regression provides a suitable method for investigating interactions between this variable, disability status, and multiple demographic factors. As this modeling breaks populations of interest into smaller groupings than those used in the other research questions, results are deemed statistically significant at $p < .01$ rather than at the $p < .001$ significance level required for Research Question 1 and Research Question 2.

Logistic regression modeling of data from the four Household Pulse Survey observations was conducted by the statistician at the researcher's workplace. The statistician also provided guidance in interpretation of these calculations. For these calculations, Household Pulse Survey Public Use Files for the four relevant observations were used (US Census Bureau, n.d.-b).

For Research Question 3, relevant data from the 2019 National Health Interview Survey were compared with the relevant Household Pulse Survey observations. 2019 National Health Interview Survey datasets used were pre-weighted "to produce representative national estimates" (National Center for Health Statistics, 2020c, p. 20). As with Household Pulse Survey calculations, point prevalence, absolute change, percent change, prevalence odds ratio, prevalence ratio, prevalence difference, and chi-square calculations were conducted for, and compared to, 2019 National Health Interview Survey variables. For chi-square calculations, results were deemed significant if the p value is less than .001 or $p < .001$. These calculations were compared to respective Household Pulse Survey calculations generated for Research Question 1.

Table 5 provides a concise overview of data analyses conducted according to research need. Data variables and statistical tests are presented with the research questions and accompanying hypotheses they address (Table 5).

Table 5

Data Analyses

RQ1: Does the presence of depression symptoms reported by individuals with disabilities and individuals without disabilities show a significant change in the Household Pulse Survey reporting period following the two instances of widespread relaxing of COVID-19 masking recommendations by the Centers for Disease Control and Prevention (5/13/2021 and 3/3/2022) in comparison to the presence of such symptoms during the prior reporting period?						
	Hypothesis	**IV(s)**	**IV(s) Data**	**DV(s)**	**DV Data**	**Test**
H1.0 Null	Individuals with disabilities experienced no significant change in the presence of depression symptoms compared to individuals without disabilities following COVID-19 masking recommendation lessening or removal.	DISABWGSS	Categorical (Nominal)	INTEREST DOWN	Dichotomous (Nominal)	Point Prevalence Absolute Change Percent Change Prevalence Odds Ratio Prevalence Ratio Prevalence Difference Chi-Square
H1.1	Individuals with disabilities experienced significant elevations in the presence of depression symptoms compared to individuals without disabilities following May 13, 2021, COVID-19 masking recommendations lessening or removal.	DISABWGSS	Categorical (Nominal)	INTEREST DOWN	Dichotomous (Nominal)	Point Prevalence Absolute Change Percent Change Prevalence Odds Ratio Prevalence Ratio Prevalence Difference Chi-Square
H1.2	Individuals with disabilities experienced significant elevations in the presence of depression symptoms compared to individuals without disabilities following March 3, 2022, COVID-19 masking recommendations lessening or removal.	DISABWGSS	Categorical (Nominal)	INTEREST DOWN	Dichotomous (Nominal)	Point Prevalence Absolute Change Percent Change Prevalence Odds Ratio Prevalence Ratio Prevalence Difference Chi-Square

RQ2: Does the presence of depression symptoms reported by individuals with and without disabilities in Household Pulse Survey data pre- and post-May 13, 2021, and pre- and post-March 3, 2022, differ according to age, educational attainment, race, or sex?						
	Hypotheses	**IV(s)**	**IV(s) Data**	**DV(s)**	**DV Data**	**Test**
H2.0 Null	Individuals with and without disabilities did not differ in the presence of depression symptoms reported pre- and post-May 13, 2021, and pre- and post-March 3, 2022, according to age, educational attainment, race/Hispanic ethnicity, or sex.	TBIRTH_YEAR EGENDER EGEND_BIRTH RHISPANIC RRACE EEDUC DISABWGSS	Dichotomous (Nominal)	INTEREST DOWN PHQ81_A PHQ82_A	Dichotomous (Nominal)	Point Prevalence Absolute Change Percent Change Logistic Regression Odds Ratio
H2.1	Individuals with and without disabilities differed in the presence of depression symptoms pre- and post-May 13, 2021, and pre- and post-March 3, 2022, according to age, educational attainment, race/Hispanic ethnicity, or sex.	TBIRTH_YEAR EGENDER EGEND_BIRTH RHISPANIC RRACE EEDUC DISABWGSS	Dichotomous (Nominal)	INTEREST DOWN PHQ81_A PHQ82_A	Dichotomous (Nominal)	Point Prevalence Absolute Change Percent Change Logistic Regression Odds Ratio

RQ3: Is the pandemic era presence of depression symptoms reported in Household Pulse Survey data from individuals with disabilities and individuals without disabilities at the four masking announcement-relevant observation points significantly different than pre-pandemic 2019 symptom presence (National Health Interview Survey) reported by both groups?						
	Hypotheses	**IV(s)**	**IV(s) Data**	**DV(s)**	**DV Data**	**Test**
H3.0 Null	Individuals with and without disabilities experienced no change in the presence of depression symptoms at the four masking announcement-relevant observation points in comparison to pre-pandemic symptom presence as indicated by 2019 National Health Interview Survey data.	DISABWGSS	Dichotomous (Nominal)	INTEREST DOWN PHQ81_A PHQ82_A	Dichotomous (Nominal)	Point Prevalence Absolute Change Percent Change Prevalence Odds Ratio Prevalence Ratio Prevalence Difference Chi-Square
H3.1	Individuals with and without disabilities experienced significant change in the presence of depression symptoms at the four masking announcement-relevant observation points in comparison to pre-pandemic symptom presence as indicated by 2019 National Health Interview Survey data.	DISABWGSS	Dichotomous (Nominal)	INTEREST DOWN PHQ81_A PHQ82_A	Dichotomous (Nominal)	Point Prevalence Absolute Change Percent Change Prevalence Odds Ratio Prevalence Ratio Prevalence Difference Chi-Square

Chapter Four: Results

This chapter focuses on results of quantitative analyses presented in Chapter Three. Research questions and related hypotheses at the heart of this research drive the analyses. These questions and hypotheses concentrate on differences between individuals with and without disabilities in their experience of the presence of depression symptoms preceding and following Centers for Disease Control and Prevention announcements of pandemic-related masking protocol relaxations. To investigate these questions, response data from the nationally representative Household Pulse Survey's questions on depression-related symptoms, disability status, and relevant demographics identified in the Review of the Literature and called out in National Center for Health Statistics' estimates (n.d.-c) are compared. In addition, relevant results from the nationally representative 2019 National Health Interview Survey, the survey administration most immediately preceding the onset of the COVID-19 pandemic in the US, are presented to offer a comparative baseline to aid in investigating the extent to which pandemic-era experiences of symptoms related to depression differ from pre-pandemic norms.

This chapter individually presents the research questions and results of analyses meant to explore these three queries. The accuracy of hypotheses related to each question is evaluated according to results of analyses primarily focused on prevalence-related statistics.

Research Question 1

Does the presence of depression symptoms reported by individuals with disabilities and individuals without disabilities show a significant change in the Household Pulse Survey reporting period following the two instances of widespread relaxing of COVID-19 masking recommendations by the Centers for Disease Control and Prevention (5/13/2021 and 3/3/2022) in comparison to the presence of such symptoms during the prior reporting period?

Regarding Research Question 1, point prevalence, absolute change, percent change, prevalence odds ratio, prevalence ratio, prevalence difference, and chi-square calculations were performed to ascertain whether the presence of depression symptoms reported by individuals with and without disabilities showed a significant change following the two instances of widespread relaxing of masking recommendations. National Center for Health Statistics (n.d.-b) point prevalence numbers were taken for the four relevant observations from the "Indicators of Anxiety or Depression Based on Reported Frequency of Symptoms" table using the indicator "Symptoms of Depressive Disorder." These National Center for Health Statistics (n.d.-b) point prevalence estimates were then used to calculate both absolute change and percent change between the observations preceding and following the two announcements. National Center for Health Statistics (n.d.-b) point prevalence estimates were also used to align US Census Bureau (n.d.-a) weighted Data Table-derived contingency tables. These contingency tables were used to calculate prevalence odds ratio, prevalence ratio, prevalence difference, and chi-square estimates for the specified date pairings. Unweighted and weighted contingency tables derived from the US Census Bureau data (n.d.-b) were also used in calculating these statistics for comparisons (Appendix A). Though totals derived from the weighted Public Use Files (US Census Bureau, n.d.-b) differ little from those emanating from the National Center for Health Statistics (n.d.-b) point prevalence-aligned estimates, the researcher determined National Center for Health Statistics (n.d.-b) point prevalence-aligned estimates would likely provide statistics more broadly applicable to the US population.

Hypothesis 1.1.

For the observation immediately preceding the initial May 13, 2021, Centers for Disease Control and Prevention masking recommendation relaxation announcement, the National Center

for Health Statistics (n.d.-b) reports an estimated 50.4% of individuals with disabilities experienced the presence of symptoms of depression while an estimated 17.6% of non-disabled respondents noted such presence. As a reminder, the Household Pulse Survey at that time queried respondents on the presence of symptoms related to depression within the past seven day period (National Center for Health Statistics, n.d.-b). For the May 12 through May 24, 2021, observation encompassing and immediately following the announcement, the National Center for Health Statistics (n.d.-b) reports an estimated 53.2% of individuals with disabilities experienced the presence of symptoms of depression, in contrast to an estimated 16.8% of respondents without disabilities.

For the observation taking place May 12 through May 24, 2021, the presence of depression symptoms in individuals with disabilities underwent an absolute change of 2.8 and a positive percentage change of 5.56%. In contrast, individuals without disabilities underwent an absolute change of -0.8, equating to a decrease in percentage change of 4.55%, in reported presence of depression symptoms. Table 6 provides an overview of these results according to disability status.

Table 6

Depression Symptom Presence Over Last Seven Days by Disability Status Around 5/13/2021 Announcement

	With Disabilities Reporting Presence of Depression Symptoms	Without Disabilities Reporting Presence of Depression Symptoms
Pre-5/13/2021 Announcement 4/28-5/10/2021 Point Prevalence	50.4%	17.6%
Post-5/13/2021 Announcement 5/12-5/24/2021 Point Prevalence	53.2%	16.8%
Absolute Change	2.8	-0.8
Percent Change	5.56% Increase	4.55% Decrease

Table 7 provides ratios of the risk, difference, and odds for the prevalence of depression symptom presence by disability status for the two observations surrounding the May 13, 2021,

masking protocol relaxation. According to these calculations, individuals with disabilities were 2.86 times more at risk than individuals without disabilities to experience the presence of depression symptoms prior to the May 13, 2021, announcement. Following the announcement, individuals with disabilities' risk of reporting the presence of depression symptoms rose to 3.17 times more than counterparts without disabilities. The prevalence odds ratio, or the ratio of the probability that individuals with disabilities would report the presence of depression symptoms to the probability that individuals without disabilities would report the presence of depression symptoms, was 4.76 prior to the first major masking relaxation announcement by the Centers for Disease Control and Prevention. That ratio grew to 5.63 following the May 13, 2021, announcement.

Table 7 also depicts the results of chi-square analyses of significance for relevant Household Pulse Survey data. Each relevant administration of the Household Pulse Survey included more than 70,000 respondents. For all chi-square calculations, *p*-values are less than .001 ($p < .001$) with results deemed significant at $p < .001$. The proportion of individuals reporting the presence of depression symptoms differs significantly ($p < .001$) by disability status. Individuals with disabilities report the presence of depression symptoms at a greater proportion than individuals without disabilities. Chi-square tests of these proportions yield statistically significant results of $p < .001$. Table 7 provides a more detailed presentation of these and related results.

Table 7

Results of Statistical Analyses Around 5/13/2021 Announcement

Statistical Test	Household Pulse Survey 4/28-5/10/2021	Household Pulse Survey 5/12-5/24/2021
Prevalence Ratio	2.86	3.17
Prevalence Difference	0.33	0.36
Prevalence Odds Ratio	4.76	5.63
***P* Value**	$p < .001$	$p < .001$

Results of these calculations suggest a rejection of the null hypothesis relating to the lack of change in the presence of depression symptoms prior to and following the May 13, 2021, announcement. Instead, results indicate support for Hypothesis 1.1, stating that individuals with disabilities experienced significant elevations in the presence of depression symptoms compared to individuals without disabilities following the May 13, 2021, announcement of lessening of COVID-19 masking recommendations. Appendix A provides the fourfold contingency tables used to derive these statistics as well as comparative contingency tables drawn from unweighted and weighted US Census Bureau (n.d.-b) Public Use Files.

Hypothesis 1.2.

In the observation following the March 3, 2022, announcement of the second major relaxation of masking recommendations, individuals with disabilities again experienced an elevation in the presence of depression symptoms while individuals without disabilities experienced a decrease in the presence of such symptoms. Following this second announcement, however, differences from the period prior to the announcement appear less stark.

It should be noted that, during this second pair of observations, the Household Pulse Survey queried respondents on the presence of symptoms related to depression over the "last two weeks" (National Center for Health Statistics, n.d.-b, sec. Technical Notes). The National Center for Health Statistics (n.d.-b) presents depression symptom presence data for both its earlier seven

day depression symptom presence measurement and its prior two weeks measurement together in its analyses. The current research uses this unified presentation to adhere to National Center for Health Statistics convention.

For the pre-second announcement observation taking place January 26 through February 7, 2022, the National Center for Health Statistics (n.d.-b) estimates 50.4% of individuals with disabilities again experienced the presence of depression symptoms while an estimated 17.6% of individuals without disabilities had the presence of such symptoms. For the encompassing and post-second announcement observation taking place March 2 through March 14, 2022, the National Center for Health Statistics (n.d.-b) reports an estimated 50.9% of individuals with disabilities experienced the presence of depression symptoms while an estimated 17% of individuals without disabilities reported such experiences. Individuals with disabilities experienced an absolute positive change of 0.5, equating to a nearly one point percentage change, in their reported presence of depression symptoms. In contrast, individuals without disabilities experienced an absolute negative change of 0.6, equating to a 3.41 negative percentage decrease in their reported presence of these symptoms. Table 8 offers a view of these reported statistics, the absolute change between the observations for both groups, and the percent change between these observations.

Table 8

Depression Symptoms Presence During Last Two Weeks by Disability Status Around 3/3/2022 Announcement

	With Disabilities Reporting Presence of Depression Symptoms	Without Disabilities Reporting Presence of Depression Symptoms
Pre-3/3/2022 Announcement 1/26-2/7/2022 Point Prevalence	50.4%	17.6%
Post-3/3/2022 Announcement 3/2-3/14/2022 Point Prevalence	50.9%	17%
Absolute Change	0.5	-0.6
Percent Change	0.99% Increase	3.41% Decrease

As Table 9 shows, ratios of the risk, difference, and odds for the prevalence of the presence of depression symptoms by disability status were calculated for observations surrounding the March 3, 2022, announcement. Individuals with disabilities were, as in the period preceding the first announcement, 2.86 times more at risk than individuals without disabilities to experience the presence of depression symptoms prior to the March 3, 2022, announcement. Following the announcement, however, individuals with disabilities were 2.99 times more at risk to report the presence of depression symptoms than counterparts without disabilities. The prevalence odds ratio, or the ratio of the probability that individuals with disabilities would report the presence of depression symptoms to the probability that individuals without disabilities would report the presence of depression symptoms, was 4.76—the same result derived for the observation prior to the first major masking relaxation announcement. That ratio grew less, to 5.06, following the second major announcement on March 3, 2022.

Table 9 depicts the results of chi-square analyses of significance for the relevant Household Pulse Survey data. Again, interpretation using this measure of significance may be complicated by large dataset size. For both chi-square calculations, *p*-values are less than .001 ($p < .001$) with results deemed significant at $p < .001$. Once more the proportion of individuals

with the presence of depression symptoms differs significantly by disability status. Individuals with disabilities reported the presence of depression symptoms at a greater proportion than individuals without disabilities during each relevant observation. The *p*-value is < 0.001 with significance set at $p < .001$.

Table 9

Results of Statistical Analyses Around 3/3/2022 Announcement

Statistical Test	**Household Pulse Survey 1/26-2/7/2022**	**Household Pulse Survey 3/2-3/14/2022**
Prevalence Ratio	2.86	2.99
Prevalence Difference	0.33	0.34
Prevalence Odds Ratio	4.76	5.06
P Value	$p < .001$	$p < .001$

Results of these calculations indicate rejection of the null hypothesis relating to the lack of change in the presence of depression symptoms prior to and following the March 3, 2022, announcement. Instead, these results support Hypothesis 1.2, which proposes that individuals with disabilities experienced significant elevations in the presence of depression symptoms compared to individuals without disabilities following the March 3, 2022, second masking recommendation relaxation. Appendix A provides fourfold contingency tables used to derive these statistics as well as comparative contingency tables drawn from unweighted and weighted US Census Bureau (n.d.-b) Public Use Files.

Research Question 2

Does the presence of depression symptoms reported by individuals with and without disabilities in Household Pulse Survey data pre- and post-May 13, 2021, and March 3, 2022, differ according to age, educational attainment, race, or sex?

Hypothesis 2.1.

Hypothesis 2.1 maintains that individuals with and without disabilities differ in reported experience of the presence of depression symptoms pre- and post-May 13, 2021, and March 3, 2022, announcements according to age grouping, educational attainment, race/Hispanic ethnicity, and sex. Unlike investigations of Research Questions 1 and 3, which include various measures of association and calculations of difference, exploration of Research Question 2 requires regression modeling along with calculations of difference. Also differing from Research Question 1 and Research Question 3 analyses, Research Question 2 calculations examine the presence of depression symptoms by additional demographic categories of age grouping, educational attainment, race/Hispanic ethnicity, and sex.

Age Grouping and Disability Status.

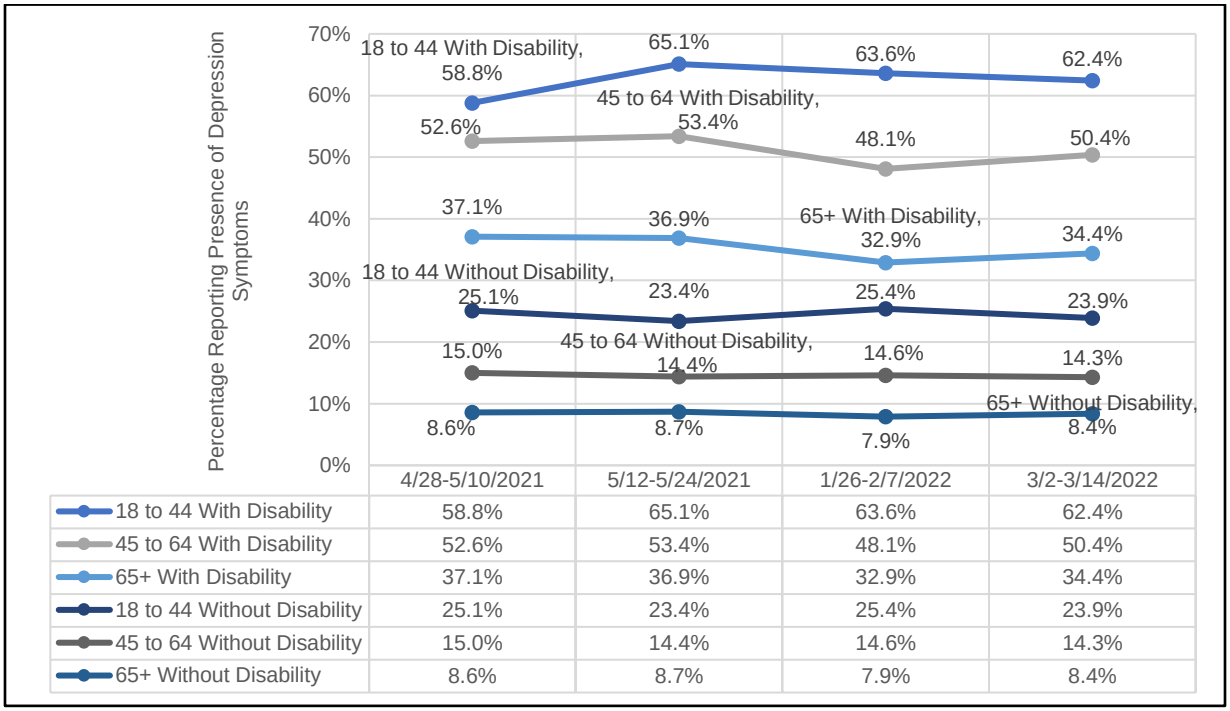
Figure 3 offers a representation of the interaction between age grouping, disability status, and presence of depression symptoms at the four observation points (National Center for Health Statistics, n.d.-c). While the four observation points are presented together, it should once more be noted that the first two Household Pulse Survey observations employ a time measurement of seven days when querying respondents on their presence of depression-related symptoms. The second pairing of observations comes from after the Household Pulse Survey changed to a two week time measurement for the presence of depression-related symptoms (National Center for Health Statistics, n.d.-b). The National Center for Health Statistics (n.d.-c, n.d.-b) presents these data together in their graphic and tabular representations.

Analyses in this research apply the same age groupings used by the National Center for Health Statistics (n.d.-c). Adults aged 18 to 44 show the greatest presence of depression symptoms followed by adults aged 45 to 64. Adults 65 years and older display the presence of

depression symptoms at the lowest amounts. Across disability status and age grouping interactions, individuals with disabilities experience the presence of depression symptoms at percentages higher than individuals without disabilities. These differences continue across the four Household Pulse Survey observations surrounding the two masking relaxations.

Figure 3.

Presence of Depression Symptoms by Age Grouping, Disability Status Around Masking Announcements



	4/28-5/10/2021	5/12-5/24/2021	1/26-2/7/2022	3/2-3/14/2022
18 to 44 With Disability	58.8%	65.1%	63.6%	62.4%
45 to 64 With Disability	52.6%	53.4%	48.1%	50.4%
65+ With Disability	37.1%	36.9%	32.9%	34.4%
18 to 44 Without Disability	25.1%	23.4%	25.4%	23.9%
45 to 64 Without Disability	15.0%	14.4%	14.6%	14.3%
65+ Without Disability	8.6%	8.7%	7.9%	8.4%

Table 10 offers an examination of point prevalence by age grouping and disability status interactions surrounding the masking announcements. Absolute and percent changes derived from these prevalence points are also provided. As noted, across age groupings, presence of depression symptoms is higher among individuals with disabilities than counterparts without.

In individuals with and without disabilities, people aged 18 to 44 show the greatest presence of depression symptoms. In individuals with disabilities in this age group, reported presence of depression symptoms shows an absolute change increase of 6.3% and a percent

change increase of 10.71% following the first masking announcement. In contrast, presence of depression symptoms in individuals without disabilities in this age grouping show a decrease by an absolute change of 1.7% and a percentage change of nearly 7%.

Following the second masking announcement, individuals with and without disabilities show decreases in their presence of depression symptoms. However, the percent and absolute change for individuals with disabilities within the singular category of those aged 18 to 44 (percent change: -1.89%; absolute change: -1.2%) are smaller than decreases for counterparts without disabilities (percent change: -5.91%; absolute change: -1.5%).

Individuals aged 45 to 64 differ in their presence of depression-related symptomology. Individuals with disabilities in this middle age group did report a percentage change increase of 1.52% in their presence of depression symptoms after the first masking relaxation announcement, but not to the extent of younger individuals with disabilities. Likewise, adults without disabilities in this 45 to 64 year old age grouping show a decrease in their percentage change of -4%. Individuals without disabilities aged 18 to 44 show a greater decrease in this calculation at -6.77%.

After the second masking announcement, individuals with disabilities in this middle age group deviate from their younger counterparts and show a percentage change increase of 4.78% in the presence of depression symptoms. As with younger peers, individuals without disabilities in this age grouping do show a decrease in the presence of depression symptoms. The -2.05% change in percentage experienced by individuals without disabilities aged 45 to 64 is not so drastic as the -5.91% decrease reported by their 18 to 44 year old counterparts.

In agreement with the findings of the Review of the Literature, individuals in the oldest age grouping (65 years of age and older) reported the lowest presence of depression symptoms

by disability status when compared with younger age groupings. Their change in presence of depression symptoms also appears less drastic after the first masking announcement. Older individuals with disabilities even reported a slight decrease (absolute change: -0.2%; percent change: -0.54%) in their presence of depression symptoms while non-disabled counterparts reported a small increase (absolute change: 0.1%; percent change: 1.16%) in the wake of this first announcement.

A striking difference occurs among this oldest age grouping after the second major masking announcement. Individuals with and without disabilities show marked increases in the presence of depression symptoms. Individuals with disabilities in this age grouping of 65 years of age and older show a positive absolute change of 1.5% and a positive percent change of 4.56%. Individuals without disabilities aged 65 years and older show a 0.5% absolute change and, more starkly, a percentage change of 6.33%. These increases in the presence of depression symptoms in members of the oldest age grouping with and without disabilities may be partially attributable to the brunt of COVID-19 mortality having been borne by their age grouping (National Center for Health Statistics, 2022a). Having by March 2022 observed these losses in person and via news and social media reports, older individuals may have especially perceived great risk from new COVID-19 infections following the second masking relaxation.

Table 10

Results of Age Grouping-specific Statistical Analyses Around Both Masking Announcements

Age Grouping and Disability Status	**4/28 - 5/10/ 2021**	**5/12- 5/24/ 2021**	**Absolute Change**	**Percent Change**	**1/26- 2/7/ 2022**	**3/2- 3/14/ 2022**	**Absolute Change**	**Percent Change**
18 to 44 **With** Disability	58.8%	65.1%	6.3%	10.71%	63.6%	62.4%	-1.2%	-1.89%
18 to 44 **Without** Disability	25.1%	23.4%	-1.7%	-6.77%	25.4%	23.9%	-1.5%	-5.91%
45 to 64 **With** Disability	52.6%	53.4%	0.8%	1.52%	48.1%	50.4%	2.3%	4.78%
45 to 64 **Without** Disability	15%	14.4%	-0.6%	-4%	14.6%	14.3%	-0.3%	-2.05%
65+ **With** Disability	37.1%	36.9%	-0.2%	-0.54%	32.9%	34.4%	1.5%	4.56%
65+ **Without** Disability	8.6%	8.7%	0.1%	1.16%	7.9%	8.4%	0.5%	6.33%

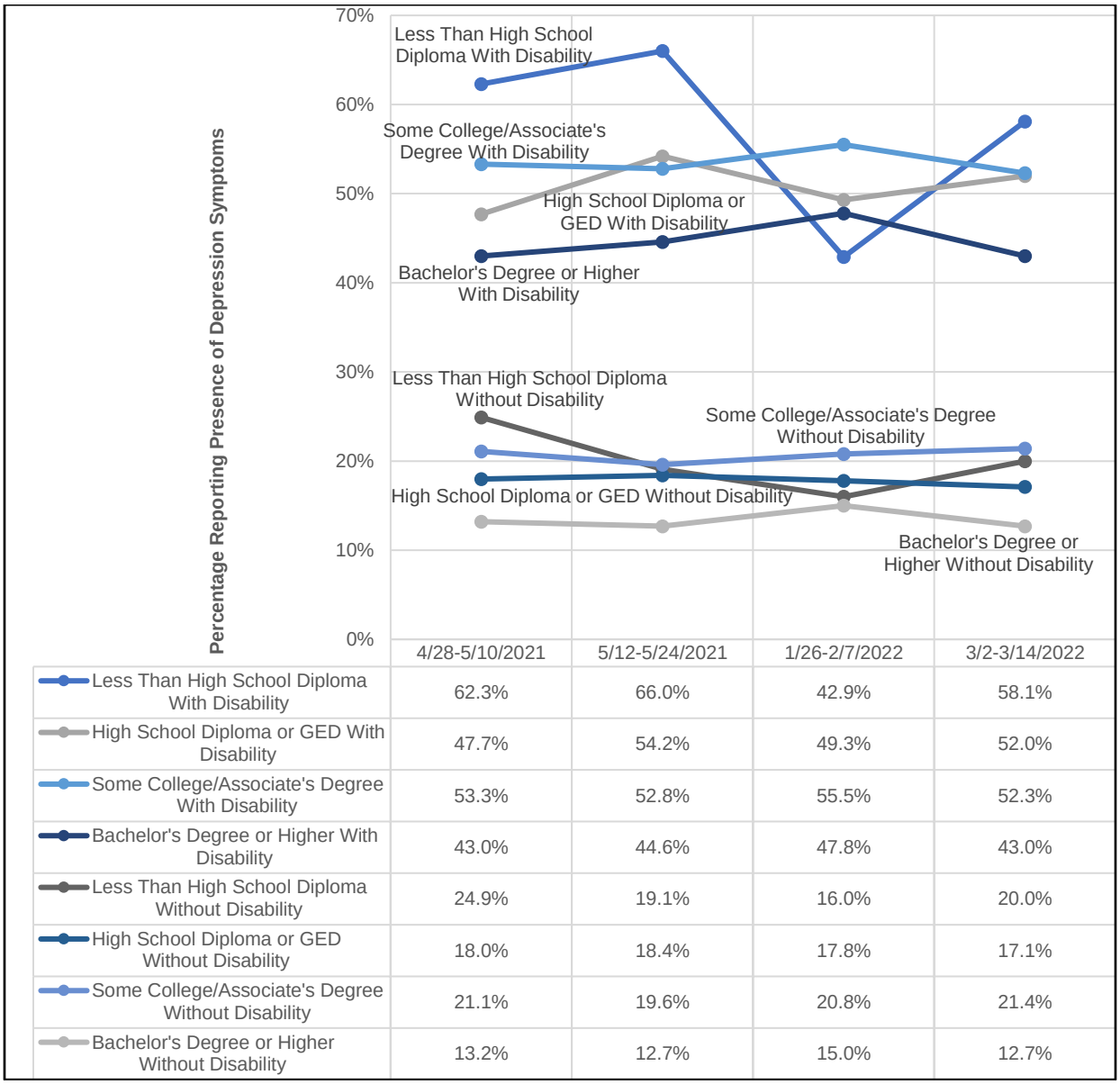
Odds ratio calculations were drawn from logistic regression modeling for the variables of age grouping, depression symptom presence, and disability status. The odds of individuals with disabilities in the middle age grouping of 45 to 64 years experiencing the presence of depression symptoms are 5.74 times greater than peers without disabilities. In contrast, in the oldest age grouping of 65 years and older, the odds of individuals with disabilities experiencing the presence of depression symptoms are 5.31 times more than counterparts without disabilities. Meanwhile, the odds of individuals with disabilities in the youngest age grouping of 18 to 44 years experiencing the presence of depression symptoms are 5.11 times those of counterparts without disabilities. According to logistic regression modeling, the interaction of age grouping, disability status, and the presence of depression symptoms is significant at $p < .01$. During in-group analyses, a statistically significant difference (p value for the predictor variable of age grouping = 0.0003) was found to exist between the age groupings of 18 to 44 years and 45 to 64 years. Appendix B offers select variables and related results from the output of regression modeling for age grouping and other demographic interaction measures.

Educational Attainment and Disability Status.

Analyses performed regarding educational attainment use National Center for Health Statistics (n.d.-c) categories. Figure 4 provides trend information for National Center for Health Statistics (n.d.-c) estimates. As noted, the first two observations use a seven day measurement when querying about depression symptom presence while the second pairing come from observations occurring after the Household Pulse Survey changed to a two week time measurement for symptom presence (National Center for Health Statistics, n.d.-b).

Figure 4.

Presence of Depression Symptoms by Educational Attainment, Disability Status Around Masking Announcements



	4/28-5/10/2021	5/12-5/24/2021	1/26-2/7/2022	3/2-3/14/2022
Less Than High School Diploma With Disability	62.3%	66.0%	42.9%	58.1%
High School Diploma or GED With Disability	47.7%	54.2%	49.3%	52.0%
Some College/Associate's Degree With Disability	53.3%	52.8%	55.5%	52.3%
Bachelor's Degree or Higher With Disability	43.0%	44.6%	47.8%	43.0%
Less Than High School Diploma Without Disability	24.9%	19.1%	16.0%	20.0%
High School Diploma or GED Without Disability	18.0%	18.4%	17.8%	17.1%
Some College/Associate's Degree Without Disability	21.1%	19.6%	20.8%	21.4%
Bachelor's Degree or Higher Without Disability	13.2%	12.7%	15.0%	12.7%

Table 11 provides information on point prevalence by educational attainment and disability status preceding and following both masking relaxation announcements. Absolute and percent changes derived from these differing points of prevalence are also provided. Presence of

depression symptoms is higher among individuals with disabilities than those without, independent of educational attainment.

Individuals with and without disabilities having less than a high school diploma show some of the greatest change in presence of depression symptoms following masking announcements. In the case of individuals with disabilities at this degree of educational attainment, they show an increase of 3.7% absolute change (5.94% percent change) in the presence of depression symptoms after the first announcement. In contrast, individuals without disabilities with less than a high school diploma show a notable decrease in presence of depression symptoms with an absolute change of -5.8% and a percentage change of -23.29%.

Following the second masking announcement, however, both individuals with and without disabilities with less than a high school diploma show increases in presence of depression symptoms. Individuals with disabilities show an absolute change of 15.2% and a percentage change of greater than 35%. Individuals without disabilities show an absolute change of 4% and a percentage change of 25%. One possible factor in these elevations may again owe to COVID-19 mortality. As noted by American Cancer Society researchers (Marlow et al., 2023), pre-pandemic disparities in mortality rates for individuals with lesser amounts of education increased during the COVID-19 pandemic.

Individuals both with and without disabilities who possess a high school diploma or GED show increased presence of depression symptoms following the first masking relaxation announcement. Individuals with disabilities in this grouping show an even larger positive absolute change (6.5%) and percent change (13.63%) than those reported by peers having less than a high school diploma. Deviating from peers with less than a high school diploma,

individuals without disabilities having a high school diploma or GED show increased depression symptom presence (absolute change: 0.4%; percent change: 2.22%).

Following the second masking relaxation announcement, individuals with disabilities with a high school diploma or GED again experienced an increase in their presence of depression symptoms (absolute change: 2.7%; percent change: 5.48%), though not at the degree experienced after the first announcement. Individuals without disabilities in this educational grouping show a decrease (absolute change: -0.7%; percent change: -3.93%) in depression symptom presence.

In individuals having some amount of college education or an associate's degree, both individuals with disabilities (absolute change: -0.5%; percent change: -0.94%) and those without disabilities (absolute change: -1.5%; percent change: -7.11%), show decreases in the presence of depression symptoms following the first masking announcement. While such decreases persisted for individuals with disabilities following the second masking announcement (absolute change: -3.2%; percent change: -5.77%), the presence of depression symptoms for individuals without disabilities in this educational grouping shows a slight increase (absolute change: 0.6%; percent change: 2.88%).

Individuals having a bachelor's degree or higher also show differences according to disability status following both masking announcements. For individuals with disabilities in this educational attainment grouping, depression symptom presence shows an increase (absolute change: 1.6%; percent change: 3.72%) following the first announcement. For individuals without disabilities, the presence of these symptoms shows a decrease (absolute change: -0.5%; percent change: -3.79%). After the second announcement, in contrast, individuals with (absolute change: -4.8%; percent change: -10.04%) and without (absolute change: -2.3%; percent change: -

15.33%) disabilities having a bachelor's degree or higher show decreases in their presence of depression symptoms.

Table 11

Results of Educational Attainment-specific Statistical Analyses Around Both Masking Announcements

Educational Attainment and Disability Status	**4/28 - 5/10/ 2021**	**5/12- 5/24/ 2021**	**Absolute Change**	**Percent Change**	**1/26- 2/7/ 2022**	**3/2- 3/14/ 2022**	**Absolute Change**	**Percent Change**
Less Than High School Diploma **With** Disability	62.3%	66%	3.7%	5.94%	42.9%	58.1%	15.2%	35.43%
Less Than High School Diploma **Without** Disability	24.9%	19.1%	-5.8%	-23.29%	16%	20%	4%	25%
High School Diploma or GED **With** Disability	47.7%	54.2%	6.5%	13.63%	49.3%	52%	2.7%	5.48%
High School Diploma or GED **Without** Disability	18%	18.4%	0.4%	2.22%	17.8%	17.1%	-0.7%	-3.93%
Some College/ Associate's Degree **With** Disability	53.3%	52.8%	-0.5%	-0.94%	55.5%	52.3%	-3.2%	-5.77%
Some College/ Associate's Degree **Without** Disability	21.1%	19.6%	-1.5%	-7.11%	20.8%	21.4%	0.6%	2.88%
Bachelor's Degree or Higher **With** Disability	43%	44.6%	1.6%	3.72%	47.8%	43%	-4.8%	-10.04%
Bachelor's Degree or Higher **Without** Disability	13.2%	12.7%	-0.5%	-3.79%	15%	12.7%	-2.3%	-15.33%

Logistic regression modeling was used to calculate odds ratios related to interactions in educational attainment, disability status, and presence of depression symptoms. Calculations indicate the odds of individuals with disabilities who have less than a high school diploma experiencing the presence of depression symptoms are between 4.74 and 6.33 times those of counterparts without disabilities. The odds of individuals with disabilities with a high school

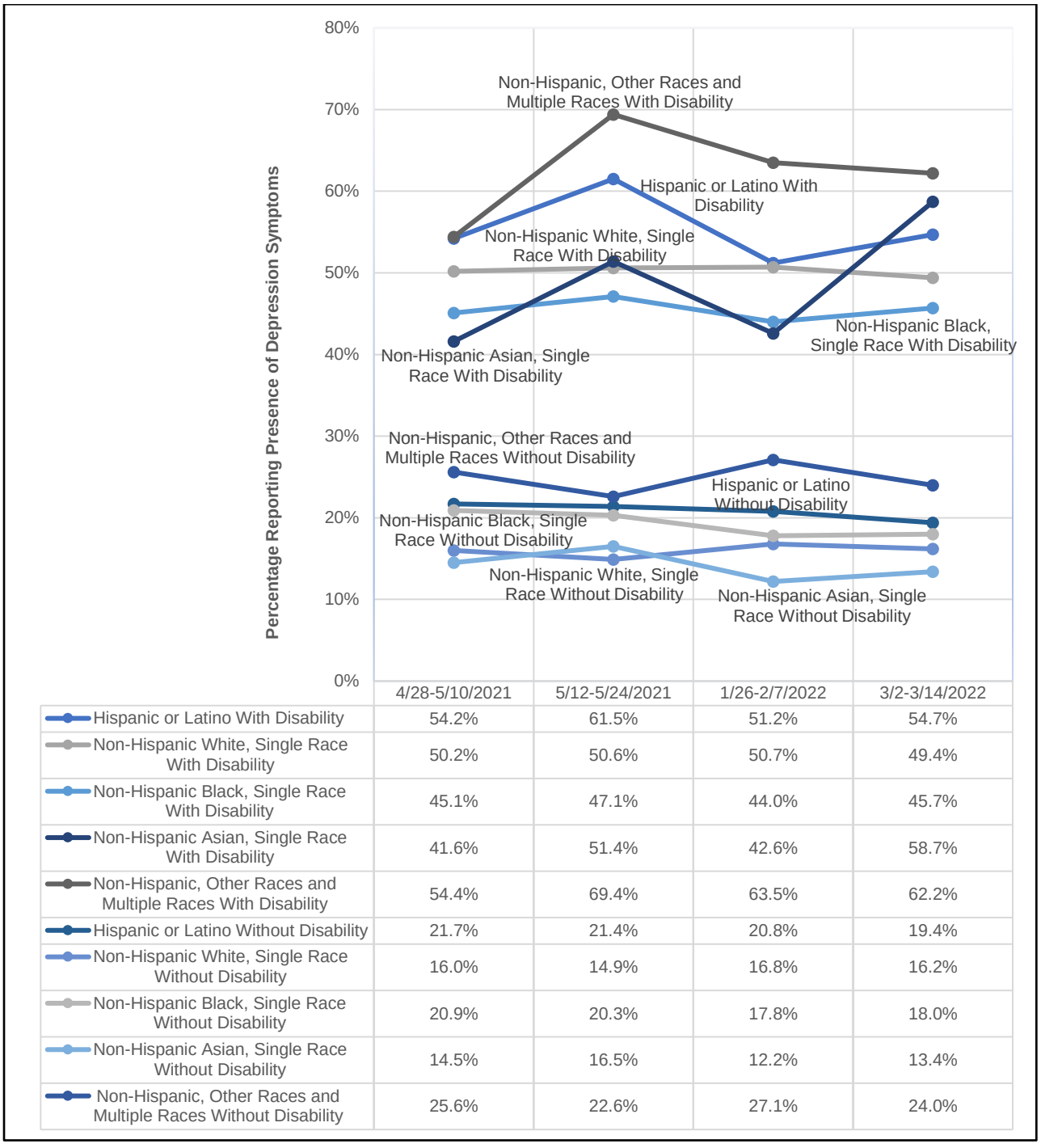
diploma or GED experiencing the presence of depression symptoms are 4.96 times greater than peers without disabilities. Meanwhile, the odds of individuals with disabilities who have some level of college education or an associate's degree are 4.76 to 5.42 times those of counterparts without disabilities. In contrast, individuals with disabilities who have a bachelor's degree or higher level of education experiencing the presence of depression symptoms are 5.51 to 6.15 times those of peers without disabilities. Statistical significance at a level of $p < .01$ was not reached for calculations involving educational attainment, disability status, and presence of depression symptoms variables. Across analyses, though, the odds remain much higher for individuals at all levels of educational attainment who have disabilities to experience the presence of depression symptoms than counterparts without disabilities.

Race/Hispanic Ethnicity and Disability Status.

Race/Hispanic ethnicity categories used by the National Center for Health Statistics (n.d.-c) are replicated in these analyses. As with interactive demographics of age and educational attainment, individuals with disabilities more often show presence of depression symptoms than counterparts without disabilities across demographics (National Center for Health Statistics, n.d.-c). Figure 5 offers a visual representation of these trends. As noted, the first two observations employ a time measurement of seven days when querying respondents on their presence of depression-related symptoms. The second pairing of observations comes after the Household Pulse Survey's change to a two week time measurement for the presence of depression symptoms (National Center for Health Statistics, n.d.-b). The National Center for Health Statistics (n.d.-c, n.d.-b) offers these data together in their own graphic and tabular representations.

Figure 5.

Presence of Depression Symptoms by Race/Hispanic Ethnicity, Disability Status Around Masking Announcements



	4/28-5/10/2021	5/12-5/24/2021	1/26-2/7/2022	3/2-3/14/2022
Hispanic or Latino With Disability	54.2%	61.5%	51.2%	54.7%
Non-Hispanic White, Single Race With Disability	50.2%	50.6%	50.7%	49.4%
Non-Hispanic Black, Single Race With Disability	45.1%	47.1%	44.0%	45.7%
Non-Hispanic Asian, Single Race With Disability	41.6%	51.4%	42.6%	58.7%
Non-Hispanic, Other Races and Multiple Races With Disability	54.4%	69.4%	63.5%	62.2%
Hispanic or Latino Without Disability	21.7%	21.4%	20.8%	19.4%
Non-Hispanic White, Single Race Without Disability	16.0%	14.9%	16.8%	16.2%
Non-Hispanic Black, Single Race Without Disability	20.9%	20.3%	17.8%	18.0%
Non-Hispanic Asian, Single Race Without Disability	14.5%	16.5%	12.2%	13.4%
Non-Hispanic, Other Races and Multiple Races Without Disability	25.6%	22.6%	27.1%	24.0%

Table 12 provides a view of point prevalence by race/Hispanic ethnicity and disability status surrounding both masking relaxation announcements. Absolute and percent changes derived from these differing points of prevalence are also provided. Presence of depression symptoms is again higher among individuals with disabilities than those without, independent of race/Hispanic ethnicity.

Differences in the presence of depression symptoms exist in racial and ethnic groupings in interactions with disability status following both masking announcements. Only one grouping, Non-Hispanic Asians, consistently show increases in the presence of depression symptoms in individuals with and without disabilities following both masking announcements. The next and final chapter of this research, the Discussion, addresses possible factors behind these comparatively consistent increases. Briefly, Asian Americans have reported increasing levels of perceived prejudice and acts of violence since the onset of the COVID-19 pandemic (Pew Research Center et al., 2022; Pew Research Center, Ruiz, et al., 2021). Though Asian Americans have not experienced COVID-19 mortality increases at rates approaching those of other racial and ethnic groupings in the US (Batty et al., 2022), the Integrated Perspective (Cox et al., 2012) may provide some explanation for ties between increases in discriminatory behaviors and increases in the presence of depression symptoms in discrimination targets.

Non-Hispanic Black individuals with disabilities show increases in the presence of depression symptoms after both the first (absolute change: 2%; percent change: 4.43%) and second (absolute change: 1.7%; percent change: 3.86%) masking announcements. While individuals without disabilities in this demographic grouping show a decrease in the presence of depression symptoms following the first masking announcement (absolute change: -0.6%;

percent change: -2.87%), presence of depression symptoms shows an increase after the second announcement (absolute change: 0.2%; percent change: 1.12%).

For Hispanic or Latino individuals, those with disabilities show an increase in the presence of depression symptoms following both the first (absolute change: 7.3%; percent change: 13.47%) and second (absolute change: 3.5%; percent change: 6.84%) masking announcements. For individuals without disabilities in this demographic grouping, presence of depression symptoms show a decrease after the first (absolute change: -0.3%; percent change: -1.38%) and second (absolute change: -1.4%; percent change: -6.73%) announcements.

Non-Hispanic White individuals with disabilities show an increase in the presence of depression symptoms following the first masking announcement (absolute change: 0.4%; percent change: 0.8%), but a decrease after the second masking announcement (absolute change: -1.3%; percent change: -2.56%). For individuals without disabilities in this demographic grouping, decreases in the presence of depression symptoms after both the first (absolute change: -1.1%; percent change: -6.88%) and second (absolute change: -0.6%; percent change: -3.57%) announcements are shown.

Non-Hispanic, other races, and multi-racial individuals show the greatest presence of depression symptoms across race/Hispanic ethnicity groupings at these four Household Pulse Survey observation points. As this demographic grouping may include a multitude of racial and ethnic identities as well as Indigenous Americans, implications are more difficult to draw using provided data. However, individuals with disabilities in this demographic grouping show a precipitous increase in the presence of depression symptoms following the first masking announcement (absolute change: 15%; percent change: 27.57%). This grouping maintains a greatly elevated prevalence in the presence of depression symptoms prior to the second masking

announcement. However, they show a decrease (absolute change: -1.3%; percent change: -2.05%) following the second masking announcement. In contrast, individuals without disabilities in this demographic grouping show decreases in their presence of depression symptoms after both the first (absolute change: -3%; percent change: -11.72%) and second (absolute change: -3.1%; percent change: -11.44%) masking announcements.

Table 12

Results of Race/Hispanic Ethnicity-specific Statistical Analyses Around Both Masking Announcements

Race/Hispanic Ethnicity and Disability Status	**4/28 - 5/10/ 2021**	**5/12- 5/24/ 2021**	**Absolute Change**	**Percent Change**	**1/26- 2/7/ 2022**	**3/2- 3/14/ 2022**	**Absolute Change**	**Percent Change**
Non-Hispanic Asian, Single Race **With** Disability	41.6%	51.4%	9.8%	23.56%	42.6%	58.7%	16.1%	37.79%
Non-Hispanic Asian, Single Race **Without** Disability	14.5%	16.5%	2%	13.79%	12.2%	13.4%	1.2%	9.84%
Non-Hispanic Black, Single Race **With** Disability	45.1%	47.1%	2%	4.43%	44%	45.7%	1.7%	3.86%
Non-Hispanic Black, Single Race **Without** Disability	20.9%	20.3%	-0.6%	-2.87%	17.8%	18%	0.2%	1.12%
Hispanic or Latino **With** Disability	54.2%	61.5%	7.3%	13.47%	51.2%	54.7%	3.5%	6.84%
Hispanic or Latino **Without** Disability	21.7%	21.4%	-0.3%	-1.38%	20.8%	19.4%	-1.4%	-6.73%
Non-Hispanic White, Single Race **With** Disability	50.2%	50.6%	0.4%	0.80%	50.7%	49.4%	-1.3%	-2.56%
Non-Hispanic White, Single Race **Without** Disability	16%	14.9%	-1.1%	-6.88%	16.8%	16.2%	-0.6%	-3.57%
Non-Hispanic, Other Races and Multiple Races **With** Disability	54.4%	69.4%	15%	27.57%	63.5%	62.2%	-1.3%	-2.05%
Non-Hispanic, Other Races and Multiple Races **Without** Disability	25.6%	22.6%	-3%	-11.72%	27.1%	24%	-3.1%	-11.44%

Data pertaining to race/Hispanic ethnicity, disability status, and presence of depression symptoms for the four relevant Household Pulse Survey observations were then used in logistic regression analysis to derive odds ratios. Of note, the odds of individuals with disabilities who are non-Hispanic Asian experiencing the presence of depression symptoms are 6.67 times greater than counterparts without disabilities. In comparison, the odds of individuals with disabilities who are non-Hispanic White experiencing the presence of depression symptoms are 5.50 times those of peers without disabilities. In addition, the odds of individuals with disabilities who are classified as non-Hispanic other races or multiple races experiencing the presence of depression symptoms are 4.87 times higher than counterparts without disabilities. Meanwhile, the odds of individuals with disabilities who are non-Hispanic Black experiencing the presence of depression symptoms are 4.68 times higher than peers without disabilities. The logistic regression model did not detect significant interactions between being Hispanic or Latino, disability status, and the presence of depression symptoms. Statistical significance at a level of $p < .01$ was not reached for calculations involving race/Hispanic ethnicity, disability status, and presence of depression symptoms variables.

Sex and Disability Status.

Sex descriptors used by the National Center for Health Statistics (n.d.-c) are replicated in these analyses. Sex in this context may not align with individuals' gender identity. Gender identity-related questions were not added to the Household Pulse Survey until July 2021. Verbiage was added to clarify sex assigned at birth to sex-related questions (US Census Bureau, 2021e) for only the final two observation periods taking place in 2022. To provide greater accuracy in data comparisons, the variable for sex used in the first two relevant observations was again used in the second two observations, despite the welcome presence of new, additional

questions allowing for greater recognition of individual identities. Chapter Five's discussion of limitations and delimitations details this important issue.

Results indicate individuals' reporting of the presence of depression symptoms differs according to the interaction of recorded sex and disability status at the relevant Household Pulse Survey observation points. As in other demographic comparisons, individuals with disabilities more often show the presence of depression symptoms than individuals without disabilities, regardless of recorded sex. Within groupings by disability status, females show the presence of depression symptoms more often than males. Figure 6 offers a visual representation of these totals drawn directly from National Center for Health Statistics (n.d.-c) estimates. As noted, the first two observations employ a time measurement of seven days when querying respondents on their presence of depression-related symptoms. The second pairing of observations comes after the Household Pulse Survey's change to a two week time measurement for the presence of depression symptoms (National Center for Health Statistics, n.d.-b). The National Center for Health Statistics (n.d.-c; n.d.-b) offers these data together in their own graphic and tabular representations.

Figure 6.

Presence of Depression Symptoms by Sex, Disability Status Around Masking Announcements

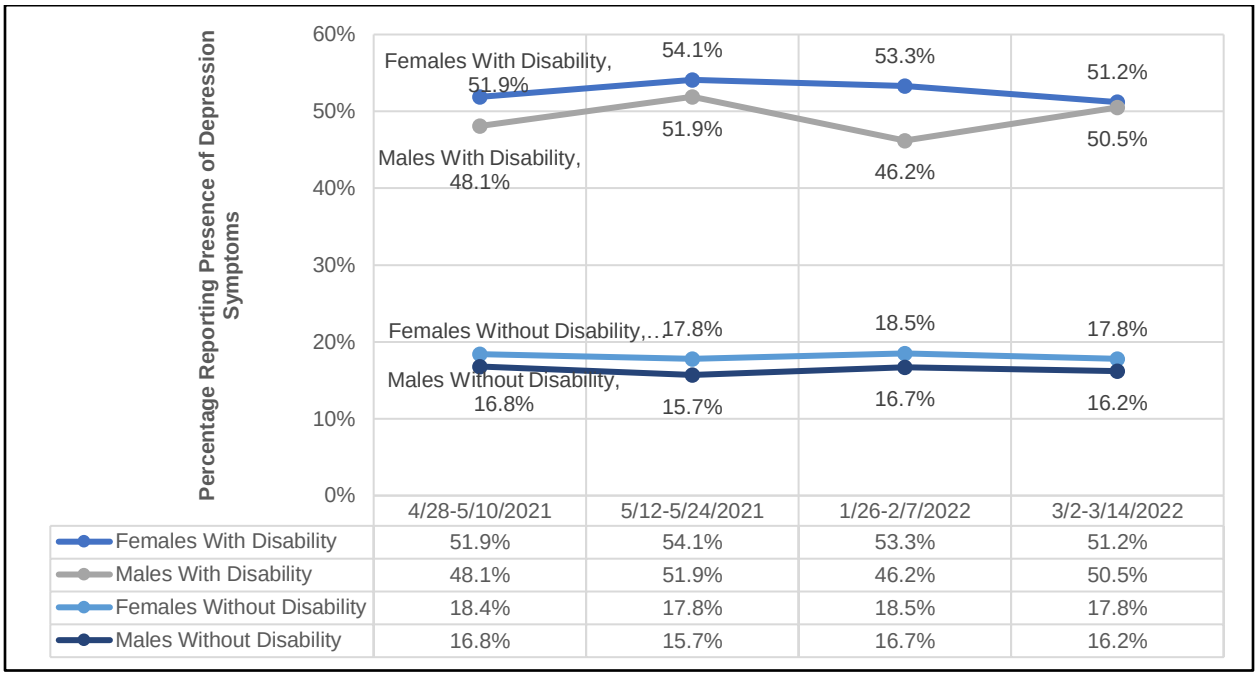


Table 13 provides a view of point prevalence by sex and disability status preceding and following both masking announcements. Absolute and percent change derived from these differing points of prevalence are also provided. Once more, presence of depression symptoms is higher among individuals with disabilities than those without independent of sex.

Individuals with disabilities categorized as females (absolute change: 2.2%; percent change: 4.24%) and males (absolute change: 3.8%; percent change: 7.90%) show elevations in the presence of depression symptoms following the first masking protocol relaxation announcement. Though females have higher point prevalence regarding the presence of depression symptoms, males show larger increases in these levels after the first masking announcement. This trend continues after the second masking announcement when males (absolute change: 4.3%; point change: 9.31%) with disabilities again show increases in the

presence of depression symptoms. Females (absolute change: -2.1%; percent change: -3.94%) with disabilities show a decrease in the presence of depression symptoms.

In contrast, females (absolute change: -0.6%; percent change: -3.26%) and males (absolute change: -1.1%; percent change: -6.55%) without disabilities show decreases in the presence of depression symptoms following the first masking announcement. Likewise, females (absolute change: -0.7%; percent change: -3.78%) and males (absolute change: -0.5%; percent change: -2.99%) without disabilities show decreases in the presence of depression symptoms following the second masking announcement. While females without disabilities consistently report somewhat higher percentages of the presence of depression symptoms than male counterparts, differences are less pronounced and show greater consistency than in females and males with disabilities.

Table 13

Results of Sex-specific Statistical Analyses Around Both Masking Announcements

Sex and Disability Status	**4/28-5/10/2021**	**5/12-5/24/2021**	**Absolute Change**	**Percent Change**	**1/26-2/7/2022**	**3/2-3/14/2022**	**Absolute Change**	**Percent Change**
Females **With** Disability	51.9%	54.1%	2.2%	4.24%	53.3%	51.2%	-2.1%	-3.94%
Females **Without** Disability	18.4%	17.8%	-0.6%	-3.26%	18.5%	17.8%	-0.7%	-3.78%
Males **With** Disability	48.1%	51.9%	3.8%	7.9%	46.2%	50.5%	4.3%	9.31%
Males **Without** Disability	16.8%	15.7%	-1.1%	-6.55%	16.7%	16.2%	-0.5%	-2.99%

Logistic regression modeling again enables calculation of the odds ratio pertaining to the presence of depression symptoms, disability status, and sex. Using data drawn from the four relevant Household Pulse Survey observations, calculations indicate that the odds for individuals with disabilities who are male to experience the presence of depression symptoms are 5.62 times

greater than for counterparts without disabilities. Meanwhile, the odds of individuals with disabilities who are female experiencing the presence of depression symptoms are 5.15 times higher than their peers without disabilities. When sex, disability status and presence of depression symptoms are considered together, there is a significant interaction at a level of $p < .01$ (p value for the predictor variable of sex = 0.0026).

Evidence indicates that no demographic category explored appears to outweigh one's disability status in affecting the likelihood an individual will experience the presence of depression symptoms. Logistic regression modeling results indicate there are significant interactions at a level of $p < .01$ when the demographic groupings of age and sex are considered with disability status and presence of depression symptoms. However, for the demographic variables of educational attainment and race/Hispanic ethnicity, results do not show such significant interactions. As such, the null hypothesis is partially rejected in its assertion that the presence of depression symptoms in individuals with and without disabilities did not differ pre- and post-May 13, 2021, and pre- and post-March 3, 2022, according to age and sex, but partially supported according to educational attainment and race/Hispanic ethnicity. Consequently, Hypothesis 2.1 is partially supported in its contention that individuals with and without disabilities differ in their reporting of the presence of depression symptoms pre- and post-May 13, 2021, and pre- and post-March 3, 2022, according to age and sex. However, Hypothesis 2.1 is rejected in the areas of educational attainment and race/Hispanic ethnicity.

Research Question 3

Is the pandemic era presence of depression symptoms reported in Household Pulse Survey data from individuals with disabilities and individuals without disabilities at the four masking

announcement-relevant observation points significantly different than pre-pandemic 2019 symptom presence (National Health Interview Survey) reported by both groups?

Hypothesis 3.1

In response to Research Question 3, the alternate Hypothesis 3.1 posits that both individuals with and without disabilities experienced significant changes in the presence of depression symptoms at the four masking announcement-relevant observation points in comparison to pre-pandemic symptom presence as indicated by 2019 National Health Interview Survey data. As investigation of Research Question 1 and its related hypotheses already required calculations for the relevant Household Pulse Survey administrations, investigation of Research Question 3 and its related Hypothesis 3.1 primarily required calculations involving relevant data from the pre-pandemic 2019 National Health Interview Survey.

Calculations of Pre-pandemic Baseline (2019 National Health Interview Survey)

As noted, the National Center for Health Statistics specifically calls out 2019 National Health Interview Survey data as appropriate baseline comparison depression symptom data for the Household Pulse Survey (National Center for Health Statistics, n.d.-b). The National Health Interview Survey also employs the Washington Group Short Set, the same measure used by the Household Pulse Survey, to identify respondents with disabilities (National Center for Health Statistics, 2021b).

Multiple analyses were performed on the publicly available dataset for the 2019 National Health Interview Survey to determine baseline, pre-pandemic presence of depression symptoms in individuals with and without disabilities. This survey administration includes data from more than 31,000 individuals for questions applicable to the Washington Group Short Set disability criteria and the Patient Health Questionaire-2 criteria. Chi-square analysis of the presence of

symptoms of depression in individuals with and without disabilities shows significant difference at a level of $p < 0.001$.

Descriptive statistics were tabulated for the variables of disability status according to Washington Group Short Set criteria and presence of depression symptoms according to Patient Health Questionnaire-2-related criteria. Among individuals with disabilities, 26.5% show the presence of depression symptoms in the 2019 baseline assessment. In contrast, 4.8% of individuals without disabilities show the presence of such symptoms.

Calculations addressing hypotheses related to Research Question 1 provide information on point prevalence, prevalence ratio, prevalence difference, prevalence odds ratio, and chi-square analyses for relevant Household Pulse Survey administrations. These results deviate markedly from the 2019 baseline. Table 14 offers these calculations for comparison. At each of the five time points, people with disabilities show significantly higher presence of depression symptoms than people without disabilities; these differences were all significant at $p < .001$.

While both individuals with disabilities and individuals without disabilities show precipitous growth in their presence of depression symptoms from the pre-pandemic 2019 National Health Interview Survey to each of the Household Pulse Survey observations, escalation is much more marked for individuals without disabilities than individuals with disabilities. While individuals with disabilities had 5.58 times the prevalence of experiencing the presence of depression symptoms pre-pandemic compared to individuals without disabilities, that prevalence ratio became just 2.86 before the first masking announcement and raising to 3.17 after the first masking announcement. Before the second masking announcement, individuals with disabilities had 2.86 times the prevalence of experiencing the presence of depression symptoms compared to individuals without disabilities and 2.99 times the prevalence after the

second announcement. Individuals with disabilities continued to show much greater likelihood of experiencing the presence of depression symptoms during the pandemic era Household Pulse Survey observations. However, the difference appears not nearly as great as pre-pandemic.

Household Pulse Survey observations indicate that individuals with and without disabilities both experienced elevations in the presence of depression symptoms in comparison to pre-pandemic levels. The difference in the presence of depression symptoms experienced by individuals without disabilities appears greater, however, than the difference in the presence of such symptoms in individuals with disabilities. In comparison to baseline 2019 National Health Interview Survey estimates, individuals with disabilities experienced absolute changes greater than 23% and percent changes exceeding 90% for each of the four Household Pulse Survey observations. While individuals without disabilities experienced an absolute change of 12% or greater over baseline measurements for each of the Household Pulse Survey observations, their percent change from the 2019 pre-pandemic baseline exceeded 250% at each relevant Household Pulse Survey observation (Table 14).

Table 14

Results of Selected Statistical Analyses for Pre-Pandemic Baseline (2019 National Health Interview Survey) Compared with Relevant Household Pulse Survey Observations

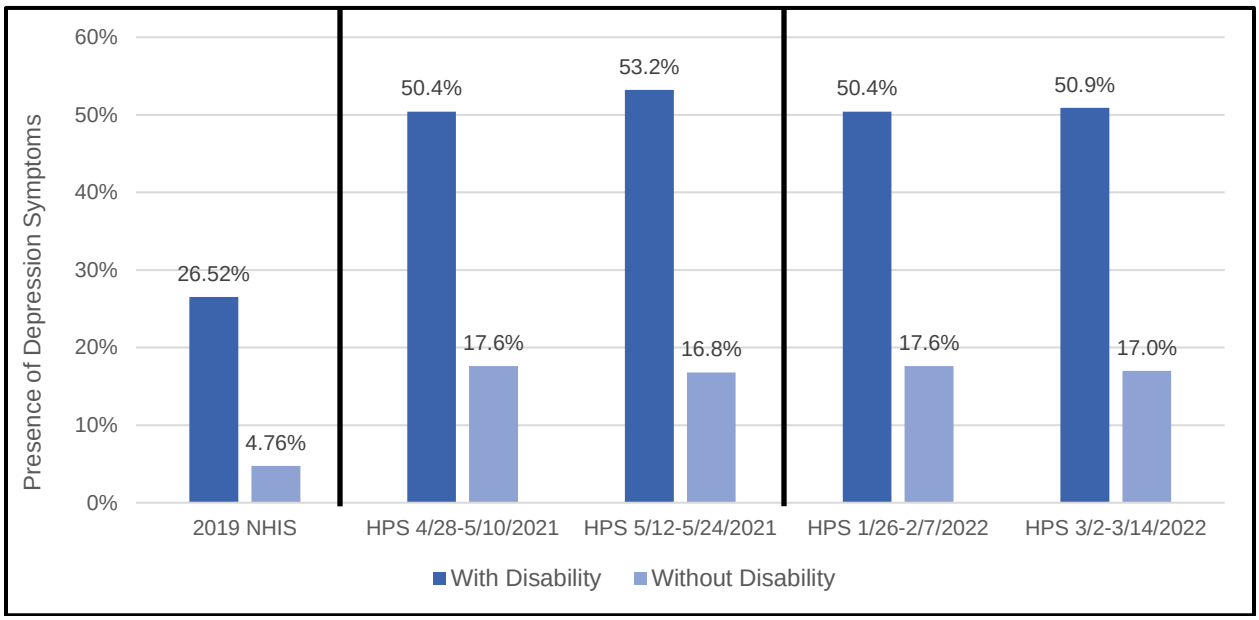
Statistical Test	**Baseline 2019 National Health Interview Survey**	**Household Pulse Survey /28-5/10/ 2021**	**Household Pulse Survey 5/12-5/24/ 2021**	**Household Pulse Survey 1/26-2/7/ 2022**	**Household Pulse Survey 3/2-3/14/ 2022**
Point Prevalence (**With** Disabilities)	26.5%	50.4%	53.2%	50.4%	50.9%
Point Prevalence (**Without** Disabilities)	4.8%	17.6%	16.8%	17.6%	17.0%
Prevalence Ratio	5.58	2.86	3.17	2.86	2.99
Prevalence Difference	0.22	0.33	0.36	0.33	0.34
Prevalence Odds Ratio	7.23	4.76	5.63	4.76	5.06
P Value	$p < .001$	$p < .001$	$p < .001$	$p < .001$	$p < .001$
Chi-square	1554.92	44588546.58	56240985.28	49512136.75	52283996.2
Absolute Change From Baseline (**With** Disabilities)		23.9%	26.7%	23.9%	24.4%
Absolute Change From Baseline (**Without** Disabilities)		12.8%	12%	12.8%	12.2%
Percent Change From Baseline (**With** Disabilities)		90.19%	100.75%	90.19%	92.08%
Percent Change From Baseline (**Without** Disabilities)		266.67%	250%	266.67%	254.17%

Figure 7 distills these deviations in the presence of depression symptoms. The first section presents prevalence data for individuals with and without disabilities from the pre-pandemic 2019 National Health Interview Survey. The second section presents commensurate

data for the observations surrounding the date of the first major Centers for Disease Control and Prevention announcement. The third section covers the second major announcement on relaxation of masking protocols.

Figure 7

Presence of Depression Symptoms by Disability Status for 2019 National Health Interview Survey (NHIS), Relevant Household Pulse Survey (HPS) Observations



Statistical comparisons of results from the 2019 National Health Interview Survey and the four relevant Household Pulse Survey observations indicate rejection of the null hypothesis related to Research Question 3. The null hypothesis maintains that individuals with and without disabilities experienced no change in the presence of depression symptoms at the four relevant observation points in comparison to pre-pandemic symptom presence as indicated by 2019 National Health Interview Survey data. Instead, results support Hypothesis 3.1 postulating that both individuals with and without disabilities experienced significant change in the presence of depression symptoms at the four masking announcement-relevant observation points in

comparison to pre-pandemic symptom presence as indicated by 2019 National Health Interview Survey data.

The next chapter provides further discussion of these results. Conclusions drawn from the results are offered and research limitations are explored in detail. Finally, recommendations for the ways in which research findings may inform public health and policy practice are presented, and opportunities for further research are proposed.

Chapter 5: Discussion

This final chapter covers implications emanating from research findings while also acknowledging delimitations and limitations of the research. The author then makes practice and policy-based recommendations arising from interpretations of the research findings. Future research opportunities conclude the discussion.

While greater presence of depression symptoms in individuals with disabilities during the pandemic could be anticipated from long-time pre-pandemic patterns (Cree et al., 2020; Deschênes et al., 2015; Gayman et al., 2011; Hassouneh & Fornero, 2021) and initial indications from Household Pulse Survey data (National Center for Health Statistics, n.d.-b), other aspects of the research were not so predictable. Results affirm hypotheses for the two research questions (Research Question 1 and Research Question 3) focusing on variables of disability and depression symptom presence. For Research Question 2, in its exploration of the interactions of multiple other demographic factors, hypotheses were not fully supported. Across data examinations for the three research questions, however, findings support a clear delineation between the presence of depression symptoms experienced by individuals with disabilities and their counterparts without disabilities.

The research indicates that individuals with disabilities did experience significant elevations in the presence of depression symptoms compared to individuals without disabilities following both major announcements of masking recommendations lessening or removal. Notably, the prevalence of symptoms related to depression sat at 50.4% and 17.6% for individuals with and without disabilities, respectively, prior to both the May 13, 2021, and the March 3, 2022, announcements. This return, a decrease in the presence of symptoms for individuals with disabilities and an increase for individuals without disabilities, may indicate that

the presence of depression symptoms in both groups had settled at similar points in the weeks leading up to the two announcements. While these returns to reduced pre-announcement depression symptom presence may highlight resilience in individuals with disabilities (Moore et al., 2020), it should be noted that even mild stressors related to depression have been linked with serious outcomes such as synaptic damage in the brain (Aceto et al., 2020).

As noted, following both announcements, the presence of depression symptoms in individuals with disabilities increased while these symptoms decreased for peers without disabilities. Changes observed are significant. This significance does not owe solely to the increased presence of depression symptoms in individuals with disabilities following announcements, however. The presence of such symptoms in peers without disabilities decreased post-announcements, showing an opposite reaction in mood. Changes were less drastic following the second announcement than those experienced after the first relaxation in masking protocols; however, notable differences in the depression-related reactions of both groups remained. Individuals not having disabilities may have experienced improved mood when masking recommendations relaxed, signaling to them that their danger from COVID-19 had been deemed by government officials less than during the times preceding both announcements. In contrast, individuals with disabilities appeared to experience these restriction changes negatively.

Findings from the current research may indicate that, for many, the importance of public masking extends beyond a mask's material. Results, examined through the lens of Cox and colleagues' (Cox et al., 2012) Integrated Perspective, indicate the act of not wearing a mask can be interpreted as disregard for the wellbeing of people with disabilities. Such emotional impacts of a perceived disregard for others' lives may have long-term implications (Wang et al., 2022).

Individuals with and without disabilities also differed in their reported presence of depression symptoms around Centers for Disease Control and Prevention masking relaxation announcements when the variables of age, educational attainment, race/Hispanic ethnicity, and sex were included. Of note, results indicate that, while all age categories of individuals with disabilities experienced the presence of depression symptoms at greater percentages than peers without disabilities, the prevalence of such presence reduced with advancing age in both groups. These findings echo age-related research cited in Chapter Two's Review of the Literature. The decrease may not be as significant as data suggest, however—mental illness stigma may prevent older individuals from seeking care for depressive symptoms (Colligan et al., 2020), limiting numbers of older adults who report experiencing depression.

Regarding educational attainment, all categories of individuals with disabilities reported the presence of symptoms of depression at higher percentages than peers without disabilities across the four relevant Household Pulse Survey observations. For both individuals with and without disabilities, individuals with the highest level of educational attainment recorded (those having a bachelor's degree or higher) primarily experienced a lower reported presence of depression symptoms than did other educational attainment categories by disability status. External research indicates an association between lower educational attainment and depression (Amin et al., 2023; Cohen et al., 2020; Peyrot et al., 2015), supporting this finding within the present research.

According to race/Hispanic ethnicity, all classifications of individuals with disabilities reported the presence of symptoms of depression at higher percentages than peers without disabilities. For both individuals with and without disabilities, individuals classified in the Household Pulse Survey as "non-Hispanic, other races and multiple races" reported the presence

of depression symptoms at higher percentages than peers of other race/Hispanic ethnicity classifications across the four relevant observations. Reid Marks and colleagues (2020) maintain that research into the "psychological functioning in this growing heterogeneous population is still in infancy" (p. 318), indicating that more research is needed to better understand possible relationships between individuals with multiracial identities and the presence of symptoms of depression.

It should also be noted that community-specific stigma may moderate differences in depression reporting. In a comparison of Hispanic and White non-Hispanic primary care patients, Benuto et al. (2019) found Hispanic patients hold higher levels of internalized depression stigma than White non-Hispanic counterparts. Both internal and external stigma may impact Black individuals' help-seeking and willingness to report symptoms aligned with depression. Past race-based discrimination also contributes to a fear of double discrimination based on race and mental illness, further complicating admission of depression-related symptoms and help seeking (Yu et al., 2022).

As with age, educational attainment, and race/Hispanic ethnicity groupings, sex-based groupings of individuals with disabilities consistently reported the presence of depression symptoms at higher percentages than peers without disabilities across the four relevant Household Pulse Survey observations. Results also align with expectations from the wider literature (Labaka et al., 2018; Moreno-Agostino et al., 2021) that females report the presence of depression symptoms at somewhat higher percentages than males. This finding is supported in disability-focused research. For instance, Noh and colleagues' (2016) South Korea-based, nationally representative sampling found interactions between gender and disability to be statistically significant with the variable of female sex showing borderline significance. Despite

consistent reports in the literature and in wider society of females experiencing higher rates of depression than males, however, stigma may limit males' willingness to admit to symptoms of depression (Oliffe et al., 2016) and possibly moderate this reported difference.

Logistic regression analyses found significance only in the interactions of the variables of age and sex with the presence of depression symptoms and disability status. However, effects of intersections between other facets of demography, disability, and the experience of heighted depression-related symptoms are also important and bear further consideration.

Results support the final hypothesis positing individuals with and without disabilities experienced significant change in their reported presence of depression symptoms in the Household Pulse Survey observations than did pre-pandemic peers. Sizable increases in the presence of depression symptoms for individuals with and without disabilities are indicated by comparisons of 2019 National Health Interview Survey and relevant Household Pulse Survey data. The first Household Pulse Survey observation (April 28 through May 10, 2021) in the analysis took place approximately one year into the global pandemic. At that time, COVID-19 had caused more than 570,000 deaths in the US (New York Times, 2023) and pandemic restriction fatigue had set in for many (Bozdağ, 2021; Taylor et al., 2022). These cataclysmic events provide some explanation for greater presence of depression symptoms independent of disability status. These findings also align with national (Panchal et al., 2023) and international (World Health Organization, 2022) data indicating substantial growth in symptoms consistent with depression during the COVID-19 pandemic. When compared to pre-pandemic levels, pandemic era growth in the presence of depression-related symptoms in individuals without disabilities appears more striking than in individuals with disabilities. This disparity may have more to do with the moderating effect of already elevated levels of depression present in

individuals with disabilities, however (Deschênes et al., 2015; R. A. Murphy et al., 2016; Noh et al., 2016).

Delimitations and Limitations

Delimitations

Issues of sex and gender were not be completely addressed in testing. Physiological sex has been noted as a factor in depression, with women being more likely to receive a diagnosis of depression than men (Eid et al., 2019). Gender and societal expressions of gender roles (Lin et al., 2021), as well as transgender status (Pellicane & Ciesla, 2022), have also been identified as correlating with depression. Though critically important, exploration of the variables of sex not aligned with sex assigned at birth and gender expression fell outside the scope of the research.

One reason for this omission is the lack of consistent gender identity-related questions across the four Household Pulse Survey observations. Gender identity-related questions were not added to the Household Pulse Survey until after the first two observations. Verbiage was added to clarify sex assigned at birth to sex-related questions after the first two observations, further impairing accurate comparison of data between the surveys (US Census Bureau, 2021e).

While evidence suggests pandemic expressions of depression symptoms are not significantly proportionally different between sexes than pre-pandemic proportions (Dal Santo et al., 2022), pandemic-era effects on individuals who are transgender or gender diverse appear more stark (Smout et al., 2022). These issues are critical for exploration, particularly in view of intersectionalities between disability, sex, and gender discrimination. However, these factors cannot be adequately addressed within limitations of the current research.

The factors of employment status (Hagen et al., 2022), food security (Ward & Lee, 2022), perceived health status, income level, region (Richmond et al., 2022), and urban and rural

geographic location (Rudenstine et al., 2021) were also not addressed in this research. These variables may have bearing on the presence of depression symptoms, particularly during the pandemic. However, time constraints of the present research do not allow sufficient exploration of these factors.

Limitations

Study limitations were detected and addressed as thoroughly as possible throughout the research process. However, not all limitations could be fully addressed. It is hoped that, when future researchers consider this and related topics, they may learn from the limitations of the present research and better avoid them where possible.

One limitation identified early in the research process is the difficulty in relating relaxation of masking recommendations with observed change (or, in the case of the null hypothesis, lack of change) in the presence of depression symptoms and perceived discrimination. The Household Pulse Survey did not ask respondents about reasoning behind their responses to the Patient Health Questionnaire-2 queries nor directly address masking. It is hoped that, by comparing representative samples of individuals with and without disabilities, a measure of national reaction around the events may be gained. As noted in Chapter Three's discussion of the research methodology, this approach has already been applied in the research of Eichstaedt and colleagues (2021).

Statistical Analyses.

Chi-square analyses of significance pertaining to the presence of depression symptoms by disability status were conducted for the 2019 National Health Interview Survey and relevant Household Pulse Survey measurements. Interpretation of chi-square calculations also present a limitation within the research. Sample sizes were comparatively large for both the 2019 National

Health Interview Survey and the four relevant administrations of the Household Pulse Survey. As Hayat notes, “If the sample size is very large, the *p* value necessarily will be very small. An increasingly large sample size yields a decreasingly smaller *p* value; thus, a large sample size leads to a statistically significant result, regardless of scientific importance” (2010, p. 221). Though significance was set for these calculations at $p < .001$, or one in 1,000, to help moderate such effects, it is important to temper interpretations of *p* values considering this caution.

Another limitation of chi-square analyses of significance in this research is the possibility of type I errors. Type I errors occur when the null hypothesis is rejected due to interpretation of results indicating a significant difference where no outcome difference exists in the population (Sedgwick, 2014). Though the current research has found statistical significance at $p < .001$ for each chi square analysis, there may have been no actual difference between individuals with and without disabilities regarding presence of depression symptoms at the specified points. In this event, incorrect inferences may have been drawn from chi square significance testing in the current research.

Survey Methods.

Another limitation of the research existed in the previously discussed differences in survey administration practices between the Household Pulse Survey and the 2019 National Health Interview Survey. Despite demographic equivalence between the two surveys (Twenge et al., 2021) and the National Center for Health Statistics’ assertion that National Health Interview Survey data are most applicable in comparisons with Household Pulse Survey data dealing with depression symptoms (National Center for Health Statistics, 2020a), survey administration methods complicated direct comparisons between the surveys. Participants complete the Household Pulse Survey online (US Census Bureau, 2023b) while the 2019 National Health

Interview Survey was conducted in person (National Center for Health Statistics, n.d.-d). As one state policy-focused assessment postulates regarding the Household Pulse Survey's internet-based format, "It excludes people who do not have access to or choose not to use the internet. As such, it may disproportionately omit people who are home insecure, people with lower incomes, and people with disabilities" (Farina et al., 2023, pp. 8–9).

Despite possible drawbacks of internet administered surveys, the format may be especially useful in the context of depression-related queries. Evidence suggests that individuals may be more willing to express negative sentiments in online surveys than when speaking with a live interviewer (Keeter, 2015). This propensity extends to personal estimations of psychological well-being; individuals appear more likely to portray better psychological functioning during in-person interviews than when providing such feedback in online surveys (Zager Kocjan et al., 2022).

An extensive analysis performed by Brookings Institution researchers (Dobson et al., 2022) supports the existence of a disconnect between depression-related data gathered in the Household Pulse Survey and the National Health Interview Survey. The Brookings Institution analysis highlights the two surveys' differences in not only administration format, but also number and time of administrations. In particular, analyses conducted by the Brookings Institution researchers (Dobson et al., 2022) indicate Patient Health Questionnaire-2 responses for the National Health Interview Survey for the general population do not align with the more frequently collected, online format Household Pulse Survey responses.

As for pandemic-era Patient Health Questionnaire-2 data collected by the National Health Interview Survey, codebooks and data files for 2020 (National Center for Health Statistics, 2022f) and 2021 (National Center for Health Statistics, 2022e) administrations lack Patient

Health Questionnaire-8 and Patient Health Questionnaire-2 variables altogether. Survey implementation materials for the 2022 administration of the National Health Interview Survey do indicate that Patient Health Questionnaire-8 variables (from which Patient Health Questionnaire-2 data can be extracted) are to be included when 2022 survey data become available (National Center for Health Statistics, 2022d).

To address this limitation, discussion of Research Question 3 findings and their impact on overall research implications further noted relevant differences between National Health Interview Survey and Household Pulse Survey administration methods. In addition, descriptive statistics tabulated by the National Center for Health Statistics and related to a different set of depression-related variables were acknowledged within the discussion. Since 2010, the National Health Interview Survey (National Center for Health Statistics, 2023b) has included two questions from the Washington Group Extended Set on Functioning or WG-ES (Washington Group on Disability Statistics, 2023b). These questions are “How often do you feel depressed?” (National Center for Health Statistics, 2020b, p. 392) and “Thinking about the last time you felt depressed, how depressed did you feel?” (National Center for Health Statistics, 2020b, p. 394).

Though these queries differ from the Patient Health Questionnaire-2 in symptom description and time measurement, acknowledgement of this alternate measure across pre-pandemic and pandemic eras may offer a more nuanced understanding of baseline 2019 National Health Interview Survey data.

Measures of Disability and Symptoms of Depression.

Both measures used within the 2019 National Health Interview Survey and the Household Pulse Survey to identify disability status and detect the presence of depression symptoms have received criticism over issues of accuracy. Concerns exist over the screening

accuracy of both the six-item Washington Group Short Set and the Patient Health Questionnaire-2. In the case of the six-item Washington Group Short Set, this tool may fail to detect a large percentage of individuals with disabilities (Brucker, 2022), particularly those with chronic illness or psychiatric conditions (Hall et al., 2022). The Patient Health Questionnaire-2, meanwhile, has been critiqued for a possible lack of sensitivity and specificity, especially in the domain of cut-off scoring (Ghazisaeedi et al., 2022; Levis et al., 2020).

While the Washington Group Short Set has drawbacks, namely the likely underestimation of the prevalence of disability (Hall et al., 2022), it is one of the most widely used disability questionnaires world-wide (Brucker, 2022). While this breadth of usage cannot cancel out the tool's probable limitations, its frequent usage does enable comparability. As Hall and colleagues (2022) note, policy makers and researchers must work toward using the variations of this tool and others like it that will yield the most accurate estimates of disability prevalence.

Regarding Patient Health Questionnaire-2 limitations, most concerns focus on the tool's usage to screen for major depression (Levis et al., 2020). In the context of the Household Pulse Survey, analysis of Patient Health Questionnaire-2 groups the composite score of responses into only two categories: scores of zero to two and three to six (National Center for Health Statistics, n.d.-b), omitting gradations made possible by traditional Patient Health Questionnaire-2 screening (Kroenke et al., 2003). Household Pulse Survey and National Health Interview Survey usage of Patient Health Questionnaire-2 items in the current research functions to detect "associations" with diagnoses, rather than screen for depression (National Center for Health Statistics, n.d.-b). While the Patient Health Questionnaire-2 has its limitations (Levis et al., 2020), major US government entities' choice to use the tool to detect changes in emotions over short periods of time during the volatile COVID-19 pandemic seems appropriate.

Pandemic-specific Racial and Ethnic Demographics.

In addition to the previously noted delimitation of insufficient sex and gender identity discussion within the current research, explorations of research implications arising from the intersections of disability, the presence of symptoms of depression, and racial and ethnic groupings are also inadequate. For example, the Household Pulse Survey, similar to other US government-sponsored surveys, offers the category "Non-Hispanic Asian" to describe a grouping of individuals from numerous countries of origin making up some 60% of the world's population (United Nations Population Fund, n.d.). Greater specificity in racial and ethnic demography may enable deeper exploration of the implications of prejudice as Asian Americans reported growing threats, physical attacks, discrimination, and the need to alter daily routines in order to avoid violence during the COVID-19 pandemic (Pew Research Center et al., 2022; Pew Research Center, Ruiz, et al., 2021).

As noted by Pew Research Center researchers Budiman and Ruiz (2021, para. 1), "Asian Americans are the fastest-growing major racial or ethnic group in the United States. More than 22 million Asians live in the U.S., and almost all trace their roots to specific countries or populations from East and Southeast Asia and the Indian subcontinent." Of these, individuals of Chinese, Filipino, Indian, Japanese, Korean, and Vietnamese origin made up 85% of the broad grouping of Asian Americans in 2019, with 5.4 million individuals of Chinese origin accounting for nearly a quarter of the total (Pew Research Center, Budiman, et al., 2021). As increasingly accusatory political and social rhetoric was aimed at China during the pandemic, research indicates this significant proportion of individuals of (or perceived to be of) Chinese origin may have experienced even more prejudice than other groups categorized as "Non-Hispanic Asian" within the Household Pulse Survey (Okazaki et al., 2022).

Implications

Policy and Practice

The national scope of pre-pandemic and pandemic data sources used in the present research enables its findings to offer policy, practice, and personal implications relevant to the US. Findings may also be of use in comparative international research as issues of disability and discrimination are just as widespread, if not more so, than COVID-19 was at its height.

Public health professionals and policy makers may find the implications of this research useful in their work to understand correlates of mental health conditions arising from the pandemic (McCartan et al., 2021), particularly those affecting individuals with disabilities. Further, a better understanding of linkages between perceived discrimination and elevations in symptoms of depression may provide impetus to directly address discriminatory behavior and, if possible, prevent it.

Policy makers and public health professionals must also consider the long-reaching implications of policy decisions on the public's opinion. As Barraza and colleagues (2023) note in their examination of public reactions to US government level measures aimed at preventing the spread of COVID-19:

> Policy makers throughout the pandemic have been forced to make real-time decisions frequently based on rapidly changing guidance as new information became, and continues to become, available. Public opinion about these decisions will influence the future of infectious disease control policy and law (p. 104).

Results of the current research indicate that real-time decisions like changes in masking mandates had detrimental effects on the perceptions of many individuals with disabilities. Future public health decisions should be made, even in times of calamity, with as much caution as

possible regarding populations already at risk and in partnership with these populations. When decisions must be made that further imperil these communities, then messaging surrounding the implementation of these decisions should be informed or led by members of those same communities. As disability already affects a significant portion of the world's population, gathering and acting on input from the multiple sectors of the disability community is not only possible, but necessary.

Considering the findings of the current research, preventing discriminatory behaviors against individuals with disabilities may be the most crucial means to reduce depression in this population. The following often used quote from Archbishop Desmond Tutu, here cited from a *TIME Magazine* retrospective on Tutu written by Bono and quoting a phrase Tutu used, embodies prevention in this context: "There comes a point where we need to stop just pulling people out of the river. We need to go upstream and find out why they're falling in" (Bono, 2021, para. 5). Discriminatory behaviors against individuals with disabilities may take the form of bullying (National Center on Safe Supportive Learning Environments, 2023; United Nations Educational, Scientific and Cultural Organization, 2023), violent crime (Harrell & Bureau of Justice Statistics, 2021), and, most commonly, aversive ableism in which non-disabled individuals have unconscious, well-meaning but still harmful prejudice against individuals with disabilities (Council on Quality and Leadership & Friedman, 2019; Friedman, 2019). The pandemic provided, and likely continues to provide, numerous examples of each type of discrimination.

As with most multi-faceted and wide-ranging issues, stopping prejudice against individuals with disabilities and the discriminatory actions it causes does not have one simple solution. Increasing contact and communication between individuals with disabilities and non-

disabled individuals has shown promise in mixed-methods research on decreasing discrimination (Byrd et al., 2019). Training on individual, group, and empowerment-based strategies for confronting discrimination also has research-based support (Cox & Devine, 2019).

Future Research

Results of the present study support findings of prior research indicating that disability-related discrimination is an important, under-addressed factor in development or worsening of depression in individuals with disabilities (Conover et al., 2021; McClendon et al., 2021; Namkung & Carr, 2020). Further research is needed on effective methods of preventing discrimination and ameliorating its effects when not avoided.

Described in the discussion of research limitations, the issue of over-aggregation of race and ethnicity categories complicates data interpretation particular to relationships between discrimination and the presence of depression symptoms in individuals categorized as “Non-Hispanic Asian” within the Household Pulse Survey. Well-founded concerns exist over the refinement of demographic data, leading to opportunities for increased surveillance and discriminatory actions (Kader et al., 2022). Future research exploring impacts of racialized prejudice on symptoms of depression should consider diversity within existing categories and improve upon categorization led by individuals from those racial and ethnic groups. Meanwhile, researchers must strive for responsible surveying and interviewing, ensure secure data storage, and conduct thorough deidentification prior to any publication of data.

The emotional well-being of individuals with newly acquired disabilities stemming from COVID-19 offers another avenue for future research. Societal skepticism over COVID-19-related illnesses and the desire for COVID-19 to be over may further complicate the journeys of individuals newly introduced to having a disability. Studying discrimination against humans

labeled as reminders of the pandemic's toll of this discrimination may provide greater insight into the unique facets of pandemic-related disability discrimination and its psychological effects.

Conclusion

Depression is a serious, disabling condition for more than a quarter billion individuals worldwide (World Health Organization, 2021). Despite its widespread prevalence, depression disproportionately affects individuals with disabilities (Senra & McPherson, 2021). While causes of depression vary (Rottenberg, 2022), perceived discrimination is one important factor leading to depression in individuals with disabilities (McClendon et al., 2021). To address depression in individuals with disabilities, a combination of preventive (Hoare et al., 2021) and treatment (Guideline Development Panel for the Treatment of Depressive Disorders & American Psychological Association, 2022) strategies are warranted in addition to efforts to curb prejudice experienced by individuals with disabilities (Byrd et al., 2019; Cox & Devine, 2019). Widespread application of these tactics may yield positive outcomes for both individuals with disabilities and their non-disabled counterparts.

Despite the passage of time since the pandemic's beginning, long-term physical and psychiatric effects of the pandemic are still largely unknown (Jones et al., 2023; Lind et al., 2023; Noureddine et al., 2023; Ribeiro Carvalho et al., 2023; Xu et al., 2023). Initial research indicates most individuals' negative physical effects from infection (Du et al., 2021; Gunluoglu et al., 2023) and mental health effects from lockdown and isolation (Bourmistrova et al., 2022; Prati & Mancini, 2021) will pass. However, implications for the more than one-quarter of the pre-pandemic US population with disabilities and those who now find themselves newly disabled or with additional disabilities are not so clear (C. E. Barrett et al., 2022; Jesus et al., 2021; Mehandru & Merad, 2022; Taniguchi et al., 2022). Dr. Carli Friedman of the disabilities-focused

Council on Quality and Leadership notes that, ". . . ableist discrimination and oppression all adversely impact people with disabilities' mental health; this is important to recognize during the pandemic, and beyond" (2022, p. 25). It is hoped the current research provides a meaningful contribution to the body of knowledge on these impacts and aids in addressing them into the future.

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Appendix A

Household Pulse Survey Fourfold Contingency Tables and Calculations With No Weighting, Weighting, and Weighting Alignment with National Center for Health Statistics Estimates by Disability Status and Reported Presence of Depression Symptoms

Unweighted Public Use Files

4/28-5/10/2021	**With** Presence of Depression Symptoms	**Without** Presence of Depression Symptoms	Totals	Point Prevalence	Prevalence Ratio	Prevalence Difference	Prevalence Odds Ratio
Individuals **With** Disabilities	3222	3814	7036	45.8%	3.34	0.32	5.31
Individuals **Without** Disabilities	7543	47445	54988	13.7%			
The chi-square statistic is 4474.2159. The *p-value* is < .00001. The result is significant at $p < .001$.							

5/12-5/24/2021	**With** Presence of Depression Symptoms	**Without** Presence of Depression Symptoms	Totals	Point Prevalence	Prevalence Ratio	Prevalence Difference	Prevalence Odds Ratio
Individuals **With** Disabilities	3040	3555	6595	46.1%	3.45	0.33	5.54
Individuals **Without** Disabilities	6801	44077	50878	13.4%			
The chi-square statistic is 4406.7294. The *p-value* is < .00001. The result is significant at $p < .001$.							

1/26-2/7/2022	**With** Presence of Depression Symptoms	**Without** Presence of Depression Symptoms	Totals	Point Prevalence	Prevalence Ratio	Prevalence Difference	Prevalence Odds Ratio
Individuals **With** Disabilities	3800	4176	7976	47.6%	3.11	0.32	5.03
Individuals **Without** Disabilities	8831	48799	57630	15.3%			
The chi-square statistic is 4707.5274. The *p-value* is < .00001. The result is significant at $p < .001$.							

3/2-3/14/2022	**With** Presence of Depression Symptoms	**Without** Presence of Depression Symptoms	Totals	Point Prevalence	Prevalence Ratio	Prevalence Difference	Prevalence Odds Ratio
Individuals **With** Disabilities	3945	4812	8757	45%	3.31	0.31	5.21
Individuals **Without** Disabilities	8425	53490	61915	13.6%			
The chi-square statistic is 5252.6001. The *p-value* is < .00001. The result is significant at $p < .001$.							

Weighted Public Use Files

4/28-5/10/2021	**With** Presence of Depression Symptoms	**Without** Presence of Depression Symptoms	Totals	Point Prevalence	Prevalence Ratio	Prevalence Difference	Prevalence Odds Ratio
Individuals **With** Disabilities	12146181	12007983	24154164	50.3%	2.86	0.33	4.73
Individuals **Without** Disabilities	27288936	127667617	154956553	17.6%			
The chi-square statistic is 12994541.7628. The *p-value* is < .00001. The result is significant at $p < .001$.							
5/12-5/24/2021	**With** Presence of Depression Symptoms	**Without** Presence of Depression Symptoms	Totals	Point Prevalence	Prevalence Ratio	Prevalence Difference	Prevalence Odds Ratio
Individuals **With** Disabilities	12854806	11359247	24214053	53.1%	3.18	0.36	5.64
Individuals **Without** Disabilities	26405368	131586088	157991456	16.7%			
The chi-square statistic is 16434156.1148. The *p-value* is < .00001. The result is significant at $p < .001$.							
1/26-2/7/2022	**With** Presence of Depression Symptoms	**Without** Presence of Depression Symptoms	Totals	Point Prevalence	Prevalence Ratio	Prevalence Difference	Prevalence Odds Ratio
Individuals **With** Disabilities	14266365	14134689	28401054	50.2%	2.86	0.33	4.74
Individuals **Without** Disabilities	30805138	144704406	175509544	17.6%			
The chi-square statistic is 15162794.0748. The *p-value* is < .00001. The result is significant at $p < .001$.							
3/2-3/14/2022	**With** Presence of Depression Symptoms	**Without** Presence of Depression Symptoms	Totals	Point Prevalence	Prevalence Ratio	Prevalence Difference	Prevalence Odds Ratio
Individuals **With** Disabilities	14101410	13615849	27717259	50.9%	3.00	0.34	5.07
Individuals **Without** Disabilities	28677981	140310572	168988553	17%			
The chi-square statistic is 16084907.0519. The *p-value* is < .00001. The result is significant at $p < .001$.							

Detailed Data Tables With Alignment With National Center for Health Statistics Estimates

4/28-5/10/2021	**With** Presence of Depression Symptoms	**Without** Presence of Depression Symptoms	Totals	Point Prevalence	Prevalence Ratio	Prevalence Difference	Prevalence Odds Ratio
Individuals **With** Disabilities	33907902	33369681	67277583	50.4%	2.86	0.33	4.76
Individuals **Without** Disabilities	241226740	1129379735	1370606475	17.6%			
The chi-square statistic is 44588546.5809. The *p-value* is < .00001. The result is significant at $p < .001$.							
5/12-5/24/2021	**With** Presence of Depression Symptoms	**Without** Presence of Depression Symptoms	Totals	Point Prevalence	Prevalence Ratio	Prevalence Difference	Prevalence Odds Ratio
Individuals **With** Disabilities	35633390	31346667	66980057	53.2%	3.17	0.36	5.63
Individuals **Without** Disabilities	234424911	1160961466	1395386377	16.8%			
The chi-square statistic is 56240985.275. The *p-value* is < .00001. The result is significant at $p < .001$.							
1/26-2/7/2022	**With** Presence of Depression Symptoms	**Without** Presence of Depression Symptoms	Totals	Point Prevalence	Prevalence Ratio	Prevalence Difference	Prevalence Odds Ratio
Individuals **With** Disabilities	37544981	36949028	74494009	50.4%	2.86	0.33	4.76
Individuals **Without** Disabilities	274526893	1285285000	1559811893	17.6%			
The chi-square statistic is 49512136.7478. The *p-value* is < .00001. The result is significant at $p < .001$.							
3/2-3/14/2022	**With** Presence of Depression Symptoms	**Without** Presence of Depression Symptoms	Totals	Point Prevalence	Prevalence Ratio	Prevalence Difference	Prevalence Odds Ratio
Individuals **With** Disabilities	36657888	35361538	72019426	50.9%	2.99	0.34	5.06
Individuals **Without** Disabilities	255969674	1249734293	1505703967	17%			
The chi-square statistic is 52283996.2035. The *p-value* is < .00001. The result is significant at $p < .001$.							

Appendix B

Regression Model Output for Demographics from Household Pulse Survey Observations

Variables	Estimate	Std. Error	z value	Pr(>|z|)
Without disabilities	reference group			
Males with disabilities	reference group			
Females with disabilities	-0.0865	0.0287	-3.015	0.0026
18 to 44 years old with disabilities	reference group			
45 to 64 years old with disabilities	0.1156	0.032	3.6156	0.0003
65 + years old with disabilities	0.0381	0.0365	1.0422	0.2973
Hispanic ethnicity	0.0675	0.0183	3.6875	0.0002
Non-Hispanic White with disabilities	reference group			
Non-Hispanic Black with disabilities	-0.1617	0.0484	-3.3417	0.0008
Non-Hispanic Asian with disabilities	0.1924	0.0758	2.54	0.0111
Non-Hispanic other race or race in combination with disabilities	-0.1228	0.0536	-2.2911	0.022
Less than high school with disabilities	reference group			
Some high school with disabilities	-0.29	0.1627	-1.7825	0.0747
High school diploma or GED with disabilities	-0.2442	0.1379	-1.7708	0.0766
Some college with disabilities	-0.2844	0.136	-2.0914	0.0365
Associate's degree with disabilities	-0.1554	0.1388	-1.1196	0.2629
Bachelor's degree with disabilities	-0.1377	0.1364	-1.0093	0.3128
Graduate degree with disabilities	-0.029	0.1374	-0.2108	0.833