

COVID-19 impact on adults with disabilities: A lifespan analysis

Faika Zanjani¹, Jason Hardin², Kimberley Battle², Melissa Cisewski³,
Jane Chung³, Anna Diallo³, Katherine Falls², Tracey Gendron¹,
Marissa Mackiewicz¹, Elvin Price⁴, Leland Waters¹, Jody Winship¹,
Pamela Parsons², Lana Sargent² & the VCU iCubed team⁴

Abstract

The Covid pandemic has indicated that social structures need to be more equitable, inclusive, resilient, and strengthened to better support adults across disability and age status. The aim of this study was to increase our understanding of community needs at the intersection of disability, age, and racial equity during the Covid-19 pandemic. A total of 441 individuals were surveyed cross-sectionally using the Epidemic – Pandemic Impacts Inventory Geriatric Adaptation (EPII-G). The mean age of the sample was 58.22 years old (range 19-94 years of age); moreover, a little over half of the sample (n = 241, 54.64%) was below the age of 62 and 69.29% of these reported disability, while the rest (n = 200, 45.35%) was over the age of 62 and 65.00% of these reported disability. The study's findings indicated significant (p < .05) psychosocial consequences of the Covid pandemic both for disability

Received: June 15, 2023; Revised: September 25, 2023; Accepted: December 12, 2023

© 2023 Associazione Oasi Maria SS. – IRCCS

¹ Virginia Commonwealth University, College of Health Professionals, Gerontology, Richmond, Virginia.

² Virginia Commonwealth University, College of Nursing, Richmond, Virginia.

³ Virginia Commonwealth University, L. Douglas Wilder School of Government and Public Affairs, Richmond, Virginia.

⁴ Virginia Commonwealth University, Institute for Inclusion, Inquiry, and Innovation (iCubed), Health and Wellness Across the Lifespan Core, Richmond, Virginia.

Correspondence to: Faika Zanjani PhD, Virginia Commonwealth University, 900 E. Leigh Street, 7210, Richmond, VA 23298. Phone: 804-828-0670; E-mail: fzanjani@vcu.edu.

Funding Disclosures: Fundings provided by Virginia Senior Connections: The Capital Area Agency on Aging and Resources for Independent Living, Inc. for data collection and analysis.

Conflict of Interest: The authors declare that there is no financial, general, and institutional conflict of interest regarding the publication of this article.

groups and younger adults. Differences were identified for mental health, social health, and access issues. The social structural changes that occurred during Covid created a larger effect on young and disabled adults, suggesting that the systems that these groups relied on were challenged during Covid.

Keywords: Aging; Disability; Covid; Community health.

1. Introduction

As we continue to experience the impact of the Covid pandemic, it is essential to identify pathways to success for future pandemics. Covid-19 changed the way in which people navigated their lives (Nicklett, Ory, Johnson, & Dwolatzky, 2022). Lockdowns resulted in a new world experience; pathways for obtaining food and essentials were at risk as we determined ways to live every day. Social distancing became the norm and increased technology use was considered a strategy to stay connected (Richardson, Roscoe, Green, Brooks, Barnes, Matthews *et al.*, 2022). By the fall of 2020, there was evidence that individuals with disability were experiencing increased challenges (Rowe, 2022).

The Covid-19 pandemic has exposed inadequate care systems, even in countries with advanced social protection policies (Hall, Deusdad, D'Hers Del Pozo, & Martínez-Hernández, 2022). Adults with disability across ages were severely impacted by the pandemic (Brooks, Patton, Maroukel, Perez, & Levanda, 2022). The lives of adults were affected at all levels, including the biological level, with great severity of Covid-related morbidity in disability groups (Clarke, Hong, Schoonveld, Greenspan, Montgomery, & Thierry, 2023). The impact of the pandemic spanned multiple life domains. For instance, individuals with disability delayed/foregone medical care during Covid (Xie, Hong, Tanner, & Marlow, 2022). Psychological distress was high (Ciciurkaite, Marquez-Velarde, & Brown, 2022) and higher education attainment was negatively impacted (Halpern-Manners, McLeod, Anderson, & Ekl, 2022). As a result of the pandemic, many community organizations adapted services/resources for individuals with disabilities (Lapierre, Olatona, Labrie, Gagnon, Paquette Raynard, Mortenson *et al.*, 2022). However, we found out that the public health safety network was not ready to support the daily living of adults with disabilities (Puce, Trabelsi, Ammar, Jabbour, Marinelli, Mori *et al.*, 2022).

Societal and institutional bias created a vulnerability that disproportionately exposed people with disabilities to natural disasters and hazards (Mladenov & Brennan, 2021). Institutional bias, which resulted in an inadequate response during the pandemic, was found for people with disabilities (Sakellariou, Malfitano, & Rotarou, 2020). The Covid-19 pandemic perpetuated disability-related disparity through the fast pace of policy changes, insufficient accommodations, insufficient medical access, heightened marginalization, heightened isolation, and the general devaluing of groups considered weak (Fitzgerald, Goodman, Kenan, & Kenan, 2021;

Douglas, Settles, Cech, Montgomery, Nadolsky, Hawkins *et al.*, 2022; Feldner, Evans, Chamblin, Ellis, Harniss, Lee *et al.*, 2022). Pre-existing disparities and inequities were perpetuated for people with disabilities, who were marginalized within disability subgroups and who were more likely to be diagnosed with Covid-19, such as people with cognitive disabilities, cisgender women, Black people and Hispanic people (Friedman, 2022). Disability-related discrimination, under-representation, and ableism across institutional policy and personnel created oppression, dismissiveness, stigma, undervaluing, misrepresentation, barriers to access, and perceptions of not being heard or seen with accuracy, with more severity at the marginal intersections (Feldner *et al.*, 2022). Disability-related institutional discrimination, under-representation, and ableism still need to be addressed to create sustained change and health equity before the next crisis.

The social health modifications, which were carried out during Covid-19, perpetuated discrimination and hardships for the disability community (Lund & Ayers, 2022). In Richmond's surrounding areas, pre-existing health disparities were reported; the localities closest to the academic medical center, despite being highly resourced, were shown to have the highest poverty in the region, with the highest incidence of health disparities (Robertson, Graham, & City of Richmond, VA Anti-Poverty Commission, 2013). In the poorest Richmond neighborhoods, life expectancy was 63 years old; about ten miles away, in the wealthiest area, life expectancy was 83 years old (VCU Center on Society and Health, 2016), reinforcing evidence for the fact that where a person lives makes a difference. Poverty and income-driven disparities, including access to healthy foods, transportation, and health care, were high in the region. In addition, disparities were shown to be higher for Black individuals, even when socio-demographics were factored (Zimmerman, Haley, Walker, Woolf, Nguyen, Shue *et al.*, 2016). This all set the stage for continued disparities during Covid.

The aim of this study was to identify the challenges and strengths experienced during Covid by the disability community by performing a lifespan analysis. During the initial phases of the Covid-19, the Virginia Commonwealth University (VCU), Institute for Inclusion, Inquiry, and Innovation (iCubed), Health and Wellness Across the Lifespan Core, received internal funding to support an assessment of one hundred individuals living in the Richmond area and who were served by the local wellness clinic (Richmond Health and Wellness Program – RHWP; Parsons, Slattum, & Bleich, 2019). With the successful implementation of this initial

survey, the core partnered with the local area's agency on aging (Senior Connections and Resources for Independent Living) with the need to identify and gather information to guide services, resources, and interventions for older adults and the disabled community in the Richmond surrounding areas, where most of whom resided and where social determinants had an impact on their ability to sustain their quality of life. The partnership was aimed to identify the targeted resources and enhancements needed for the vulnerable populations.

2. Methods

This report presents the results of a cross-sectional survey, which was performed between February 2021 and October 2021, by using a convenience sample of adults aged 18 years old and over and living in the Richmond, Virginia/Tri-Cities area (including Richmond, Chesterfield, Henrico, Hanover, Petersburg, Colonial Heights, Hopewell, New Kent, or Charles City). Older adults as well as individuals with disabilities were purposefully sampled to ensure a robust representation of the population. Since cognitive impairment can affect an individual's ability to complete the survey accurately, cognition was screened using the Six Item Screener for Cognitive Impairment (Grasso, 2020); individuals scoring three or below were excluded from the participation. This study was approved by VCU. Study data was collected and managed using REDCap electronic data capture tools hosted at VCU. All participants provided verbal consent. Participants compensation was a \$20 gift card.

Individuals were primarily referred through the RHWP and Resources for Independently Living (RIS). Flyers were also posted in facilities served by the RHWP, including a local academic health center (HealthHub@25th), and emailed to the local Area Agency on Aging, Senior Connections. Eight-hundred forty-eight individuals were referred, of which 252 could not be reached after a minimum of two attempts to contact by phone. Twenty-nine were screened ineligible due to location of residence or cognitive impairment, while 30 declined their participation at screening. An additional 87 were screened eligible, but could not be reached to take the survey, leaving a convenience sample of 450 individuals. Surveys that did not provide sufficient data to be categorized into the defined age/disability groups were excluded from the analysis ($n = 9$). No other inclusion criteria were used to limit bias. Thus, a total of 441 individuals were included in the final dataset.

1.1. Sample

The sample was divided into four categories based on age and disability status:

- Age 62 and over with a self-reported disability (OAD)
- Age 62 and over without disability (OAND)
- Under age 62 with a self-reported disability (YAD)
- Under age 62 without disability (YAND)

Responses to the following question determined the disability status: Do you have a physical impairment that limits your daily activity or disability that qualifies you for Social Security Disability Insurance (SSDI)? Participants who answered “yes” were categorized as having a self-reported disability. While there is no universally accepted age to define “older adult,” we used age 62, as defined by the Social Security retirement benefit eligibility and to be consistent with the age requirements enforced by many senior housing buildings served by the RHWP. Two-hundred forty-one individuals (54.64%) were below age 62 of which 167 (69.29%) reported having disability, while 200 subjects (45.35%) were over age 62, of which 130 (65.00%) reported having disability. There were no unexpected demographic differences across groups (see Tab. 1 for more details).

Table 1 – Descriptive demographics of the participants (n = 441)

Frequency (%)	Total sample	Below age 62		Age 62 and over		p-value
		With self-reported disability (YAD)	Did not report disability (YAND)	With self-reported disability (OAD)	Did not report disability (OAND)	
<i>N</i>	441	167	74	130	70	
Age						
Mean	58.21	50.28	47.34	68.16	70.11	< .01
Range	19-94	19-61	19-61	62-94	62-85	
Missing	0					
Sex						
Male	128 (29.16)	49 (29.52)	12 (16.22)	44 (33.85)	23 (33.33)	.37
Female	309 (70.39)	119 (69.88)	62 (83.78)	85 (65.38)	46 (66.67)	
Other	2 (.46)	1 (.60)	0	1 (.77)	0	
Missing	2 (.46)					
Race						
African American	324 (74.14)	120 (72.73)	52 (71.23)	97 (75.19)	55 (78.57)	.42
White	83 (18.99)	34 (17.81)	13 (17.81)	24 (18.60)	12 (17.14)	
Asian	4 (.92)	0	2 (2.74)	2 (1.55)	0	
Am. Ind./Hawaiian/Pac. Isl.	1 (.23)	1 (.61)	0	0	0	
Multi-racial	16 (3.66)	7 (4.24)	3 (4.11)	5 (3.88)	1 (1.43)	
Prefer not to answer	9 (2.06)	3 (1.82)	3 (4.11)	1 (.78)	2 (2.86)	
Missing	1 (.23)					

COVID-19 impact on adults with disabilities

Frequency (%)	Total sample	Below age 62		Age 62 and over		<i>p</i> -value
		With self-reported disability (YAD)	Did not report disability (YAND)	With self-reported disability (OAD)	Did not report disability (OAND)	
<i>N</i>	441	167	74	130	70	
Hispanic Ethnicity	10 (2.30)	3 (1.81)	3 (4.05)	2 (1.57)	2 (2.94)	.61
Missing	6 (1.38)					
Yearly Personal Income						
< \$15,000	290 (65.76)	120 (71.86)	20 (39.19)	97 (74.62)	44 (62.86)	.02
\$15,000 - \$29,999	87 (19.73)	34 (20.36)	16 (21.62)	21 (16.15)	16 (22.86)	
\$30,000-\$44,999	35 (7.94)	3 (1.80)	16 (21.62)	8 (6.15)	8 (11.43)	
> \$45,000	26 (5.90)	10 (5.99)	11 (14.86)	3 (2.31)	2 (2.86)	
Prefer not to answer	3 (.68)	0	2 (2.70)	1 (.77)	0	
Missing	0%					
Living situation						
Alone	247 (56.01)	82 (49.10)	10 (13.51)	99 (76.15)	56 (80.00)	.47
With parents	7 (1.59)	4 (2.40)	3 (4.05)	0	0	
With other relatives	55 (12.47)	28 (16.77)	13 (17.57)	13 (10.00)	1 (1.43)	
Single parent	58 (13.15)	25 (14.97)	23 (31.08)	5 (3.85)	5 (7.14)	
With spouse + children	28 (6.35)	11 (6.59)	14 (18.92)	1 (.77)	2 (2.86)	
With spouse/partner	19 (4.31)	10 (5.99)	3 (4.05)	3 (2.31)	3 (4.29)	
Roommates (not related)	17 (3.85)	4 (2.40)	5 (6.76)	6 (4.62)	2 (2.86)	
Homeless	4 (.91)	1 (.60)	0	2 (1.54)	1 (1.43)	
Other	5 (1.13)	1 (.60)	3 (4.05)	1 (.77)	0	
Prefer not to answer	1 (.23)	1 (.60)	0	0	0	
Missing	0					
Children living at home	123 (27.89)	52 (31.14)	50 (67.57)	14 (10.77)	7 (10.00)	.02
Missing	0					
Highest level of education						
8 th grade or less	11 (2.49)	1 (.60)	0	8 (6.2)	2 (2.86)	.47
Some high school	93 (21.09)	35 (20.96)	10 (13.51)	29 (22.3)	19 (27.14)	
High school graduate	122 (27.66)	54 (32.34)	19 (25.68)	29 (22.3)	20 (28.57)	
Trade/tech training	16 (3.63)	7 (4.19)	3 (4.05)	5 (3.9)	1 (1.43)	
Some college	114 (25.85)	45 (26.95)	20 (27.03)	35 (26.9)	14 (20.00)	
Associate's degree	23 (5.22)	10 (5.99)	6 (8.11)	6 (4.6)	1 (1.43)	
Bachelor's degree	43 (9.75)	10 (5.99)	9 (12.16)	14 (10.8)	10 (14.29)	
Graduate degree	19 (4.31)	5 (2.99)	7 (9.46)	4 (3.1)	3 (4.29)	
Missing	0					
Do <u>not</u> have reliable telephone access	7 (1.59)	3 (1.80)	1 (1.35)	2 (1.54)	1 (1.45)	.67
Missing	1 (.23)					
Have a smart speaker (Alexa, Google home, etc.)	82 (18.64)	30 (17.96)	18 (24.32)	19 (14.62)	15 (21.74)	.34
Missing	1 (.23)					
Services used						
Meals on Wheels	28 (6.35)	8 (4.79)	3 (4.05)	13 (10.00)	4 (5.71)	.05
SNAP	216 (48.98)	97 (58.08)	29 (39.19)	62 (47.69)	28 (40.00)	
Food Commodity Box	37 (8.39)	10 (5.99)	1 (1.35)	16 (12.31)	10 (14.29)	
Other local food programs	109 (24.72)	41 (24.55)	17 (22.97)	38 (29.23)	13 (18.57)	
Feed More Food Pantry	97 (22.00)	35 (20.96)	13 (17.57)	34 (26.15)	15 (21.43)	
RHWP	85 (19.32)	27 (16.17)	5 (6.76)	28 (29.46)	15 (21.43)	
Missing	1 (.23)					

Frequency (%)	Total sample	Below age 62		Age 62 and over		<i>p</i> -value
		With self-reported disability (YAD)	Did not report disability (YAND)	With self-reported disability (OAD)	Did not report disability (OAND)	
<i>N</i>	441	167	74	130	70	
Covid Infection History – YES Responses						
Currently have symptoms of this disease but have not been tested.	3 (.68)	1 (.60)	1 (1.35)	1 (.77)	0	.87*
Missing	1 (.23)					
Tested and currently have this disease.	4 (.92)	0	1 (1.35)	1 (.77)	2 (2.86)	.84*
Missing	0					
Had symptoms of this disease but were never tested.	13 (2.95)	5 (2.99)	2 (2.70)	4 (3.08)	2 (2.86)	1.00*
Missing	0					
Tested positive for this disease but no longer have it.	43 (9.75)	18 (10.78)	9 (12.16)	9 (6.92)	7 (10.00)	.60
Missing	0					
Got medical treatment due to severe symptoms of this disease.	27 (6.12)	11 (6.59)	8 (10.81)	4 (3.08)	4 (5.71)	.16*
Missing	0					
Hospital stays due to this disease.	11 (2.49)	5 (2.99)	4 (5.41)	1 (.77)	1 (1.43)	.18*
Missing	0					
Someone died of this disease while in our home.	3 (.68)	1 (.60)	0	1 (.77)	1 (1.43)	.76*
Missing	0					
Death of a close friend or family member from this disease.	143 (32.43)	58 (34.73)	31 (41.89)	39 (30.00)	15 (21.43)	.05
Missing	0					

Note: Values indicated in brackets represent percentages, unless otherwise stated.

*Fisher’s exact test reported when 20% or more of cells have a count less than 5.

1.2. Survey instruments

Census-based demographic questions (age, sex, race/ethnicity), the income, living situation, and level of education, as well as the use of community services (e.g., participation in Meals on Wheels) were included (Tab. 1). Covid impact in these domains was assessed: infection status, social/family health, mental health, physical health/behaviors, treatment preferences/behaviors, and economic health.

2.2.1. Epidemic – Pandemic Impacts Inventory Geriatric Adaptation

The EPII Geriatric Adaptation (EPII-G; Manning, Steffens, Grasso, Briggs-Gowan, Ford, & Carter, 2020) is an adaptation of the main EPII designed to assess the tangible impacts of epidemics and pandemics across personal and social life domains in geriatric populations (Manning *et al.*,

2020). It was developed in 2020 by researchers at the University of the Connecticut School of Medicine in response to the COVID-19 epidemic and is the only identified geriatric COVID survey that is widely used. The survey consists of a series of 92 statements where individuals indicate whether they experienced the impact (“Yes”), did not experience (“No”), or the statement did not apply.

2.2.2. Epidemic – Pandemic Impacts Inventory Racial/Ethnic Discrimination Addendum

The Racial/Ethnic Discrimination Addendum is a supplement that includes 15 items to assess the pandemic impact associated with racial and ethnic discrimination (Yang, Ablorh, Hall, Roemer, Carter, Ford *et al.*, 2020). Individuals indicate whether they experienced the impact (“Yes”), did not experience (“No”), or the statement did not apply.

2.2.3. COVID19 – Impact for Older Adults Survey

The COVID19-Impact for Older Adults Survey (IOAS) was adapted from the VCU Peds Cancer Caregivers survey (VCU, n.d.) to understand the impact of the COVID-19 domains on personal/family life. This study utilized IOAS questions about emotional states, health care preferences, access, and utilization.

3. Analysis

Statistical analysis was conducted in JMP® Pro, Version 15. The sample was summarized by number and frequency or mean. Pearson's chi-squared was used for between-group analysis (a measure of independence to assess whether observations among groups were independent). Fisher's exact test was reported in cases where 20% or more of the contingency cells had a count of less than 5. Statistical significance was assumed at $p = .01$ to adjust for multiple comparisons. If Pearson's chi-squared showed a significant difference between groups, a post-hoc pairwise comparison with a Bonferroni adjustment ($\alpha = .0125$) was conducted to determine which groups were statistically different beyond chance (see Tab. 2 for more details).

Table 2 – *Epidemic-Pandemic Impacts Inventory – Geriatric Adaptation (EPII-G): Disability/age group differences*

Frequency (%)	TOTAL SAMPLE	Below age 62		Age 62 and over		Pearson's Chi Squared χ^2 , <i>p</i> -value
		With self- reported disability (YAD)	Did not report disability (YAND)	With self- reported disability (OAD)	Did not report disability (OAND)	
<i>N</i>	441	167	74	130	70	
COVID – YES responses						
I already had the vaccine. Missing	240 (54.55) 1 (.23)	70 (42.17)	34 (45.95)	85 (65.38)	51 (72.86)	43.00, < .001
Close family member not in the home was quarantined. Missing	171 (38.78) 0	77 (46.11)	35 (47.30)	41 (31.54)	18 (25.71)	13.94, < .01
Racial/Ethnic discrimination – YES responses						
Felt less safe with police or law enforcement than before the coronavirus because of race/ethnicity. Missing	38 (8.66) 2 (.46)	23 (13.77)	9 (12.16)	4 (3.13)	2 (2.86)	14.61, < .01
Social activities – YES responses						
Travel or vacations cancelled. Missing	237 (53.74) 0	88 (52.69)	56 (75.68)	61 (46.92)	32 (45.71)	18.64, < .001
Unable to do enjoyable activities or hobbies. Missing	234 (53.18) 1 (.23)	94 (56.29)	49 (66.22)	63 (48.84)	28 (40.00)	11.56, < .01
Unable to participate in social clubs, sports teams, or usual volunteer activities. Missing	220 (50.00) 1 (.23)	82 (49.40)	48 (64.86)	62 (47.69)	28 (40.00)	9.64, .02
Family/friend separation – YES responses						
Separated from family or close friends. Missing	328 (74.38) 0	124 (74.25)	68 (91.89)	96 (73.85)	40 (57.14)	22.84, < .001
Family celebrations cancelled or restricted. Missing	262 (59.41) 0	102 (61.08)	57 (77.03)	67 (51.54)	36 (51.43)	14.91, < .01
Unable to attend in-person funeral or religious services for a family member or friend who died. Missing	210 (47.62) 0	88 (52.69)	44 (59.46)	48 (36.92)	30 (42.86)	12.48, .01
Family responsibilities – YES responses						
Had to spend a lot more time taking care of a family member. Missing	80 (18.18) 1 (.23)	36 (21.56)	26 (35.62)	13 (10.00)	5 (7.14)	27.78, < .001
Had to take over teaching or instructing a child. Missing	79 (17.95) 1 (.23)	38 (22.75)	30 (40.54)	9 (6.98)	2 (2.86)	49.62, < .001

COVID-19 impact on adults with disabilities

Frequency (%)	TOTAL SAMPLE	Below age 62		Age 62 and over		Pearson's Chi Squared
		With self-reported disability (YAD)	Did not report disability (YAND)	With self-reported disability (OAD)	Did not report disability (OAND)	χ^2, p -value
Family quality – YES responses						
More quality time with children. Missing	163 (36.96) 0	67 (40.12)	48 (64.86)	32 (24.62)	16 (22.86)	39.92, < .001
More quality time with partner or spouse. Missing	101 (22.90) 0	45 (26.95)	25 (33.78)	18 (13.85)	13 (18.57)	13.29, < .01
More conflict with child or harsher in disciplining child or children. Missing	63 (14.29) 0	30 (17.96)	24 (32.43)	6 (4.62)	3 (4.29)	37.39, < .001
Emotional/mental health and wellbeing – YES responses						
Increase in mental health problems or symptoms (e.g., mood, anxiety, stress). Missing	267 (60.54) 0	118 (70.66)	47 (63.51)	77 (59.23)	25 (35.71)	25.59, < .001
Increase in sleep problems or poor sleep quality. Missing	241 (54.65) 0	99 (59.28)	49 (66.22)	71 (54.62)	22 (31.43)	20.67, < .001
Increase in alcohol/substance use. Missing	58 (13.15) 0	31 (18.56)	12 (16.22)	12 (9.23)	3 (4.29)	11.46, < .01
Since the coronavirus disease pandemic, have you felt or experienced any of the following?						
Worry	258 (58.50)	104 (62.28)	51 (68.92)	71 (55.38)	31 (44.29)	10.63, .01
Nervousness	221 (50.11)	95 (56.89)	44 (59.46)	58 (44.62)	24 (34.29)	14.24, .00
Depression	218 (49.43)	97 (58.08)	36 (48.65)	64 (49.23)	21 (30.00)	15.60, .00
Loss of interest in usual activities Missing	186 (42.18) 0	80 (47.90)	39 (52.70)	49 (37.69)	18 (25.71)	14.86, .00
Physical health – YES responses						
More time sitting or being sedentary. Missing	302 (68.48) 0	127 (76.05)	50 (67.57)	89 (68.46)	36 (51.43)	13.88, < .01
Overeating or eating more unhealthy foods (e.g., junk food). Missing	235 (53.29) 0	104 (62.28)	46 (62.16)	58 (44.62)	27 (38.57)	17.78, < .001
Health care – YES responses						
Clinical Visit Preferences						
In person	293 (66.44)	100 (59.88)	42 (56.76)	97 (74.62)	54 (77.14)	21.51, .01
Via telephone	42 (9.52)	22 (13.17)	9 (12.16)	6 (4.62)	5 (7.14)	
Video-conferencing	51 (11.56)	24 (14.37)	14 (18.92)	11 (8.46)	2 (2.86)	
None of the above currently	55 (12.47)	21 (12.57)	9 (12.16)	16 (12.31)	9 (12.86)	
Missing	0					

Frequency (%)	TOTAL SAMPLE	Below age 62		Age 62 and over		Pearson's Chi Squared χ^2 , <i>p</i> -value
		With self- reported disability (YAD)	Did not report disability (YAND)	With self- reported disability (OAD)	Did not report disability (OAND)	
Unable to access mental health treatment or therapy. Missing	85 (19.32) 1 (.23)	46 (27.54)	15 (20.27)	19 (14.73)	5 (7.14)	15.70, .001
Not satisfied with changes in mental health treatment or therapy. Missing	74 (16.78) 1 (.23)	39 (23.35)	12 (16.22)	18 (13.85)	5 (7.14)	10.64, .01
Economic – YES responses						
Unable to pay important bills like rent or utilities. Missing	195 (44.32) 1 (.23)	81 (48.50)	43 (58.11)	53 (41.09)	18 (25.71)	18.75, < .01
Difficulty getting to places due to less access to public transportation or concerns about safety. Missing	145 (32.88) 0	70 (41.92)	19 (25.68)	42 (32.31)	14 (20.00)	13.52, < .01
Unable to get enough food or healthy food. Missing	131 (29.71) 0	71 (42.51)	17 (22.97)	34 (26.15)	9 (12.86)	25.03, < .001
Work/employment – YES responses						
Prior to the coronavirus disease pandemic did you have a job? Missing	124 (28.38) 4 (.92)	48 (28.92)	54 (72.97)	10 (7.81)	12 (17.39)	101.34, < .001
Found greater meaning in work, volunteering, employment, school. Missing	114 (25.85) 0	35 (20.96)	32 (43.24)	29 (22.31)	18 (25.71)	13.54, < .01
More efficient or productive in work, volunteering, employment, or school. Missing	102 (23.23) 2 (.56)	32 (19.28)	31 (41.89)	20 (15.38)	19 (27.54)	19.74, < .001

Note: Values indicated in brackets represent percentages, unless otherwise stated.

4. Results

3.1. COVID infections

4.1.1. Treatment history

Four individuals (.92%) had COVID-19, three had Covid symptoms but were not tested. Nearly ten percent (9.75%) previously had COVID-19, 6.12% needed treatment, 2.49% required hospitalization, and 2.95% had symptoms but had never been tested (see Tab. 1 for major details). Some

(32.43%) lost a close friend/family member due to COVID-19, .68% lost a family member in the home (Tab. 1). Differences were identified for vaccinations, older adults being more likely to be vaccinated ($\chi^2 = 5.36, p = .021$; $\chi^2 = 17.46, p < .0001$), even more so for the OAND group ($\chi^2 = 4.96, p = .026$).

4.1.2. Isolation and quarantine

Many individuals (42.63%) were isolated or quarantined because of possible COVID-19 exposure, and 20.41% were quarantined because of symptoms. Pre-existing conditions was also a reason for isolation (39.23%). Some (35.83%) had limited physical closeness with loved ones due to infection concerns. Others (27.89%) said their family was quarantined for at least a week. A few individuals (1.59%) reported to have moved away from the family due to the high-risk Covid employment setting, and 11.79% had a family member that could not return home due to quarantine restrictions. The rate of younger adults quarantined from immediate family members was significantly higher than that of the OAD and OAND categories ($\chi^2 = 6.23, p = .01$; $\chi^2 = 6.70, p = .01$).

4.1.3. Race-based impact

Most of the subjects (95.46%) didn't report race as impacting their living, but 3.40% perceived a racial/ethnic responsibility, 4.54% perceived a racial/ethnic blame, and five (1.13%) were publicly attacked for a racial/ethnic blame. About 19.45% perceived COVID-19 as a more dangerous health condition, which was improperly treated due to race/ethnicity. Some (6.12%) felt unsafe wearing a mask because of their race and 6.58% felt less safe in public because of their race. A few felt that they were denied or received inadequate or delayed testing due to race (4.32%) or were denied or received inadequate or delayed COVID-19 treatment due to race (1.59%). Several participants (7.26%) felt exposed to people or places with an elevated risk of contracting COVID-19 due to race. Differences were identified for the YAND and YAD groups in feeling less safe with police than before the pandemic because of race/ethnicity ($\chi^2 = 9.88, p = .002$; $\chi^2 = 4.42, p = .04$).

3.2. COVID impact on hobbies and social activities

Many participants experienced church (65.08%) and vacation (53.74%) cancellations/restrictions (refer to Tab. 2 for more details). Many could not

do enjoyable activities/hobbies (53.18%) or were not able to participate in usual social clubs, sports, etc., or engage in hobbies (50.00%). However, a certain number of individuals, in contrast, reported to spend more time doing enjoyable activities (59.18%), to develop new hobbies/activities (39.18%), and to donate time and goods to causes related to the pandemic (31.29%). As expected, differences identified the YAND group as the most affected, more than the YAD ($\chi^2 = 4.93, p = .03; \chi^2 = 11.26, p = .0008$) and OAND ($\chi^2 = 8.92, p = .003; \chi^2 = 13.59, p = .0002; \chi^2 = 9.94, p = .002$) groups, in terms of social clubs, travel, and hobbies/activities cancellations/restrictions.

3.3. COVID impact on family & relationships

4.3.1. Family/friend separation

Most individuals (74.38%) were separated from close family/friends (Tab. 2). A few didn't have resources to talk to separated family/friends (8.84%), were unable to visit family in nursing/group homes (27.21%) and were unable to be with a family member in critical condition (32.20%). Compared to the YAD ($\chi^2 = 9.85, p = .002$) and OAND ($\chi^2 = 23.12, p < .0001$) groups, the YAND group reported to be more frequently separated from friends and family. Most subjects had family celebrations canceled (59.41%) and 47.62% could not attend an in-person funeral (refer to Tab. 2 for more details). The YAND category most likely experienced cancellations/restrictions of family celebrations ($\chi^2 = 10.31, p = .001$) and the impossibility of attending in-person funerals ($\chi^2 = 7.33, p = .007$).

4.3.2. Family responsibilities

Many individuals (42.15%) had difficulty in caring for children at home, and 10.43% were unable to provide childcare for children living outside the home. Some (17.95%) took over teaching/instructing their child during distance learning. Differences were identified for the YAND and OAD categories in terms of teaching/child instructing ($\chi^2 = 8.00, p = .005; \chi^2 = 13.56, p = .0002; \chi^2 = 29.56, p < .0001$). Likewise, 18.18% spent much more time caring for family and the YAND group was more likely than all other groups ($\chi^2 = 5.24, p = .02; \chi^2 = 7.09, p = .008; \chi^2 = 17.06, p < .0001$).

4.3.3. Relationships quality

Almost half of the participants (47.61%) improved their relationships with friends and family and created new supportive connections (43.54%). Most (76.42%) had more quality time with friends/family, 22.90% with the

partner/spouse, and 36.96% with children (Tab. 2). Differences indicated that younger individuals without disability most likely increased quality time with a spouse/partner ($\chi^2 = 7.51, p = .006$; $\chi^2 = 4.29, p = .03$) and with children ($\chi^2 = 7.91, p = .005$; $\chi^2 = 25.71, p < .0001$, $\chi^2 = 12.59, p = .0004$). In contrast, a small proportion experienced an increase in verbal arguments (8.16%) with the spouse and other adults in the home and physical conflict (2.27%) with their family members or adults in the home; 10.49% expressed an increased conflict among children and 14.29% an increase in conflict with children. Younger adults without disability also more likely reported conflict with children compared to the OAND category ($\chi^2 = 24.65, p < .001$).

3.4. COVID impact on mental health

Most participants (86.85%) were appreciative of what they had previously taken for granted and 27.73% used less alcohol and substances. However, over 60.54% had increased mental health problems (Tab. 2). In fact, 54.65% increased sleep problems, and 13.15% increased alcohol/substance use. Additionally, 31.75% reported increased mental health symptoms for family members outside the home. Over half experienced worry (58.50%), sadness (54.65%), nervousness (50.11%), and depression (49.43%; see Tab. 2 for more details). Nearly half experienced loneliness (46.49%), fears (42.95%) and loss of interest in usual activities (42.18%).

Individuals with disability and younger adults more likely expressed an increased depression, which was relatively higher in the younger age group with disability ($\chi^2 = 5.23, p = .02$) and more so differentiated in the OAD and OAND categories ($\chi^2 = 6.89, p = .009$), with the OAD group more likely reporting depression. Regarding differences in the increase in mental health problems/symptoms and in sleep problems, younger adults with disability were reported with the highest score. The OAND category reported problems less frequently than the OAD ($\chi^2 = 9.80, p = .002$; $\chi^2 = 10.07, p = .002$) and YAND groups ($\chi^2 = 17.42, p < .0001$; $\chi^2 = 11.12, p = .0009$). About 13.15% increased alcohol/substance use, more so in the younger group with and without disability ($\chi^2 = 5.14, p = .02$; $\chi^2 = 5.49, p = .019$). Loss of interest in usual activities, nervousness, and worry were reported most likely by younger adults without disability ($\chi^2 = 10.96, p < .001$; $\chi^2 = 9.15, p = .003$; $\chi^2 = 11.23, p < .001$).

3.5. COVID impact on health & health behaviors

4.5.1. General health

Most participants paid more attention to their personal health (87.07%) and in preventing injuries (85.26%). However, 40.14% reported increases in non-Covid health problems. No age/disability differences resulted.

4.5.2. Exercise and physical activity

About a quarter of participants (27.44%) increased exercise/physical activity, 35.60% increased outdoor/nature time, and 12.70% decreased time on screen/devices. However, more than half (55.78%) decreased physical activity/exercise. Most (78.46%) increased time on screen and devices and 68.48% increased sitting/being sedentary (refer to Tab. 2). Differences indicated more sedentary behavior in the YAND category ($\chi^2 = 3.90, p = .05$).

4.5.3. Eating habits

Most individuals (60.77%) ate healthier food. However, a high percentage of participants (53.29%) also overate and chose unhealthy food. The YAND and YAD categories were more likely to eat poorly ($\chi^2 = 9.20, p = .002; \chi^2 = 8.01, p = .005$).

3.6. COVID impact on access to treatment & preferences for care

4.6.1. Access and treatment

Some individuals (33.11%) received less medical care than usual for routine and preventative care appointments, over 1 in 4 (26.76%) had an essential medical procedure or surgery canceled, 14.97% said they could not access care, and 21.18% could not access needed medications. Individuals were also unable to get home-based help for themselves (10.00%) and family members (11.79%). The majority did not have a signed Advanced Care Plan (ACP; 73.02%).

4.6.2. Telehealth and visits preferences

Nearly six percent (6.38%) indicated being uncomfortable sharing health information remotely. People preferred in-person medical visits (66.44%). The YAND and YAD categories more likely indicated a preference for virtual visits than the OAND and OAD groups ($\chi^2 = 9.16, p = .003; \chi^2 = 9.69, p = .002$). Some individuals (19.32%) were unable to access

treatment/therapy, and 16.78% were unsatisfied with pandemic-related treatment/therapy changes (Tab. 2). Differences indicated a higher inability to access mental health treatment ($\chi^2 = 6.98, p = .008$; $\chi^2 = 5.18, p = .023$) and dissatisfaction with mental health treatments ($\chi^2 = 4.26, p = .04$) in the younger and disability groups.

3.7. Economic Impacts of COVID

4.7.1. Paying bills

Many individuals (44.09%) could not pay their bills. The OAND group was less likely to have difficulty in paying bills compared to the OAD ($\chi^2 = 4.62, p = .03$) and YAND groups ($\chi^2 = 15.46, p < .0001$).

4.7.2. Transportation

One in three (32.88%) had difficulty in accessing transportation due to decreased access or safety concerns, with a more pronounced impact experienced by disability groups across age ($\chi^2 = 5.81, p = .02$; $\chi^2 = 3.42, p = .06$).

4.7.3. Food insecurity

Almost half (48.98%) received SNAP benefits before the pandemic. Nearly 29.71% could not get enough healthy food because of the pandemic. And when examining food insecurity by group, we found that the younger age group with disability was unable to get enough food, more than the YAND ($\chi^2 = 8.45, p = .004$) and OAD categories ($\chi^2 = 8.56, p = .003$).

4.7.4. Housing

While four respondents were homeless, 5.22% reported becoming homeless, 11.79% moved/relocated, and 7.94% were unable to access to clean water. Furthermore, 9.77% had family/friends move into their homes. No age/disability differences were reported.

4.7.5. Work

Some individuals (28.38%) had a job before the pandemic and answered to work-related questions (Tab. 2). Younger adults were most likely employed before the pandemic ($\chi^2 = 103.2, p < .0001$). Among those working, 44.35% were laid off, 7.32% were laid off/furloughed employees, 43.55% reduced their work hours, and 44.35%, had an increased workload. A quarter of participants (25.20%) reported that taking care of others

impacted their ability to do their job well, and 13.82% had a hard time transitioning to working from home. Nearly half of the participants (54.84%) continued working even after being in close contact with people that could have been infected, with 62.10% spending a lot of time disinfecting at home due to close contact with colleagues at work that could have been infected. Some individuals (7.32%) provided care directly to people with Covid, 10.57% supportive Covid care, and 2.44% to individuals that later died from Covid. Some participants found a greater meaning in work (25.85%), 44.44% dedicated themselves to volunteering and 23.23% were more efficient at work (Tab. 2). Differences identified positive work experiences more in the YAND ($\chi^2 = 12.69, p = .0004$; $\chi^2 = 12.93, p = .0003$) than the OAND category ($\chi^2 = 4.88, p = .03$; $\chi^2 = 3.34, p = .07$).

5. Discussion

Our sample represented a demographically and socioeconomically diverse cross-section of adults, aged 18 and older, with and without disabilities, coming from the urban metropolitan area surrounding Richmond, Virginia (US). At the time of our survey, the poverty threshold for one person was established as below \$18,000, with that of a family of four below \$36,908 (Assistant Secretary for Planning and Evaluation, 2023). Most of the individuals of our survey fell in the low-income category, with 65.76% having incomes less than \$15,000. Notably, there was a low rate of documented need for access to the COVID-19 vaccine. The state of Virginia, and mainly central Virginia, was proactive and above the national standard with response time and vaccine outreach efforts (Kaiser Family Foundation, 2021). We collected data several months into the immediate phase of the vaccine roll-out, when Virginia was at the center of a simultaneous racial crisis. At the same time as the pandemic, as reported in the literature, we found ourselves dealing with our history, with the need to move towards a more socially conscious and racially just world in terms of our approach to health and to how we addressed the impact of structural racism (Winship, Gendron, Waters, Chung, Battle, Cisewski *et al.*, 2022).

Our survey specifically assessed the needs of our community at the intersection of disability and age. Differences were identified for mental health, social health, and access issues. Our study findings indicated that younger individuals reported more psychosocial Covid pandemic consequences. Younger adults without reported disability experienced both more negative and positive Covid-related consequences. Access issues, such

as treatment, transportation, and clinical mental health, impacted adults who reported disabilities. Older adults (e.g., 62 years and older) that reported disability had a greater Covid pandemic impact, except in work-life domains, compared to non-disabled older adults. These findings suggest that the Covid-related social structural changes greatly impacted young and disabled adults, suggesting that the social systems these groups relied on were challenged. Findings also pointed to younger adults without disabilities who had greater opportunities to experience positive Covid benefits, indicating a weakness in the older adult social system.

Examining the intersection of age and disability highlighted differences, typically the challenges that the pandemic-related social structures created for individuals with disabilities. The most predominant response in the disability group was the mental health symptom affirmation. Individuals with disability were more likely reported to express an increased depression, mental health problems/symptoms, alcohol/substance use, with increased sedentary behaviors, which were relatively higher in the younger disability group. Unfortunately, differences also indicated higher rates regarding the inability to access mental health treatment and dissatisfaction with mental health treatments. In fact, almost one-third of the participants reported difficulty with transportation due to the decreased access and/or safety concerns, with a more pronounced impact experienced by those with disabilities across age. Access may have also contributed to differences in terms of disabled older adults with lower vaccinations and who were more likely reported to have difficulty in paying bills and in accessing food than non-disabled older adults. Differences also indicated a greater perceived racism in the disability groups, especially in the younger disabled group, specifically in feeling less safe with police due to race/ethnicity.

The intersection of age and disability also highlighted the resilience of older adults, despite their age (Colenda, Reynolds, Applegate, Sloane, Zimmerman, Newman *et al.*, 2020; Ng, Chow, & Yang, 2021), and highlighted how younger adults may have been less prepared for challenges presented by the Covid pandemic. The most common experience reported by younger adults was separation from family and friends and social cancellations. Younger adults most likely reported experiencing cancellations/restrictions for social clubs, travel, hobbies/activities, and family celebrations, and more frequently reported being separated from friends and family and missing in-person funerals during quarantining. Across disability status, younger adults more than older adults also reported close family members not living with them due to quarantine. Mental health

anxiety was the next most common experience, demonstrated by the loss of interest in usual activities, nervousness, worry, and sleep problems, which were most reported by younger adults. Another common experience reported was the change in family dynamics. The younger adults more likely reported to spend more time taking care of family members and to child instruction and conflict with children. Additionally, there was a greater economic impact on younger adults, who were most likely reported to have difficulty in paying bills and in accessing food and transportation. When examining positive Covid experiences, younger individuals, however, also most likely reported an increased quality time with spouses and children and positive work experiences.

The findings of our survey reflect the outcomes from the patterns identified in existing national studies. The pandemic highlighted the need for services and support for some of the most vulnerable segments of the populations. Those with disabilities residing in community-based settings were very likely to be disconnected from family and friends, with an increased risk of the inability to access social resources (National Council on Disability, 2021). Prolonged stress, such as a pandemic combined with social isolation, can increase mental strain and conflict (Brown, Doom, Lechuga-Peña, Watamura, & Koppels, 2020). The Covid pandemic separated people physically from friends and family and was responsible of the increased loneliness due to changes in social and family dynamics (Peng & Roth, 2022).

Poor mental health, increased depression, and stress prompted various coping behaviors, including an increased alcohol use. Data from the nationwide COVID-19 pandemic Coping Study of US adults identified an increased use of alcohol after the onset of Covid, as one in ten adults was reported to be more prone to alcohol especially individuals with mental health symptoms (Eastman, Finlay, & Kobayashi, 2021). Additionally, although the use of the emergency room and healthcare system decreased after the onset of the Covid pandemic, when compared to prior the onset of the pandemic, emergency room use for substance use disorders markedly increased (Holland, Jones, Vivolo-Kantor, Idaikkadar, Zwald, Hoots *et al.*, 2021).

The COVID-19 pandemic impacted our ability to receive routine and critical medical procedures. Many healthcare facilities limited in-person visits and instead relied on remote visits. At the pandemic's start, Richmond City's Greater Richmond Transit Company (GRTC) removed bus fares to reduce interactions while using public transportation. While this may have

removed a financial barrier to public transportation, service routes changed and were reduced. This, coupled with health and safety concerns over the spread of the virus in public areas, led to a marked difficulty in getting around. Relying on public transportation increased the risks of exposure to Covid, stress, and barriers to health care and to the needed resource access (Dickinson, Roberts, Banacos, Neuberger, Koebele, Blanch-Hartigan *et al.*, 2021). Restrictions in activities and resulting weight gain were highlighted nationwide, with those with obesity, more at risk for weight gain and decreased activity, often linked to depression (Friedman, Mulhausen, Cleveland, Coll, Daniel, Hayward *et al.*, 2019).

The COVID-19 pandemic caused significant challenges to employment and income, affecting younger adults more due to their higher workforce representation. Unemployment was high nationwide in 2020 due to business closures and stay-at-home orders. The impact of changes to the work environment then spilled over into other essential areas, such as economic challenges and food access (Center on Budget and Policy Priorities, 2022). Food insecurity and lack of access to healthy foods were prevalent even before the Covid pandemic, with many under-resourced regions recognized as food deserts. Our study mirrored the national findings for food hardship that significantly worsened during the pandemic due to the lockdowns and to the loss of income (Fitzpatrick, Harris, Drawve, & Willis, 2021). The federal government expanded efforts to provide support and increase access to healthy foods; however, nearly 20 million adults lived in households where individuals continued to report not getting enough to eat, with Black and Latino adults reporting more than twice as likely to not get enough to eat in their households (Center on Budget and Policy Priorities, 2022). These statistics would point to a more stressful environment due to the pandemic (Saenz & Sparks, 2020).

6. Conclusions

With this study we gained insight into the daily lives and into the needs of high-risk individuals across different ages and disabilities. Although the study used a convenient sample that was geographically limited, Virginia can be considered to be nationally representative, for age, life expectancy, and health status (CHR, 2020). Over half of the sample documented/self-reported disabilities; there was evidence of an additional set of challenges presented by the Covid pandemic to the disability and to the younger-aged groups. Individuals reported preferring in-person health care visits or

telehealth, with most of our population having access to at least phone services. Mental health issues, substance abuse, depression, anxiety, and changes to social/family/work life were highly prevalent. Transportation, food insecurity, and economic challenges were predominant, indicating areas of attention for improved community infrastructure. Social structures need strengthening to be more consistently equitable, inclusive, and resilient. Greater opportunities to experience benefits are necessary across the adult lifespan. Shedding light on the daily lives of some of our most vulnerable community members indicated that policy and funding are needed to improve mental health, transportation, and ability/social determinant/economical drivers to health equity. Future research will need to explore the intersection of age and disability with other key social determinants of health, such as living arrangement, family arrangement, and race. The intersection of social determinants of health and disability are likely to have compounding effects on people's outcomes, requiring multilevel interventions to address.

References

Assistant Secretary for Planning and Evaluation (2023). Frequently Asked Questions Related to the Poverty Guidelines and Poverty. Retrieved January 3, 2023, from ASPE website: <https://aspe.hhs.gov/topics/poverty-economic-mobility/poverty-guidelines/frequently-asked-questions-related-poverty-guidelines-poverty>.

Brooks, J. M., Patton, C., Maroukel, S., Perez, A. M., & Levanda, L. (2022). The differential impact of COVID-19 on mental health: Implications of ethnicity, sexual orientation, and disability status in the United States. *Frontiers in Psychology, 13*: 902094. <https://doi.org/10.3389/fpsyg.2022.902094>.

Brown, S. M., Doom, J. R., Lechuga-Peña, S., Watamura, S. E., & Koppels, T. (2020). Stress and parenting during the global COVID-19 pandemic. *Child Abuse & Neglect, 110*: 104699. <https://doi.org/10.1016/j.chiabu.2020.104699>.

Center on Budget and Policy Priorities (2022). Tracking the COVID-19 Economy's Effects on Food, Housing, and Employment Hardships. Retrieved July 14, 2022, from Center on Budget and Policy Priorities website: <https://www.cbpp.org/research/poverty-and-inequality/tracking-the-Covid-19-economys-effects-on-food-housing-and>

CHR (2020). County Health Rankings & Roadmaps: Virginia. Retrieved December 3, 2020, from County Health Rankings & Roadmaps website: <https://www.countyhealthrankings.org/app/virginia/2020/overview>.

Ciciurkaite, G., Marquez-Velarde, G., & Brown, R. L. (2022). Stressors associated with the COVID-19 pandemic, disability, and mental health: Considerations from the Intermountain West. *Stress and Health: Journal of the International Society for the Investigation of Stress*, 38 (2), 304-317. <https://doi.org/10.1002/smi.3091>.

Clarke, K. E., Hong, K., Schoonveld, M., Greenspan, A. I., Montgomery, M., & Thierry, J. M. (2023). Severity of Coronavirus Disease 2019 Hospitalization Outcomes and Patient Disposition Differ by Disability Status and Disability Type. *Clinical Infectious Diseases*, 76 (5), 871-880. <https://doi.org/10.1093/cid/ciac826>.

Colenda, C. C., Reynolds, C. F., Applegate, W. B., Sloane, P. D., Zimmerman, S., Newman, A. B., Meeks, S., & Ouslander, J. G. (2020). COVID-19 Pandemic and Ageism: A Call for Humanitarian Care. *Journal of the American Medical Directors Association*, 21 (8), 1005-1006. <https://doi.org/10.1016/j.jamda.2020.05.054>

Dickinson, K. L., Roberts, J. D., Banacos, N., Neuberger, L., Koebele, E., Blanch-Hartigan, D., & Shanahan, E. A. (2021). Structural Racism and the COVID-19 Experience in the United States. *Health Security*, 19 (S1), S-14. <https://doi.org/10.1089/hs.2021.0031>.

Douglas, H. M., Settles, I. H., Cech, E. A., Montgomery, G. M., Nadolsky, L. R., Hawkins, A. K., Ma, G., Davis, T. M., Elliott, K. C., & Cheruvelil, K. S. (2022). Disproportionate impacts of COVID-19 on marginalized and minoritized early-career academic scientists. *PLoS One*, 17 (9): e0274278. <https://doi.org/10.1371/journal.pone.0274278>.

Eastman, M. R., Finlay, J. M., & Kobayashi, L. C. (2021). Alcohol Use and Mental Health among Older American Adults during the Early Months of the COVID-19 Pandemic. *International Journal of Environmental Research and Public Health*, 18 (8): 4222. <https://doi.org/10.3390/ijerph18084222>.

Feldner, H. A., Evans, H. D., Chamblin, K., Ellis, L. M., Harniss, M. K., Lee, D., & Woiak, J. (2022). Infusing disability equity within rehabilitation education and practice: A qualitative study of lived experiences of ableism, allyship, and healthcare partnership. *Frontiers in Rehabilitation Sciences*, 3: 947592. <https://doi.org/10.3389/fresc.2022.947592>.

Fitzgerald, M. J., Goodman, H. J., Kenan, S., & Kenan, S. (2021). Did COVID-19 related delays in surgical management lead to patient morbidity in the orthopaedic oncological population? *Bone & Joint Open*, 2 (4), 236-242. <https://doi.org/10.1302/2633-1462.24.BJO-2021-0005.R1>.

Fitzpatrick, K. M., Harris, C., Drawve, G., & Willis, D. E. (2021). Assessing Food Insecurity among US Adults during the COVID-19 Pandemic. *Journal of Hunger & Environmental Nutrition*, 16 (1), 1-18. <https://doi.org/10.1080/19320248.2020.1830221>.

Friedman, C. (2022). COVID-19 infection differences among people with disabilities. *Dialogues in Health*, 1: 100083. <https://doi.org/10.1016/j.dialog.2022.100083>.

Friedman, S. M., Mulhausen, P., Cleveland, M. L., Coll, P. P., Daniel, K. M., Hayward, A. D., Shah, K., Skudlarska, B., & White, H. K. (2019). Healthy Aging: American Geriatrics Society White Paper Executive Summary. *Journal of the American Geriatrics Society*, 67 (1), 17-20. <https://doi.org/10.1111/jgs.15644>.

Grasso, D. J. (2020). *Epidemic-Pandemic Impacts Inventory (EPII)*. Retrieved from <https://osf.io/ng45c/>.

Hall, K. A. E., Deusdad, B., D'Hers Del Pozo, M., & Martínez-Hernández, Á. (2022). How Did People with Functional Disability Experience the First COVID-19 Lockdown? A Thematic Analysis of YouTube Comments. *International Journal of Environmental Research and Public Health*, 19 (17): 10550. <https://doi.org/10.3390/ijerph191710550>.

Halpern-Manners, A., McLeod, J. D., Anderson, E. M., & Ekl, E. A. (2022). COVID-19 and changes in college student educational expectations and health by disability status. *SSM - Population Health*, *19*: 101195. <https://doi.org/10.1016/j.ssmph.2022.101195>.

Holland, K. M., Jones, C., Vivolo-Kantor, A. M., Idaikkadar, N., Zwald, M., Hoots, B., Yard, E., D’Inverno, A., Swedo, E., Chen, M. S., Petrosky, E., Board, A., Martinez, P., Stone, D. M., Law, R., Coletta, M. A., Adjemian, J., Thomas, C., Puddy, R. W., Peacock, G., Dowling, N. F., & Houry, D. (2021). Trends in US Emergency Department Visits for Mental Health, Overdose, and Violence Outcomes Before and During the COVID-19 Pandemic. *JAMA Psychiatry*, *78* (4), 372-379. <https://doi.org/10.1001/jamapsychiatry.2020.4402>.

Kaiser Family Foundation. (2021). COVID-19 Vaccines Delivered and Administered. Retrieved January 3, 2023, from KFF website: <https://www.kff.org/other/state-indicator/Covid-19-vaccines-delivered-and-administered/>.

Lapierre, N., Olatona, O., Labrie, D., Gagnon, M., Paquette Raynard, E., Mortenson, W. B., & Routhier, F. (2022). Providing community services for persons with disabilities during the COVID-19 pandemic: A scoping review. *Health & Social Care in the Community*. <https://doi.org/10.1111/hsc.14050>.

Lund, E. M., & Ayers, K. B. (2022). Ever-changing but always constant: “Waves” of disability discrimination during the COVID-19 pandemic in the United States. *Disability and Health Journal*, *15* (4): 101374. <https://doi.org/10.1016/j.dhjo.2022.101374>.

Manning, K. J., Steffens, D. C., Grasso, D. J., Briggs-Gowan, M. J., Ford, J. D., & Carter, A. S. (2020). *Epidemic – Pandemic Impacts Inventory Geriatric Adaptation (EPII-G)*. University of Connecticut School of Medicine.

Mladenov, T., & Brennan, C. S. (2021). Social vulnerability and the impact of policy responses to COVID-19 on disabled people. *Sociology of Health & Illness*, *43* (9), 2049-2065. <https://doi.org/10.1111/1467-9566.13379>.

National Council on Disability (2021). *The Impact of COVID-19 on People with Disabilities* (p. 260). Retrieved from https://ncd.gov/sites/default/files/NCD_COVID-19_Progress_Report_508.pdf.

Ng, R., Chow, T. Y. J., & Yang, W. (2021). Culture Linked to Increasing Ageism During COVID-19: Evidence From a 10-Billion-Word Corpus Across 20 Countries. *The Journals of Gerontology. Series B, Psychological Sciences and Social Sciences*, 76 (9), 1808-1816. <https://doi.org/10.1093/geronb/gbab057>.

Nicklett, E. J., Ory, M. G., Johnson, K. E., & Dwolatzky, T. (2022). Editorial: COVID-19, Aging, and Public Health. *Frontiers in Public Health*, 10: 924591. <https://doi.org/10.3389/fpubh.2022.924591>.

Parsons, P. L., Slattum, P. W., & Bleich, M. (2019). Mainstreaming health and wellness: The RHWP Innovation model to complement primary care. *Nursing Forum*, 54 (2), 263-269. <https://doi.org/10.1111/nuf.12326>.

Peng, S., & Roth, A. R. (2022). Social Isolation and Loneliness Before and During the COVID-19 Pandemic: A Longitudinal Study of U.S. Adults Older Than 50. *The Journals of Gerontology. Series B: Psychological Sciences and Social Sciences*, 77 (7), e185-e190. <https://doi.org/10.1093/geronb/gbab068>.

Puce, L., Trabelsi, K., Ammar, A., Jabbour, G., Marinelli, L., Mori, L., Kong, J. D., Tsigalou, C., Cotellessa, F., Schenone, C., Samanipour, M. H., Biz, C., Ruggieri, P., Trompetto, C., & Bragazzi, N. L. (2022). A tale of two stories: COVID-19 and disability. A critical scoping review of the literature on the effects of the pandemic among athletes with disabilities and para-athletes. *Frontiers in Physiology*, 13: 967661. <https://doi.org/10.3389/fphys.2022.967661>.

Richardson, C. D., Roscoe, H., Green, E., Brooks, R., Barnes, L., Matthews, F. E., & Brayne, C. (2022). Impact of COVID-19 policies on perceptions of loneliness in people aged 75 years and over in the cognitive function and aging study (CFAS II). *Journal of the American Geriatrics Society*, 71 (2), 463-473. <https://doi.org/10.1111/jgs.18099>.

Robertson, E., Graham, C., & City of Richmond, VA Anti-Poverty Commission. (2013). *Mayor's Anti-Poverty Commission Report*. Retrieved from http://www.richmondgov.com/CommissionAntiPoverty/documents/Antipovertycommissionfinal1_17_2013c--printready.pdf.

Rowe, J. W. (2022). Covid-19 and Aging: Challenges and Opportunities. *The Journals of Gerontology. Series A: Biological Sciences and Medical Sciences*, 77 (7), 1349-1351. <https://doi.org/10.1093/gerona/glac089>.

Saenz, R., & Sparks, C. (2020). The Inequities of Job Loss and Recovery Amid the COVID-19 Pandemic. *The Carsey School of Public Policy at the Scholars' Repository*. <https://dx.doi.org/10.34051/p/2021.3>.

Sakellariou, D., Malfitano, A. P. S., & Rotarou, E. S. (2020). Disability inclusiveness of government responses to COVID-19 in South America: A framework analysis study. *International Journal for Equity in Health*, 19, 1-10. <https://doi.org/10.1186/s12939-020-01244-x>.

VCU (n.d.). Pediatric research and innovation. Retrieved March 10, 2023, from <http://www.chrichmond.org/research>.

VCU Center on Society and Health (2016). Mapping Life Expectancy. Retrieved December 3, 2020, from <https://societyhealth.vcu.edu/work/the-projects/mapping-life-expectancy.html>.

Winship, J. M., Gendron, T., Waters, L., Chung, J., Battle, K., Cisewski, M., Gregory, M., Sargent, L., Zanjani, F., Slattum, P., Mackiewicz, M., Diallo, A., Ford, G., Falls, K., Price, E. T., Parsons, P. L., & VCU iCubed Health and Wellness in Aging Transdisciplinary Core8 (2022). COVID in Context: The Lived Experience of Richmond's Low-Income Older Adults. *Gerontology & Geriatric Medicine*, 8: 23337214221079208. <https://doi.org/10.1177/23337214221079208>.

Xie, Z., Hong, Y. R., Tanner, R., & Marlow, N. M. (2022). People with Functional Disability and Access to Health Care During the COVID-19 Pandemic: A US Population-based Study. *Medical Care*, 61 (2), 58-66. <https://doi.org/10.1097/MLR.0000000000001765>.

Yang, A., Ablorh, T., Hall, A., Roemer, L., Carter, A. S., Ford, J. D., Briggs-Gowan, M. J., & Grasso, D. J. (2020). *The Epidemic – Pandemic Impacts Inventory (EPII) Racial/Ethnic Discrimination Addendum*. University of Connecticut School of Medicine.

Zimmerman, E., Haley, A., Walker, A., Woolf, S., Nguyen, K., Shue, W., Kelley, L., Hellman, J., & Chapman, D. (2016). *Health Equity in Richmond, Virginia*. Richmond, Virginia: Center on Society and Health, Virginia Commonwealth University. <https://www.rmhfoundation.org/>.