

Firearm Suicide and Perceived Physical Health Challenges: A Case-Control Study

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A thesis

submitted in partial fulfillment of the

requirements for the degree of

Master of Public Health

University of Washington

2022

Committee:

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Program Authorized to Offer Degree:

School of Public Health - Epidemiology

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Abstract

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Firearm suicide is a critical public health issue in the United States as firearms are the mechanism for the majority of all suicides and suicides account for more than half of all firearm-related deaths. Prior research has identified certain physical health diagnoses as well as functional disability as risk factors for suicide particularly among individuals 65 years and older. This project expands on this relationship by exploring indicators of perceived poor physical health among firearm suicide decedents drawn from King County Medical Examiner's Office (KCMEO) records from 2005 - 2020 in comparison with individuals who report living in households with firearms on the Behavioral Risk Factor Surveillance System (BRFSS) survey. We conducted logistic regression with adjustment for age, sex, race, and year as well as a quantitative bias assessment to account for potential exposure misclassification. We found that the odds of perceived poor physical health were higher among firearm suicide decedents and explored the methodological opportunities and challenges for using BRFSS as a control population for vital registry-drawn cases.

Introduction

Across the United States, nearly 50,000 individuals die by suicide each year, making a leading cause of death.¹ National rates have increased 30% between 1999 and 2019 and are considered a leading contributor to declining life expectancy trends across the U.S.² Each event impacts families and communities, rippling out a national burden of lives lost, lost years and potential earnings, health care expenditures, and bereavement impacts. The burden of suicide is broad-reaching, affecting people around the world and across demographic groups; however, suicide does disproportionately affect certain communities based on age, geography, and other risk factors including psychiatric conditions, substance abuse, certain physical conditions, social isolation, family and intimate partner relationship problems.^{1,3-7}

Mixed methods investigations exploring physical health and suicidality have found that in addition to specific frustration with disability, illness, and pain, suicidal behavior is also linked with related perceptions of loss of autonomy and dignity, declining pleasure in life as well as a desire not to burden others.⁸ This aligns with Thomas Joiner's interpersonal-psychological theory of suicidal behavior that highlights three components: the sense of being a burden to loved ones; a feeling of isolation; and, an acquired ability to cause fatal harm to oneself. First, experiencing physical health challenges leading to functional disability may require reliance on caregivers as well as create the perception of financial burden through the significant cost of health insurance, prescription medications, and in some cases assisted living residence or skilled nursing resources.⁹ Second, the impact of physical health challenges may be heightened if an individual does not have a spouse or other close family or caregiver who may provide support for daily activities thus rendering an individual without needed social and physical care. And finally, if an individual is facing significant pain or a terminal diagnosis, they may adopt a belief that pain and death are inevitable thus lowering inhibitions toward self-harm.

In the context of firearm suicide, we are interested in exploring the association with perceived physical health as prior work has found suicidal behavior is associated with numerous physical health conditions including cancer, neurological disorders, physical pain, and liver disease.^{3,8,10} Examining electronic health records, Ahmedani et al (2017) found that traumatic brain injury, sleep disorders, and

HIV/AIDS were associated with increased suicide risk when adjusting for age, sex, mental health, and substance use diagnoses but further that multimorbidity and overall burden of physical health were key to understanding risk of suicide.³ Among adults age 65 and older, the association between suicide and physical health is linked to an age-related increase in the development and diagnosis of health conditions as well as later-in-life decline in other suicide risk factors like relationship and job stress.^{8,10,11} However, physical health conditions can impact daily activities across the lifespan and an investigation in Northern Ireland by Onyeka et al found that among young adults (18-34 years old) high levels of functional disability were associated with an increased risk of suicide.¹²

Any inquiry into the risk factors for suicide in the context of the United States, must consider mechanism owing to both the comparative lethality of firearms and the uneven distribution of firearm access in U.S. society. The case fatality for suicide events involving a firearm is estimated to be 90% as compared to 51% for suffocation and under 5% for poisoning and other mechanisms including cutting, drowning, and jumping.¹³ Further, the United States has the highest prevalence of civilian owned firearms in the world with an estimated 38% of all Americans residing in a home with a firearm.^{14,15} This access to a firearm has consistently been found to be associated with an increased risk of suicide and other violence.¹⁶⁻¹⁸

Suicides among older adults is a key public health issue as adults 65 years and older are expected to increase as a proportion of the U.S. population, from 16% (52 million) in 2018 to nearly a quarter (95 million) by 2060.¹⁹ Further of note, among suicide fatalities in 2017, in those 65 years and older firearms were the mechanism of record in 70% of cases compared to only 46% of cases among those 15 – 64 years old.²⁰ Given the impact and burden of firearm suicide, as well as some of the historical limitations on resources allocated for this research space, existing administrative data offer a unique opportunity to expand our understanding of firearm suicide risk factors. Data on all suicide deaths in King County, WA are collected by the King County Medical Examiner's Office (KCMEO) acting under authority of the Washington State Legislature to investigate sudden, unexpected, and unnatural deaths that occur within their jurisdiction. Medico-legal investigators determine the mechanism of death as well as prepare a

narrative describing the context of the incident including scene assessment and information gathered from witnesses and next of kin. This is a rich data source providing a census of reported suicide deaths in the jurisdiction, however utilizing this information in research presents some challenges – particularly in the identification of an appropriate comparison population and in the assessment of potential information bias within in these narratives due to the post-mortem data collection.²¹

In this analysis, we compare measures of perceived physical health status that are respectively included in medical examiner death narratives coded in accordance with National Violent Death Reporting System (NVDRS) guidelines and Behavioral Risk Factor Surveillance System (BRFSS) surveys as to explore subjective physical wellbeing a risk factor for firearm suicide across the lifespan. In addition to exploring the methodological challenges and opportunities of linking registry and survey data, quantifying perceived physical health as precipitating factor in firearm suicide may integrate into broader efforts to utilize primary care and clinical settings as sites for prevention activities around firearm screenings.^{22–24}

Methods

This case control analysis is set in King County, Washington, one of the most populous counties in the U.S and home to the city of Seattle. Most of the county's 2.2 million residents live in the western half near Puget Sound, while the eastern portion is characterized by rural communities at the foothills of the Cascade mountains.²⁵ In King County, WA more than 250 people die by suicide each year, nearly half of which result from firearm injury.²⁶

Cases

Cases were drawn from the 1740 firearm suicide decedents included in King County Medical Examiner's Office (KCMEO) records between 2005 – 2020. We selected only cases where the event took place in King County. There were 133 cases that were excluded because, though the death was recorded in King County the incident took place in another jurisdiction, and the decedent had been evacuated to

King County for medical care. Further, 47 cases were excluded because the decedent was under the age of 18 or there was no age data available. This exclusion was made based on the age restriction for participating in BRFSS.

We consider the remaining 1560 cases to be a census of adult firearm suicide deaths that occurred in King County during the study period. These case narratives were reviewed and qualitatively coded using Dedoose software in accordance with National Violent Death Reporting System (NVDRS) variable definitions.²⁷ The NVDRS is a national surveillance system designed to gather cross-cutting data to better assess and prevent violent deaths in the United States.²⁸ One of the primary sources of data is coroner and medical examiner officer records which include free text narrative reports. The NVDRS coding manual includes codes for circumstances relevant to all manners of violent death as well as suicide-specific codes which can be used to identify key themes and contexts related to the event. The focus of this analysis is the identification of a “contributing physical health problem” (CPHP) in which an individual’s diagnosed or perceived health challenges appear to have contributed to the death. Simple mentions of health conditions (e.g. diabetes, asthma) in the narrative were not endorsed unless there is description of relevance to the event including a terminal diagnosis, debilitating conditions or despondency over health status. Finally, “health conditions are coded from the perspective of the victim. If the victim believed him- or herself to be suffering from a physical health problem, and this was contributory to the death, it does not matter if any particular health event was ever treated, diagnosed, or even existed.”²⁷ Coding was conducted by two research assistants trained in NVDRS data standards. Examples of narrative excerpts coded for CPHP include “the decedent is depressed over failing health and quality of life”; “A note of intent detailing health issues was found in the bedroom”; “he mentioned to [a family member] that he was afraid of his deteriorating health and made comments about wishing for death”; “decedent had recently been more depressed and feared that she had cancer.”

Additionally, decedents’ age at time of death, race and sex were extracted from KCMEO records (Table 1). These values are assigned by medico-legal investigators in the course of the inquiry into each case.

Controls

Controls were selected from individuals sampled by the Behavioral Risk Factor Surveillance System (BRFSS) who reside in King County who reported living in a household with firearms. Each year BRFSS conducts more than 400,000 telephone-based interviews on health behaviors with non-institutionalized adults over the age of 18 in the United States.²⁹ BRFSS interviews are composed of a series of modules including core components, optional modules, and state-added questions. Subjective physical health questions are included as a core module every year, but as we also needed information on household firearm access, controls were drawn from years in which the firearm module was included in BRFSS either as a core module or as state added questions (2004, 2009, 2013, 2015, 2016, 2018 and 2020). We elected to draw controls from those who reported living in a household with a firearm based on findings demonstrating that access to firearms is associated with an increased risk of suicide, and that that this selection would create an appropriate comparison pool for the cases who all died by firearm injury.^{16-18,30}

To draw a comparison with the ‘contributing physical health problem’ code assigned to the KCMEO narratives, we examined two different measures of subjective wellbeing included on BRFSS surveys.³¹ Further, in constructing binary indicators necessary for comparison with CPHP in the cases, we created and explored different parameterizations of the response levels that were considered as self-reported poor health:

- a. Would you say in general that your health is—excellent, very good, good, fair, or poor?
 - i. Good / Fair / Poor
 - ii. Fair / Poor
 - iii. Poor
- b. Now thinking about your physical health, which includes physical illness and injury, for how many days during the past 30 days was your physical health not good?
 - i. 1 or more days
 - ii. 7 or more days
 - iii. 14 or more days
 - iv. 21 or more days
 - v. All 30 days

These survey measures are both part of core and supplemental health-related quality of life questions utilized in BRFSS. These questions were developed, validated, and introduced in the 1990s as a mechanism of capturing overall self-reported health in the absence of effective surveillance for chronic disease.³²

Data Analysis

Cases and controls were matched on five-year age groupings and sex using an exact match criterion.³³ No cases were excluded in the matching stage and controls were weighted based on their frequency in the matching strata. There were 1560 cases and 4336 controls included in the general analysis.

We conducted logistic regression comparing cases (those who died of firearm suicide) to controls (those who report residing in a household with a firearm on a BRFSS survey), adjusting for age, sex, race, and year. This analysis was repeated with each of the respective measures of subjective wellbeing from BRFSS and the corresponding response levels. Odds ratios (OR) and 95% confidence intervals (CI) are reported from adjusted logistic regressions conducted in R.

We then stratified by age groups (18-34, 35-49, 50-64, 65+ years old) and sex (male and female) to repeat the analysis and explore the differences in this association across the lifespan. Further, the opportunity to create different groupings of BRFSS response options allows more examination of the level of severity – in terms of reported health status and number of days – that may be associated with an increased risk of firearm suicide.

Table 1: Distribution of matching variables and covariates among cases and controls

	CASES: firearm suicide decedents				UNWEIGHTED CONTROLS: BRFSS respondents who live in a household with a firearm	
	Total (n = 1560)	Column %	# with CPHP	Row %	Total (n = 4336)	Column %
Years of Age						
18 - 24	146	9.4%	3	2.1%	193	4.5%
25 - 29	139	8.9%	8	5.8%	156	3.6%
30 - 34	118	7.6%	4	3.4%	215	5.0%
35 - 39	115	7.4%	10	8.7%	270	6.2%
40 - 44	99	6.3%	12	12.1%	281	6.5%
45 - 49	127	8.1%	17	13.4%	331	7.6%
50 - 54	168	10.8%	27	16.1%	424	9.8%
55 - 59	144	9.2%	32	22.2%	475	11.0%
60 - 64	120	7.7%	37	30.8%	546	12.6%
65 - 69	104	6.7%	47	45.2%	483	11.1%
70 - 74	66	4.2%	29	43.9%	399	9.2%
75 - 79	76	4.9%	43	56.6%	275	6.3%
80 +	138	8.8%	80	58.0%	288	6.6%
Sex						
Female	195	12.5%	43	22.1%	1887	43.5%
Male	1365	87.5%	306	22.4%	2449	56.5%
Race						
White	1380	88.5%	332	24.1%	3951	91.1%
Black	63	4.0%	5	7.9%	92	2.1%
Asian	85	5.4%	10	11.8%	138	3.2%
Pacific Islander	2	0.1%	0	0.0%	26	0.6%
Native American	18	1.2%	2	11.1%	51	1.2%
Other	9	0.6%	0	0.0%	55	1.3%
Null	3	0.2%	0	0.0%	23	0.5%

Quantitative Bias Assessment

Given the application of two data sources with unique data collection mechanisms we wanted to explore the impact differential exposure misclassification might have on our primary findings.

Specifically, we were concerned about CPHP ascertainment among cases, which was collected by secondary report from a proxy or scene observation following death. Our analysis assumes CPHP status among cases is equivalent to reporting of perceived poor physical health on BRFSS and thus we sought to assess the level of misclassification of the exposure among cases that would produce a null result.

To perform the quantitative bias analysis, we compared results from the primary analyses to estimates with intentional misclassification among the cases. We assigned a range of levels of misclassification in the exposure among the cases (10%, 20%, 30%, 40%, 50%) and conducted repeated sampling to produce adjusted estimates. These analyses assessing misclassification among cases were performed in comparison with two parameterizations of BRFSS measures of subjective poor physical health in the controls: (1) individuals who responded ‘Fair or Poor’ health status and (2) individuals who responded they had experienced 7 or more days of poor physical health in the past 30 days.

Qualitative coding of the KCMEO narratives was conducted using Dedoose, while data cleaning, logistic regression estimation, and quantitative bias assessment were conducted in R.^{34,35} The Washington State Institutional Review Board and the University of Washington Institutional Review Board has determined that analysis of KCMEO and BRFSS data does not require formal review nor an exemption designation because it does not involve “human subjects” as defined under federal regulation.³⁶

Results

Of the 1560 case narratives included in the analysis, 349 (22.3%) were coded for a contributing physical health problem (CPHP). The frequency of application of the CPHP code was directly correlated with age of the decedent; among those 18-24 years old only 2.1% (3) of narratives contained the code while for those 80 years and older 58.0% (80) were coded for CPHP ([Table 1](#)). There were seven times as many case narratives from male decedents as female decedents and the proportion of cases coded for CPHP was similar -- 22.4% (306) and 22.1% (43), respectively. White decedents had the highest frequency of CPHP at 24.1% (332) followed by Asian decedents at 11.8% (10), then 11.1% (2) among Native American decedents, and 7.9% (5) for Black decedents.

When comparing to the BRFSS measure of self-reported health status and adjusting for age, sex, race, and year, the odds of CPHP among firearm suicide decedents was 2.37 times the odds of reporting 'Fair or Poor' among controls (95% CI: 2.06, 2.72; Table 2). When the measure of subjective poor health status among the controls is restricted to only those who reported 'Poor' health status, the adjusted OR increased to 13.81 (95% CI: 10.29-18.53). The association was not found to be statistically significant when using the definition of poor health status that encompassed 'Good or Poor or Fair' responses.

Similarly, when we utilized the BRFSS measure of self-reported poor physical health days, we found the adjusted odds ratio comparing CPHP among firearm suicide decedents to controls who self-reported 7 or more days of poor physical health was 2.31 (95% CI: 1.94, 2.75; Table 2). The magnitude of association increased as we raised the floor on the number of days considered to represent poor physical health status (Figure 1).

We then stratified by sex and age to repeat the analysis. We found the same pattern of significant associations across the response categories in the female and male sub-groups as in the overall analysis, but there was variation observed across age groups (18-34, 35-49, 50-64, 65+; Table 2).

Quantitative Bias Analysis Results

After applying a range of misclassification levels (10%, 20%, 30%, 40%, 50%) to the ascertainment of the exposure (CPHP status) in the cases, we compared these estimates with our observed results for two parameterizations of BRFSS measures of subjective poor physical health in the controls: (1) individuals who responded 'Fair or Poor' health status; (2) individuals who responded they had experienced 7 or more days of poor physical health in the past 30 days). In both assessments, the level of misclassification among the cases would have needed to be greater than 30% in order to nullify the observed association (Figure 2). Only when we had reclassified at least 130 of the 349 cases who were coded for CPHP to not have CPHP did we produce a null result.

Figure 1: Adjusted ORs comparing CPHP in cases with respective measures of subjective physical health from BRFSS among controls

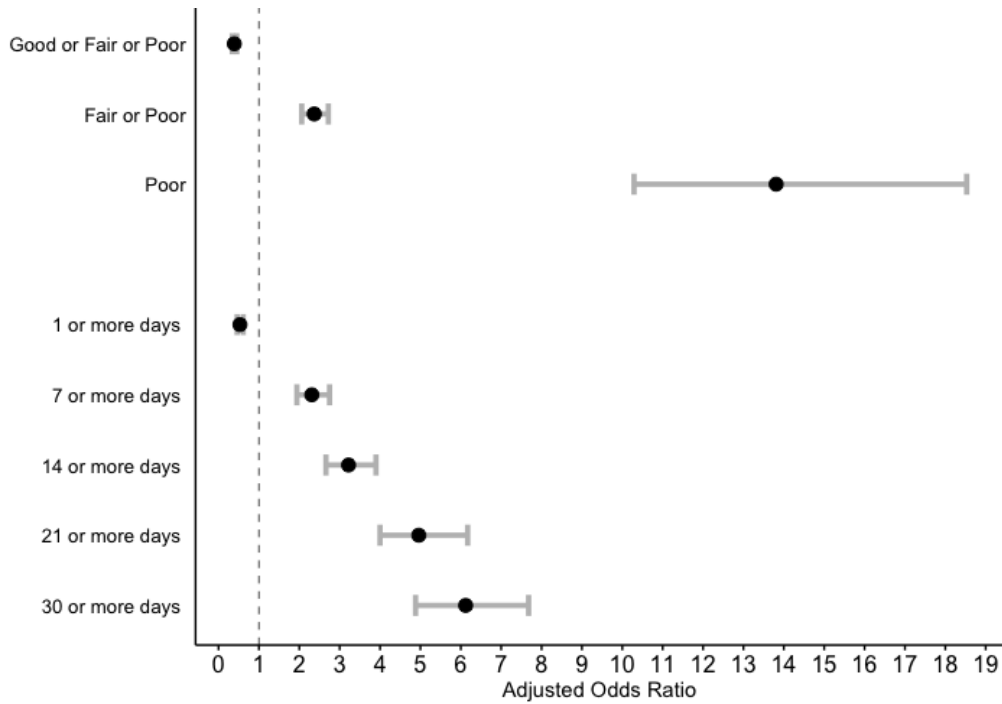
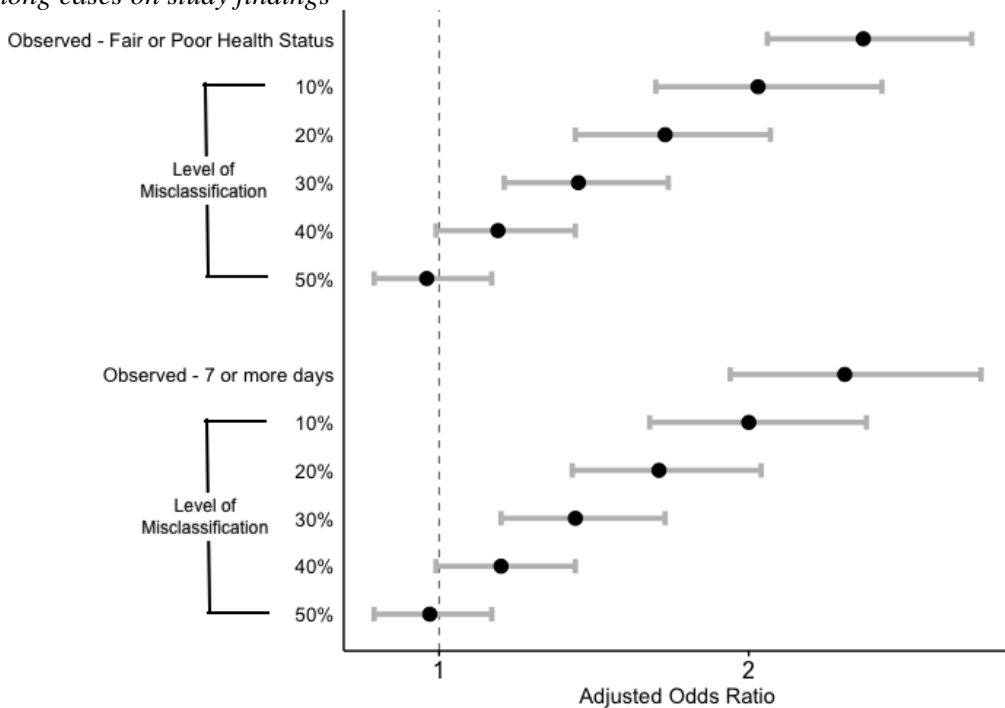


Table 2: Adjusted ORs comparing CPHP in cases with respective measures of subjective physical health from BRFSS among controls (Overall, by Sex, by Age)

BRFSS Response Category	Overall	Female	Male
Good / Fair / Poor	0.39 (0.34, 0.45)	0.5 (0.34, 0.72)	0.37 (0.32, 0.44)
Fair / Poor	2.37 (2.06, 2.72)	2.99 (2.01, 4.46)	2.33 (1.92, 2.84)
Poor	13.81 (10.29, 18.53)	18.55 (10.93, 31.49)	13.72 (9.95, 18.91)
1 or more days	0.53 (0.46, 0.61)	0.41 (0.28, 0.58)	0.55 (0.47, 0.64)
7 or more days	2.31 (1.94, 2.75)	1.74 (1.2, 2.53)	2.44 (2, 2.98)
14 or more days	3.22 (2.66, 3.9)	3.08 (2.09, 4.54)	3.29 (2.66, 4.08)
21 or more days	4.96 (4, 6.17)	5.19 (3.88, 9.03)	4.96 (3.9, 6.3)
30 or more days	6.12 (4.88, 7.68)	7.2 (4.66, 11.13)	6.13 (4.77, 7.89)

BRFSS Response Category	18 - 34 year olds	35 - 49 year olds	50 - 64 year olds	65+ year olds
Good / Fair / Poor	0.09 (0.04, 0.15)	0.22 (0.15, 0.32)	0.4 (0.31, 0.52)	0.87 (0.68, 1.11)
Fair / Poor	0.61 (0.29, 1.26)	1.88 (0.18, 3)	1.92 (1.43, 2.58)	4.48 (3.42, 5.86)
Poor	7.04 (1.63, 30.37)	9.9 (4.48, 21.9)	8.16 (5.37, 12.41)	23.17 (15.51, 34.61)
1 or more days	0.07 (0.04, 0.12)	0.26 (0.18, 0.38)	0.53 (0.41, 0.69)	1.99 (1.55, 2.55)
7 or more days	0.42 (0.22, 0.83)	1.35 (0.87, 2.1)	1.94 (1.44, 2.61)	6.03 (4.55, 8)
14 or more days	0.75 (0.37, 1.51)	2.39 (1.47, 3.89)	2.4 (1.77, 3.26)	7.04 (5.29, 9.39)
21 or more days	1.37 (0.6, 3.15)	4.44 (2.5, 7.91)	3.48 (2.5, 4.86)	9.31 (6.87, 12.63)
30 or more days	2.06 (0.82, 5.19)	7.29 (3.77, 14.08)	3.84 (2.74, 5.39)	10.66 (7.78, 14.6)

Figure 2: *Quantitative bias analysis results assessing impact of potential exposure misclassification among cases on study findings*



Discussion

We found that perceived poor physical health was associated with risk of firearm suicide. When we defined poor physical health in the controls as reporting ‘Fair or Poor’ health status on BRFSS, we found the odds of CPHP were more than 2 times as high among firearm suicide decedents in our general analysis as well as when stratified by sex. Additionally, the results show a clear pattern in the magnitude of effect increasing across the respective BRFSS comparison measures as we moved toward the more restrictive definitions of poor physical health. We included these multiple parameterizations of the BRFSS variables as they are subjective measures of health and there are differing approaches to which response levels correspond with poor health.^{31,32} We did observe age-related variability as to which levels of the BRFSS definitions we found a significant association between perceived poor physical health and firearm suicide. Of note, among older adults (65+ years old) nearly every comparison definition of subjective poor physical health, including reporting one or more days of poor physical health in the past 30 days, is associated with risk of firearm suicide.

Our findings align with prior research that identifies poor physical health as a risk factor for suicide. First, the proportion of cases coded for CPHP in our analysis matches a larger review of National Violent Death Reporting System data which found that contributing physical health problems were recorded as a contributing factor for suicide in half of decedents over the age of 65 (Table 1).³⁷ While we were unable to explore specific health conditions and diagnosis, we feel the focus on perceived health status extends upon mixed methods and theoretical approaches that finds poor physical health is a risk factor suicide due to individual experiences of pain and expectation of death in the case of terminal illness as well as changes in quality of life and autonomy that heighten a sense of burdensomeness.¹⁰

This novel application of two publicly available data sources demonstrates that BRFSS may be an appropriate data source to draw controls for certain investigations of fatal injury data. First, the NVDRS definition of ‘contributing physical health problem’ that was applied to KCMEO firearm suicide narratives and the BRFSS survey questions on subjective wellbeing both center the perceived health status of individuals, independent of formal diagnosis.^{27,32} Relative to some of the other suicide-related

codes included in NVDRS, physical health problems have some characteristics that make them more likely to be communicated, included in a narrative, and appropriately coded. First, poor physical health carries less social stigma than some other suicide-risk factors in NVDRS like poor mental health, substance use, and relationship strife.^{38,39} Second, the NVDRS code definition for ‘contributing physical health problem’ centers decedent perception of their health regardless of formal diagnoses and the progression of functional disability is likely to be observed by family members and friends who may be in the role of caregiver.²⁷ Further, the quantitative bias assessment allays some of the concern about differential information bias owing largely to the use of proxy interviews by KCMEO medico-legal investigators to assess the causes and context of a suicide event. If this bias alone accounted for the observed levels of association, nearly 40% of cases coded as CPHP would have had to be in error. Of note, because we were primarily interested in testing whether our findings could be found to be non-significant on account of this bias, we only modeled misclassification toward the null. However, given the format of proxy and post-mortem data collection to ascertain case exposure status there is potential that the exposure was in fact underreported among cases and thus our estimates of the relationships between subjective physical health status and risk of firearm suicide are attenuated. We also caveat that BRFSS does not include institutionalized individuals which encompasses people in skilled nursing facilities and may result in an undercount of the prevalence of those who would report poor health status.²⁹ Though in Washington State, possession of firearms is prohibited in certain health care facilities and additionally private institutions like nursing homes have the right to restrict firearm carriage within their premises.⁴⁰

There were some further challenges and limitations to this analysis. Owing to constraints in the two data sources we were unable to consider adjusting for income, urbanicity, or health insurance status. Given the geographic focus within a single large county we were comfortable proceeding with the project but if we were to expand across Washington State or another larger area with more geographic, economic, and demographic heterogeneity these would be a key consideration. We did not include a measure of mental health status in our model as we hypothesize the relationship between poor physical and mental health to be mediating rather than confounding. Additionally, we selected only firearm suicide decedents

as our cases and assumed by the classification of their death that they had access to a firearm which is different than the BRFSS firearm module determination of whether an individual reports residing in a home with a firearm. Next as previously discussed, Ultimately, as death narratives are a primary source of information about suicide decedents their limitations should not prove prohibitive to their inclusion in research projects in this space.

While not every NVDRS code has a clear parallel in BRFSS this project demonstrates some of the opportunities and challenges of utilizing survey-based controls to match with registry-drawn cases. This specific inquiry was strengthened by the frequent administration of the BRFSS firearm module in Washington state (2004, 2009, 2013, 2015, 2016, 2018 and 2020) which allowed us to address a potential source of confounding by selecting controls from a subset of the population that also has access to firearms. There may be future opportunities to link NVDRS codes with BRFSS variables or to identify new variables that could be coded from medical examiner office records and narratives, particularly through the development of natural language processing techniques and standardization of medico-legal investigations and narrative preparation to improve data quality. The National Violent Death Reporting System began collecting data in 2002 with six states and as of 2018 now reports data from all 50 evolving to become one of the most comprehensive and timely repositories of information on violent deaths.²⁸ As NVDRS continues to grow and build up a longer horizon of data available, there will be critical and expanding opportunities to assess factors and trends in violent deaths across geography and within demographic groups. In sum, we believe this study demonstrates that BRFSS survey respondents can be an appropriate comparison population for cases drawn from fatal registry data.

Ultimately, we believe these findings extend upon prior work identifying specific health conditions to highlight the importance of individual perception of health in considering risk factors for suicide. Additional research may also be warranted to explore how individuals construct and are influenced in their perceptions of their own physical wellbeing, including through their access, interaction and (lack of) satisfaction with health care services. The two measures we compared in this analysis were both indicators of perceived health status, independent of any specific or formal diagnosis. There also

may be a role for primary care providers to have conversations, conduct screenings, and provide resources that consider the intersection of subjective poor physical health and access to firearms, especially in light of prior research that has found that nearly half of older adult suicide victims see their physician in the month before the fatal event.⁸ The importance of exploring physical health as a factor in firearm suicide is paramount in the context of an aging U.S. population, increasing personal firearm ownership, and pandemic impacts including increasing rates of disability stemming from long-term effects of COVID infection.^{14,19,41-43} However, any response to these results should take care to not discount and undermine the autonomy of individuals with significant physical health challenges and who are experiencing functional disability. Further, it invites further conversation about the resources and support that is provided for individuals facing severe and chronic physical health problems both in terms of attendant counseling and therapy opportunities as well as access to and acceptability of programs like physician assisted suicide that provide an alternative end of life pathway.⁴⁴⁻⁴⁶

Acknowledgements

Washington State Department of Health, Center for Health Statistics, Behavioral Risk Factor Surveillance System, supported in part by the Centers for Disease Control and Prevention, Cooperative Agreement: U58/CCU022819-1 (2004); U58/DP001996-1 (2009); U58/SO000047-3 (2013); NU58/DP006066-01 (2015); NU58/DP006066-02 (2016); NU58/DP006066-04 (2018); NU58/DP006865 (2020).

Injury and Violence Prevention Data Science Demonstration Project awarded by the American Public Health Association

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