

ALPHA FOUNDATION FOR THE IMPROVEMENT OF MINE SAFETY AND HEALTH

Final Technical Report

Project Title: Symptoms of Depression, Anxiety and Post-Traumatic Stress among Coal Miners Compared to Other Occupational Groups in a Population Survey in the Appalachia Region

Grant Number: AFCTG22-157

Organization: The Regents of the University of California, San Francisco

Principal Investigator: Paul D, Blanc MD MSPH

Contact Information: Paul.Blanc@ucsf.edu 415-476-7377

Administrative Contact: Aleks Herynk, Grants Officer, aleks.herynk@ucsf.edu 971-392-0308

Period of Performance: October 1, 2022 – June 30, 2024

Acknowledgement/Disclaimer: This study was sponsored by the Alpha Foundation for the Improvement of Mine Safety and Health, Inc. (ALPHA FOUNDATION). The views, opinions and recommendations expressed herein are solely those of the authors and do not imply any endorsement by the ALPHA FOUNDATION, its Directors and staff.”

1.0 Executive Summary

Previous study suggested that the prevalence of depressive symptoms, anxiety, and post-traumatic stress disorder (PTSD) among coal miners in Appalachia may be very high, but data among persons not already seeking medical care and comparisons to other workers were lacking. This made difficult a clear assessment of the potential problem. To address this open question our study aimed to estimate the prevalence of symptoms of depression, anxiety, and PTSD among current and former coal miners, independent of medical care for coal worker's pneumoconiosis (CWP) or other health conditions and to analyze whether coal mining is a risk factor for depression, anxiety or PTSD compared to other occupations.

We carried out a population-based random digit dial (RDD) survey in the same Appalachian counties that we previously studied successfully with support from the Alpha Foundation. The survey was conducted by telephone in a random sample of males aged 50 or older with a history of any current or past labor force participation living within selected counties in the states of Kentucky, Ohio, Pennsylvania, Tennessee, Virginia, and West Virginia with elevated CWP mortality rates. The survey included an adequate representation of subjects reachable by cell phone as well as those reachable via residential landline phones. We examined the associations between coal mining and the three mental health outcomes: depression, anxiety, and post-traumatic stress disorder (PTSD) using logistic regression models, with and without adjustment for trauma exposure (work-related or non-work related), age, education, smoking (ever), and obesity.

Of 1428 survey respondents analyzed, 233 (16.3%) reported coal mining employment. Among the coal miners, 48% self-reported fair or poor health compared to 28% of non-miners ($p < 0.001$). Of the 233 coal miners, the median duration of mining employment was 12 years (interquartile range 3 -29 years). The majority (59%) had engaged in some underground coal mining; the remainder had only worked in surface mining. One in four (56) reported having received a diagnosis of CWP. Only 12 (5%) of the respondents were still employed as coal miners. Among all 1428 participants, 50% (711) reported any past traumatic event consistent with the PTSD screening questionnaire. Trauma was similar but statistically more frequent among those who ever worked in coal compared to all others (56% vs. 49%; $p = 0.04$). Work-related trauma was more frequent in the coal worker group, with both coal specific (21%) and non-coal work trauma (14%). Trauma from any physical accident (including vehicular/occupational) was more common among coal workers; this difference was particularly marked for work-related trauma (21% vs. 8%; $p < 0.001$). The coal miners more frequently had witnessed trauma (26% vs. 15%; $p < 0.001$); the majority (39 of 60) had witnessed the trauma specifically in coal mining.

We carried out multivariable logistic regression modeling of coal mining risk for depression, anxiety, and PTSD, taking into account prior trauma, age, smoking status, obesity, and educational level. Coal mining was associated with 60% increased odds of depression (OR 1.6; 95% CI 1.1 to 2.4) and 73% increased odds of anxiety (OR 1.7; 95% CI 1.1 to 2.7). In contrast, in analysis limited to those with any traumatic event ($n = 711$), coal mining was not associated with increased risk of PTSD. Further analysis of depression, anxiety, and PTSD risk by source of trauma showed that non-work-related trauma was not statistically associated with depression, whereas work-related trauma from non-coal and from coal events were associated with similar, three-fold elevated odds of depression (OR 3.2 [95% CI 2.2 to 4.5] and OR 3.5 [95% CI 1.8 to 6.8], respectively). In contrast, non-work trauma was associated with increased odds of anxiety (OR 1.6; 95% CI 1.0 to 2.6); non-coal trauma was associated with increased odds of anxiety similar to that for depression (OR 3.2; 95% CI 2.0 to, 5.1); while the odds of anxiety associated with coal trauma were increased six-fold (OR 6.0; 95% CI 2.9 to 12.4). For the analysis of PTSD, limited to those with any trauma ($n = 711$) and those with non-work-related trauma as the referent, the odds of PTSD were more than doubled but were similar for non-coal or coal-related work events.

Our findings support the conclusion that there is increased risk of morbidity from depression, anxiety, and PTSD among coal miners. Coal mining is well recognized as a risky occupation for work-related physical injury and CWP. Our study adds to that by showing that coal mining also is associated with increased odds of depression, anxiety, and PTSD. Interventions intended to promote coal mining safety and prevent lung disease also should take mental health morbidity into account.

2.0 Problem Statement and Objectives

The prevalence of depressive symptoms, anxiety, and post-traumatic stress disorder (PTSD) among coal miners in Appalachia may be at a crisis level. In May 2021, Harris and colleagues published a provocative research letter in JAMA Network Open, “Characterization of Mental Illness Among US Coal Miners.”¹ The Harris study reported that among 2364 US coal miners seen in a single Black Lung practice (Stone Mountain Health Service), more than one third (37%) reported symptoms consistent with a depression disorder (defined by the nine-item Patient Health Questionnaire [PHQ-9] score ≥ 10), and more than one in ten (11%) had active suicidal ideation. In addition, 40% provided questionnaire responses consistent with clinically significant anxiety (defined by a 2-item Generalized Anxiety Disorder [GAD-2] score ≥ 3), and 26% gave screener questionnaire responses consistent with PTSD (defined by a 4-item Primary Care–PTSD [PC-PTSD 4] score ≥ 2). Importantly, and consistent with the nature of the clinic patient population, 79.1% had coal worker’s pneumoconiosis (CWP) by chest x-ray and 210 (16.2%) had progressive massive fibrosis. Low oxygen levels (hypoxemia) were common and correlated with the mental health scores. Other published studies of mental health in coal mining or more generally in pneumoconiosis have been based on data from outside the U.S., with much of the data from Chinese mining.²⁻⁶

As concerning as the Harris study findings were, they cannot be generalized to the wider coal mining population because the presence of moderate to severe lung disease is a recognized contributor to symptoms of depression and anxiety. The correlation in the Harris study of the symptoms of depression, anxiety and PTSD to lower blood oxygen levels underscores this critical limitation. Our research plan was designed to address the current knowledge gap as to whether depression, anxiety, and PTSD are more common among former and current coal miners, even in the absence of severe disease, compared to other occupational groups. Through this study, the mental health burden in this population can be more accurately ascertained; armed with such information health resources can be appropriately deployed. To address this, our overarching project goal was to estimate the mental health burden among former and current coal miners for depression, anxiety, and PTSD. Our study aims were:

1. To accurately estimate the prevalence of symptoms of depression, anxiety, and PTSD among current and former coal miners, independent of medical care for CWP or other health conditions
2. To analyze whether coal mining is a risk factor for depression, anxiety or PTSD compared to other occupations.

3.0 Research Approach

We carried out a population-based random digit dial (RDD) survey in the same Appalachian counties that we previously studied successfully with support from the Alpha Foundation. The data we have obtained provides more accurate estimates of the burden of depressive symptoms, anxiety, and PTSD among current and former coal miners in the region and address the question of whether the prevalence of these conditions among current and former coal miners differs from those in other occupations. This addressed a fundamental limitation of the Harris study, because of that study’s reliance on data from a clinical population of persons seeking medical care for coal workers’ pneumoconiosis (CWP). The random-digit dial (RDD) survey methodology that we used corrected this limitation of the Harris study and permitted a true population-based prevalence of depression, anxiety, and post-traumatic stress disorder (PTSD) among coal miners. Moreover, our study was not limited to those with poor health status or with health care access and included persons with and without coal mining work histories.

The survey was conducted by telephone in English among random samples of males aged 50 or older with a history of any current or past labor force participation living within selected counties in the states of Kentucky, Ohio, Pennsylvania, Tennessee, Virginia, and West Virginia. We selected these Appalachian region counties because of their elevated CWP mortality rates. We demonstrated the effectiveness and validity of an RDD sample frame in our prior studies of the association of coal mining and rheumatoid arthritis in

Appalachia.^{7,8} We have also validated the general RDD approach in a population-based study of hard rock miners in New Mexico, Colorado, and Utah.⁹ The survey was carried out by Davis Research, the professional survey research firm with which we have collaborated in those previous studies.

The study target was a total of 1,500 completed interviews. When sampling eligible subjects, Davis Research took steps to ensure that the survey included an adequate representation of subjects reachable by cell phone as well as those reachable via residential landline phones. The study took advantage of the extensive sampling we did in the 2017 and 2019 studies to build the new study's sample more efficiently. Based on that experience, we excluded households that did not qualify previously. Those who completed a survey in 2017 or 2019 remained eligible; reinterview attempts were made to include them in the current study. In addition, a fresh sample of cell phone listings was developed through a random digit dial (RDD) sampling of the active cell phone area codes and exchanges serving the specified counties in the sample frame.

Our study timeline included a focus on the initial survey development over the first four months and then the pre-programming phase of questionnaire design, with months 5-6 focusing on initial programming of the computer assisted telephone interview (CATI). Study months seven through twelve were devoted to completing active data collection, initial data cleaning, and creation of a dataset for analysis. For the survey, we created an initial brief screener questionnaire confirming study eligibility based on sex, age, and employment history. The screener was structured as in our three previous surveys with the same types of screening questions. In the body of the main questionnaire, we recapitulated the core sociodemographic and work history items of our previous survey. Consistent with the study focus, validated questionnaires were used to measure depression, anxiety, and PTSD: the 8-item Patient Health Questionnaire (PHQ)-8, the 7-item Generalized Anxiety Disorder (GAD) questionnaire, and the standard 5-item screening battery, the "Primary Care PTSD Screen."¹⁰⁻¹³ Importantly, we supplemented the PTSD Screen with the Brief Trauma Questionnaire to capture specific coal mining events that might have led to PTSD symptoms among coal miners.¹⁴ The main survey questionnaire is provided in Appendix 1.

We tabulated characteristics for the total sample and compared characteristics of respondents with and without a history of coal mining using chi-square analyses for categorical variables and t-tests for continuous variables. We compared traumatic experiences captured in the Brief Trauma Questionnaire among respondents with and without coal mining experience, using chi-square tests. We examined the associations between coal mining and the three mental health outcomes: depression (PHQ-8 ≥ 10), anxiety (GAD-7 ≥ 10) and post-traumatic stress (PC-PTSD-5 ≥ 3). We estimated odds ratios and 95% confidence intervals from logistic regression models, with and without adjustment for trauma (work-related or non-work related), age, education, smoking (ever), and obesity (BMI ≥ 30 based on self-reported height and weight). Because PTSD is conditioned on experience of trauma, the analyses for that variable were limited to respondents who reported traumatic experiences in the screener. Turning to the four-level source of trauma rather than the dichotomous measure of coal mining experience, we examined the associations between source of trauma and the three outcomes, in logistic regression models with and without adjustment for age, education, smoking, and obesity. As a sensitivity analysis, we re-estimated the model for anxiety excluding participants who reported a diagnosis of coal worker's pneumoconiosis (CWP).

4.0 Research Findings and Accomplishments

Table 1 (following page) shows the characteristics of the 1428 study participants whose data were analyzed by coal mining status. Of 1428, 233 (16.3%) reported coal mining employment. Age, race/ethnicity, and the proportion of ever smokers were similar between the miners and all others. Coal miners, however, had statistically significantly lower educational attainment and lower household incomes compared to the non-coal miner study participants. Among the coal miners 48% self-reported fair or poor health compared to 28% of non-miners ($p < 0.001$).

	All	Any Coal Mining Employment	No Coal Mining Employment	p-value
	(n=1428)	(n=233)	(n=1234)	
Age, mean±sd	66.4± 9.2	67.2± 8.3	66.3± 9.4	0.17
Race/ethnicity				0.99
White	1326 (94%)	211 (94%)	1115 (94%)	
Black	25 (2%)	4 (2%)	21 (2%)	
All other races (includes Hispanic ethnicity)	61 (4%)	10 (4%)	51 (4%)	
Education				<0.001
HS or less	315 (22%)	83 (37%)	232 (19%)	
Some college, no 4 year degree	544 (38%)	94 (41%)	450 (37%)	
4 year college degree or more	569 (40%)	50 (22%)	519 (43%)	
Household income				<0.001
< \$40,000	383 (29%)	81 (38%)	302 (27%)	
\$40,000 - 79,999	432 (32%)	74 (35%)	358 (32%)	
\$80,000 or more	517 (39%)	56 (27%)	461 (41%)	
Self-reported fair or poor health	447 (31%)	109 (48%)	338 (28%)	<0.001
Obesity (BMI≥30)	659 (46%)	122 (54%)	537 (45%)	0.01
Ever smoker	752 (53%)	121 (53%)	631 (53%)	0.83
Alcohol consumption >28 drinks/month	200 (14%)	21 (9%)	179 (15%)	0.02
Cells are n(%) unless indicated				
Statistical tests: χ^2 for categoric variables, Mantel-Haenszel χ^2 test for ordinal, t-test for continuous (age)				
Number of missing values: race/ethnicity (16), income (96), years of exposure (19)				

Of the 233 coal miners, the median duration of mining employment was 12 years (interquartile range 3 - 29 years). The majority (59%) had engaged in some underground coal mining; the remainder had only worked in surface mining. One in four (56) reported having received a diagnosis of CWP. Only 12 (5%) of the respondents were still employed as coal miners. Of 1428 participants, 50% (711) reported any past traumatic event consistent with the PTSD screening questionnaire.

Trauma was statistically more frequent among those who ever worked in coal compared to all others (56% vs. 49%; $p=0.04$). Work-related trauma was more frequent in the coal worker group, with both coal specific (21%) and non-coal work trauma (14%) contributing to the 35% prevalence. Trauma from any physical accident (including vehicular and occupational) was more common among the coal worker group, and this difference was particularly marked for work-related trauma (21% vs. 8%; $p<0.001$). The coal miners more frequently had witnessed trauma (26% vs. 15%; $p<0.001$); the majority (39 of 60) had witnessed the trauma specifically in coal mining.

	All	Any Coal Mining Employment	No Coal Mining Employment	
	(n=1428)	(n=227)	(n=1201)	
	n (%)	n (%)	n (%)	p-value
Any Traumatic Event	711 (50%)	127 (56%)	584 (49%)	0.04
Work-Related Trauma				0.001
No traumatic event	717 (50%)	100 (44%)	617 (51%)	
Only non-work related event(s)	364 (25%)	48 (21%)	316 (26%)	
Work-related event(s)	347 (24%)	79 (35%)	268 (22%)	
Only non-coal work related event(s)	300 (21%)	32 (14%)	268 (22%)	NA
Any coal work related event(s)	47 (3%)	47 (21%)	--	NA
Source, Experienced Serious Danger or Injury				
War zone/war casualties	161 (11%)	23 (10%)	138 (11%)	0.55
Serious danger	132 (9%)	19 (8%)	113 (9%)	0.62
Serious injury	30 (2%)	7 (3%)	23 (2%)	0.31
Automobile/Work/Other Accident	395 (28%)	80 (35%)	315 (26%)	0.01
Serious danger	295 (21%)	66 (29%)	229 (19%)	0.001
Serious injury	174 (12%)	43 (19%)	131 (11%)	0.001
Work-related (any)	150 (11%)	48 (21%)	102 (8%)	<0.001
Coal-related		27 (12%)		
Major natural/technological disaster	299 (21%)	57 (25%)	242 (20%)	0.09
Serious danger	186 (13%)	34 (15%)	152 (13%)	0.34
Serious injury	23 (2%)	3 (1%)	20 (2%)	0.99
Work-related (any)	110 (8%)	24 (11%)	86 (7%)	0.08
Coal-related		9 (4%)		
Other traumatic situation	301 (21%)	57 (25%)	244 (20%)	0.10
Serious injury	106 (7%)	24 (11%)	82 (7%)	0.05
Work-related (any)	113 (8%)	15 (7%)	98 (8%)	0.43
Coal-related		6 (3%)		
Witnessed serious accident	473 (33%)	85 (37%)	388 (32%)	0.13
Work-related (any)	239 (17%)	60 (26%)	179 (15%)	<0.001
Coal-related		39 (17%)		NA
Childhood physical abuse	230 (16%)	34 (15%)	196 (16%)	0.61
Sexual trauma, any age	112 (8%)	12 (5%)	100 (8%)	0.12

Table 3 (following page) provides the result of multivariable logistic regression modeling of coal mining risk for depression, anxiety, and PTSD, taking into account prior trauma, age, smoking status, obesity, and educational level. Coal mining was associated with 60% increased odds of depression (OR 1.6; 95% CI 1.1 to 2.4) and 73% increased odds of anxiety (OR 1.7; 95% CI 1.1 to 2.7). In contrast, in analysis limited to those with any traumatic event (n=711), coal mining work without taking into account the source of trauma (work-related vs. non-work-related) was not associated with increased risk of PTSD.

Table 3. Association of Coal Mining Exposure and Trauma with Depression, Anxiety, and PTSD				
	Sample	Frequency n (%)	Unadjusted models	Adjusted models
Depression (PHQ8 ≥ 10)				
All respondents	1428	217 (15%)		
Any coal mining occupation			OR (95% CI)	
No	1201	164 (14%)	Referent	Referent
Yes	227	53 (23%)	1.93 (1.4, 2.7)	1.62 (1.1, 2.4)
Anxiety (GAD7 ≥ 10)				
All respondents	1428	139 (10%)		
Any coal mining occupation			OR (95% CI)	
No	1201	103 (9%)	Referent	Referent
Yes	227	36 (16%)	2.01 (1.3, 3.0)	1.73 (1.1, 2.7)
Post-traumatic Stress (PTSD screener ≥3)				
Respondents reporting trauma	711	184 (26%)		
Any coal mining occupation			OR (95% CI)	
No	584	152 (26%)	Referent	Referent
Yes	127	32 (25%)	0.96 (0.6, 1.5)	0.80 (0.5, 1.3)
PHQ-8 has a range of 0-24 points. GAD-7 has a range of 0-21 points; PTSD has a range of 0-5 points.				
OR = Odds ratio Odds ratios from logistic regression models.				

Further analysis of depression, anxiety, and PTSD risk by *source of trauma* showed that non-work-related trauma was not statistically associated with depression, whereas work-related trauma from non-coal and from coal events were associated with similar, three-fold elevated odds of depression (OR 3.2 [95% CI 2.2 to 4.5] and OR 3.5 [95% CI 1.8 to 6.8], respectively). (See Table 4. Following page) In contrast, non-work trauma was associated with increased odds of anxiety (OR 1.6; 95% CI 1.0 to 2.6); non-coal trauma was associated with increased odds of anxiety similar to that for depression (OR 3.2; 95% CI 2.0 to, 5.1). The odds of anxiety associated with coal trauma were increased six-fold (OR 6.0; 95% CI 2.9 to 12.4).

For the analysis of PTSD, limited to those with any trauma (n=711) and with those with non-work-related trauma as the referent, the odds of PTSD were more than doubled, but were similar for non-coal or coal-related work events. The results on Table 4 clarify that PTSD risk in coal miners is increased specifically through coal-work-related trauma rather than coal mining carrying added PTSD risk compared to other occupations via another mechanism (for example, motor vehicle trauma in coal miners vs. others).

Of the 56 participants who reported a diagnosis of CWP, 28 (50%) reported coal trauma, whereas 19 (11%) of the remaining 171 coal workers reported coal trauma (p<0.001). Of the 47 participants with coal trauma, 14 (30%) met the definition of anxiety. Of these 14, 9 (64%) also reported CWP. Excluding all 56 participants with CWP from the analysis, however, did not attenuate the association between coal trauma and anxiety (OR 5.9; 95% CI 1.9 to 18.0).

	Sample	Frequency n (%)	Unadjusted models	Adjusted models
Depression (PHQ8 ≥ 10)				
All respondents	1428	217 (15%)		
Source of Trauma			OR (95% CI)	
No traumatic event	717	71 (10%)	Referent	Referent
Only non-work-related event(s)	364	47 (13%)	1.35 (0.9, 2.0)	1.17 (0.8, 1.8)
Non-coal related event(s)	300	84 (28%)	3.54 (2.5, 5.0)	3.15 (2.2, 4.5)
Any coal-related event(s)	47	15 (32%)	4.27 (2.2, 8.3)	3.47 (1.8, 6.8)
Anxiety (GAD7 ≥ 10)				
All respondents	1428	0 (10%)		
Source of Trauma			OR (95% CI)	
No traumatic event	717	39 (5%)	Referent	Referent
Only non-work-related event(s)	364	35 (10%)	1.85 (1.2, 3.0)	1.62 (1.0, 2.6)
Non-coal related event(s)	300	51 (17%)	3.56 (2.3, 5.5)	3.23 (2.0, 5.1)
Any coal-related event(s)	47	14 (30%)	7.38 (3.7, 14.9)	6.03 (2.9, 12.4)
Post-traumatic Stress (PTSD screener ≥3)				
Respondents reporting trauma	711	184 (26%)		
Source of Trauma			OR (95% CI)	
Only non-work-related event(s)	364	69 (19%)	Referent	Referent
Non-coal related event(s)	300	98 (33%)	2.07 (1.5, 3.0)	2.15 (1.5, 3.1)
Any coal-related event(s)	47	17 (36%)	2.42 (1.3, 4.6)	2.41 (1.2, 4.7)
Adjusted models control for age, education, smoking, and obesity.				

5.0 Publication Record and Dissemination Efforts

A full manuscript based on these findings, “Psychological morbidity among coal miners compared to other occupations in Appalachia” has been submitted and is currently under review at the *Scandinavian Journal of Work, Health and the Environment*. This journal is open-access and has the highest impact factor among all occupational health journals which means it is the most cited by others.

6.0 Conclusions and Impact Assessment

We found that coal miners experience more prevalent work-related trauma than other persons with non-coal employment histories and, associated with that, carry an increased burden of depression and anxiety. For depression, the odds were similar for coal or non-coal work trauma, while for anxiety, trauma from coal work was associated with six-fold increased odds of this adverse outcome. Post-traumatic stress disorder was associated with work trauma as opposed to other sources, but the odds were similar for coal and non-coal work-related events. These findings support the observation of Harris and colleagues of increased risk of morbidity from depression, anxiety, and PTSD among coal miners. Our study cohort was population-based rather than drawn from a clinical care setting, reducing that as source of selection bias in the sample. The limited and conflicting biomedical literature, none from the United States except for the study by Harris and colleagues, further underscores the importance of studying such morbidity among miners in the context of other working persons. The population-based random-digit dial telephone survey methodology that we employed in this study is similar to the approach that we have

previously used in the study of rheumatologic disease risk among coal miners in Appalachia and hard rock miners in the western United States. This study design allows comparison to other employed persons in the same region who do not have mining employment histories and does not select for persons with morbidity. Our regional survey does limit generalizability to coal miners elsewhere in the United States or in other countries around the globe. We studied males over 50, few of whom were currently mining, thus our findings may not be relevant to younger male workers, nor can we make inferences about work trauma and depression, anxiety, or PTSD among women.

Coal mining is well recognized as a risky occupation for work-related physical injury and CWP. Our study adds to that by showing that coal mining also is associated with increased odds of depression, anxiety, and PTSD. Interventions intended to promote coal mining safety and prevent lung disease also should take mental health morbidity into account.

7.0 Recommendations for Future Work

Depression, anxiety, and PTSD in younger current miners in Appalachia should be studied. These morbidities in other mining populations also should be investigated further.

8.0 References

1. Harris D, McMurry T, Caughron A, Willis J, Blackburn JC, Brizendine C, Tomann M. Characterization of mental illness among US coal miners. *JAMA Netw Open*. 2021 May 3;4(5):e2111110.
2. Joaquim AC, Lopes M, Stangherlin L, et. al. Mental health in underground coal miners. *Arch Environ Occup Health* 2018; 73:334-43.
3. Liu L, Wen F, Xu X, Wang L. Effective resources for improving mental health among Chinese underground coal miners: perceived organizational support and psychological capital. *J Occup Health* 2015; 57:58-68
4. Yildiz T, Eşsizoğlu A, Onal S, et. al. Quality of life, depression and anxiety in young male patients with silicosis due to denim sandblasting. *Tuberk Toraks* 2011;59:120-5.
5. Lee HM, Liu DY, Hsu HL, et. al. Risk of depression in patients with pneumoconiosis: A population-based retrospective cohort study. *J Affect Disord*. 2024; 352:146-52.
6. Wang HH, Zhang ZJ, Tan QR, et. al. Psychopathological, biological, and neuroimaging characterization of posttraumatic stress disorder in survivors of a severe coalmining disaster in China. *J Psychiatr Res* 2010; 44:385-92.
7. Schmajuk G, Trupin L, Yelin E, Blanc PD. Prevalence of arthritis and rheumatoid arthritis in coal mining counties of the U.S. *Arthritis Care Res (Hoboken)* 2019; 71:1209-15.
8. Schmajuk G, Trupin L, Yelin EH, Blanc PD. Dusty trades and associated rheumatoid arthritis in a population-based study in the coal mining counties of Appalachia. *Occup Environ Med* 2022; 79:308–14.
9. Blanc PD, Trupin L, Yelin EH, Schmajuk G. Assessment of risk of rheumatoid arthritis among underground hard rock and other mining industry workers in Colorado, New Mexico, and Utah. *JAMA Netw Open*. 2022 Oct 3;5:e2236738.
10. Bovin M J, Kimerling R, Weathers FW, et. al. Diagnostic accuracy and acceptability of the Primary Care Posttraumatic Stress Disorder Screen for the Diagnostic and Statistical Manual of Mental Disorders (Fifth Edition) among US veterans. *JAMA Network Open*, 2021; 4(2), e2036733138.
11. Kroenke K, Strine TW, Spitzer RL, Williams JBW, Mokdad AH. The PHQ-8 as a measure of current depression in the general population. *J Affective Disorders* 2009; 114: 163-173.
12. Spitzer RL, Kroenke K, Williams JBW, Löwe B. A brief measure for assessing generalized anxiety disorder: the GAD-7. *Arch Intern Med* 2006;11 166:1092-97.
13. Toussaint A; Hüsinga P, Gumza A, et al. Sensitivity to change and minimal clinically important difference of the 7-item Generalized Anxiety Disorder Questionnaire (GAD-7). *J Affect Disord* 2020; 265: 395-401.12
14. Schurr P, Vielhauer M, Weathers F, Findler M. The Brief Trauma Questionnaire (BTQ) <https://www.ptsd.va.gov/professional/assessment/documents/BTQ.pdf> (accessed 3 March 2024).

9.0 Appendix Survey Questionnaire

See following pages.

**2023 UCSF Alpha Survey
 – Main Sample Screener –**

Hello, my name is _____, and I am calling from Davis Research, an independent public opinion research organization. We are conducting an important survey for one of the nation’s leading schools of medicine about some work and health-related issues. This is a legitimate public opinion survey – we are not selling anything.

- S1. We are only conducting this survey in certain states and counties in the U.S. In what state do you live?
- | | |
|-------------------------|--------|
| KENTUCKY | 1 |
| OHIO | 2 |
| PENNSYLVANIA..... | 3 |
| TENNESSEE | 4 |
| VIRGINIA | 5 |
| WEST VIRGINIA..... | 6 |
| ALL OTHER STATES.7 | →END |
| DK/PREFER NOT TO ANSWER | |
| ..... | 8 →END |

S2. And, in what county do you live?

<u>IF KENTUCKY</u>	<u>IF OHIO</u>	<u>IF PENNSYLVANIA</u>
BELL..... 01	ATHENS 01	ARMSTRONG 01
CLAY 02	BELMONT 02	BEDFORD..... 02
FLOYD 03	GALLIA..... 03	CAMBRIA..... 03
HARLAN..... 04	JEFFERSON..... 04	CARBON 04
HOPKINS..... 05	LAWRENCE 05	CENTRE 05
JOHNSON..... 06	MEIGS 06	CLARION..... 06
KNOTT..... 07	MUSKINGUM..... 07	CLEARFIELD..... 07
KNOX..... 08	PERRY 08	COLUMBIA..... 08
LAUREL 09	TUSCARAWAS 09	DAUPHIN..... 09
LESLIE 10	OTHERCOUNTY.10→END	ELK 10
LETCHER 11	DK/PREFER NOT TO ANSWER	FAYETTE..... 11
MCCREARY 12	.....REF→END	GREENE..... 12
MARTIN..... 13		INDIANA 13
MUHLENBERG 14		JEFFERSON..... 14
PERRY..... 15		LACKAWANNA 15
PIKE 16		LUZERNE 16
PULASKI 17		MONTOUR..... 17
UNION 18		NORTHUNMBERLAND.18
WHITLEY 19		SCHUYLKILL 19
OTHERCOUNTY20→END		SOMERSET..... 20
DK/PREFER NOT TO ANSWER		SUSQUEHANNA 21
... REF→END		WASHINGTON..... 22
		WAYNE 23
		WESTMORELAND 24
		WYOMING 25
		OTHER COUNTY.26 →END
		DK/PREFER NOT TO ANSWER
		.....REF →END

<u>IF TENNESSEE</u>	<u>IF VIRGINIA</u>	<u>IF WEST VIRGINIA</u>
ANDERSON 01	BUCHANAN 01	BARBOUR 01
CAMPBELL 02	DICKENSON 02	BOONE 02
CLAIBORNE 03	FAUQUIER 03	BRAXTON 03
GRUNDY 04	LEE 04	CLAY 04
HAWKINS 05	NORTON CITY 05	FAYETTE 05
MARION 06	RUSSELL 06	GREENBRIER 06
MORGAN 07	SCOTT 07	HARRISON 07
ROANE 08	TAZEWELL 08	KANAWHA 08
SCOTT 09	WASHINGTON 09	LINCOLN 09
OTHER COUNTY 10 →END	WISE 10	LOGAN 10
DK/PREFER NOT TO ANSWER	OTHER COUNY 11 →END	MCDOWELL 11
.....REF →END	DK/PREFER NOT TO ANSWER	MARION 12
	.... REF →END	MARSHALL 13
		MERCER 14
		MINERAL 15
		MINGO 16
		MONONGALIA 17
		MONROE 18
		NICHOLAS 19
		PRESTON 20
		RALEIGH 21
		RANDOLPH 22
		SUMMERS 23
		TAYLOR 24
		UPSHUR 25
		WAYNE 26
		WEBSTER 27
		WYOMING 28
		OTHER COUNTY 29 →END
		DK/PREFER NOT TO ANSWER
		REF →END

- S3. **RECORD GENDER:** (INTERVIEWER: I F YOU HAVE ANY DOUBT AS TO RESPONDENT'S GENDER, SAY:
Because it is sometimes difficult to determine over the phone, I am asked to confirm whether you are male or female.)
- | | |
|-------------|---|
| MALE..... | 1 |
| FEMALE..... | 2 |

LANDLINE SAMPLE

IF MAN IS ON THE TELEPHONE, SAY:

S4a. For this interview I need to speak to a male age 50 or older. Does a male age 50 or older live in your household? (IF YES, ASK) Is that you or someone else? (IF SOMEONE ELSE, ASK TO SPEAK TO THAT PERSON) (IF MORE THAN 1 MALE AGE 50 OR OLDER LIVING IN HOUSEHOLD, SAY: I'd like speak with the youngest male age 50 or older who is at home now.)

- | | | | |
|---------------------------------|---|---|---|
| SPEAKING TO ELIGIBLE MALE | | 1 | CONTINUE WITH S5A |
| ELIGIBLE MALE COMES TO PHONE | 2 | | REPEAT INTRO, THEN CONTINUE WITH S5A |
| ELIGIBLE MALE NOT AVAILABLE NOW | 3 | | CALLBACK |
| NO MALES AGE 50+ IN HOUSEHOLD | 4 | | END |
| DON'T KNOW/PREFER NOT TO ANSWER | 5 | | END |

IF WOMAN IS ON THE TELEPHONE, SAY:

S4b. For this interview I need to speak to a male age 50 or older. Does a male age 50 or older live in your household? (ASK TO SPEAK TO THAT PERSON) (IF MORE THAN 1 MALE AGE 50 OR OLDER LIVING IN HOUSEHOLD, SAY: I'd like to speak with the youngest male age 50 or older who is at home now.)

- | | | | |
|------------------------------------|---|--|---|
| ELIGIBLE MALE COMES TO PHONE | 1 | | REPEAT INTRO, THEN CONTINUE WITH S5A |
| ELIGIBLE MALE IS NOT AVAILABLE NOW | 2 | | CALLBACK |
| NO MALES AGE 50+ IN HOUSEHOLD | 3 | | END |
| DON'T KNOW/PREFER NOT TO ANSWER | 4 | | END |

S5a. What is your age?

- | | |
|--------------------------|------------------------------|
| | IF AGE 50+, GO TO S6A |
| UNDER 50 YEARS OLD.....X | → END |
| DON'T KNOW/PREFER | NOT |
| TO ANSWER | REF → ASK S5B |

IF REFUSED, ASK:

- | | | | |
|---|-------------------|-----|-----------------|
| S5b. I don't need to know exactly, but can you tell me if you are under age 50, age 50-54, 55-59, 60-64, 65-69, 70-74 or 75 or older? | UNDER AGE 50..... | 1 | →END |
| | 50-54..... | 2 | CONTINUE |
| | 55-59..... | 3 | CONTINUE |
| | 60-64..... | 4 | CONTINUE |
| | 65-69..... | 5 | CONTINUE |
| | 70-74..... | 6 | CONTINUE |
| | 75 OR OLDER..... | 7 | CONTINUE |
| | DON'T KNOW/PREFER | NOT | |
| | TO ANSWER | 8 | →END |

S6a. Did you ever work for pay or profit for one year or longer, including civilian and military duties?

- | | | |
|-------------------|---|------------------|
| YES..... | 1 | GO TO S10 |
| NO | 2 | ASK S6B |
| DON'T KNOW/PREFER | | NOT |
| TO ANSWER | 3 | ASK S6B |

IF NO OR REFUSED, ASK:

- | | | | |
|---|---------------------|---|------------------|
| S6b. Did you ever work without salary or pay on a farm or family business for one year or more? | YES..... | 1 | GO TO S10 |
| | NO | 2 | END |
| | DON'T KNOW/PREFER | | |
| | NOT TO ANSWER | 3 | END |

CELL PHONE SAMPLE

• **IF MALE FROM S3, GO TO S8A; IF FEMALE FROM S3, END**

S8a. What is your age?

IF AGE 50+, GO TO S9A
 IF UNDER AGE 50.....X →END
 DON'T KNOW/PREFER
 NOT TO ANSWER REF →ASK S8b

IF REFUSED, ASK:

S8b. I don't need to know exactly, but can you tell me if you are under age 50, age 50-54, 55-59, 60-64, 65-69, 70-74 or 75 or older?	UNDER AGE 50 1 →END 50-54.....2 CONTINUE 55-59.....3 CONTINUE 60-64.....4 CONTINUE 65-69.....5 CONTINUE 70-74.....6 CONTINUE 75 OR OLDER.....7 CONTINUE DON'T KNOW/PREFER NOT TO ANSWER .....8 →END
---	---

S9a. Did you ever work for pay or profit for one year or longer, including civilian and military duties? **(IF PAUSES OR IS CONFUSED, SAY: Have you ever been employed for 1 year or more in your lifetime?)**

YES.....1 GO TO S10
 NO2 ASK Q9B
 DON'T KNOW/PREFER NOT
 TO ANSWER3 ASK Q9B

IF NO OR REFUSED, ASK:

S9b. Did you ever work without salary or pay on a farm or family business for one year or more?	YES.....1 GO TO S10 NO .....2 END DON'T KNOW/PREFER NOT TO ANSWER .....3 END
---	---

IF ELIGIBLE FROM S6 OR S9, SAY

S10. You are eligible to participate in an important study about the impact of work on health. Upon completing the survey, we will send you a \$10 gift card to Amazon or Starbucks. It will not take long, only about 15-20 minutes for most people . . . It is completely voluntary and you can stop at any point . . . The study's principal investigator is Dr. Paul Blanc at the University of California, School of Medicine. Would you like to participate?	YES, PROCEED.....1 → CONTINUE YES, BUT CALL BACK LATER..2 → CALLBACK UNSURE/HAS QUESTIONS...3 → SEE BELOW NO, PREFER NOT TO PARTICIPATE. 4 →END
--	--

(IF UNSURE OR HAS QUESTIONS, SAY) If you have any questions, we can give you the telephone number of Dr. Blanc's office or for the Office of Research Affairs at the University. **(IF REQUESTED)** Dr. Blanc's research office telephone number is 415-476-8030. The University Office of Research Affairs telephone number is 415-476-1814.

IF CELL PHONE LISTING, ASK

S11. For your safety, are you currently driving a motor vehicle, operating heavy equipment or in a place that is unsafe to do the survey?	YES,.....1→ CALLBACK NO.....2→ CONTINUE
---	--

IF CALLBACK FROM S10 OR S11, ASK:

S12a. When would be a good time for us to call back?	RECORD DAY AND TIME OF CALLBACK
S12b. So our interviewer can ask for you to speak to (that person) (you) by name, what is (his) (your) first name?	RECORD FIRST NAME FOR CALLBACK

2023 UCSF Alpha Survey Main Questionnaire

Before we begin, I need to tell you that my supervisor sometimes monitors these interviews to ensure quality and courtesy.

The first questions concern work and employment.

1. Are you currently employed for pay or profit either full or part time? YES 1 (ASK Q1A)
NO.....2 (SKIP TO Q2)
DK/PREFER NOT TO ANSWER 3 (SKIP TO Q2)

IF Q1=YES, ASK:

- 1a. Do you currently work in coal mining? YES.....1 (SKIP TO Q3)
NO..... 2 (ASK Q2)
DK/PREFER NOT TO ANSWER 3 (ASK Q2)

IF Q1=NO OR DK OR Q1A=NO OR DK, ASK:

2. Did you ever work in coal mining? YES.....1 (ASK Q3)
NO.....2 (SKIP TO Q5)
DJ/PREFER NOT TO ANSWER,3(SKIP TO Q5)

IF Q1A=YES OR Q2=YES, ASK:

3. Did this ever include underground mining? YES 1 (ASK Q3A)
NO.....2 (GO TO Q4)
DON'T KNOW/PREFER NOT TO ANSWER 3 (GO TO Q4)

IF Q3=YES, ASK:

- 3a. Did this ever include room and pillar mining? YES..... 1 (GO TO Q3B)
NO 2 (GO TO Q3G)
DON'T KNOW/PREFER NOT TO ANSWER 3 (GO TO Q3G)

IF Q3A=YES, ASK:

- 3b. Did you ever pull pillars or do retreat mining? YES.....1
NO2
DON'T KNOW/PREFER NOT TO ANSWER3

- 3c. Was the room and pillar mining done by conventional mining? YES..... 1 (GO TO Q3D)
NO2 (GO TO Q3E)
DON'T KNOW/PREFER NOT TO ANSWER 3(GO TO Q3E)

IF Q3C = YES, ASK:

- 3d. Were you ever a driller or shooter? YES 1
NO2
DON'T KNOW/PREFER NOT TO ANSWER .3

- 3e. Was the room and pillar work done with continuous miner? YES 1 (GO TO Q3F)
NO2 (GO TO Q3G)
DON'T KNOW/PREFER NOT TO ANSWER 3 (GO TO Q3G)

IF Q3E = YES, ASK:

- 3f. Did you ever have to cut and work beneath an unsupported top? YES 1
NO2
DON'T KNOW/PREFER NOT TO ANSWER .3

3g. Was your underground coal work ever longwall mining? YES 1 (GO TO Q3H)
 NO.....2 (GO TO Q3J)
 DON'T KNOW/PREFER NOT TO ANSWER 3 (GO TO Q3J)

IF Q3G = YES, ASK:

3h. Were you ever a longwall sheer operator or helper? YES 1
 NO.....2
 DON'T KNOW/PREFER NOT TO ANSWER..... 3

3i. Were you ever a longwall shield or jack setter? YES 1
 NO.....2
 DON'T KNOW/PREFER NOT TO ANSWER..... 3

3j. Were you ever a roof bolter? YES.....1
 NO2
 DON'T KNOW/PREFER NOT TO ANSWER3

3k. Considering all underground coal mining, for how many years in total did you do this work? _____ YEARS
 DON'T KNOW/PREFER NOT TO ANSWER.....DK

3l. What percentage of these years did you work at the coal face? _____ PERCENT (0%-100%)
 DON'T KNOW/PREFER NOT TO ANSWERDK

IF Q1A OR Q2=YES, ASK:

4. Did your coal mining work ever include surface or strip mining? YES.....1 (GO TO Q4A)
 NO2 (GO TO Q5)
 DON'T KNOW/PREFER NOT TO ANSWER 3 (GO TO Q5)

IF Q4=YES, ASK:

4a. In this work did you do drilling or blasting? YES1
 NO2
 DON'T KNOW/PREFER NOT TO ANSWER3

4b. In this work did you operate a bulldozer, dragline, or scraper? YES1
 NO2
 DON'T KNOW/PREFER NOT TO ANSWER3

4c. Were you a high wall continuous miner or auger operator or helper? YES1
 NO2
 DON'T KNOW/PREFER NOT TO ANSWER3

4d. Considering all surface or strip coal mining, for how many years in total did you do this work? _____ YEARS
 DON'T KNOW/PREFER NOT TO ANSWER .DK
 LESS THAN 1 YEAR.... X

Now, some questions about your health.

5. In general, would you say your health is excellent, very good, good, fair, or poor? EXCELLENT 1
VERY GOOD 2
GOOD 3
FAIR 4
POOR 5
DK/PREFER NOT TO ANSWER 6
6. Are you limited in any way in any activities because of a long-term physical condition? (**DO NOT COUNT RETIREMENT AS A LONG-TERM HEALTH PROBLEM**) YES 1
NO 2
DK/PREFER NOT TO ANSWER 3
7. Have you ever received care at a Black Lung Clinic? (**PROMPT IF NEEDED:** A Black Lung Clinic is a Federally funded medical clinic that focuses on the diagnosis and treatment of coal miner lung disease.) YES 1
NO 2
DK/PREFER NOT TO ANSWER 3
8. Has a medical doctor ever told you that you have black lung, or have you ever applied for benefits for this condition? YES 1 [GO TO Q8a]
NO 2 [GO TO Q9]
DK/PREFER NOT TO ANSWER 3 [GO TO Q9]

IF Q8=YES, ASK:

8a. Did this include large lung nodules (nod-jewels) or Caplan's syndrome? (IF NECESSARY: Caplan's syndrome is a lung disease.)	YES 1 NO 2 DK/PREFER NOT TO ANSWER 3
---	--

9. Have you ever received care or benefits paid through workers compensation? YES.... 1 (IF Q1A=1 OR Q2=1 ASK Q9A, ELSE GO TO Q10)
NO 2 (GO TO Q10)
DK//PREFER NOT TO ANSWER 3(GO TO Q10)

IF Q9=1 AND (Q1A=YES OR Q2=YES), ASK:

9a. Was this this related to your work in coal mining?	YES 1 NO 2 DK/PREFER NOT TO ANSWER 3
--	--

10. Have you smoked at least 100 cigarettes in your entire life? YES 1
NO 2
DON'T KNOW/PREFER NOT TO ANSWER 3

IF Q10 = YES, ASK:

10a. About how old were you when you first started smoking cigarettes?	_____ YEARS OLD DON'T KNOW/PREFER NOT TO ANSWER.. DK
10b. Do you now smoke cigarettes every day, some days, or not at all?	EVERY DAY 1 SOME DAYS 2 NOT AT ALL 3 DON'T KNOW/PREFER NOT TO ANSWER 4
10c. On the average, [if 10b=3, say: over the years you smoked], about how many cigarettes do/did you smoke a day?	_____ CIGARETTES DON'T KNOW/PREFER NOT TO ANSWER.DK
10d. Not counting years you may have quit, for how many years altogether (have you smoked) (did you smoke) cigarettes?	_____ YEARS DON'T KNOW/PREFER NOT TO ANSWER.DK

11. During the past month, have you had at least one drink of any alcoholic beverage, such as beer, wine, or liquor? YES.....1
 NO.....2
 DON'T KNOW/PREFER NOT TO ANSWER 3

IF Q11=1, ASK Q11A-C:

11a.	During the past month, how many days per week or month did you drink any alcoholic beverages, on average?	_____ DAYS PER WEEK _____ DAYS PER MONTH DON'T KNOW/PREFER NOT TO ANSWER. DK
11b.	If a drink is considered one can or bottle of beer, one glass of wine, one cocktail or one shot of liquor, on the days when you drank, about how many drinks did you have on the average?	_____ DRINKS PER OCCASION DON'T KNOW/PREFER NOT TO ANSWER. DK
11c.	Considering all types of alcoholic beverages, how many times during the past month did you have five or more drinks on an occasion?	_____ TIMES DON'T KNOW/PREFER NOT TO ANSWER. DK

The next set of questions have to do with your mood. If any of these raise feelings of distress or sadness, please contact your doctor to discuss them.

12. Over the last two weeks have you had any of the following problems. **(READ ITEMS ONE AT A TIME, ASKING)** Over the last two weeks how often did you feel this way – not at all, several days, more than half the days or nearly every day?

	NOT AT ALL	SEVERAL DAYS	MORE THAN HALF THE DAYS	NEARLY EVERY DAY	DON'T KNOW/ PREFER NOT TO ANSWER
a. Little interest or pleasure in doing things .	..... 1	..... 2	..... 3	..... 4	..... 5
b. Feeling down, depressed, or hopeless. ....	..... 1	..... 2	..... 3	..... 4	..... 5
c. Trouble falling or staying asleep or sleeping too much.....	..... 1	..... 2	..... 3	..... 4	..... 5
d. Feeling tired or having little energy.....	..... 1	..... 2	..... 3	..... 4	..... 5
e. Poor appetite or overeating.....	..... 1	..... 2	..... 3	..... 4	..... 5
f. Feeling bad about yourself — or that you are a failure or have let yourself or your family down.....	..... 1	..... 2	..... 3	..... 4	..... 5
g. Trouble concentrating on things, such as reading the newspaper or watching television.....	..... 1	..... 2	..... 3	..... 4	..... 5
h. Moving or speaking so slowly that other people could have noticed? Or the opposite - being so fidgety or restless that you have been moving around a lot more than usual	..... 1	..... 2	..... 3	..... 4	..... 5

13. Over the last two weeks how often did you feel this way – not at all, several days, more than half the days or nearly every day?

	NOT AT <u>ALL</u>	SEVERAL <u>DAYS</u>	MORE THAN HALF THE <u>DAYS</u>	NEARLY <u>EVERY DAY</u>	DON'T KNOW/ PREFER NOT <u>TO ANSWER</u>
a. Feeling nervous, anxious, or on edge.....	1	2	3	4	5
b. Not being able to stop or control worrying.	1	2	3	4	5
c. Worrying too much about different things.	1	2	3	4	5
d. Trouble relaxing.	1	2	3	4	5
e. Being so restless that it is hard to sit still	1	2	3	4	5
f. Becoming easily annoyed or irritable.....	1	2	3	4	5
g. Feeling afraid as if something awful might happen	1	2	3	4	5

14. Sometimes things happen to people that are unusually or especially frightening, horrible, or traumatic. For example: a serious accident or fire; a physical or sexual assault or abuse; an earthquake or flood; a war; seeing someone be killed or seriously injured; having a loved one die through homicide or suicide? Have you ever experienced this kind of event?
- | | |
|------------------------------|---|
| YES, ONLY ONCE..... | 1 |
| YES, MORE THAN ONCE..... | 2 |
| YES, BUT CANNOT SPECIFY..... | 3 |
| NONE..... | 4 |
| NOT SURE..... | 5 |
| DK/PREFER NOT TO ANSWR..... | 6 |

IF NONE, NOT SURE OR DECLINE TO STATE, SKIP TO Q23

IF YES, ASK

Please take your time to think about (this event) (these events) when answering. In the past month, have you . . . (READ ITEMS ONE AT A TIME)		
	<u>NO/DK</u>	<u>YES</u>
14a. Had nightmares about the event(s) or thought about the event(s) when you did not want to? .....	...1 ....	..2
14b. Tried hard not to think about the event(s) or went out of your way to avoid situations that reminded you of the event(s)/.....	...1 ....	..2
14c. Been constantly on guard, watchful, or easily startled?.....	...1 ....	..2
14d. Felt numb or detached from people, activities, or your surroundings?.....	...1 ....	..2
14e. Felt guilty or unable to stop blaming yourself or others for the event(s) or any problems the event(s) may have caused? .....	...1 ....	..2

IF YES TO Q14, ASK – (ALL OTHERS SKIP TO Q23)

The following questions ask about events that may be extraordinarily stressful or disturbing for almost everyone. Please tell me if these have happened to you.

- | | | |
|-----|--|----------------------------------|
| 15. | Have you ever served in a war zone, or have you ever served in a noncombat job that exposed you to war-related casualties (IF NEEDED: for example, as a medic or on graves registration duty?) | NO/DON'T KNOW.....1
YES.....2 |
|-----|--|----------------------------------|

IF YES TO Q15, ASK

- | | | |
|------|--|----------------------------------|
| 15a. | Did you think your life was in danger or you might be seriously injured? | NO/DON'T KNOW.....1
YES.....2 |
|------|--|----------------------------------|

IF YES TO Q15a ASK

- | | | |
|------|-----------------------------|----------------------------------|
| 15b. | Were you seriously injured? | NO/DON'T KNOW.....1
YES.....2 |
|------|-----------------------------|----------------------------------|

- | | | |
|-----|---|----------------------------------|
| 16. | Have you ever been in a serious car accident or a serious accident at work or somewhere else? | NO/DON'T KNOW.....1
YES.....2 |
|-----|---|----------------------------------|

IF YES TO Q16, ASK

- | | | |
|------|--|----------------------------------|
| 16a. | Did you think your life was in danger or you might be seriously injured? | NO/DON'T KNOW.....1
YES.....2 |
|------|--|----------------------------------|

IF YES TO Q16A, ASK

- | | | |
|------|-----------------------------|----------------------------------|
| 16b. | Were you seriously injured? | NO/DON'T KNOW.....1
YES.....2 |
|------|-----------------------------|----------------------------------|

IF (YES TO Q16) AND COAL MINING (Q1A=YES OR Q2=YES), ASK

- | | | |
|------|---------------------------------------|----------------------------------|
| 16c. | Did this happen on a coal mining job? | NO/DON'T KNOW.....1
YES.....2 |
|------|---------------------------------------|----------------------------------|

IF NO TO Q16c, ASK

- | | | | | | | |
|----------------|---------------------------------|--|----------------|------------|---------|------|
| 16d. | Did this happen on another job? | <table border="0"> <tr> <td style="text-align: center;"><u>NO / DK</u></td> <td style="text-align: center;"><u>YES</u></td> </tr> <tr> <td style="text-align: center;">...1...</td> <td style="text-align: center;">...2</td> </tr> </table> | <u>NO / DK</u> | <u>YES</u> | ...1... | ...2 |
| <u>NO / DK</u> | <u>YES</u> | | | | | |
| ...1... | ...2 | | | | | |

IF (YES TO Q16) AND NO COAL MINING (Q1A NOT YES AND Q2=NOT YES), ASK

- | | | |
|------|-----------------------------|----------------------------------|
| 16e. | Did this happen on the job? | NO/DON'T KNOW.....1
YES.....2 |
|------|-----------------------------|----------------------------------|

- | | | |
|-----|--|----------------------------------|
| 17. | Have you ever been in a major natural or technological disaster, such as a fire, earthquake, tornado, hurricane, explosion, or chemical spill? | NO/DON'T KNOW.....1
YES.....2 |
|-----|--|----------------------------------|

IF YES TO Q17, ASK

- | | | |
|------|--|----------------------------------|
| 17a. | Did you think your life was in danger or you might be seriously injured? | NO/DON'T KNOW.....1
YES.....2 |
|------|--|----------------------------------|

IF YES TO Q17a, ASK

- | | | |
|------|-----------------------------|----------------------------------|
| 17b. | Were you seriously injured? | NO/DON'T KNOW.....1
YES.....2 |
|------|-----------------------------|----------------------------------|

IF (YES TO Q17) AND COAL MINING (Q1A=YES OR Q2=YES), ASK

- | | | |
|------|---------------------------------------|----------------------------------|
| 17c. | Did this happen on a coal mining job? | NO/DON'T KNOW.....1
YES.....2 |
|------|---------------------------------------|----------------------------------|

IF NO TO Q17c, ASK

- | | | | | | | |
|----------------|---------------------------------|--|----------------|------------|---------|------|
| 17d. | Did this happen on another job? | <table border="0"> <tr> <td style="text-align: center;"><u>NO / DK</u></td> <td style="text-align: center;"><u>YES</u></td> </tr> <tr> <td style="text-align: center;">...1...</td> <td style="text-align: center;">...2</td> </tr> </table> | <u>NO / DK</u> | <u>YES</u> | ...1... | ...2 |
| <u>NO / DK</u> | <u>YES</u> | | | | | |
| ...1... | ...2 | | | | | |

IF (YES TO Q17) AND NO COAL MINING (Q1A NOT YES AND Q2=NOT YES), ASK

- | | | |
|------|-----------------------------|----------------------------------|
| 17e. | Did this happen on the job? | NO/DON'T KNOW.....1
YES.....2 |
|------|-----------------------------|----------------------------------|

18. Have you ever been in any other situation in which you were seriously injured, or have you ever been in any other situation in which you feared you might be seriously injured or killed? NO/DON'T KNOW.....1
YES.....2

THERE IS NO Q18A

IF YES TO Q18, ASK

18b. Were you seriously injured?	NO/DON'T KNOW.....1
	YES.....2

IF (YES TO Q18b) AND COAL MINING (Q1A=YES OR Q2=YES), ASK

18c. Did this happen on a coal mining job?	NO/DON'T KNOW.....1
	YES.....2

IF NO TO Q18c, ASK

	<u>NO / DK</u>	<u>YES</u>
18d. Did this happen on another job?	...1...	...2

IF (YES TO Q18) AND NO COAL MINING (Q1A NOT YES AND Q2=NOT YES), ASK

18e. Did this happen on the job?	NO/DON'T KNOW.....1
	YES.....2

19. (IF YES TO Q15a Q16, Q17, OR Q18, INSERT: Other than the events you already told me about,) (h)(H)ave you ever witnessed a situation in which someone was seriously injured or killed, or have you ever witnessed a situation in which you feared someone else would be seriously injured or killed? NO/DON'T KNOW.....1
YES.....2

THERE IS NO Q19A OR 19B

IF (YES TO Q19) AND COAL MINING (Q1A=YES OR Q2=YES), ASK

19c. Did this happen on a coal mining job?	NO/DON'T KNOW.....1
	YES.....2

IF NO TO Q19c, ASK

	<u>NO / DK</u>	<u>YES</u>
19d. Did this happen on another job?	...1...	...2

IF (YES TO Q19) AND NO COAL MINING (Q1A NOT YES AND Q2=NOT YES), ASK

19e. Did this happen on the job?	NO/DON'T KNOW.....1
	YES.....2

20. Before age 18, were you ever physically punished or beaten by a parent, caretaker, or teacher so that you were very frightened or thought you would be injured; or you received bruises, cuts, welts, lumps, or other injuries? NO/DON'T KNOW.....1
YES2
DON'T KNOW/PREFER NOT TO ANSWER.3

21. Has anyone ever made or pressured you into having some type of unwanted sexual contact? NO/DON'T KNOW.....1
YES2
DON'T KNOW/PREFER NOT TO ANSWER.3

IF YES TO Q16c, Q17c, Q18c OR Q19c, ASK: (ALL OTHERS SKIP TO Q23)

22. Think about a coal mining event that has caused you the most stress or difficulty or bad memories over the past week even if it happened a long time in the past. I'm going to read a list of difficulties or feelings people sometimes have after stressful life events. In the past 7 days, how much have you experienced each of these difficulties or feelings about that event. (INSERT ITEM AND READ IN ORDER, ASKING) How much have you been distressed or bothered by this -- not at all, a little bit, moderately, quite a bit or extremely?

	<u>NOT AT ALL</u>	<u>A LITTLE BIT</u>	<u>MODERATELY</u>	<u>QUITE A BIT</u>	<u>EXTREMELY</u>
a. Any reminder brought back feelings about it	.....1	..... 2	..... 3	.....4	.....5
b. I had trouble staying asleep.....	.....1	..... 2	..... 3	.....4	.....5
c. Other things kept making me think about it	.....1	..... 2	..... 3	.....4	.....5
d. I felt irritable and angry.....	.....1	..... 2	..... 3	.....4	.....5
e. I avoided letting myself get upset when I thought about it or was reminded of it.....	.....1	..... 2	..... 3	.....4	.....5
f. I thought about it when I didn't mean to. ....	.....1	..... 2	..... 3	.....4	.....5
g. I felt as if it hadn't happened or wasn't real	.....1	..... 2	..... 3	.....4	.....5
h. I stayed away from reminders of it.....	.....1	..... 2	..... 3	.....4	.....5
i. Pictures about it popped into my mind	.....1	..... 2	..... 3	.....4	.....5
j. I was jumpy and easily startled.....	.....1	..... 2	..... 3	.....4	.....5
k. I tried not to think about it.....	.....1	..... 2	..... 3	.....4	.....5
l. I was aware that I still had a lot of feelings about it, but I didn't deal with them. ....	.....1	..... 2	..... 3	.....4	.....5
m. My feelings about it were kind of numb.....	.....1	..... 2	..... 3	.....4	.....5
n. I found myself acting or feeling like I was back at that time.....	.....1	..... 2	..... 3	.....4	.....5
o. I had trouble falling asleep.....	.....1	..... 2	..... 3	.....4	.....5
p. I had waves of strong feelings about it. ....	.....1	..... 2	..... 3	.....4	.....5
q. I tried to remove it from my memory	.....1	..... 2	..... 3	.....4	.....5
r. I had trouble concentrating. ....	.....1	..... 2	..... 3	.....4	.....5
s. Reminders of it caused me to have physical reactions such as sweating, trouble breathing, nausea, or a pounding heart.....	.....1	..... 2	..... 3	.....4	.....5
t. I had dreams about it.....	.....1	..... 2	..... 3	.....4	.....5
u. I felt watchful and on-guard.....	.....1	..... 2	..... 3	.....4	.....5
v. I tried not to talk about it.....	.....1	..... 2	..... 3	.....4	.....5

And finally, some questions about yourself for classification purposes.

23. What is the highest level of school that you have completed or the highest degree that you have received? **(READ LIST ONLY IF NECESSARY)**

- 4TH GRADE OR LESS 1
- 5TH-8TH GRADE 2
- 9TH-12TH GRADE (NO HIGH SCHOOL DEGREE) 3
- HIGH SCHOOL GRADUATE 4
- SOME COLLEGE / NO DEGREE 5
- ASSOC. DEGREE / TRADE OR VOCATIONAL SCHOOL 6
- COLLEGE GRADUATE OR HIGHER 7
- DK/PREFER NOT TO ANSWER 8

24. Are you married, separated or divorced, widowed, are you a member of an unmarried couple, or have you never been married?

- MARRIED 1
- SEPARATED/DIVORCED 2
- WIDOWED 3
- UNMARRIED COUPLE 4
- NEVER BEEN MARRIED 5
- DK/PREFER NOT TO ANSWER 6

25. How many people, including yourself, live in your household?

_____ DK/PREFER NOT TO ANSWER..DK

26. For classification purposes, are you Latino or of Hispanic origin or descent?

- YES 1
- NO 2
- DK/PREFER NOT TO ANSWER 3

27. What is your racial background? Are you white, black or African American, Asian or Pacific Islander, or are you a member of another race? **(ANSWER CAN BE A MULTIPLE)**

- WHITE/CAUCASIAN 1
- BLACK/AFRICAN AMERICAN 2
- ASIAN /PACIFIC ISLANDER 3
- LATINO /HISPANIC (VOLUNTEERED)... 4
- OTHER (SPECIFY) _____ 5
- DK/PREFER NOT TO ANSWER 6

28. About how tall are you without shoes?

_____ FEET
 _____ INCHES

OR IN METRIC UNITS
 (EXAMPLE: 1 METER IS 100 CENTIMETERS)
 _____ CENTIMETERS

DK/PREFER NOT TO ANSWER.DK

29. About how much do you weigh without shoes?

_____ POUNDS

OR IN METRIC UNITS
 (EXAMPLE: 1 KILOGRAM IS 2.2 POUNDS)
 _____ KILOGRAMS

DK/PREFER NOT TO ANSWER.DK

- | | |
|---|--|
| 30. We don't need to know exactly, but just roughly could you tell me if your annual household income <u>from all sources</u> before taxes in 2022. Was it less than \$20,000, \$20,000 through \$40,000, \$40,000 through \$60,000, \$60,000 through \$80,000, \$80,000 through \$100,000, or \$100,000 or more? | LESS THAN \$20,000..... 1
\$20,000 – \$39,999..... 2
\$40,000 – \$59,999..... 3
\$60,000 – \$79,999..... 4
\$80,000 -- \$99,999 5
\$100,000 OR MORE..... 6
DK/PREFER NOT TO ANSWER 7 |
| 31. Is the telephone that I dialed to reach you a landline phone or a cell phone? | LANDLINE PHONE..... 1
CELL PHONE 2
OTHER 3
DK/PREFER NOT TO ANSWER 4 |

IF Q31=LANDLINE, OTHER OR DK, ASK:

- | | |
|--|---|
| 31a. Do you make and receive personal calls from a cell phone? | YES..... 1
NO 2
DK/PREFER NOT TO ANSWER ... 3 |
|--|---|

IF Q31=CELL PHONE, ASK:

- | | |
|--|---|
| 31b. Is there a telephone inside your home that you use to make and receive personal calls that is not a cell phone? | YES 1
NO 2
DK/PREFER NOT TO ANSWER..... 3 |
|--|---|

IF Q31a OR Q31b =YES, ASK:

- | | |
|--|---|
| 31c. Of all the personal telephone calls that you receive, do you get most of them on a landline phone or on a cell phone? | MOST ON LANDLINE PHONE 1
MOST ON CELL PHONE 2
ABOUT EQUAL (VOLUNTEERED..... 3
DK/PREFER NOT TO ANSWER..... 4 |
|--|---|

- | | |
|---|--|
| 32a. These are all the questions I have. To thank you for your participation, we would like to send you a \$10 gift card for completing this survey. What type of gift card would you like? | \$10 AMAZON GIFT CARD.....1
\$10 STARBUCKS GIFT CARD.....2
I DO NOT USE AMAZON OR STARBUCKS...3
PREFER NOT TO RECEIVE.....4 (GO TO END) |
|---|--|

IF Q32a =1 OR 2, ASK:

- | | |
|---|--|
| 32b. What e-mail address can we send that to? Please note that it takes up to a week to receive the gift card and it will come directly from (Amazon) (Starbucks). If you do not receive the gift card in a week please e-mail us at surveyinfo@davisresearch.com and we will investigate. Please reference your ID of (REFERENCE # PLAYED BACK). | ENTER E-MAIL ADDRESS.....1
PREFER NOT TO RECEIVE....2 (GO TO END) |
| FIRST NAME: _____
LAST NAME: _____
EMAIL: _____ | |

IF Q32a = 3 ASK:

32c. We can also send you a \$10 check. To what address and name should we send the check? Please note that it may take up to two weeks to receive the check and it will come in a Davis Research envelope. If you do not receive the check in two weeks, please email us at surveyinfo@davisresearch.com and we will investigate. Please reference your ID of (REFERENCE # PLAYED BACK). The electronic gift card option will likely take much less time as an option.

ENTER MAILING ADDRESS FOR CHECK...1
\$10 AMAZON GIFT CARD 2
\$10 STARBUCKS GIFT CARD 3
PREFER NOT TO RECEIVE 4 (GO TO END)

IF Q32c = 1 ASK:

Your check will be processing and mailed to you within 14 business days. Please provide the following information?

FIRST NAME: _____
LAST NAME: _____
EMAIL: _____
ADDRESS 1: _____
ADDRESS 2: _____
CITY: _____
STATE: _____
ZIP CODE: _____
PREFER NOT TO RECEIVEREF

That completes our public opinion survey. Thank you very much for participating in this important survey.