

## **Attachment 1: NIOSH response to questions raised by OMB**

November 12, 2019

### Purpose of the 2021 National Health Interview Survey Occupational Health Supplement (NHIS-OHS)

The National Institute for Occupational Safety and Health (NIOSH), part of the Centers for Disease Control and Prevention (CDC) relies on data collected through population-based surveys to study aspects of occupational safety and health that are not well-covered by traditional occupational health surveillance systems. For example, NIOSH has been able to study many occupational health outcomes included in National Health Interview Survey Occupational Health Supplements (NHIS-OHS) conducted in 2010 and 2015 (See <https://www.cdc.gov/niosh/topics/nhis/default.html>). NIOSH has recently allocated funding to the development of a new NHIS-OHS to be administered in 2021. The 2021 NHIS-OHS will build on the 2010 and 2015 NHIS-OHS's sponsored by NIOSH but will have a narrower focus. The 2021 NHIS-OHS questions will focus on characteristics of healthy work design, emphasizing detailed characterization of work arrangements, work schedules, and workplace psychosocial exposures. NIOSH has submitted a proposed set of questions related to these issues to NCHS for cognitive testing.

### Purpose of cognitive testing

Cognitive testing will identify the ways in which respondents interpret each question and provide evidence for question validity when the patterns of interpretation fall within the scope of the questions' intent. There may be concern that the cognitive testing will reveal problems with the questionnaire without providing suggestions for question improvement. However, this project will contain iterative rounds of cognitive testing to allow CCQDER, NIOSH, and DHIS to revise questions based on the findings of the cognitive interviews and then cognitively test the revised questionnaire. Iterative cognitive testing will provide data on how the revised questionnaire performs; therefore, resulting in a full set of validated questions.

### Rationale for the proposed set of questions

One of the top priorities of the new Healthy Work Design (HWD) and Well-being research program at NIOSH is to develop a systematic line of research examining the relationship between work arrangements and worker safety, health, and well-being. As described in the NIOSH Strategic Plan, NIOSH has defined a standard work arrangement as "an arrangement that is secure or permanent (career). These workers have employee status, stable and adequate pay, access to health insurance, paid leave and retirement benefits, a regular, full-time work schedule, and the ability to negotiate their schedule and take time off." NIOSH defines a nonstandard work arrangement as "an arrangement that differs in some way from the standard arrangement." NIOSH also defines two related concepts: contingent workers and precarious employment. Contingent workers are those with a job that they do not expect to last. Precarious employment has some degree of the following: insecurity, temporariness, vulnerability to unfair treatment, lack of ability to negotiate pay, benefits, and work schedule, lack of ability to take leave, and lack of social safety net including unemployment and workers' compensation insurance. As evident in these definitions, work schedules and workplace psychosocial exposures are intertwined with work arrangements.

Nonstandard work arrangements and work schedules have not been comprehensively characterized with regard to their implications for occupational safety and health, but there is evidence that workers in some nonstandard arrangements are more likely to experience lower pay, less access to fringe benefits (including health insurance), financial stress, increased exposure to poor psychosocial work environments, safety hazards, job stress, and poor health-related quality of life (Asfaw et al, 2017; Alterman et al, 2017; Ray et al., 2017; Foley, 2017). The proposed 2021 NHIS-OHS will help characterize several types of nonstandard work arrangements (e.g. self-employed, contractor or temporary agency worker), work schedules, and related workplace psychosocial exposures (e.g., job insecurity). The 2021 NHIS-OHS data will primarily be used to study associations between these job characteristics and

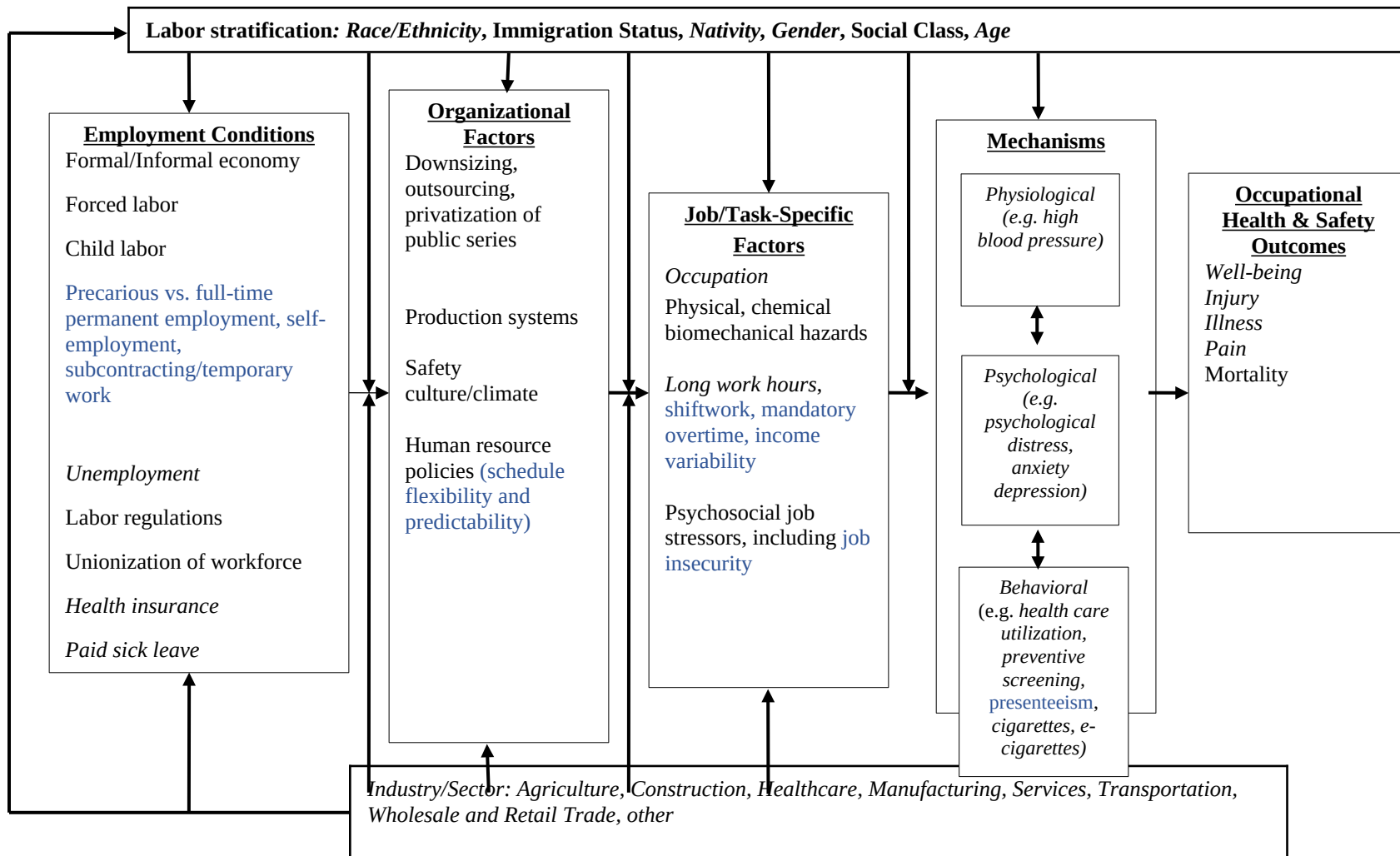
select health outcomes in order to determine which elements of work design may be associated with poor health outcomes so that they can be targeted for interventions.

Some of the elements of nonstandard work arrangements, contingent work, and precarious employment are covered by the annual or rotating content of the NHIS core adult questionnaire. The 2021 NHIS-OHS will be designed to collect data on the elements of these concepts that will not be part of the NHIS core or rotating core content. This will provide a more complete picture of these job characteristics among U.S. workers from participants in the 2021 NHIS, providing an opportunity to study associations between these job characteristics and health outcomes.

**Figure 1** describes a general model of our approach to understanding the constructs that we are proposing to examine with regard to employment conditions, organizational factors, job or task specific factors, mechanisms (physiological, psychological and behavioral) and potential associations with occupational safety and health outcomes (well-being, injury, and illness). As seen in the figure, items in italics will be covered by 2021 NHIS core questions and those in blue will be added by proposed supplemental questions to the 2021 NHIS, once approved by OMB and cognitively tested.

For example, the NHIS includes questions in the core on employment, health insurance and paid sick leave. We are proposing to add questions in 2021 (shown in blue) under employment conditions on precarious vs. full-time permanent employment, self-employment, contracting and temporary work. We also hope to add questions covering the constructs under organizational factors and human resource policies regarding schedule flexibility and predictability (shown in blue). Under job or task specific factors, the 2021 NHIS rotating core will include questions on occupation, but we are proposing to add questions regarding shift work, mandatory overtime, and income variability. Job insecurity is one construct we are proposing to add under psychosocial factors. Under Mechanisms, the 2021 NHIS has questions relating to physiological mechanisms such as high blood pressure. For psychological mechanisms, the 2021 NHIS rotating core will include the K6 psychological distress scale, as well as individual questions on anxiety and depression. Under behavioral mechanisms, the NHIS will include questions on health care utilization and preventive screening. We are planning to add a question on presenteeism (coming to work while physically ill). The 2021 NHIS includes each of the outcomes listed in Figure 1: well-being (e.g. self-rated health), injury, illness and perceptions of pain. Later studies can link participant data to mortality files.

Figure 1. Example of model showing Relationships between proposed constructs/questions and health outcomes:



Adaptation based on model from Landsbergis P, Grzywacz JG, LaMontagne A. Work Organization Job Insecurity and Occupational Health Disparities. *American Journal of Industrial Medicine*, 2014;57:495–515.  
 Items covered by 2021 NHIS core questions (annual or rotating) are in italics.  
 Constructs in blue are added by the currently proposed questions.

### Proposed analyses

**Table 1** summarizes research topics that can be examined with the data that will be collected by the proposed questions by listing key constructs measured by the proposed questions, along with relevant outcomes that will be included in the 2021 NHIS. The last two columns in the table provide additional support for studying these topics based on existing literature. References for the table are provided in Appendix B.

For example, work arrangement (nonstandard work) will be measured using two questions proposed to identify independent contractors or those working for a temporary help or staffing agency that were discussed at the National Academy of Sciences Meeting in June 2019. Relevant outcomes that will be covered in the 2021 NHIS include health insurance coverage, and the burden of paying for medical care (e.g. difficulty paying medical bills, unaffordability of health insurance, and skipping medication to save money). NIOSH researchers have previously shown in cross-sectional analyses that nonstandard workers are more likely to experience financial stress, have lower pay and fewer benefits, and are less likely to have health insurance (Alterman et al., 2017, Su et al., 2019, Asfaw et al., 2017). However, NIOSH's previous studies were based on a single multiple-choice question about work arrangements. We now believe that asking separate questions about specific types of nonstandard arrangements will be more valid. Other researchers have shown that aspects of nonstandard work are associated with depression, sickness presenteeism, injury, musculoskeletal disorders, job stress and lower health-related quality of life (Virtanen et al., 2008; Kim et al., 2016; Im et al, 2012; Foley, 2017; Lewchuck et al., 2003; Ray et al., 2017); but these studies are based in other countries or on samples of workers from a restricted set of industries or occupations. Most of these topics will be covered in the 2021 NHIS; however, there is no question in the 2021 on sickness presenteeism (Kim et al., 2016). We are proposing to add a question on sickness presenteeism which has been associated with exhaustion and impaired work performance (Aboagye et al., 2019).

As a second example, we are proposing to ask a question about how long workers can expect to have a job with their current employer which represents aspects of precarity and job insecurity. This topic has never been included in the NHIS before. As shown in Table 1, researchers have found that job insecurity is associated with poor self-rated health, frequent mental distress, and depression (Peckham et al., 2019; Ferrie et al., 2003; Virtanen et al., 2011; Burgard et al., 2009). There will be questions in the 2021 NHIS on self-rated health, psychological distress, depression and anxiety that can be further examined in descriptive analyses and cross-sectional associations. Table 1 provides examples for each of the 10 proposed questions, with a sample reference list. Complete reference information is provided in Appendix B. The literature cited is not meant to be exhaustive.

Although we are proposing to evaluate each of the questions in Appendix A with cognitive testing, only the first ten questions are proposed to be included in the 2021 NHIS Occupational Health Supplement. The remaining nine questions are for possible inclusion in NHIS future supplements, contingent on funding. Each represents related issues of importance. For example, unpredictable shifts have been associated with economic instability, chronic stress, poor worker well-being and poor work-family or work-life balance. Other questions deal with having multiple supervisors which may put workers at greater risk of injury, work engagement, electronic monitoring—which may be associated with psychological distress, and further exploration of employment characteristics (methods of payment, owning a business, professional practice or farm, and working for a private for profit vs. a private not for profit company).

### Characterization of the NHIS sample of workers

Per our previous discussion with OMB, recognizing that the sample frame for the NHIS is not workers in all occupations, we will describe our analytical sample as *workers* from a representative sample of the civilian noninstitutionalized population of the U.S. The NHIS is not specifically designed to measure small subpopulations of workers. Sampling error is likely to have a substantial impact on statistics from small subpopulations such as workers in nonstandard work arrangements. In addition, because it is

household based, it may underrepresent low income earners and earners in agriculture and mining. Presentation of prevalence estimates for any subpopulations and any correlations with health outcomes will include both point estimates and confidence intervals so that the reader understands the impact of sampling error on the conclusions from the study. We recognize the limitations on assumptions of causality from cross-sectional data but feel that providing prevalence estimates for the measured variables is useful for public health planning, monitoring and evaluation, as other data sources are lacking. Results of logistic regression analyses and calculation of prevalence ratios exploring cross-sectional associations between these aspects of work organization and workplace psychosocial factors and health can suggest areas for further research.

**Table 1. Constructs, proposed questions, NHIS 2021 relevant outcomes and supporting literature. <sup>a</sup>**

Constructs	Proposed questions (exposures)	NHIS 2021 relevant outcome	Outcomes in literature	References
<b>Work arrangement (nonstandard work)</b>				
	1-Does your employer deduct or withhold taxes from your pay? (used to identify contractors per NAS meeting)	Health insurance & burden of medical care: Unable to pay medical bills, health insurance coverage is unaffordable skipped medication to save money	Financial stress	Alterman et al., 2017
	2-Is the company that pays you at your main job a temporary help or staffing agency?		Lack of health insurance	Su et al., 2019
		Serious psychological distress (K-6)	Lower pay, fewer benefits	Asfaw et al., 2017
		Single items on depression	Depression	Virtanen et al., 2008
		Question proposed covers this	Sickness presenteeism	Kim, et al., 2016
			Sickness presenteeism	Reuter et al., 2019
		Repetitive strain injuries & accidents and injuries while working	Injury	Im et al., 2012
			Injury	Foley, 2017
			Musculoskeletal disorders	Lewchuck et al., 2003
			Job stress, health-related quality of life	Ray et al., 2017
<b>Job insecurity</b>				
	3-Provided you wish to continue working how long could you expect to have a	General health status Serious psychological distress (K-6)	Poor self-rated health, frequent mental distress	Peckham et al., 2019

Constructs	Proposed questions (exposures)	NHIS 2021 relevant outcome	Outcomes in literature	References
	job with your current employer?	Single items on depression and anxiety	Poor self-rated health, depression  Poor self-rated health, sleep, mental health Poor self-rated health, depressive symptoms	Ferrie et al., 2003  Virtanen et al., 2011 Burgard et al. 2009
<b>Shiftwork</b>				
Usual hours	4-Which of the following best describes your usual hours of work on your main job?	Self-rated health  Heart condition  Accidents & injuries while working, impact of injury General health status Serious psychological distress (K-6) Single items on depression and anxiety Depression  Cancer screening	Nonstandard work schedules at higher risk of poor health outcomes  Risk of metabolic syndrome  Sleep disorders  Cardiovascular disease  Injuries  Poor mental health, poor self-rated health  Depressed mood  Cancer screening	Fisher et al., Working Time Society Consensus Statement (example of studies listed below) Itani et al. 2017  Kerkhof 2018  Torquati et al 2018  Wong et al., 2015 Cho 2018  Driesen et al., 2010  Tsai et al., 2014

Constructs	Proposed questions (exposures)	NHIS 2021 relevant outcome	Outcomes in literature	References
		Work stress, poor work-family or work-life balance		Arlinghaus et al., 2019
<b>Presenteeism</b>				
	6-Over the past 30 days, how many days did you work while physically ill?	Serious psychological distress (K-6)	Emotional exhaustion	Miraglia & Johns, 2016
			Health behaviors – physical activity, poor sleep Influenza-like illness	Guertler et al., 2015 Chiu et al., 2017
		Physical, mental or emotional problem limit kind or amount of work Heart condition	Exhaustion	Aboagye et al., Kivimäki et al., 2005
<b>Mandatory overtime</b>				
	7-Over the past 30 days, how many mandatory hours of overtime did you work per week at your main job?	Heart condition	Job control – loss of control based on job demand control model	Näswall et al. 2015
		Accidents & injuries while working Serious psychological distress & single items on depression & anxiety	Long work hours - higher risk of injury Long work hours - higher prevalence of anxiety and depression	Dembe et al. 2005 Kleppa et al., 2008
		Heart condition	Long work hours -short sleep duration, sleep disturbance, sleep problem, exhaustion and injuries (long work hours) Long work hours - risk of	Wong et al. 2015 Kivimäki et al. 2015

Constructs	Proposed questions (exposures)	NHIS 2021 relevant outcome	Outcomes in literature	References
			stroke	
<b>Income variability or uncertainty<sup>c</sup></b>				
	<b>8</b> -How much do your earnings change from month to month?	Heart condition, access to healthcare, health insurance unaffordable	Incident CVD and all-cause mortality  Acute and chronic health outcomes: Hypoglycemia	Elfassy et al., 2019  Basu S. 2017 Basu et al., 2017
<b>Schedule predictability and flexibility</b>				
	<b>5</b> -How easy is it for you to change your work schedule to do things that are important to you or your family?	Heart condition	Metabolic syndrome  Interference with family functioning	Lin, Hsiao, & Chen, 2009  Presser 2005
	<b>9</b> -Does your work schedule at your main job change on a regular basis? <b>9a</b> -If yes, how far in advance does your employer usually tell you the hours that you need to work on a given day?	Serious psychological distress K-6 Serious psychological distress K-6, single item depression	Chronic stress Depression	Schnieder & Harknett, 2016 Rosenbaum & Morett, 2009,

<sup>a</sup> Reference list in Appendix B.

## Analyses

### Power Calculations (Previously submitted to OMB on 6/7/2019)

For purposes of power calculations, we assume the data will contain 20,000 employed respondents (2015 NHIS has >19,000.) Using design effect=1.82 (estimated from NHIS 2015,) the effective sample size will be  $20,000/1.82 = 11,000$ . Possible outcome prevalences are shown in the left column of Table 2. The center column contains prevalence ratios from 1.2 to 1.9, and the final column contains the power to detect associated prevalence ratios. For example, if the prevalence of anxiety in workers is similar to what it was in 2017 (20%), there is adequate power to detect a prevalence ratio of 1.3 or greater. With an outcome prevalence of 10% there is adequate power to detect a prevalence ratio of 1.4 or greater; and with a prevalence ratio of 5%, there is adequate power to detect a prevalence ratio of 1.6 or greater.

**Table 2. Power Calculations**

Outcome Prevalence (%)	Prevalence Ratio	Power
20	1.2	0.618
	1.3	0.909
	1.4	0.990
	1.5	0.999
	1.6	1.000
	1.7	1.000
	1.8	1.000
10	1.2	0.341
	1.3	0.611
	1.4	0.824
	1.5	0.939
	1.6	0.984
	1.7	0.996
	1.8	0.999
5	1.2	0.201
	1.3	0.362
	1.4	0.541
	1.5	0.703
	1.6	0.826
	1.7	0.907

Outcome Prevalence (%)	Prevalence Ratio	Power
	1.8	0.955
	1.9	0.980

Table 3 shows the power for odds ratios with varying prevalence of the outcome in the left-hand column (5%, 10%, 20%) assuming an odds ratio of 1.5 a confounder, and correlations of 0.2 and 0.5 (furthest right column) with a characteristic having a prevalence of 5%.

**Table 3. Power calculations with confounder and correlations.**

Outcome Prevalence (%)	Simple logistic regression		Multiple logistic regression with one confounder (OR=1.5 and Correlation=0.2)		Multiple logistic regression with one confounder (OR=1.5 and correlation=0.5)	
	Odds Ratio	Power	Odds Ratio	Power	Odds Ratio	Power
20	1.2	0.406	1.2	0.392	1.2	0.319
	1.3	0.709	1.3	0.690	1.3	0.584
	1.4	0.903	1.4	0.890	1.4	0.805
	1.5	0.978	1.5	0.973	1.5	0.929
	1.6	0.996	1.6	0.995	1.6	0.980
	1.7	>.999	1.7	>.999	1.7	0.996
	1.8	>.999	1.8	>.999	1.8	>.999
	1.9	>.999	1.9	>.999	1.9	>.999
	10	1.2	0.257	1.2	0.250	1.2
1.3		0.482	1.3	0.469	1.3	0.384
1.4		0.705	1.4	0.690	1.4	0.584
1.5		0.864	1.5	0.852	1.5	0.757
1.6		0.949	1.6	0.943	1.6	0.878
1.7		0.985	1.7	0.982	1.7	0.947
1.8		0.996	1.8	0.995	1.8	0.980
1.9		>.999	1.9	0.999	1.9	0.993
5		1.2	0.159	1.2	0.156	1.2
	1.3	0.289	1.3	0.283	1.3	0.231
	1.4	0.451	1.4	0.441	1.4	0.360
	1.5	0.616	1.5	0.604	1.5	0.502

Outcome Prevalence (%)	Simple logistic regression		Multiple logistic regression with one confounder (OR=1.5 and Correlation=0.2)		Multiple logistic regression with one confounder (OR=1.5 and correlation=0.5)	
	1.6	0.758	1.6	0.746	1.6	0.640
	1.7	0.863	1.7	0.853	1.7	0.758
	1.8	0.930	1.8	0.923	1.8	0.849
	1.9	0.967	1.9	0.963	1.9	0.912

Sample Table 4 shows an example of a descriptive table presenting weighted prevalence estimates and 95% confidence intervals for select work organization characteristics by demographic and other factors.

**Sample Table 4. Weighted prevalence estimates and 95% confidence intervals of work organization characteristics among a working U.S. adults, by demographic and geographic characteristics (National Health Interview Survey, 2021)**

	Sample <sup>b</sup>	Est. population	Somewhat or very difficult to change work schedule <sup>a</sup>		Unpredictable work schedule (changes on a regular basis) <sup>a</sup>		Mandatory overtime ≥10 hours per week <sup>a</sup>	
			Exp. <sup>c</sup>	% (95% CI)	Exp. <sup>c</sup>	% (95% CI)	Exp. <sup>c</sup>	% (95% CI)
Total								
Sex								
Female								
Male								
Age group (yrs.)								
18-29								
30-44								
45-64								
≥65								
Race/ethnicity								
Non-Hispanic white								
Non-Hispanic black								
Hispanic								
Non-Hispanic other								
Marital status								
Married/cohabiting								
Never married								
Divorced/separated/ widowed								
Children < age 18 in home								
Yes								
No								
Education								
Less than HS diploma								
HS diploma/GED								
Some college								
Bachelor's degree or more								
Poverty status								
<100% FPL								
>100% FPL								

Est., estimated; Exp., exposed; CI, confidence interval; HS, high school; GED, General Educational Development; FPL Federal poverty level; MSA, metropolitan statistical area;

Notes: All estimates weighted unless otherwise noted.

<sup>a</sup>Includes only adults who are currently working.

<sup>b</sup>Unweighted.

<sup>c</sup>Estimate of weighted population exposed to this characteristic.

\*Cells <10 were suppressed for confidentiality.

**Sample Table 4. (continued) Weighted prevalence estimates and 95% confidence intervals of work organization characteristics among working U.S. adults, by demographic and geographic characteristics (National Health Interview Survey, 2021)**

	Sample <sup>b</sup>	Est. population	Somewhat or very difficult to change work schedule <sup>a</sup>		Unpredictable work schedule (changes on a regular basis) <sup>a</sup>		Mandatory overtime ≥10 hours per week <sup>a</sup>	
			Exp. <sup>c</sup>	% (95% CI)	Exp. <sup>c</sup>	% (95% CI)	Exp. <sup>c</sup>	% (95% CI)
Class of worker								
Private company for wages								
Federal, state, or local government								
Self-employed in own business, professional or farm								
Working without pay in family owned business or farm								
Standard employment								
Non-standard employment								
Self-employed								
Employed by temporary help or staffing agency								
Place of residence								
Large MSA								
Small MSA								
Not in MSA								
Region								
Northeast								
Midwest								
South								
West								

Est., estimated; Exp., exposed; CI, confidence interval; HS, high school; GED, General Educational Development; FPL Federal poverty level; MSA, metropolitan statistical area.

Notes: All estimates weighted unless otherwise noted.

<sup>a</sup> Includes only adults who are currently working.

<sup>b</sup> Unweighted.

<sup>c</sup> Estimate of weighted population exposed to this characteristic.

\*Cells <10 were suppressed for confidentiality.

Sample Table 5 shows results of a multivariate model examining cross-sectional associations between work organization factors, adjusted for having health insurance and paid sick leave with self-rated health.

**Sample Table 5. Adjusted prevalence ratios and 95% confidence intervals for job characteristics associated with fair or poor self-rated health among employed adults in multivariate model (National Health Interview Survey, 2021) <sup>a</sup>**

Characteristic	Adjusted Prevalence Ratio <sup>a</sup> (95% Confidence Interval)	
	Women	Men
Employment type		
Standard employment		
Non-standard employment		
Self-employed (independent contractor)		
Employed by temporary help or staffing agency		
Contingent work – expect to have a job		
2 weeks or less		
More than 2 weeks but less than 3 months		
3 months to less than 1 year		
1 year but less than 3 years		
More than 3 years		
Mandatory overtime		
No		
Yes		
Have health insurance		
No		
Yes		
Paid sick leave		
No		
Yes		

<sup>a</sup> Adjusted for sociodemographic variables (age, race and Hispanic origin, education, family income and marital status) (Assumes that sex interactions are significant, but other interactions are not – will test for interactions)

## Appendix A. Questions submitted for cognitive testing

Concept: Self-employment

1. Does your employer deduct or withhold taxes from your pay?

- a. Yes
- b. No

Refused

Don't know

Concept: Temporary or staffing agency work

2. Is the company that pays you at your main job a temporary help or staffing agency?

- a. Yes
- b. No

Refused

Don't Know

\*Read If Necessary: A temporary help or staffing agency is a company that supplies workers for temporary assignments to other companies or organizations.

Concept: Contingent work

3. Provided you wish to continue working, how long could you expect to have a job with your current employer? Would you say

- a. 2 weeks or less
- b. More than 2 weeks but less than 3 months
- c. 3 months to less than 1 year
- d. 1 year but less than 3 years
- e. More than 3 years

Refused

Don't Know

Concept: Usual shift

4. Which of the following best describes your usual hours of work on your main job?

- a. Daytime shift
- b. Evening shift
- c. Night shift
- d. Rotating shift
- e. Some other shift

Refused

Don't know

\*Read if Necessary

Daytime – Most hours between 6 am and 6 pm

Evening – between 2pm and midnight

Night – Most hours between 9 pm and 8 am

Rotating – change periodically between day and evening shift, or between night shift and day or evening

Concept: Schedule flexibility

5. How easy is it for you to change your work schedule to do things that are important to you or your family? Would you say...

- a. Very easy
- b. Somewhat easy
- c. Somewhat difficult
- d. Very difficult

Refused

Don't know

Concept: Presenteeism

6. Over the past 30 days, how many days did you work while physically ill?

- a. \_\_\_\_\_ days
- b. None

Refused

Don't know

Concept: Mandatory overtime

7. Over the past 30 days, how many mandatory hours of overtime did you work per week at your main job?

- a. \_\_\_\_\_ hours per week

Refused

Don't know

\*Read If Necessary: By overtime, we mean work hours required by your employer that are over 40 hours per week.

Concept: Income variability

8. How much do your earnings change from month to month? Would you say...

- a. Not at all
- b. A small amount
- c. A moderate amount
- d. A large amount

Refused

Don't know

Concept: Schedule predictability

9.1 Does your work schedule at your main job change on a regular basis?

- a. Yes (go to 9.2)
- b. No

9.2 Approximately how far in advance does your employer usually tell you the hours that you will need to work on any given day?

- a. 1 day or less
- b. 2 to 3 days
- c. 4 to 6 days
- d. 1 to 2 weeks
- e. 2 to 4 weeks
- f. More than 1 month

Refused

Don't know

**Questions to be tested for consideration for future NHIS supplement if additional funding is received**

Concept: Organizational justice - distributive

10. Considering your performance at your main job, how fairly are you rewarded? Would you say...

- a. Very fairly
- b. Somewhat fairly
- c. Somewhat unfairly
- d. Very unfairly

Refused

Don't know

Concept: Extra shift

11. On average, how often do you have to work an extra shift on short notice, that is within a day or less.

- a. Never
- b. Once a month or less
- c. Two or three times a month
- d. Once or twice a week
- e. More than twice a week

Refused

Don't know

Concept:

Hours of work desired

12. Which statement best describes the number of hours you want to work?

- a. I want to work more hours
- b. I want to work fewer hours
- c. I work about the right number of hours

Refused

Don't know

Concept: Method of payment

13.1 Which of the following best describes how you are paid (in your main job)?

- a. Salary
  - b. Hourly wage
  - c. Some other way
- (go to 13.3)

Refused

Don't Know

13.2 Is there any other way that you are paid?

- a. No
- b. Yes

(go to 13.3)

13.3 What other way are you paid?

- c. Commission or bonus
- d. Tips
- e. Based on the quantity of work you accomplish, such as the number of jobs, number of items, services, or sales
- f. Profit from a business that you own
- g. Other

Refused

Don't know

Concept: Financial stress

14. During the past 12 months, which of the following statements best describes your home finances at the end of each month? With regard to money, do you have?

- a. more than enough
- b. just enough
- c. not enough
- d. much less than enough

Refused

Don't know

Concept: Multiple supervisors

15. Besides the employer who pays you, is there any other company or organization that also supervises you or directs how you do your job? (not asked)

- a. No, my supervisors all work for the same employer who pays me
- b. Yes, there is at least one person in another company or organization who supervises me
- c. I do not have a supervisor

Refused

Don't know

Concept: Work engagement

16. In my work, I feel alive and vital.

- a. Strongly disagree
- b. Somewhat disagree
- c. Somewhat agree
- d. Strongly agree

Refused

Don't know

Concept: NCHS considering modifying core question on type of employee

18. Which of these best describes your current work at your main job?

- a. Employee of a PRIVATE company for wages
- b. A FEDERAL government employee
- c. A STATE government employee
- d. A LOCAL government employee
- e. Self-employed
- f. Working WITHOUT PAY in a family-owned business or farm

Refused

Don't Know

18.1 [If self-employed:] Do you own a business, professional practice or farm?

- a. Yes
- b. No

Refused

Don't know

18.2 [If employee of a private company:] Do you work at a private for-profit or a private not for profit company?

- a. Private for-profit company
  - b. Private not for profit company
- Asked separately.

Concept: Electronic monitoring

19. In your job, how often do your supervisors use electronic monitoring to keep track of what you do?

- a. Not at all

- b. A little
  - c. Somewhat
  - d. A lot
- Refused  
Don't know

## Appendix B. References for Table 1.

1. Aboagye E, Björklund C, Gustafsson K, Hagberg J, Aronsson G, Marklund S, Leineweber C, Bergström G. Exhaustion and impaired work performance in the workplace - Associations with presenteeism and absenteeism. *J Occup Environ Med* 2019 online first DOI : 10.1097/JOM.0000000000001701
2. Alterman T, Asfaw A, Pana-Cryan R. Association between non-standard employment and financial stress in a nationally representative sample of U.S. Workers. Presented at the American Psychological Association/NIOSH conference on Work Stress and Health June 2017, Minneapolis, MN.
3. Arlinghaus A, Bohle P, Iskra-Golec I, Jansen N, Jay S, Rotenberg L. Working time society consensus statements: Evidence-based effects of shift work and non-standard working hours on workers, family and community. *Ind Health* 2019; 57:184-200.
4. Asfaw A, Pana-Cryan R, Alterman T. The impact of non-standard employment on earnings and benefits: Evidence from the 2010 and 2015 National Health Interview Survey. Presented at the American Psychological Association/NIOSH conference on Work Stress and Health June 2017, Minneapolis, MN.
5. Basu S, Berkowitz SA, Seligman H. The monthly cycle of hypoglycemia: an observational claims-based study of emergency room visits, hospital admissions, and costs in a commercially insured population. *Med Care* 2017; 55(7):639-645.
6. Basu S. Editorial. *AJPH Forum*. Income volatility: A preventable public health threat. *Am J Public Health* 2017; 107(12):1898-1899.
7. Burgard SA, Brand JE, House JS. Perceived job insecurity and worker health in the United States. *Soc Sci Med* 2009; 69:777–785.
8. Driesen, K, Jansen N, Kant I, Mohren DCL, Van Amelsvoort L. Depressed mood in the working population: Associations with work schedules and working hours. *Chronobiology Int* 2010;27(5): 1062-1079.
9. Chiu S, Black CL, Yue X, Greby SM, Laney AS, Campbell AP, Perio MA. Working with influenza-like illness: Presenteeism among US healthcare personnel during the 2014-2015 influenza season. *Am J Infect Control and Epidemiol* 2017; 45:1254-1258.
10. Cho Y. The effects of nonstandard work schedules on workers' health: A mediating role of work-to-family conflict. *Int J Soc Welfare* 2018; 27:74-87.
11. Dembe AE, Erickson JB, Delbos RG, Banks SM. The impact of overtime and long work hours on occupational injuries and illnesses: new evidence from the United States. *Occup Environ Med* 2005; 62:588-597.
12. Driesen K, Jansen, NWH, van Amelsvoort, LGPM, Kant I. The mutual relationship between shift work and depressive complaints – a prospective cohort study. *Scand J Work Environ Health* 2011; 37(5):402-410.
13. Elfassy T, Swift SL, Glymour MM, Calonico S, Jacobs DR, Mayeda ER, Kershaw KN, Kiefe C, Al Hazzouri AZ. Associations of income volatility with incident cardiovascular disease and all-cause mortality. *Circulation* 2019; 139:850–859.
14. Elovainio M, Leino-Arjas P, Vahterab J, Kivimäki M. Justice at work and cardiovascular mortality: a prospective cohort study. *J Psychosom Res* 2006; 61: 271– 274.
15. Elovainio M, Singh-Manoux A, Ferrie JE et al., Organisational justice and cognitive function in middle-aged employees: the Whitehall II study. *J Epidemiol Community Health* 2012; 66:552-556.

16. Ferrie JE, Shipley MJ, Stansfeld SA, Smith GD, Marmot M. Future uncertainty and socioeconomic inequalities in health: the Whitehall II study. *Soc Sci Med* 2003; 57:637-646.
17. Fischer FM, Silva-costa A, Griep HR, Smolensky MH, Bohle P, Rotenberg L. Working Time Society consensus statements: Psychosocial stressors relevant to the health and wellbeing of night and shift workers. *Ind Health* 2019; 57:175–183.
18. Foley M. Factors underlying observed injury rate differences between temporary workers and permanent peers. *Am J Ind Med* 2017; 60:841–851.
19. Guertler D, Vandelanotte, C, Short, C, Alley, S, Schoeppe, S, Duncan, MJ. The association between physical activity, sitting time, sleep duration, and sleep quality as correlates of presenteeism. *J Occup Environ Med* 2015; 53(3):321-328.
20. Herr RM, Boscha JA, Loerbroks, A, Genser B, Almer C, van Vianen AEM, Fischer JE. Organizational justice, justice climate, and somatic complaints: A multilevel Investigation. *J Psychosomatic Res* 2018; 11:15-21.
21. Im H-J, Oh D-g JuY-S, Kwon Y-J, Jang T-W, Yim J. The association between nonstandard work and occupational injury in Korea. *Am J Ind Med* 2012; 55(10):876–883.
22. Inoue A, Kawakami N, Ishizaki M, Shimazu A, Tsuchiya M, Tabata M, Akiyama M, Kitazume A, Kuroda M. Organizational justice, psychological distress, and work engagement in Japanese workers. *Int Arch Occup Environ Health* 2010; 83:29-38.
23. Itani O, Kaneita Y, Tokiya M, Jike M, Murata A, Nakagome S, Otsuka Y, Ohida T. Short sleep duration, shift work, and actual days taken off work are predictive lifestyle risk factors for new-onset metabolic syndrome: a seven-year cohort study of 40,000 male workers. *Sleep Med* 2017; 39:87–94.
24. Kerkhof GA. Shift work and sleep disorder comorbidity tend to go hand in hand. *Chronobiol Int* 2018; 35:219–28.
25. Kivimäki M, Jokela M, Nyberg ST, et al. (2015) Long working hours and risk of coronary heart disease and stroke: a systematic review and meta-analysis of published and unpublished data for 603 838 individuals. *The Lancet* 2015; 386:1739-1746.
26. Kivimäki M.; Head J, Ferrie JE Hemingway, H, Shipley, MJ, Vahtera J. Marmot, M.G. Working while ill as a risk factor for serious coronary events: The Whitehall II study. *Am J Public Health* 2005; 95:98–102.
27. Kleppa E, Sanne B, Tell GS. Working overtime is associated with anxiety and depression: The Hordaland Health Study. *J Occup Envir Med* 2008; 50(6):658-666.
28. Lewchuk W, de Wolff A, King A, Polanyi M. From job strain to employment strain: health effects of precarious employment. *Just Labour* 2003; 3(Fall):23–35.
29. Lin YC, Hsieh TJ, Chen PC. Persistent rotating shift-work exposure accelerates development of metabolic syndrome among middle-aged female employees: A five-year follow-up. *Chronobiol Int* 2009; 26(4), 740–755.
30. Näswall K, Burt CDB, Pearce M. The moderating effect of control over work scheduling and overtime on the relationship between workload demands and perceived job risk. *Work* 2015; 51:571-577.
31. Miraglia M, Johns G. Going to work ill: A meta-analysis of the correlates of presenteeism and a dual path model. *J Occup Health Psychol* 2016; 21(3):261-283.
32. Peckham T, Fujishiro K, Hajat A, Flerherty BP, Seixas N. Evaluating employment quality as a determinant of health in a changing labor market. *J Soc Sci* 2009; 5(4): 258–281.

33. Presser H. Working in a 24/7 Economy: Challenges for American Families. 2005 New York: Russell Sage Foundation. <https://www.russellsage.org/publications/working-247-economy-0>
34. Ray TK, Kenigsberg TA, Pana-Cryan R. Employment arrangement, job stress, and health-related quality of life. *Saf Sci* 2017; 100(A): 46–56.
35. Reuter M, Wahrendorf M, Di Tecco C, et al., Do temporary workers more often decide to work while sick? Evidence for the link between employment contract and presenteeism in Europe. *Int J Environ. Res Public Health* 2019; 16:1868 <http://dx.doi.org/10.3390/ijerph16101868>
36. Rosenbaum E, Morett CR. The effect of parents' joint work schedules on infants' behavior over the first two years of life: Evidence from the ECLSB. *Maternal and Child Health J* 2009; 13(6),732–744.
37. Sara JD, Prasad M, Eleid MF, Zhang M, Widmer RJ, Lerman A. Association between work-related stress and coronary heart disease: a review of prospective studies through the job strain, effort-reward balance, and organizational justice models. Downloaded from <http://ahajournals.org> by on August 17, 2018. DOI: 10.1161/JAHA.117.00807
38. Schneider D, Harknett K. Schedule instability and unpredictability and worker and family health and wellbeing. Washington Center for Equitable Growth: Working Paper Series, Washington, D.C. <http://cdn.equitablegrowth.org/wp-content/uploads/2016/09/12135618/091216-WP-Schedule-instability-and-unpredictability.pdf>
39. Su C, Asfaw A, Tamers SL, Luckhaupt SE. Health insurance coverage among U.S. workers: Differences by work arrangements in 2010 and 2015. *Am J Prev Med* 2019; 56(5)673-679.
40. Torquati L, Mielke GI, Brown WJ, Burton NW, Kolbe-Alexander TL. Shift Work and Poor Mental Health: A Meta-Analysis of Longitudinal Studies. *Am J Pub Health* 2019; 109(11):13-20.
41. Tsai RJ, Luckhaupt SE, Sweeney MH, Calvert GM. Shift work and cancer screening: Do females who work alternate shifts undergo recommended cancer screening? *Am J Ind Med* 2014; 57(3):265-275.
42. Virtanen M, Kivimäki M, Ferrie JE, Elovainio M, et al., Temporary employment and antidepressant medication: a register linkage study. *J Psychiatr Res* 2008; 42(3):221–229
43. Virtanen P, Janlert U, Hammarström A. Exposure to temporary employment and job insecurity: a longitudinal study of the health effects. *Occup Environ Med* 2011; 68:570-574.
44. Wong IS, Smith PM, Mustard CA, Gignac MA. Health and occupational outcomes among injured, nonstandard shiftworkers. *J Occup Environ Med* 2015; 57:1244-1249.