

Presentation Title	Place in Schedule
Applying new and broad ways to use data sources and metrics to assess the relationship between work and health	Chat 'n Chew <i>Day 3 – Thursday</i> <i>May 10<sup>th</sup>, 2018</i> <i>12:15 – 1:00pm</i>
Description of Presentation	Presenter Name(s) And Credentials
<p>Summary</p> <p>Precarious work and non-standard work arrangements may adversely affect the health of workers and their families.</p> <p>Work precariousness is a multi-faceted concept, encompassing several dimensions of work that contribute to worker insecurity and vulnerability. It is widely measured in Europe using the Precariousness Index (PI), developed by Amable, Benach, and others.</p> <p>Using US data, we estimated a work precariousness scale, constructed to mimic the PI. We then examined the associations between work precariousness and: job stress, healthy days, and productive functioning among U.S. workers from 2002 to 2014 using econometric models. Odds ratios obtained from the logistic models showed that were statistically significant positive associations between job stress and work precariousness. Results obtained from linear regression models suggest that workers with high work precariousness were likely to experience more days in poor physical and mental health and more days with limited activities due to health issues.</p> <p>Background: Precarious work may adversely affect the health of workers and their families. There is no consensus on the definition of precarious work but there are working definitions of this concept and models of the broader social environment in which it is embedded (Benach et al., 2016). Precarious work may be defined as work that is poorly paid and is not sufficient to support a household. It can also be defined as insecure work. In addition, recent technological and work organization changes</p>	Regina Pana-Cryan, PhD <i>CDC-NIOSH</i>
	Abay Asfaw, PhD <i>CDC-NIOSH</i>
	Tim Bushnell, PhD <i>CDC-NIOSH</i>
	Anasua Bhattacharya, PhD <i>CDC-NIOSH</i>
	Brian Quay, MS <i>CDC-NIOSH</i>

have resulted in an increased prevalence of non-standard work arrangements. One of the consequences of this is an increased prevalence of precarious work (Fudge, et al., 2006).

Objective: We estimated a scale to measure work precariousness following Amable and Cols (2006) and examined the associations between work precariousness and: job stress, healthy days, and productive functioning among U.S. workers from 2002 to 2014.

Analysis: We used pooled data from the NIOSH-sponsored Quality of Work Life (QWL) module (2002, 2006, 2010, and 2014), a component to the General Social Survey (GSS). We generated a work precariousness scale classifying variables into four components, temporariness, disempowerment, vulnerability and wages (see the scale components in the table below). We used factor analysis to estimate the work precariousness scale. Covariates included age, gender, race, education, overall health status, industry, work arrangement and job satisfaction. We used multinomial logistic models to predict the association between job stress and work precariousness, and linear regression models to examine the association between work precariousness and healthy days and work precariousness and productive functioning.

Results: We considered observations for 5,911 respondents, of which 52 percent were female and 58 percent were in the age group of 18 to 45 years. Thirty-two percent of respondents reported that they experienced job stress; of these, 53 percent were female. Descriptive analyses demonstrated that mean work precariousness was highest for workers paid by temporary agencies, and those employed by the wholesale and retail trade sectors. Odds ratios obtained from the multinomial logistic models showed

that statistically significant positive associations existed among job stress and work precariousness. Outcomes obtained from the linear regression models suggest that workers with high work precariousness were likely to experience more days in poor physical and mental health and more days with limited activities due to health issues.

Implications and Conclusion: Work precariousness seems to be a determinant of job stress, which in turn affects the health and well-being of workers and their families. Developing and systematically tracking metrics of work precariousness and linking them to metrics of health and well-being for workers and their families can improve our understanding of how work precariousness affects health and well-being. This can help us understand how to develop effective interventions to reduce precariousness.

Table

SCALE COMPONENT AND VARIABLE : QWL  
QUESTION AND RESPONSE OPTIONS  
TEMPORARINESS

Job security: The job security is good (Very true; Somewhat true; Not too true; Not at all true)

Labor force status: Last week were you working full time, part time, going to school, keeping house, or what?  
(Working full time;

Working part time; With a job, but not at work because of temporary illness, vacation, strike; temporarily off; Unemployed, laid off,

looking for work; Retired; In school; Keeping house)

Salaried or Wage Earner: In your main job, are you (Salaried; Paid by the hour)

Job Tenure: Job tenure (how long in the current job) (One year or less; 2-5 years; 6-10 years; and 11-20 years)

DISEMPOWERMENT

Work Freedom: I am given a lot of freedom to decide how to do my own work (Very true; Somewhat true; Not too true; Not at all true)

Decision Making: In your job, how often do you take part with others in making decisions that affect you? (Often; Sometimes; Rarely; Never)

Job Schedule: How often are you allowed to change your starting and quitting times on a daily basis? (Often; Sometimes; Rarely; Never)

#### VULNERABILITY

Management and Employee Relation: In general, how would you describe relations in your work place between management and employees? (Very good; Quite good; Neither good or bad; Quite bad or very bad)

Respect at Workplace: At work, people are treated with respect (Strongly Agree; Agree; Disagree; Strongly Disagree)

Trust towards Management: I trust the management at the place where I work (Strongly agree; Agree; Disagree; Strongly disagree)

Treatment at Workplace: In the relation to the way you are treated at work can you tell me whether (You are afraid to demand better working conditions; You feel defenseless towards unfair treatment by superiors; You feel afraid of being fired for not doing what you are asked to do; You are treated in a discriminatory and unjust manner; You are treated in an authoritarian and violent manner; You are made to feel you can be easily replaced)

#### WAGES

Financial Situation: So far as you and your family are concerned, how would you say your financial situation is, that you are (Pretty well satisfied; More or less satisfied; Not satisfied at all)

Gross Family Income: Inflation-adjusted family income in constant dollars

Family Income Satisfaction: Compared with American families in general, would you say your family income is (Far below average; Below average; Average; Above average or far above average)

Fringe Benefits: My fringe benefits are good (Very true; Somewhat true; Not too true; Not at all true)

\*\*\*\*\*

Cause-Specific Mortality Following Occupational Injury: An Exploratory Study

Presenter: Abay Asfaw

(Authors: Applebaum K, Asfaw A, O'Leary P, Busey A, Tripodis Y, Boden LI)

Summary

We examined whether workers with lost-time occupational injuries (injuries involving more than 7 days off work) had a shorter time from injury to death from drug-related causes, suicide, and both causes than workers with medical only occupational injuries (injuries involving less than 8 days off work). Any such differences could shed light on specific mechanisms through which higher mortality occurs. We linked New Mexico workers' compensation data (n=96,700 workers) with data from the Social Security Administration and National Death Index and used a competing risk regression method. We found that, after adjusting for covariates and the risk of dying from other causes, workers who sustained lost-time injuries had an excess risk of dying from drug-related causes, suicide, and both causes compared to workers with medical-only injuries. This analysis points to long-term consequences of work injury that are little recognized and difficult to quantify, thus further supporting the case for work injury prevention, as well further research on the long-term consequences of work injury and return-to-work programs. Background: Since 1990, the U.S. Department of Health and Human Services and its partners have reaffirmed the goal of eliminating socioeconomic disparities in health and mortality (HHS, Healthy People 2020; 2010; 2000). However, studies continue to demonstrate that these disparities have been growing. Case and Deaton (2015) showed that during 1999-2013 mortality increased among white, non-Hispanics, who were 45-55 years of age. Case and Deaton (2017) called these deaths, "deaths of despair," hypothesizing they were related to declines in unionization and manufacturing employment, stagnating wages, and other

social and economic factors. The literature also shows that occupational injury is associated with elevated mortality, anxiety, depression, chronic pain, and opioid use. This led us to hypothesize that the mortality of occupationally injured workers may be elevated for specific causes of death. We compared lost-time with medical-only occupational injuries. Considering only injured workers has several advantages including the ability to create comparable groups; medical-only injury groups are the best control groups to evaluate the impact of lost-time injuries.

Objective: We examined whether workers with lost-time injuries (injuries involving more than 7 days off work) had a shorter time from injury to death from drug-related causes, suicide, and both causes than workers with medical-only injuries (injuries involving less than 8 days off work). Any such differences could shed light on specific mechanisms through which higher mortality occurs.

Study population: We used 1994-2000 injury data provided by the New Mexico Workers' Compensation Administration. Our analytic sample included 96,700 injured workers, of which 64.4% sustained medical-only injuries and 35.6% sustained lost-time injuries. We linked these data with data from the Social Security Administration (SSA) Death Master File for 1994-2013, creating a cohort of injured workers with mortality follow-up ranging from 13 to 20 years. Of the 96,700 injured workers, 8% were deceased, based on SSA data. We created four groups of the deceased, based on sex and injury severity. The first group contained all 939 women with lost-time injuries. The other three groups contained random samples of 1,200 persons, each, including women with medical-only, men with lost-time, and men with medical-only injuries. We matched these four groups with the National Death Index

database (NDI) of the National Center for Health Statistics using their social security number, name, sex, and date of birth, in order to validate deaths identified by SSA and to obtain the time and cause of death. The overall match rate of the records of the deceased from SSA and NDI was 98.8%. We weighted these observations by the inverse of their sampling fractions.

Measurement of variables: The outcome variables were time from injury to death from drug-related causes (ICD10: X40–44, X60–64, Y10–Y14; ICD9: E850–E855, E9800–E9809), suicide (ICD10: U03, X60–X84, Y87.0, Y10–Y33; ICD9: E950–E959, E9800–E9899), and both causes. We considered both underlying and contributing causes. Because of substantial gender differences in the likelihood and causes of mortality, we estimated separate models for men and women. We included age (six categories), earnings before injury (six categories), and industry (ten categories) as covariates.

Method: We used three outcome variables: i) deaths from drug-related causes, suicide, and both causes; ii) deaths from all other causes; and iii) remaining alive. To assess the relationship of covariates to cause-specific deaths, we used a competing risks version of the Cox proportional hazards model developed by Fine and Gray (2013). The follow-up period was calculated from the date of injury to death or the last date of follow up (December 31, 2014), whichever came first.

Results: During the median follow-up period of 217 months (range 6–253 months) from 1994 to 2013, 4,247 injured workers died. Of these deaths, 8.3% were drug-related, 5.3% were suicides, and 12.3% were due to both causes. We controlled for age, income, industry, and the risk of death from other causes. Among women, those with lost-time injuries were 2.4 times more likely to die from drug-related causes than those with medial-only injuries. Among men, those with lost-time injuries were 1.3 times more

likely to die from drug-related causes than those with medial-only injuries. The likelihood of suicide was 1.8 and 1.6 times higher for women and men with lost-time injuries than for women and men with medial-only injuries, respectively. The likelihood of death from both of these causes was 2.2 times higher for women with lost-time injuries than for women with medial-only injuries. The likelihood of death from both of these causes was 39% higher for men with lost-time injuries than for men with medial-only injuries.

Conclusion: We found that workers who sustained lost-time injuries were more likely to die from drug-related causes, suicide, and both causes than workers who sustained medical-only injuries. This analysis can be expanded to identify and reduce work hazards that contribute to these excess mortality risks.

\*\*\*\*\*

The impact of occupational injuries on the incidence and cost of opioids

Presenter: Tim Bushnell

(Authors: Asfaw A, Quay B, Bushnell T, Pana-Cryan R)

Summary

The United States is currently experiencing an opioid overdose epidemic. Assessing opioid prescribing patterns continues to be important to help understand the risk for potential harm, such as misuse or overdose. This study examined the differences between occupational and non-occupational injury in the incidence of opioid prescription, number of days of opioids prescribed, and opioid cost. We used 24,893 cases of reported injury during 2010-2014 in the Medical Expenditure Panel Survey. Descriptive statistics, and logistic and two-part regression models were used to analyze the data. We found that, after controlling for covariates, occupational injuries were more likely to lead to opioid prescription, and led to more opioid prescription days, and

higher opioid costs than non-occupational injuries. These results help make a case for investing in worker safety and health.

Background: The United States is currently experiencing an opioid overdose epidemic. Assessing opioid prescribing patterns

continues to be important to help understand the risk for potential harm, such as misuse or overdose. Although there is literature

describing prescription opioid use within the general population as well as within workers' compensation systems, little research

has been done to compare opioid prescribing patterns between occupational and non-occupational Injuries. It is possible that

occupational injuries lead to more pain and more opioid prescriptions, if post-injury avoidance of activities that led to the injuries is

sometimes more difficult because they are work activities.

Objectives: We compared opioid prescribing patterns for occupational and non-occupational injuries, comparing the percentage of

injuries followed by an opioid prescription within the survey year of the injury, the number of days of supply, and the total

medication cost. We hypothesized that occupational injuries were more likely to result in opioid prescription, more days of

prescribed opioids, and higher total opioid costs than non-occupational injuries.

Data: We used data from the Medical Expenditure Panel Survey (MEPS), a nationally representative survey designed to collect

information on healthcare use and expenditure. We used the medical condition (including injury), prescribed medicine, and full

year consolidated data files of MEPS . In the medical condition files, 24,893 injuries were reported from 2010 to 2014.

Respondents aged 16 and older who reported an injury or accident (terms presented as defined in MEPS) were asked a follow up

question on whether the injury or accident occurred at work. We used this information to classify injuries as occupational and nonoccupational.

We linked the injuries from the medical condition files with information from the prescribed medicine and full year consolidated files. The prescribed medicine files include information on national drug code (NDC), number of days prescribed, dates filled and payments made by different sources for each medicine. The full year consolidated files contain demographic, health insurance coverage, and economic data.

Measurement of variables: We identified opioids using the NDC of each prescribed medicine as a result of a reported injury condition. We used more than 13,000 NDCs provided by the Centers for Disease Control and Prevention to identify opioids. Then, we created three dependent variables: presence vs. absence of filled opioid prescription, number of days of supply, and cost of prescribed opioids (paid by patients, insurers, and other third parties). Our main explanatory variable was whether the injury was occupational or non-occupational. Our covariates included sex, age (4 categories), race (5 categories), education (4 categories), access to any health insurance, poverty status (4 categories), and number of comorbidities (5 categories).

Method: We used logistic regression to assess whether an opioid was prescribed following the incidence of injuries.

We used a two-part regression model to assess the number of days for which opioids were prescribed and the associated costs. In the first part, we estimated the probability that an injury results in a non-zero number of days of prescribed opioids, and in the second part, we estimated the number of days and costs of the prescribed opioids, conditional on non-zero days of prescribed opioids.

Results: Of all injuries reported, 23.7% occurred at work. Controlling for covariates, occupational injuries were 29% [95% CI: 1.14

-1.45] more likely to result in at least one opioid prescription than non-occupational injuries. The two-part regression results showed that, controlling for covariates, occupational injuries resulted in 4.15 [95% CI: 2.58-5.73] more opioid prescription days and a \$19 [95% CI: \$11 - \$27] higher cost of opioids per injury compared with non-occupational injuries. The study has some limitations. First, prescribed medicine are not always used by patients. Second, our follow-up period after injury may vary from a full year for injuries occurring at the beginning of the survey year to less than a month for injuries occurring at the end of the survey year.

Conclusion: We found that occupational injuries resulted in a greater likelihood of receiving an opioid prescription, a higher number of opioid prescription days, and higher opioid costs than non-occupational injuries. These results make a case for investing in worker safety and health.

\*\*\*\*\*

Work arrangement and schedule by industry: A descriptive analysis using the American Community Survey, 2005-2015  
Presenter (and author): Brian Quay

Summary:

Work arrangement and schedule characteristics such as whether an individual is self-employed, the number of hours worked per week, and the time a work shift begins can affect an individual's health. The American Community Survey (ACS), a large nationwide survey conducted by the U.S. Census Bureau, provides annual data on these work characteristics at a level of industry and occupation detail that is unavailable in other data sets. This descriptive analysis used ACS data from 2005-2015 to observe work arrangement and schedule characteristics and trends for 267 industries, including wage and salary income, percent selfemployed, average hours worked per week, and distributional properties of shift start-time. Results point to specific sets of

workers who may have special work arrangement health risks, or who may be experiencing more rapid changes in the organization or work.

Background: Work arrangement and schedule characteristics affect health. Several analyses by the Bureau of Labor Statistics

found that self-employed workers have consistently experienced a higher rate of occupational fatalities relative to their wage and

salary counterparts (for example, see

<https://www.bls.gov/iif/oshwc/foi/cfch0014.pdf>). Extensive NIOSH-sponsored research has

linked long work hours, flexible schedules, and shift work to adverse health outcomes (for example, see Dembe and Yao 2016,

Caruso 2015). Understanding work arrangement and schedule characteristics by industry would provide insights on which

industries are more prone to unhealthy work arrangements and schedules, and point to opportunities for prevention.

Method: This descriptive analysis used eleven years of survey data from the American Community Survey (ACS) to summarize

certain work arrangement and schedule characteristics by detailed industry and observe how these characteristics have changed

over time. Specifically, the percentage of self-employed workers within an industry, the average number of hours a worker worked

per week by industry, and distributional properties of work shift start times by industry were analyzed across wage/salary income

class and other sociodemographic characteristics. The ACS is a nationally representative survey conducted annually by the U.S.

Census Bureau. The person-level information provided by the ACS, the survey's rolling sample design, and its large sample size

provide a unique opportunity to take a detailed look at separate industries' work arrangement and schedule characteristics.

Additionally, the ACS has been used very little in occupational safety and health research. Weights provided by the U.S. Census

Bureau were used to estimate annual statistics at a nationally representative level, and the statistics were then appended to form

a panel of industries using the Bureau's 2012 Industry Code (267 industries, comparable to North American Industry Classification

System industries at the 4-digit level).

Results: We will present results of the descriptive analysis in progress. The analysis uses ACS data from 2005 through 2015, with

total observations per year ranging from 1.54 to 1.61 million workers. Not only does this descriptive analysis provide robust and

detailed industry estimates, it also observes year-to-year change within each industry.

Practical implications: Results enable researchers and decision-makers to identify industries that are experiencing – or trending toward – relatively unhealthy work arrangements and schedules. This, in turn, points to opportunities for prevention.