

Low Wages as Occupational Health Hazards

J. Paul Leigh, PhD and Roberto De Vogli, PhD

The history of occupational medicine has been characterized by ever-widening recognition of hazards, from fires in 1911 to asbestos in the 1960s, to job strain in the 1990s. In this essay, we argue for broadening the recognition further to include low wages. We first review possible mechanisms explaining the effects of wages on health or health behaviors. Mechanisms involve self-esteem, job satisfaction, deprivation, social rank, the “full” price of bad health, patience, and the ability to purchase health-producing goods and services. Second, we discuss empirical studies that rely on large, typically national, data sets and statistical models that use either instrumental variables or natural experiments and also account for other family income. Finally, we draw implications for laws governing minimum wages and labor unions.

Concepts of occupational health hazards have evolved over decades. Early identified hazards included soot, fires, and collapsing mines. Later identified hazards included asbestos, lead, and benzene. Current thinking divides hazards into three categories: physical and mechanical, biological and chemical, and psychosocial.¹ The last of these, psychosocial, has been the most recent category added to the list. Psychosocial hazards include precarious work contracts, job insecurity, organizational injustice, long working hours, and job strain, among others.^{1–3} The purpose of this essay is to argue that low wages should be added to the list.

Income can be divided into several categories: government transfers (eg, social security benefits), insurance payments (eg, unemployment compensation), rents, interest, dividends, capital gains, alimony, tips, bonuses, and wages (including salaries). For any person, any one of these categories may contain the largest amount of money. But for most working-age people with jobs, wages (including salaries), comprise, by far, the largest share of their incomes. According to two prominent workplace sociologists, Kalleberg and Reskin,⁴ “broad consensus exists that wages are a fundamental dimension of job quality.” A prominent labor economist, Clark,⁵ agrees: in a national British survey, people viewed wages as one of the two most important aspects of jobs, the other being job security; and both ranked higher than “use of initiative, the work itself, and hours of work.”

Low-wage workers comprise a large and growing share of the American workforce.⁶ Wages are generally defined on a per-hour basis. One definition of low-wage work corresponds to an hourly wage for 40 hours per-week for 1 year that is equivalent to the Federal Poverty Line (FPL) for a family of four.⁷ In 2013, that wage was \$11.45 per-hour and 27.5% of the American workforce earned \$11.45 per hour or less. In addition, stagnant or falling inflation-adjusted wages for a large percentage of the American workforce

have been major contributors to rising income inequality within the US since the mid-1970s.⁸

This essay is divided into three remaining parts. First, we address mechanisms surrounding the associations between wages and health. None of these mechanisms have been directly and singly applied to testing whether low wages harm health; these mechanisms are hypotheses yet to be tested for wages. There is indirect evidence, however, for each of these mechanisms that involves other measures of socioeconomic status, including income, and health. Second, we consider direct evidence for the effects of wages on health or health behaviors; this evidence, however, is not able to test any particular mechanism to the exclusion of others. Finally, we address implications for policy and public health.

Hypotheses for Associations Between Wages and Health

There are at least seven hypotheses or mechanisms explaining the association between wages and health or health behaviors. The first five suggest low wages result in poor health. Hypotheses six and seven suggest alternative causal relations.

The first hypothesis involves psychological and sociological theories about wages, self-esteem, job satisfaction, and health. An insightful comment by Kenneth Feinberg illustrates the hypothesis. Kenneth Feinberg, an attorney, was appointed by George W. Bush to be the Administrator of the September 11th Victim Compensation Fund and appointed by Obama to be the Administrator for Reducing Executive Compensation for Bailed-out Banks. Lost wages are the largest category of legal compensation in wrongful death lawsuits. Speaking of legal compensation, Feinberg put it this way: “when you start talking about dollars, what people hear is a ruling on their overall integrity and value to society.”⁹

Social scientists have argued and presented evidence that low wages negatively affect self-esteem and job satisfaction.^{10–12} Moreover, the effects of wages on self-esteem are significant even after controlling for possible reverse causality whereby self-esteem affects wages.¹³ There are equally compelling arguments and evidence that low self-esteem and job satisfaction predict poor health.^{14,15} Biological evidence suggests that low levels of “positive affect” in middle-aged men and women are associated with negative health effects involving “reduced neuroendocrine, inflammatory, and cardiovascular activity.”¹⁶

The second hypothesis involves absolute deprivation and direct income effects. Absolute deprivation can take many forms. In the absence of gifts or endowed resources, persons in industrial societies without income will perish. But even with low income, there will be obvious deleterious effects unrelated to self-esteem or social rank. Some people may not be able to pay rent or utilities and be forced to live in their cars; other people may eschew spending on hypertensive medications; sick persons may not seek medical services due to their costs. Finally, some people may be able to afford living in only neighborhoods with high violent crime rates and high levels of air and water pollution.

Not only do the examples above have direct health consequences, but they also have indirect ones: people may be forced to choose between essentials such as rent or healthy food and these choices create considerable mental strain. Mani et al¹⁷ identified effects of poverty on mental capacity. In two different experiments, they found that poverty consumes mental resources so that solving

From the Center for Healthcare Policy and Research (Dr Leigh), and Department of Public Health Sciences, University of California Davis School of Medicine (Drs Leigh and De Vogli).

Address correspondence to: J. Paul Leigh, PhD, Department of Public Health Sciences, UC Davis Medical School, MS1C, Davis, CA 95616-8638 (pleigh@ucdavis.edu).

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new tasks becomes more difficult for the poor than the non-poor. They hypothesize that this reduction in “cognitive capacity” results in the poor making nonoptimal choices related to use of preventive health care and compliance with prescribed drug regimes.

The absolute deprivation hypothesis is a subset of the direct income hypothesis and the latter involves what economists refer to as the “income effect.” If people with high incomes buy more of certain goods and services than people with low incomes, economists refer to those goods and services as “normal.” If high-income people buy less, those goods and services are said to be “inferior.” Medical care, gym memberships, and safe neighborhoods are “normal.” There is controversy about whether cigarettes are “normal” or “inferior.”¹⁸ On balance, most goods and services that enhance health are likely to be “normal” so that high-income people are able to afford more of these goods and services than low-income people. Given that wages are a significant part of income, both the absolute deprivation and direct income hypotheses suggest that increasing wages should improve health.

The third hypothesis involves relative deprivation. This hypothesis holds that humans are a social species, that we value the respect of others, and that this respect is partially determined by wages because wages convey information about our position in the socioeconomic hierarchy. Persons at the bottom on the hierarchy experience relative deprivation. Some of the most compelling evidence for the health effects of low socioeconomic status is from British civil servants.^{19,20} If low wages were significantly increased while holding constant the wages of others, the social distance between low wage workers and others would shrink. The biological underpinnings for this hypothesis involve chronic stress associated with low socioeconomic status. Adverse health consequences from chronic stress involve tumor growth, neuroendocrine hormone levels, high-density lipoprotein (HDL) levels, and cellular immune responses, especially through glucocorticoid and adrenergic pathways.²⁰⁻²³

The fourth hypothesis is drawn from the Grossman model²⁴ in which health is viewed as simultaneously a “normal” consumption good—and therefore subject to the direct income hypothesis above—and also an investment good. Viewing health as an investment, Grossman reasons that current investments in good health, for example, in not smoking, will yield less deterioration of health in the future. Less deterioration results in fewer lost workdays due to poor health and therefore less reduction in pay that, in turn, results in less reduction in consumption of all goods and services. Assuming that consumption of all goods and services, on balance, is beneficial and desirable, the payoff from a current health investment depends on the wage. A high (low) wage will mean a high (low) payoff. An increase in the wage raises the “full” price of smoking because it raises the health costs, that is, time lost from work due to illness and reduced life expectancy are more costly as the wage rises.

Attitudes about the future are critical in the Grossman model. There is also this corollary: If people with low wages believe they will have more future health problems and will die younger than people with high wages, people with low wages will have less incentive than people with high wages to “invest” in their current health.

The fifth hypothesis is derived from Becker and Mulligan²⁵ who suggest that a person’s high income will result in a high ability to delay gratification, that is, in improving the ability to be patient and avoiding the impulse for instant gratification. The ability to delay gratification requires imagining the future. “Future pleasures [can be made] less remote by spending resources on imagining them.”²⁵ If a future goal is to own a hybrid car, a person with a high wage might rent one for a weekend to help her imagine ultimately owning one; a person with a low wage may not be able to afford such a weekend extravagance. People who are more forward-looking, who have more patience, are more likely to “invest” in current health.²⁵

We now turn to hypotheses suggesting alternatives for the poor health and low wages correlations. The sixth hypothesis—perhaps the most widely acknowledged hypothesis by economists—is simple: people in poor health cannot work as hard as people with good health and therefore people in poor health will earn lower wages than those in good health. A brief description of studies is available in the review by Bhattacharya et al,²⁶ pages 66 to 68.

The seventh hypothesis asserts that any correlation between low wages and poor health is coincidental. This hypothesis holds that there are unmeasured “third variables” that are correlated with both poor health and low wages and that these “third variables” are the true causes of the correlations. A frequently mentioned “third variable” is the ability to delay gratification that leads persons to “invest” in their health by not smoking as well as “invest” in future wages by acquiring more schooling when young.²⁷

Any one of these seven hypotheses, summarized in Table 1, do not automatically preclude any other. It could be that all are responsible for some portion of the observed correlations between wages and health. For our purposes, the most important question is whether there is evidence for increasing wages causing improvements in health and/or health behaviors regardless of the hypothesized mechanisms in hypotheses one through five.

Evidence

In this section, we review studies investigating whether low wages result in poor health or health behavior using methods that attempt to remove that portion of the correlations due to reverse causality—that poor health results in low wages—and unobserved or unmeasured “third variables.” These analyses include the Instrumental Variables (IVs) method, use of prospective designs, and the Natural Experiment method. We also briefly mention related studies on the effects of wages on productivity and absenteeism as well as studies on the effects of income (that includes wages) on health.

The prospective design and the Natural Experiment are well-known methodologies. The IV method warrants comment. The IV technique attempts to mimic a randomized trial. Instead of dividing treatment and control groups based upon a coin toss as in a randomized trial, the IV technique divides people based upon some unique characteristic (called an “instrument”) that is irrelevant to health or behavior. For example, in estimating the effects of wages

TABLE 1. Mechanisms Explaining Low Wage and Poor Health or Behavior Correlations

Mechanisms	References
Low wages cause poor health or behaviors	
1. Low wages result in low self-esteem and low job satisfaction and these, in turn, result in adverse biological events.	10–16
2. Low wages result in absolute deprivation and direct income effects; insufficient funds available for food, shelter, or medicine.	17,18
3. Increasing wages for low wage workers can decrease socioeconomic distance across social strata thereby reducing relative deprivation	19–23
4. Decreased wages lower the “full” price of bad habits such as smoking because they lower the costs of poor health, that is, time lost from work due to illness and reduced life expectancy	24
5. Decreased wages lower the ability to delay gratification	25
Alternative mechanisms	
6. Poor health results in low wages	26, pp. 66–68
7. Some unobserved “third variable” results in both low wages and poor health.	27

on health, an IV could be created that divided a sample into people living in a state with a high minimum wage and otherwise similar people living in a state with a low minimum wage. Whereas the minimum wage would influence the level of wages among low-wage workers living in a state, it would not, logically speaking, directly influence the health of low-wage workers in the state.

Early IV analyses are conducted by Grossman²⁴ and Lee.²⁸ Whereas both claim to find evidence that low wages harm health, their instruments are not likely to be valid; years of work experience (an instrument both use) are likely to affect health.

Kim and Leigh²⁹ analyze heads of households ($n = 6312$ person-years) ages 20 to 65 years, employed full-time, from the Panel Study of Income Dynamics (PSID) for 2003 to 2007. Dependent variables are obesity and body mass index (BMI). We take the IV approach. Instruments include a measure of the subject's knowledge of computers and the subject's state minimum wage. Low wages are found to predict higher prevalence of obesity and higher levels of BMI. The two instruments are likely to be valid. Knowledge of computers and state-mandated minimum wages are well-known predictors of wages, but rarely, if ever, appear in studies predicting health or behaviors. Moreover, results from Sargan-Hansen statistical tests suggest that the instruments are valid. Limitations include restriction to heads of household (85% of whom are men) and no account of other family income.

Chiteji³⁰ analyzes 525 adults from the PSID. Information is available on participation in "heavy physical activity" in 1999 as well as measures of "future orientation" and "self-efficacy" in 1972; the latter two are psychological characteristics frequently mentioned as "third variables" that bias the statistical analysis. Chiteji³⁰ finds evidence that the subjects' wages are statistically significant and positive predictors of participation in heavy physical activity.

Leigh and Du³¹ analyze full-time employed persons age 25 to 65 years from four waves of the PSID ($n = 17,295$ person-years). The health variable is self-reported hypertension constructed with a question on whether "a doctor has told you that you have hypertension or high blood pressure." The data are longitudinal allowing for a prospective design: low wages in earlier years predict newly reported hypertension in later years. Disadvantages include absence of IV or Natural Experiment methods; and neither job strain (a well-known predictor of hypertension) nor other family income are included as covariates.

Du and Leigh³² draw data from the 1999 to 2009 waves of the PSID ($n = 17,295$ person-years) on current and past smokers who are employed full-time, age 21 to 65 years. Dependent variables include smoking continuation, quitting, and relapsing. IVs are created with state-level minimum wages and unionization rates. We find evidence that low wages predict high smoking continuation and low quit rates. Advantages of the study include the prospective design, the IV technique, inclusion of a variable measuring other family income, and the use of the Sargan-Hansen statistic tests to demonstrate that the instruments are valid. A limitation of the study is that wages are not used to predict who begins smoking among persons age 13 to 20 years.

In 1999, the UK government increased the national minimum wage. Reeves et al³³ use the Natural Experiment research design to analyze data on 279 people in the British Household Panel Survey (BHPS), 63 of whom were directly affected by the new wage (the intervention group), one control group of 107 people who had incomes 10% above the minimum and were not directly affected, and another group ($n = 109$) who were employed in firms that did not comply with the new law. All 279 persons completed short mental health questionnaires as part of the BHPS. Reeves et al³³ find that the intervention group experienced improvements in measures of mental health measuring anxiety and depression but that neither control group experienced similar improvements. Limitations of

this study include small sample sizes and that minimum wage increases have well-known ripple effects for workers with wages near the minimum.³⁴

Finally, numerous studies confirm the beneficial effects of increasing wages on workplace outcomes, including absenteeism, productivity, customer service, and worker disciplinary problems.^{35–37}

A colossal number of studies link income—as opposed to the subcategory of wages—to various measures of health. Even the studies that attempt to remove reverse causality bias (poor health reduces income) and unobserved "third variables" with the IV and Natural Experiment methods are too numerous to mention (see Evans et al²³ for a review). Many find evidence for causal effects. Gardner and Oswald³⁸ use a Natural Experiment involving lottery winners and losers in the UK and find evidence for higher income resulting in better mental health. Several recent studies use Natural Experiments involving the Earned Income Tax Credit (EITC). Averett and Wang³⁹ exploit a 1993 policy change in the EITC leading to an increase in income for mothers with more than two children. Data are drawn from the National Longitudinal Survey of Youth 1979. They use a difference-in-differences approach comparing smoking among low-educated mothers before and after 1993. They find that smoking prevalence for white and Hispanic mothers of more than children decreases when compared with mothers with only one child. Hoynes et al⁴⁰ conducted a similar study incorporating expansions in the EITC in 1986, 1990, and 1993 to examine the program's effect on maternal birth outcomes. Data are drawn from the U.S. Vital Statistics Natality Dataset. They found increases in EITC benefits, an increase in mean birth weights, and reduction in the incidence of low birth weight. They attributed part of these effects to decreases in maternal smoking prevalence resulting from increases in EITC benefits. Rehkopf et al⁴¹ exploited the EITC payment structure whereby recipients receive benefits in February, March, and April and not in other months. The authors investigated 30 health outcomes involving diet, health behaviors, and cardiovascular biomarkers, among others for 6925 persons in the National Health and Nutrition Survey. Whereas some outcomes are negatively affected, most are positively affected and the authors conclude that, on balance, the short-term effects of the EITC enhance health.

Implications for Policy and Health

Whereas there is some debate about the effects of minimum wages on overall employment, there is little debate about the effects of hikes in minimum wages on the wages of low-wage employees. Not only do workers earning the minimum wage experience an increase, but because of ripple effects, workers earning as much as 150% above the minimum also experience an increase.³⁴ One estimate is that federal hikes in the minimum wage increase wages for 35 million workers.³⁴ Labor unions increase wages for unionized workers—especially those with low earnings—and because of threat effects, they also increase wages for nonunionized workers.⁴² Finally, viewing low wages as occupational hazards is consistent with opinions that living wage ordinances will enhance the population health of low-income communities.^{27,43}

Just as psychologists and sociologists have attempted to widen occupational hazards to include psychosocial characteristics, this essay has cited economic and other social science research in an effort to include an economic variable: low wages. Wages are integral characteristics of jobs just as much as toxic physical, chemical, biological, or psychosocial exposures. Low wages are experienced by over 25% of the American workforce and that percentage has been increasing since 2001. Numerous hypotheses suggest that at least part of the correlations between wages and health can be attributed to low wages resulting in poor health or health behaviors rather than vice versa. Empirical studies use Natural Experiments, Instrumental Variables, and prospective

designs. Implications pertain to minimum wages, labor unions, and living wage ordinances. Future research will require large national data sets, statistical analysis such as IV, Natural Experiments, propensity scores, and other techniques that attempt to assess causality, and the inclusion of key confounding covariates such as other family income and job strain.

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