



## Review article

# Labor unions and health: A literature review of pathways and outcomes in the workplace

J. Paul Leigh<sup>a,b,c,\*</sup>, Bozhidar Chakalov<sup>a</sup>

<sup>a</sup> Department of Public Health Sciences, University of California, Davis, Davis, CA, United States

<sup>b</sup> Center for Poverty and Inequality Research, University of California, Davis, Davis, CA, United States

<sup>c</sup> Center for Healthcare Policy and Research, University of California, Davis, Davis, CA, United States

## ARTICLE INFO

## Keywords:

Social determinants  
Social epidemiology  
Labor economics  
Trade unions

## ABSTRACT

Extensive economic research demonstrates correlations between unions with wages, income inequality, health insurance, discrimination, and other factors. Corresponding epidemiologic literature demonstrates correlations between income, income inequality, insurance, discrimination, and other factors with health. The first purpose of this narrative review is to link these literatures and identify 28 possible pathways whereby labor unions might affect the health of workers. This review is restricted to effects within workplaces; we do not consider unions' political activities. This review covers studies from the US, Europe, and Canada from 1980 through April 1, 2021. Pathways are grouped within five domains informed by the CDC 5-domain model of social determinants of health and the traditional 3-domain model of occupational medicine. Linked pathways include wages, inequality, excessive overtime, job satisfaction, employer-provided health insurance (EPHI), and discrimination. Second, we identify studies analyzing correlations between unions directly with health outcomes that do not require links. Outcomes include occupational injuries, sickness absence, and drug overdose deaths. Third, we offer judgments on the strength of pathways and outcomes — labeled “consensus,” “likely,” “disputed” or “unknown” — based on literature summaries. In our view, whereas there are four “consensus” pathways and outcomes and 16 “likely” pathways and outcomes for unions improving health, there are no “consensus” or “likely” pathways for harming health. The strongest “consensus” pathways and outcomes with salubrious associations include EPHI, OSHA inspections, dangerous working conditions, and injury deaths. Fourth, we identify research gaps and suggest methods for future studies. Unions are an underappreciated social determinant of health.

## 1. Introduction

Economic research is extensive pertaining to correlations between unions on the one hand and lower income inequality, higher wages, less overtime, less discrimination, more employer-provided health insurance and additional factors on the other. Epidemiologic research is extensive on correlations between health with the same or similar factors. It is somewhat surprising how separate these two literatures are. Only a few economic studies address how unions directly affect health, but these are limited to two outcomes: sickness absence and occupational injury. And whereas epidemiology has an entire subfield for occupational epidemiology, we found only a handful of studies (discussed below) addressing the direct associations between unionization and health. The authoritative text on occupational epidemiology no longer contains a chapter on unions (Levy et al., 2017). The authoritative text on social

epidemiology (Berkman et al., 2014) does not mention unions in its 39-page index. The first purpose of this narrative review is to link the economic and epidemiologic literatures. Second, we review the few studies on direct correlations between unions and health outcomes. Third, we offer judgments on whether the links and correlations represent effects of unions on health. Fourth, we make suggestions for future research.

Unions have been at the forefront of recent debates surrounding income inequality, stagnant wages, “deaths of despair,” and protection and adequate pay for essential workers during the covid-19 pandemic. Income inequality in the US is now at historic levels not seen since the beginning of the Great Depression (Keshner, 2019). Inflation-adjusted US wages have been stagnant or falling for middle- and low-wage workers for over 40 years (Mishel et al., 2015). Epidemiologic studies find income inequality harms the population's health (Kawachi and

\* Corresponding author at: Department of Public Health Sciences, University of California, Davis, Davis, CA, United States.

E-mail address: [Pleigh@ucdavis.edu](mailto:Pleigh@ucdavis.edu) (J.P. Leigh).

<https://doi.org/10.1016/j.pmedr.2021.101502>

Received 30 November 2020; Received in revised form 16 July 2021; Accepted 18 July 2021

Available online 2 August 2021

2211-3355/© 2021 The Author(s).

Published by Elsevier Inc.

This is an open access article under the CC BY-NC-ND license

(<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

Kennedy, 2002). Kristol and Cohen (2017) estimate that 44% of the increase in wage inequality in US private sector jobs from 1988 to 2012 was attributed to the decline in unionization. “Deaths of despair” refer to the 20-year increase in deaths due to drug overdoses, alcoholism, and suicides primarily among middle-aged Americans (Case and Deaton, 2020). These deaths have been cited as causes of the stunning recent annual drops in US life expectancy even before covid (Devitt, 2018). The last time there were drops in US life expectancy was in 1918 during the Spanish Flu pandemic. “Deaths of despair” have been partially attributed to decades-long erosion of the numbers of unionized, well-paying, blue-collar jobs in the US (Case and Deaton, 2020). A similar phenomenon is threatening the UK and the decline of unions is again being cited as one cause (Joyce and Xu, 2019). Monnat (2016) and Blanchflower (2019) suggest that “deaths of despair” and falling wages since the Great Recession contributed to the election of Donald Trump and votes for Brexit. Many researchers and commentators view unions as playing pivotal roles in reducing income inequality, wage stagnation, “deaths of despair”, and especially in improving treatment of essential workers (Case and Deaton, 2020; Kapos, 2020; Mishel et al., 2015; Nunn et al., 2017).

Many people view the 1950s as a time when America was “Great” for the American worker. The economy was growing rapidly, wages were increasing at all economic levels, and unemployment was low. It was also a time that private-sector labor unions were at their zenith of power in the US. Approximately 33% of the workforce was unionized in the 1950s and the vast majority was in private, not public unions (Mayer, 2014). Private-sector unionization began a steady decline in the 1960s to arrive at the 2019 level of 6%, matching that from the 1910s in the US (Bureau of Labor Statistics, 2020).

It is beyond the scope of this review to discuss the numerous factors causing these sharp declines in private-sector unions —declines in some manufacturing industries such as autos and steel with historically high unionization rates likely played roles— but one factor for which there is near unanimous agreement deserves a brief mention: politics. Countries such as France, Denmark, Sweden, Canada and Germany, among others, also experienced declines in manufacturing but experienced no or only modest declines in the percent of the workforce covered by union contracts; the political climate in these countries is cited as largely responsible (Rosenfeld, 2014). There are unique examples from the US. The 1947 Taft-Hartley Act allowed states to pass so-called “right-to-work” (RTW) laws that permitted workers in unionized workplaces to opt-out of joining and paying dues, i.e. to free ride. RTW laws have had negative effects on unions’ abilities to organize (Ellwood and Fine, 1987). By 2017, 27 states had adopted these laws. As another example, President Reagan fired all striking air traffic controllers in 1981 thereby signaling that his administration did not support unions. Beginning in the 1980s, organized business began aggressively opposing unions (Rosenfeld, 2014). But this 40-year decline is poised for change. Public approval for unions, 64% in 2019, is near a 50-year high, with the highest approval among people < 35 years old; and politicians have noticed (Jones, 2019).

Public-sector unions followed a different path. In 1959, Wisconsin became the first state to allow state workers to unionize; most other states subsequently followed. By the late 1970s, the percent of all public workers in unions rose to approximately 33%. Unlike private-sector unionization, public-sector unionization did not decline but rather has stabilized around 33–34% since the 1980s in the US. In 2019, approximately 7.1 million workers were in public-sector and 7.5 in private-sector unions (Bureau of Labor Statistics, 2020). Private- and public-sector unionization combined was 10.3% of the workforce in 2019.

In 2019, for both private and public-sector unions combined, African Americans (11.2%) had higher union membership rates than white non-Hispanics (10.3%), Hispanics (9.1%) or Asians (8.9%) (Bureau of Labor Statistics, 2020) in the US. People in the 45–64 age bracket had the highest rates of all age brackets (12.7%) (Bureau of Labor Statistics, 2020). The rate for full-time workers (11.2%) was roughly double that

for part-time workers (5.5%). Among all 16.4 million workers represented by unions, 14.6 million were members and 1.8 million were not members but were nevertheless covered by union contracts (Bureau of Labor Statistics, 2020). In 2017, women comprised approximately 47% of private-sector union members and 58% of public-sector members (Wolf and Schmitt, 2018). Although we are not aware of statistics on occupations by gender by sector, data on educational attainment suggests that female union members are more likely to hold higher disproportionate shares of both low- and high-status occupations in the public than private sector. Approximately 14% of public-sector union members have less than a high school degree and 34% have more than a college degree; the percentages for private-sector union members are 9% and 11% (Wolf and Schmitt, 2018). In part, this reflects public schools in which cafeteria workers and janitors are not required to have high school degrees, but teachers are required college degrees.

We identify 28 possible pathways involving linked economic and epidemiologic literatures and seven health outcomes involving studies on the direct effects of unions on health. Each of these 28 economic and epidemiologic sets of studies as well as those for health outcomes studies merit their own literature review. This study, however, will not conduct 63 separate literature reviews (28 economic, 28 epidemiologic, and 7 direct). This review is restricted to effects within workplaces. We do not consider unions’ political activities involving, for example, minimum wages, universal basic income, or universal health insurance.

Unique literature search strategies were followed. Three leading labor economics texts (and references therein) formed the primary sources for the 28 economic pathways (Ehrenberg and Smith, 2015; Kaufman and Hotchkiss, 2003; McConnell et al., 2017). Google scholar searches identified the prominent epidemiologic and public health studies for the 28 epidemiologic pathways as well as four of the seven direct effects (self-rated health, drug overdoses, mortality, food insecurity). Donado’s (2015) literature review and subsequent studies citing Donado were used as the basis for our search involving the fifth and sixth direct effects: fatal and non-fatal occupational injuries. Brown and Sessions’ (1996) literature review and subsequent studies citing Brown and Sessions formed the basis of our search involving the final direct effect: work absences. The appendix provides greater detail for the search strategies for injuries and absences. For all strategies, papers were excluded if they had no direct data-based estimate of effects of unions on pathways or pathways on health. Additional exclusions were for editorials, news stories, blogs, testimony, legal briefs, undergraduate papers, and thought pieces. All searches included 1980 through April 1, 2021. Most studies were from the US, but some were from Europe and Canada. No studies were drawn from economically developing nations. Whereas the subjects of this review —workers— are sometimes viewed only through the lens of occupational medicine, the effects of unions are far-reaching and best viewed also through the lens of public health as shown in the model below.

This review follows a straightforward format. First, we present a model for analyzing direct effects of unions on the health of workers covered by collective bargaining contracts. Second, we review the economics literature pertaining to possible health pathways that are prevalent in unionized versus non-unionized workplaces. Third, we review the epidemiological literature pertaining to whether these likely pathways have health or behavior associations in working and other populations regardless of union status. Fourth, we consider the relatively few (mostly economic) studies on direct associations between union status and health outcomes. The paper closes with a summary, limitations, and suggestions for future research.

## 2. Model of effects of unions on health

Table 1 presents a model for union pathways with domains on the left side and pathways on the right. The model is informed by the literature on the Social Determinants of Health (SDoH) and Occupational Medicine. Healthy People 2020 posits five domains for the SDoH:

**Table 1**  
Model for Effects of Unions on Health of Workers.

Domains	Pathways
Economic Stability	Wages, wage inequality, pensions, job security, discrimination
Education	General and safety job training, formal education
Health and Health Care	Employer-provided health insurance (EPHI), paid sick leave, paid family leave, workplace health promotion
Environment and Work Organization	Dangerous safety or environmental conditions; OSHA inspections; receipt of workers compensation and/or unemployment benefits; right-to-know hazards, right-to-refuse dangerous work and light duty after injury; excessive overtime; shift and graveyard work; workplace flexibility for individual workers; non-standard, precarious, contingent, gig jobs; piece-rate pay; vacation leave
Psychosocial	Job satisfaction; job strain and control; social support at work; fairness; self-esteem, respect, dignity, and stigma

1) Economic Stability, 2) Education, 3) Health and Health Care, 4) Neighborhood and Built Environment, and 5) Social and Community Context (Centers for Disease Control, 2020). The leading textbook on Occupational Medicine posits three domains: Physical and Mechanical, Biological and Chemical, and Psychosocial (Levy et al., 2017). For relevance in the union and workplace context, a subcategory of Neighborhood and Built Environment—pollution— can be combined with Physical, Mechanical, Biological and Chemical to form what may be labeled Environment and Work Organization. There is overlap between portions of Social and Community Context with Psychosocial which may be labeled simply Psychosocial. The pathways are gleaned from three leading labor economics texts as well as economics literature on differences between union and non-union workplaces for which there are corresponding epidemiologic studies. The first author has been teaching classes and researching subjects in labor economics and social epidemiology since 1980. Pathways are more fully described in the next section.

The arrangement of pathways in the five domains is straightforward but some require comment. Excessive overtime, shift and graveyard work, workers and unemployment compensation, workplace flexibility for individual workers, non-standard and “gig” working conditions, piece-rate pay, and vacation leave are characteristics of the work environment and hence placed into Environment, but they also have economic and psychosocial dimensions. For example, excessive overtime can increase earnings and therefore be considered in Economic Stability. Shift and graveyard work can affect circadian rhythms which, in turn, can affect psychosocial health. In addition, whereas sub-categories for all three Occupational Medicine domains are well represented in the pathways, some subcategories for SDoH are not. Quality of housing and level of violence in the neighborhood are subcategories within Neighborhood and Built Environment. It is unlikely that workers within their workplaces are associated with housing or neighborhood violence in the same way that they are associated with, for example, wages or working conditions. The SDoH domains and subcategories are used as a guide, not the ultimate arbiter of which pathway to include in which domain.

The pathways included in Table 1 are more numerous than any other list appearing in the literature of which we are aware. Future researchers will no doubt imagine others. It is likely that other imagined pathways will fall into one of the five domains, however, thereby underscoring the utility of the model.

Table 1 describes pathways for workers at the workplace. This review will not extend to effects of unions on society at-large; they are simply too numerous. For example, teachers’ unions might promote health classes for their students; police unions might support members who kill African Americans; national unions might support environmental laws; effects of labor unions on national levels of employment or housing availability — two important determinants of health— are largely unknown. Nevertheless, two broad effects will be addressed:

economy-wide wage levels and income inequality. The first part of Table 2, labeled I, applies to union versus non-union workplaces; part II applies to society at-large, combining union with non-union workplaces.

### 3. Associations between unions and possible pathways; Columns 1–3 Table 2.

The first column in Table 2 identifies pathways. Columns 2 and 3 pertain to predominantly economic literature on unions; columns 4 and 5 pertain to predominately epidemiologic literature regardless of union status. Column 2 provides references for the judgments. Column 3 provides our judgments regarding the findings in the literature. For some pathways, there is consensus. For example, all studies with which we are aware find unionized establishments have more OSHA inspections (pathway #11). For other pathways, such as “job security,” (pathway #4) findings are disputed. We created a category, “likely,” which indicates that judgment leans to one side. Finally, we use “unknown” for pathways for which there are two or fewer studies. We use these words to describe our judgments of findings, not the findings themselves. The reader should have high confidence that when we describe findings as “disputed” that there are at least two (probably many more) studies with inconsistent findings. Our “likely” judgment means that while there may be inconsistent findings, we believe the evidence leans in a consistent direction. In general, readers should have more confidence in “consensus”, “disputed” and “unknown” judgments than “likely” ones. We sought to make Table 1 self-explanatory. Nevertheless, several pathways require additional comments.

The lion’s share of economic research has addressed private, not public unions. It is likely that all conclusions and judgments drawn in Table 1 also apply to public unions albeit to a lesser degree. For example, considering pathway #1, whereas private unions generate a 20% wage advantage over private non-union workplaces, public unions generate a 10% advantage (McConnell et al., 2017). When the same conclusions and judgments cannot be drawn for public unions, we will so indicate.

Wages and within-firm wage inequality are the first and second pathways and there is consensus: unions increase wages — especially for low-wage workers— and reduce within-firm inequality compared to non-union workplaces. A leading labor economics textbook estimates a 15% union wage for private-sector and government-sector unions combined (McConnell et al., 2017). This wage advantage represents a transfer from capital (business owners) to labor (Mishel, 2012). Mishel (2012) estimates that unionized workers are 53.9 % more likely to have employer-provided pensions (pathway #3).

Pathway #5 involves discrimination for which there are two forms: employment and wages. Historians disagree on the extent of union discrimination against Blacks for the first 60 years of the twentieth century. Some unions and affiliates (e.g. AFL) explicitly excluded Blacks but others (e.g. CIO) welcomed them (Hill, 1996). In addition, some unions, such as the Brotherhood of Sleeping Car Porters, were exclusively Black. A recent analysis finds that in the two decades following World War II, Blacks were over-represented in unions and enjoyed a greater union wage advantage than whites (Farber et al., 2020). Explicit discrimination against other minorities, particularly Asians, and women also occurred within some unions in these 60 years but, again, there is no consensus on the extent of that discrimination (Hill, 1996).

Beginning in the 1970s, most studies find less discrimination against either women or minorities than in the labor market at-large with respect to employment (Leonard, 1985). In 2016, 65% of persons covered by either private or public-sector union contracts were either women or minorities (Bivens et al., 2017). Beginning in the 1970s, while there is no consensus, numerous studies indicate less wage discrimination in either private- or public-sector unions (Bivens et al. 2017). Within the public sector, unions raise wages for women more than for men (Freeman and Leonard, 1987). For both public- and private-sector unions combined, Mishel (2012) estimates union wage premiums are higher for Blacks (17%) and Hispanics (23%) than whites (11%).

**Table 2**  
Possible health pathways.

	Effects of unions on pathways	Effects of unions on pathways	Effects of pathways on health	Effects of pathways on health
Domain and Pathway	Prominent studies or textbooks	Judgment	Prominent studies or textbooks	Judgment
<b>I. Union vs Non-union</b>				
<b>I.A. Economic Stability Domain</b>				
1. Wages, including wage theft	Cooper and Kroeger (2017) Ehrenberg and Smith (2015) Kaufman and Hotchkiss, (2003), p. 678 McConnell et al., (2017), p. 487	Consensus: unions raise wages and minimize theft	See Leigh et al., (2019) for low-wage workers and Dench and Grossman (2019) for all workers combined. See Minkler et al., 2014 for wage theft.	Likely improves health for low-wage workers; Disputed for middle- and high-wage workers.
2. Wage inequality within firms	Kaufman and Hotchkiss (2003), p. 660 McConnell et al. (2017), p. 360	Consensus: unions lower inequality	Card et al. (2012)	Decreases in wage inequality likely improve health
3. Pensions	Ehrenberg and Smith (2015), p. 487 Kaufman and Hotchkiss (2003), p. 664 McConnell et al. (2017), p. 344 Mishel et al. (2012)	Consensus: unions increase pensions	See Herd et al. (2008) and Western and Rosenfeld (2011) for Social Security Supplemental Income	Likely pensions improve health
4. Job security	Montgomery (1991) finds no union/non-union difference; Freeman and Medoff (1984) pages 114–121 find more layoffs in unions; Bender and Sloane (1999) find more job security in unions	Disputed	Barling and Kelloway (1996)	Likely improves health
5. Discrimination based on race/ethnicity and/or gender for either employment, wages, or other factors	Bivens et al. (2017) Farber et al. (2020) Jones et al. (2014)	In recent decades, unions likely reduce discrimination	Darity (2013) Krieger (2014) p. 104	Discrimination for employment or wages likely harms both mental and physiological health. Discrimination for other factors harms mental health; disputed for physiological health
<b>I.B. Education Domain</b>				
6. On-the-job general and/or safety training	McConnell et al. (2017) p. 354	Consensus: unions promote both types of training	See Colligan and Cohen (2004) for safety training.	Likely safety training reduces harms; We are not aware of health studies on general training
7. Formal education	Blanchflower (2006) Ewer (2000)	unknown	Glymour et al. (2014)	Likely more education improves health
<b>I.C. Health and Healthcare Domain</b>				
8. Employer-provided health insurance (EPHI)	Ehrenberg and Smith (2015) p. 487 Kaufman and Hotchkiss (2003) p. 664 McConnell et al. (2017) p. 344 Mishel et al. (2017)	Consensus: unions increase EPHI	O'Brien (2003)	Consensus: EPHI (versus no insurance) improves health; disputed in comparisons with other forms of insurance.
9. Paid sick leave	Mishel et al. (2017)	Consensus: unions increase paid sick leave	Asfaw et al. (2017)	Likely paid sick leave improves health of worker and co-workers
10. Paid family leave	Park et al. (2019)	Likely unions increase paid family leave	Rossin (2011)	Likely leave improves health of worker and newborns
11. Workplace health promotion programs	Holman et al. (1998) Kenkel and Supina (1992)	Disputed	Kuoppala and Lamminpää (2008)	Likely programs improve health
<b>I.D. Environment and Work Organization Domain</b>				
12. Dangerous safety or environmental hazards	Ehrenberg and Smith (2015) p. 487 Kaufman and Hotchkiss (2003) p. 648 Leigh (1981) and Table 3, below	Consensus: unions reduce hazards	Levy et al. (2017)	Consensus: hazards harm health
13. OSHA inspections	Weil (1991)	Consensus: unions increase inspections	Li and Singleton (2019)	Consensus: inspections improve health
14. Receipt of workers' compensation and/or unemployment compensation benefits	Budd and McCall (1997) Hirsch et al. (1997)	Consensus: unions increase receipts	Cylus et al. (2015) Stuckler et al. (2009)	Likely benefits improve health
15. Right-to-know hazards and right-to-refuse dangerous work; light duty after injury	Kaufman and Hotchkiss (2013) p 668 McConnell et al. (2017) p. 354	Consensus: unions increase knowledge of rights and participation in light duty	Krause and Lund (2004) find light duty improves convalescence and health.	Likely rights and light duty improve health
16. Excessive overtime		Likely unions reduce excessive overtime	Wagstaff and Lie (2011) literature review	Likely excessive overtime harms health

(continued on next page)

Table 2 (continued)

	Effects of unions on pathways	Effects of unions on pathways	Effects of pathways on health	Effects of pathways on health
17. Amount of shift and graveyard work	Booth and Francesconi (2003) Trejo (1993) Booth and Francesconi (2003) find no union effects for amount of shift or night work	Disputed	Wagstaff and Lie (2011) in review, find shift work harmful but no effect of night work.	Disputed
18. Workplace flexibility for individual worker; unpredictable work schedules; choice of shiftwork	Cotti et al. (2013) Duncan and Stafford (1980) Kaufman and Hotchkiss (2003) p. 648 Keune (2013)	Disputed	Butler et al. (2009) Grzywacz et al. (2007)	Likely flexibility improves health
19. Non-standard, precarious, contingent, gig jobs	Keune (2013) OECD (2019)	Consensus: unions reduce prevalence of non-standard jobs	See Howard (2017) and Benach et al. (2014) for harms and Apouey and Stabile (2019) for benefits	Disputed
20. Piece-rate pay, incentive pay, bonuses, for either individual workers or groups of workers	Kaufman and Hotchkiss (2003) p. 665 claims less in unions; Garen (1999) finds less incentive pay in unions	Likely less in unions	DeVaro and Heywood (2017)	Likely harms health
21. Vacation leave either with or without pay	Ehrenberg and Smith (2015) p. 487 Kaufman and Hotchkiss (2003) p. 664	Consensus: unions provide more	Aronsson and Gustafsson (2005)	Likely benefits health
<b>I.E. Psychosocial Domain</b>				
22. Job satisfaction	Laroche (2016), meta-analysis	Likely unions correlate with low job satisfaction; likely unions do not cause low job satisfaction.	Faragher et al. (2005)	Consensus: satisfaction improves health
23. Job strain and control	Gillen et al. (2003) finds no union/non-union differences	Unknown	Dragano et al. (2011) Kivimaki et al. (2012) Schnall et al. (1994) Park et al. (2004)	Likely less strain, more control improves health
24. Social support at work	Hagedorn et al. (2016) Lott (2014) Nissen and Jarley (2015)	Likely unions promote social support at work		Likely social support at work improves health
25. Fairness, justice at work	See Kochan (1979) for fairness; see Ehrenberg and Smith (2015) p. 491 for grievance and arbitration procedures; see McConnell et al. (2017) p. 346 for promotions based on seniority	Disputed: unions promote fairness via seniority and grievance and arbitration procedures but decrease fairness by de-emphasizing productivity	De Vogli et al. (2007)	Likely fairness and justice improve health
26. Self-esteem, respect, dignity, stigma	Fuller and Hester (2001) p.1096 Gibney et al. (2018) Lott (2014) Pierce and Gardner (2004)	Disputed	Jacobson (2007)	Disputed: Respect likely improves health; stigma likely harms health
<b>II. Broader effects for society at-large</b>				
27. Wages and benefits for all jobs; spillover unemployment onto non-union sectors	For wages and benefits see Ehrenberg and Smith (2015) pps 482–484 McConnell et al. (2017) pps 351–353 Kaufman and Hotchkiss (2003) pps 649–651; For spillover see McConnell et al. (2017) p. 337	Likely unions increase wages for all; disputed for unemployment	See pathways #1, #3, #10, #14 above	Likely improves health for higher wages and benefits; Likely harms health for unemployment
28. Wage and income inequality	Farber et al. (2020) Fortin et al. (2021) Kaufman and Hotchkiss (2003) p. 661 Kristol and Cohen (2017) McConnell et al. (2017) p. 362 Raphael (2011) Western and Rosenfeld (2011)	Consensus: unions reduce economy-wide inequality	Kawachi et al. (2014) Kitagawa and Hauser (1973) Pickett and Wilkinson (2009) Ross et al. (2000)	Likely decrease in wage and/or income inequality improves population health

**Table 3**

Direct associations between unions and health outcomes.

Health outcome	Prominent studies	Judgment
<b>For workers only, not society at-large (except #33, #34)</b>		
29. Fatal work-related injury or illness	Donado (2015) Economou and Theodossiou (2015) See Appendix	Consensus: unions decrease fatal injuries
30. Non-fatal work-related injury or illness	Donado (2015) Economou and Theodossiou (2015) See Appendix	Disputed
31. (a) Reported and (b) actual sickness or injury resulting in absence from work.	Allen (1984) Leigh (1981) See Appendix.	Consensus: unions increase reported absences. Disputed: unions cause sickness and/or injury
32. Self-rated physiological and psychological health	Reynolds and Brady (2012) Dollard and Nesar (2013) Eisenberg-Guyot et al. (2021)	Disputed
33. Drug overdoses	DeFina and Hannan (2019) Eisenberg-Guyot et al. (2019)	Unknown. Unions decrease drug overdoses in 2 studies.
34. Mortality	Reeves (2021)	Unknown. Unions decrease mortality in 1 study
35. Food insecurity	Reeves et al. (2021)	Unknown. Unions decrease food insecurity in 1 study

Even though formal education (pathway #7) is a powerful SDOH, research on the effects of unions on educational attainment is sparse and ambiguous (Blanchflower, 2016; Ewer, 2000). For example, Blanchflower (2016) finds educational attainment is negatively correlated with private sector membership but positively correlated with public sector membership.

There is consensus that unionized workplaces are more likely to have employer-provided health insurance (EPHI) in the US (pathway #8). One estimate is that unionized workplaces have insurance coverage rates that are 18.3 percentage points higher than those for non-unionized workplaces (Bivens et al., 2017). Buchmueller et al. (2002) find that de-unionization explains about a third of the decline in EPHI coverage between 1983 and 1997 in the US. Mishel (2012) estimates that unionized workers are 3.4% more likely to have paid sick leave (pathway #9).

We distinguish between exposure to dangerous working conditions (pathway #12) versus health and injury outcomes resulting from exposures (Table 3). Exposure can be assessed, for example, with questions to workers such as “does your job ever expose you to...” followed by possibilities including, for example, dangerous chemicals, viruses, bacteria, radiation, fire, electricity, or air pollution (Leigh, 1982). The consensus is that unionized workplaces are more hazardous than non-unionized ones. But there is a question regarding assessing blame: do unions create hazards or vice versa? A leading labor economics text suggests unions are more likely to form in hazardous workplaces and once formed, hazardous conditions are reduced, at least in the private sector; few analyses have addressed the public sector (Kaufman and Hotchkiss, 2003). A thorough discussion of this issue appears in the analysis of Table 3.

The consensus is that unions increase the likelihood of OSHA inspections (pathway #13) and, given workers experience injuries or unemployment, unions increase the likelihood of receipt of workers compensation and unemployment compensation benefits (pathway #14). Union members may feel less threatened than non-union members by possible employer retaliation resulting from contacting OSHA or filing workers' compensation claims (Weil, 1991; Hirsch et al., 1997).

Both pathways #17 and #18 include shiftwork. Pathway #17 applies to the total amount of shiftwork while #18 applies to worker control over whether to engage in shiftwork. Individual worker-controlled flexibility (#18) includes, for example, the ability to: work at home; have compressed workweeks part of the year; temporarily change start and quit times; alter the pace of work; choose shifts; require predictable hours (Cotti et al. 2013; Duncan and Stafford 1980; Kaufman and Hotchkiss, 2003; Keune, 2013). Flexibility has implications for family

health as it would allow workers more time to take care of sick family members. Whereas unions may decrease the availability of working from home or ability to alter the pace of work, they enlarge the capacity to choose which shift to work and to require predictable work hours, particularly for members with seniority. The effects of unions on individual worker-controlled flexibility are therefore disputed.

Jobs with non-standard work arrangements have also been referred to as alternative, precarious, contingent, gig, freelance, or independent contract (#19). There is no agreed-upon definition, but these jobs are typically temporary, do not have an explicit or implicit contract for on-going employment, and shift some of the risk of business onto workers (Howard, 2017). The Bureau of Labor Statistics estimates that nearly 14% of the workforce held contingent or alternative jobs in 2017 (Bureau of Labor Statistics, 2018). These jobs are disproportionately non-union (OECD, 2019). Unions have been at the forefront of keeping standard jobs from becoming gig jobs as well as helping to change the legal classification of gig work from independent contractor to employee. (Tronsor, 2018; CBS News, 2021). European unions might have success in their attempts to include gig work in their sectoral bargaining arrangements (Doherty and Franca, 2020).

A systematic review with meta-analysis finds unions correlate with low job satisfaction (pathway #22) but does not find unions cause low satisfaction (Laroche, 2016). One explanation is that union members are encouraged to “speak up”, to express any displeasure with working conditions to management; another is that dissatisfied workers are more likely to join unions. Further evidence for this “speaking up” hypothesis pertains to quit rates which can be viewed as the strongest expression of job dissatisfaction. Most studies find unionization lowers quit rates (McConnell et al., 2017).

Pathway #23 pertains to “job strain” and/or “job control” (Schnall et al., 1994). We are unaware of economic studies comparing union and non-union workers on these dimensions and only one epidemiologic study (Gillen et al. 2002) which, incidentally, finds no union/non-union differences.

Social support at work includes mentoring, cooperative spirit, willingness to share resources, companionship, emotional support, and other factors among co-workers and, when appropriate, supervisors (Park et al., 2004). We are unaware of empirical studies addressing union/non-union differences for social support at work (#24). Nevertheless, it is likely that unions promote this pathway given unions encourage members to attend meetings, voice grievances with one another, and solidarity (Hagedorn et al., 2016)

Fairness and justice (#25) encompass many dimensions and these can be in conflict (Fuller and Hester, 2001). For example, does fairness

dictate that workers be promoted based on seniority or productivity or some combination of the two? Unions give considerable weight to seniority (McConnell et al., 2017). On the other hand, unions generally have grievance and arbitration procedures that encourage workers to voice complaints and sometimes change work practices. A (dated) survey finds that 83% of American workers believe unions protect them from “unfair practices” by management (Kochan, 1979).

Self-esteem, respect, and stigma (#26) receive enormous attention in the organizational psychology literature but we are unaware of studies exploring union/non-union differences (Pierce and Gardner, 2004). One survey of steelworkers finds union membership satisfies socio-emotional needs such as “approval, self-esteem, affiliation, and respect” (Fuller and Hester, 2001). On the other hand, it could be that unions carry a stigma given some historical connections to organized crime (Gibney et al., 2018).

Pathways #27 and #28 pertain to society at-large. Unions may have effects on wages, benefits, and unemployment throughout the economy depending on effects on non-union workplaces (#27). There are conflicting theories (McConnell et al., 2017). One theory holds that unions raise wages “too high”, forcing employers to cut their unionized workforces. These laid-off workers will flood the labor market in non-union sectors, leading to declines in wages and benefits and increasing unemployment in those sectors. But there are also threat effects according to a different theory: non-union firms might increase wages and benefits to discourage any threat posed by their workers possibly deciding to unionize (Fortin et al., 2021). Finally, there is consensus that unions reduce economy-wide wage and income inequality (#28). Western and Rosenfeld (2011) find de-unionization from 1973 to 2007 explains from 20% to 33% of rising wage inequality in the US. Raphael (2011) finds unionization and inequality associations across 21 OECD countries.

**4. Associations between pathways and health regardless of union status; Columns 1, 4, 5, Table 2.**

Epidemiologists and some economists have investigated the pathways in Table 2 independent of union status. Column 4 provides prominent studies and texts and column 5, our judgments. Again, many entries in Table 2 are self-explanatory and do not require additional comment.

Several hypotheses surround higher wages (pathway #1). First, higher wages can improve access to health care as workers are more able to afford it. Women with low incomes will feed and clothe their children before spending on themselves (Elliot et al., 2015). On the other hand, higher wages might allow workers to buy more cigarettes, drugs, or alcohol (Leigh et al., 2019). We are unaware of studies on the effects of pensions on health (#3). Studies find Social Security Supplemental Income benefits (theoretically like pensions) decrease disability in the elderly (Arno et al., 2011). Substantial literature indicates increases in income, especially for low-income people, improves health (Glymour et al., 2014). For example, Davis et al. (2018) query cross-sections of Britons to determine minimum levels of income required to meet basic material needs for food, clothing, shelter, and so on; Gibson et al. (2020) review 27 studies on interventions similar to Universal Basic Incomes and find some health benefits. Discrimination (#5) harms psychological health and increases unhealthy behaviors (e.g. smoking) of women and especially minorities; effects on physiological health are “inconsistent and weak” (Krieger, 2014). Epidemiologic studies typically do not separate employment from wage discrimination.

When compared to “no insurance”, EPHI (pathway #8), improves health of workers and their families (O’Brien, 2003). If the US moves to universal coverage, however, this comparison may become moot. We are not aware of studies that compare health outcomes among similar workers with EPHI versus, for example, Medicaid or individual private insurance. But for the foreseeable future, many employed people in the US will likely not have insurance. Regarding other fringe benefits, Asfaw et al. (2017) find sick leave (pathway #9) reduces flu-related absences

because the flu is less likely to spread and Rossin (2011) finds maternity leave (pathway #10) improves child health.

Studies have identified disproportionate shares of workplace hazards and injuries within non-standard jobs (#19) (Howard, 2017). Apouey and Stabile (2019) find that non-standard employment is associated with good mental health due to the job control and flexibility. Piece work and incentive pay (#20) likely harm health (DeVaro and Heywood, 2017). The first economist to suggest harm was Adam Smith: “Workmen .... when they are liberally paid by the piece, are very apt to overwork themselves, and to ruin their health and constitution in a few years” (DeVaro and Heywood, 2017).

Economy-wide increases in either wage or income inequality (#28) likely harm population health. We are not aware of epidemiologic studies addressing only wage inequality (as there are in economics). A plethora of epidemiologic studies, however, have addressed income inequality. Ross et al.(2000) find inequality increases mortality in the US but has no effect in Canada. But Kawachi et al. (2014) and Pickett and Wilkinson (2009) find reduced inequality improves health across states and nations. Moreover, there is a wealth of epidemiologic literature addressing health effects of income reaching back decades (Kitagawa and Hauser, 1973)

**5. Direct associations between unions and health outcomes**

Table 3 presents pathways, judgments, and studies on the direct associations of unions with various measures of health. There are far fewer of these studies than appear in Table 2. These studies differ from those in Table 2 in that the dependent variable measures health and the key independent variable measures unions; no links are required between economic and epidemiologic studies. The first two dependent variables in the first two rows summarize literature reviews in the Appendix. All studies recognize the possibility of reverse causality: workplace hazards might result in more unions because unions might be more likely to form in workplaces that have significant hazards. Some studies attempt to remove reverse causality with instrumental variables and/or longitudinal data (Donado, 2015) so that researchers can test whether unions reduce the number of injuries from existing high levels. An additional complicating factor is that unions likely help workers apply for and receive workers’ compensation benefits (Hirsch et al., 1997). Our assessment of the literature in the Appendix is that unions decrease fatal injuries (pathway #29) but findings for non-fatal injuries (#30) are

**Table 4**  
Summary of findings on pathways and outcomes.

Judgment category	For workers or society at-large
Consensus unions improve health	#8 EPHI (versus no insurance), #12 dangerous conditions, #13 OSHA inspections, #29 fatal injuries (table 3)
Consensus unions harm health	none
Likely unions improve health	#2 firm-level wage inequality; #3 pensions, #5 discrimination, #6 on-the-job training, #9 sick leave, #10 family leave, #14 receive workers comp benefits, #15 right-to-know, #16 overtime, #19 non-standard work, #20 piecework, #21 vacation leave, #24 social support, #26 self-esteem, #27 wages and benefits for all jobs, #28 societal income inequality
Likely unions harm health	none
Disputed and unknown	#1 wages, #4 job loss, #7 education, #11 health promotion, #17 shiftwork, #18 individual worker-controlled flexibility, #22 job satisfaction, #23 job strain, #25 fairness, #30 non-fatal injuries (table 3), #31b actual sickness absence (table 3) *, #32 self-rated health (table 3), #33 overdose (table 3), #34 mortality (table 3), #35 food insecurity (table 3)

\*Note: Reported absence is not an outcome; only actual sickness or injury leading to absence is an outcome.

disputed.

There is consensus for the second dependent variable: unions increase reported sickness absence (#31). There is no consensus, however, for explaining the correlation. Most researchers suggest that rather than indicating unions cause sickness, unions encourage workers to take more sick days when they are truly sick. Union workers may not feel as threatened with employer retaliation as non-union workers for taking days off. Finally, seven unique studies in the bottom rows of Table 3 pertain to unions improving self-rated physiological and psychological health, drug overdoses, mortality, and food insecurity.

## 6. Summary

Table 4 provides a summary of findings. We created five categories for assessments. For a pathway to qualify within either the “Consensus unions improve health” or “Consensus unions harm health” there must have been consensus either in both columns 2 and 4 of Table 2 or within Table 3. For the two “likely” categories, qualification was broader: either the pathways in both columns 2 and 4 of Table 2 were “likely” or one was “likely” and the other was “consensus”; or the pathway in Table 3 is “likely.” If any pathway garnered a “disputed” or “unknown” judgment in either column 2 or 4 of Table 2 or Table 3, that pathway was classified as “disputed and unknown” in summary Table 4.

Findings in Table 4 reveal that whereas there are four consensus pathways and outcomes and 16 likely pathways and outcomes for unions improving health, there are no consensus or likely pathways for harming health. We cannot conclude, however, that unions improve health overall because there are 15 disputed and unknown pathways and outcomes and any of these may have powerful harmful effects.

## 7. Limitations and methodological issues for future research

This study has limitations. First, readers may not agree with our judgments regarding summaries of findings, but they at least have a place to begin to form their own or construct studies to test these pathways. Yet setting aside judgments, we identify 35 pathways and outcomes and cite relevant studies for each. Virtually all “union and health” studies with which we are aware have identified no more than three pathways. Malinowski et al. (2015) and Hagedorn et al. (2016) identify more but they do not link their pathways to the economics literature, nor do they identify as many as in this study. Second, with the exception of effects on economy-wide wages and inequality, we do not include any other possible economy-wide effects such as possible effects on the quality of products (e.g. unionized nurses providing better cardiovascular care (Ash and Seago, 2015) or union support for political public health initiatives such as Obamacare or effects on broader Social Determinants of Health such as housing. With four exceptions—employer-provided health insurance (EPHI), paid family leave, individual worker-controlled flexibility and wages—we do not address effects on families. Finally, this review primarily focuses on private-sector unions because, apart from wages, there is little research on possible pathways for public-sector unions.

There are lessons from studies in Tables 2 and 3 for future research. First, most research has been conducted within the private sector. When public- and private-sector unions are analyzed, they are frequently separated. Second, comparison groups must be constructed with an eye to the structure of the relevant labor market. For example, within the private-sector, blue-collar rather than white-collar workers are much more likely to be unionized. The comparison group for private-sector unions, therefore, should be non-unionized blue-collar, not white-collar, workers. Third, there are major gaps in research pertaining to, for example, union/non-union differences in education, job strain, and justice, and effects of pensions on health. Fourth, whatever the health dependent variable might be there is the possibility of reverse causality e.g. hazardous conditions may lead workers to form unions. To address this possibility researchers might use longitudinal data containing

people who have joined or left unions over time or instrumental variables or propensity scores.

## 8. Conclusion

We first link predominately economic with predominately epidemiologic literatures to identify 28 job-related pathways whereby unions might influence the health of workers. Pathways include wages, wage inequality, and discrimination. Second, we report on studies with direct associations between unions and health including occupational injuries and absence from work. We cannot conclude that there is consensus that unions improve or harm overall worker health; we nevertheless find considerably more salubrious than harmful pathways and outcomes. Unions can also have effects outside workplaces; for example, they can help galvanize political support for public health legislation or minimum wages. But such effects are myriad and beyond the scope of this review. Unions are underappreciated institutions for affecting not only worker health, but the health of workers’ families and the public at-large.

## Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.pmedr.2021.101502>.

## References

- Allen, S.G., 1984. Trade unions, absenteeism, and exit-voice. *Ind. Labor Relat. Rev.* 37 (3), 331–345.
- Apouey B, Stabile M. The effects of self and temporary employment on mental health: The role of the gig economy in the UK INSEAD Working Paper No. 2019/23/EPS. May 28, 2019. Available at SSRN: <https://ssrn.com/abstract=3395144> Accessed February 11, 2020.
- Arno, P.S., House, J.S., Viola, D., Schechter, C., 2011. Social security and mortality: The role of income support policies and population health in the United States. *J. Public Health Policy* 32 (2), 234–250.
- Aronsson, G., Gustafsson, K., 2005. Vacation –still an issue for worker protection? An empirical study of vacation and recuperation. *Int. J. Health Serv.* 35 (1), 143–169.
- Asfaw, A., Rosa, R., Pana-Cryan, R., 2017. Potential economic benefits of paid sick leave in reducing absenteeism related to the spread of influenza-like illness. *J. Occup. Environ. Med.* 59 (9), 822–829.
- Ash, M., Seago, J.A., 2004. The effect of registered nurses’ unions on heart-attack mortality. *Ind. Labor Relat. Rev.* 57 (3), 422–442.
- Barling, J., Kellowa, E.K., 1996. Job insecurity and health: The moderating role of workplace control. *Stress Med.* 12 (4), 253–259.
- Benach, J., Vives, A., Amable, M., Vanroelen, C., Tarafa, G., Muntaner, C., 2014. Precarious employment: Understanding an emerging social determinant of health. *Am. J. Public Health.* 35 (1), 229–253.
- Bender, K.A., Sloane, P.J., 1999. Trade union membership, tenure and the level of job insecurity. *Appl. Econ.* 31 (1), 123–135.
- Berkman, L.F., Kawachi, I., Glymour, M.M. (Eds.), 2014. *Social Epidemiology*, 2nd edition. Oxford University Press, New York, NY.
- Bivens, J., Engdahl, L., Gould, E., Kroeger, T., McNicholas, C., Mishel, L., Mokhiber, Z., Shierholz, H., Wilpert, M.V., Wilson, V., Zipperer, B. How today’s unions help working people. Economic Policy Institute. August 24, 2017. <https://www.epi.org/publication/how-todays-unions-help-working-people-giving-workers-the-power-to-improve-their-jobs-and-unrig-the-economy/#epi-toc-12> Accessed January 23, 2020.
- Blanchflower, D.G.. A Cross-Country Study of Union Membership. IZA Discussion Paper #2016. 2006. SSRN website. [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=892338#](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=892338#) Accessed May 1, 2021.
- Blanchflower, D., 2019. *Not Working: Where Have All the Good Jobs Gone?* Princeton University Press, Princeton, New Jersey.
- Booth, A.L., Francesconi, M., 2003. Union coverage and non-standard work in Britain. *Oxford Economic Papers* 55 (3), 383–416.
- Brown, S., Sessions, J.G., 1996. The economics of absence: Theory and evidence. *J. Econ. Surv.* 10 (1), 23–53.
- Buchmueller, T.C., DiNardo, J., Valletta, R.G., 2002. Union effects on health insurance provision and coverage in the United States. *Ind. Labor Relat. Rev.* 55 (4), 610–627.
- Budd, J.W., McCall, B.P., 1997. The effect of unions on the receipt of unemployment insurance benefits. *Ind. Labor Relat. Rev.* 50 (3), 478–492.



- Bureau of Labor Statistics. Contingent and Alternative Employment Arrangements Summary. Economic News Release. June 7, 2018. <https://www.bls.gov/news.release/conemp.nr0.htm> Accessed March 30, 2021.
- Bureau of Labor Statistics, 2020. Economic News Release. Union Members Summary. January 22, 2020. <https://www.bls.gov/news.release/union2.nr0.htm> Accessed January 23, 2020.
- Butler, A.B., Grzywacz, J.G., Ettner, S.L., Liu, B., 2009. Workplace flexibility, self-reported health, and health care utilization. *Work & Stress*. 23 (1), 45–59.
- Card, D., Mas, A., Moretti, E., Saez, E., 2012. Inequality at work: the effect of peer salaries on job satisfaction. *Am. Econ. Rev.* 102 (6), 2981–3003.
- Case A, Deaton A. Mortality and morbidity in the 21st century. *Brookings Papers on Economic Activity*. Spring 2017: 397–476. <https://data.nber.org/mortality-and-morbidity-in-the-21st-century/casetextsp17bpea.pdf> Accessed February 11, 2020.
- CBS News. Unions and gig drivers sue to overturn proposition 22. January 12, 2021. <https://www.cbsnews.com/news/unions-and-gig-drivers-sue-to-overturn-california-proposition-22/> Accessed April 20, 2021.
- Centers for Disease Control and Prevention. Social Determinants of Health. 2020. <https://www.healthypeople.gov/2020/topics-objectives/topic/social-determinants-of-health> accessed June 12, 2020.
- Colligan, M.J., Cohen, A., 2004. Chapter 11: The role of training in promotion workplace safety and health. In: Barling, J., Frone, M.R. (Eds.), *The Psychology of Workplace Safety*. American Psychological Association, Washington DC.
- Cooper D, Kroeger T. Employers steal billions from workers' paychecks each year: Survey data show millions of workers are paid less than the minimum wage, at significant cost to taxpayers and state economies. *Economic Policy Institute*. May 10, 2017. <https://www.epi.org/publication/employers-steal-billions-from-workers-paychecks-each-year/> Accessed January 23, 2020.
- Cotti, C.D., Haley, M.R., Miller, L.A., 2013. Workplace flexibilities, job satisfaction and union membership in the US workforce. *Br. J. Ind. Relat.* 52 (3), 403–425.
- Cytus, J., Glymour, M.M., Avendano, M., 2015. Health effects of unemployment benefit program generosity. *Am. J. Public Health* 105 (2), 217–323.
- Darity, W.A., 2003. Employment discrimination, segregation, and health. *Am. J. Public Health* 93 (2), 226–231.
- Davis A, Hirsch D, Padley M, Shepherd C. A Minimum Income Standard for the UK, 2008–2018: continuity and change. *York: Joseph Rowntree Foundation*. July 2018. [http://allcatsrgrey.org.uk/wp/download/health\\_economics/mis\\_2018\\_3298\\_final\\_report.pdf](http://allcatsrgrey.org.uk/wp/download/health_economics/mis_2018_3298_final_report.pdf) Accessed March 29, 2021.
- DeFina, R., Hannon, L., 2019. Drug use, de-unionization and drug death rates. *Social Currents*. 6 (1), 4–13.
- Dench, D., Grossman, M., 2019. Health and the wage rate: Cause, effect, both, or neither? New evidence on an old question. In: Polachek, S.W., Tatsiramos, K. (Eds.), *Health and Labor Markets*, Volume 47 of *Research in Labor Economics*. Emerald Publishing Limited, Bingley, United Kingdom, pp. 1–24.
- DeVaro, J., Heywood, J.S., 2017. Performance pay and work-related health problems. *Ind. Labor Relat. Rev.* 70 (3), 670–703.
- Devitt, M. AAFP News. CDC data show U.S. life expectancy continues to decline; Suicides, drug overdose deaths named as key contributors. *American Association of Family Practitioners*. December 10, 2018. <https://www.aafp.org/news/health-of-the-public/20181210lifeexpectdrop.html> Accessed February 11, 2020.
- DeVogel, R., Ferrie, J.E., Chandola, T., Kivimaki, M., Marmot, M.G., 2007. Unfairness and health: Evidence from the Whitehall II Study. *J. Epidemiol. Community Health* 61 (6), 513–518.
- Doherty, M., Franca, V. Solving the 'Gig-saw'? Collective Rights and Platform Work, *Industrial Law Journal*, 2020. 49 (3) 2020: 352–376.
- Donado, A., 2015. Why do union workers have more nonfatal occupational injuries? *Ind. Labor Relat. Rev.* 68 (1), 153–183.
- Dragano, N., Siegrist, J., Wahrendorf, M., 2011. Welfare regimes, labour policies and unhealthy psychosocial working conditions: a comparative study with 9917 older employees from 12 European countries. *J. Epidemiol. Community Health* 65, 793–799.
- Dollard, M.F., Nesar, D.Y., 2013. Worker health is good for the economy: Union density and psychosocial safety climate as determinants of country differences in worker health and productivity in 31 countries. *Soc. Sci. Med.* 92, 114–123.
- Duncan, G.J., Stafford, F.P., 1980. Do union members receive compensating wage differentials? *Am. Econ. Rev.* 70 (3), 355–371.
- Economou, A., Theodossiou, I., 2015. Join the union and be safe: The effects of unionization on Occupational Safety and Health in the European Union. *Labour*. 29 (2), 127–140.
- Eisenberg-Guyot, J., Mooney, S.J., Barrington, W.E., Hajat, A., 2021. Does the Union Make Us Strong? Labor-Union Membership, Self-Rated Health, and Mental Illness: A Parametric G-Formula Approach. *Am. J. Epidemiol.* 190 (4), 630–641.
- Eisenberg-Guyot, J., Mooney, S.J., Hagopian, A., Barrington, W.E., Hajat, A. Solidarity and disparity: Declining labor union density and changing racial and educational mortality inequities in the United States. *American Journal of Industrial Medicine*. e-published ahead of print, December 17, 2019. <https://onlinelibrary.wiley.com/doi/full/10.1002/ajim.23081> Accessed January 16, 2020.
- Ehrenberg, R.G., Smith, R.S., 2015. *Modern Labor Economics: Theory and Public Policy*, 12th edition. Routledge Publishers, New York, NY.
- Elliott, S., Powell, R., Brenton, 2015. Being a good mom: Low-income, black single mothers negotiate intensive mothering. *J. Fam. Issues* 36 (3), 351–370.
- Ellwood, D.T., Fine, G., 1987. The impact of right-to-work laws on union organizing. *J. Polit. Econ.* 95 (2), 250–273.
- Ewer, P., 2000. Trade unions and vocational education and training: Questions of strategy and identity. *Labor and Industry: A Journal of the Social and Economic Relations at Work*. 10 (3), 37–56.
- Faragher, E.B., Cass, M., Cooper, C.L., 2005. The relationship between job satisfaction and health: a meta-analysis. *Occup. Environ. Med.* 62, 105–112.
- Farber HS, Herbst D, Kuziemko I, Naidu S. Unions and inequality over the twentieth century: New evidence from survey data. *Princeton University Working Paper*. Princeton NJ. October 9, 2020. [https://scholar.princeton.edu/sites/default/files/kuziemko/files/unions\\_1october2020.pdf](https://scholar.princeton.edu/sites/default/files/kuziemko/files/unions_1october2020.pdf) Accessed March 30, 2021.
- Freeman, R.B., Leonard, J.S., 1987. Union maids: Unions and the female workforce. In: Brown, C., Peckman, J. (Eds.), *Gender in the Workplace*. Brookings Institution, Washington, DC, pp. 189–212.
- Freeman, R.B., Medoff, J.L., 1984. *What Do Unions Do?* Basic Books. New York, NY.
- Fortin, N.M., Lemieux, T., Lloyd, N. Labor market institutions and the distribution of wages: The role of spillover effects. *National Bureau of Economic Research Working Paper* 28375. 2021. <https://www.nber.org/papers/w28375> Accessed March 31, 2021.
- Fuller, J.B., Hester, K., 2001. A closer look at the relationship between justice perceptions and union participation. *J. Appl. Psychol.* 86 (6), 1096–1105.
- Garen, J., 1999. Unions, incentive systems, and job design. *J. Labor Res.* 20 (4), 589–603.
- Gibney, R., Masters, M., Aybat, A., Amlie, T., 2018. "I know I am but what are you?" Public perceptions of unions, members, and joining intentions. *Soc. Sci. 7* (9) article 146.
- Gibson, M., Hearty, W., Craig, P., 2020. The public health effects of interventions similar to basic income: a scoping review. *The Lancet Public Health*. 5 (3), e165–e176.
- Gillen, M., Baltz, D., Gassel, M., Kirsch, L., Vaccaro, D., 2002. Perceived safety climate, job demands, and coworker support among union and nonunion injured construction workers. *J. Saf. Res.* 33 (1), 33–51.
- Grzywacz, J.G., Casey, P.R., Jones, F.A., 2007. The effects of workplace flexibility on health behaviors: A cross-sectional and longitudinal analysis. *J. Occup. Environ. Med.* 49 (12), 1302–1309.
- Glymour, M., Avendano, M., Kawachi, I., 2014. *Socioeconomic status and health*. In: Berkman, L.F., Kawachi, I., Glymour, M.M. (Eds.), *Social Epidemiology*, 2nd edition. Oxford University Press, New York, NY.
- Hagedorn, J., Paras, C.A., Greenwich, H., Hagopian, A., 2016. The role of labor unions in creating working conditions that promote public health. *Am. J. Public Health* 106 (6), 989–995.
- Herd, P., Schonen, R.F., House, J.S., 2008. Upstream solutions: Does the supplemental security income program reduce disability in the elderly? *Milbank Q.* 86 (1), 5–45.
- Hill, H., 1996. The problem of race in American Labor History. *Rev. Am. History*. 24 (2), 189–220.
- Hirsch, B.T., Macpherson, D.A., Dumond, J.M., 1997. Workers compensation reciprocity in union and nonunion workplaces. *Ind. Labor Relat. Rev.* 50 (2), 213–236.
- Howard, J., 2017. Nonstandard work arrangements and worker safety and health. *Am. J. Ind. Med.* 20 (1), 1–10.
- Holman, C.D.A.J., Corti, B., Donovan, R.J., et al., 1998. Association of the health-promoting workplace with trade unionism and other industrial factors. *Am. J. Health Promotion*. 12 (5), 325–334.
- Jacobson, N., 2007. Dignity and health: A review. *Soc. Sci. Med.* 64 (2), 292–302.
- Jones, J.M. As Labor Day turns 125, union approval near 50-year high. *Gallup News, Politics*. August 28, 2019 <https://news.gallup.com/poll/265916/labor-day-turns-125-union-approval-near-year-high.aspx?smid=nytcore-ios-share> Accessed October 14, 2019.
- Jones, J., Schmitt, J., Woo, N. Women, working families, and unions. *Center for Economic and Policy Research*. June 2014. Washington DC. <http://cepr.net/documents/women-union-2014-06.pdf> Accessed Oct 18, 2019.
- Joyce, R., Xu, X. Inequalities in the twenty-first century: introducing the IFS Deaton Review. *Institute for Fiscal Studies, UK*. May 2019. <https://www.ifs.org.uk/inequality/wp-content/uploads/2019/05/The-IFS-Deaton-Review-launch.pdf> Accessed October 28, 2019.
- Kapos S. Unions tap into burst of worker angst over coronavirus. *Politico*. June 15, 2020. <https://www.politico.com/news/2020/06/15/unions-workers-coronavirus-304650>. Accessed September 18, 2020.
- Kaufman, B.E., Hotchkiss, J.L., 2003. *The Economics of Labor Markets*, 6th edition. South-Western publishers, Mason, Ohio.
- Kawachi, I., Kennedy, B.P., 2002. *The Health of Nations: Why Inequality Is Harmful to Your Health*. The New Press, New York, NY.
- Kawachi, I., Subramanian, S.V. Chapter 4. Income Inequality. In Berkman LF, Kawachi I, Glymour MM. *Social Epidemiology* 2nd Edition, Oxford University Press. New York, NY. 2014.
- Kenkel, D., Supina, D., 1992. The determinants of worksite health promotion behavior. *Economics Letters*. 40 (3), 345–351.
- Keshner, A. America's 1% hasn't had this much wealth since just before the Great Depression *MarketWatch* Feb 24, 2019. <https://www.marketwatch.com/story/its-been-almost-a-100-years-since-the-americas-1-had-so-much-wealth-2019-02-11> Accessed November 1, 2019.
- Keune, M., 2013. Trade union responses to precarious work in seven European countries. *Int. J. Labour Res.* 5 (1), 59–78.
- Kitagawa, E.M., Hauser, P.M., 1973. *Differential Mortality in the United States: A Study in Socioeconomic Epidemiology*. Harvard University Press, Cambridge, Mass.
- Kivimaki, M., Nyberg, S.T., Batty, G.D., et al., 2012. 2012. Job strain as a risk factor for coronary heart disease: a collaborative meta-analysis of individual participant data. *The Lancet*. 380 (9852), 1491–1497.
- Kochan, T.A., 1979. How American workers view labor unions. *Monthly Labor Review*. 102 (4), 23–31.
- Krause, N., Lund, T., 2004. Chapter 13: Returning to work after occupational injury. In: Barling, J., Frone, M.R. (Eds.), *The Psychology of Workplace Safety*. American Psychological Association, Washington DC.

- Krieger, N., 2014. Chapter 3: Discrimination and health inequities. In: Berkman LF, Kawachi I, Glymour MM., . (Ed.), *Social Epidemiology*, 2nd edition. Oxford University Press, New York, NY.
- Kristol, T., Cohen, Y., 2017. The causes of rising wage inequality: the race between institutions and technology. *Socio-Economic Review*. 15 (1), 187–212.
- Kuoppala, J., Lamminpää, A., 2008. Work health promotion, job well-being, and sickness absences—a systematic review and meta-analysis. *J. Occup. Environ. Med.* 50 (11), 1216–1227.
- Laroche, P., 2016. A meta-analysis of the union–job satisfaction relationship. *British Journal of Industrial Relations*. 54 (4), 709–741.
- Leigh, J.P., 1981. The effects of union membership on absence from work due to illness. *J. Labor Res.* 2 (2), 329–336.
- Leigh, J.P., 1982. Are unionized blue-collar jobs more hazardous than non-unionized blue-collar jobs? *J. Labor Res.* 3 (3), 349–357.
- Leigh, J.P., Leigh, W.A., Du, J., 2019. Minimum wages and health: A literature review. *Prev. Med.* 118, 122–134.
- Leonard, J.S., 1985. The effect of unions on the employment of blacks, Hispanics, and women *Industrial and Labor Relations Review*. 39 (1), 115–132.
- Levy, B.S., Wegman, D.H., Baron, S.L., Sokas, R.K., 2017. *Occupational and Environmental Health*, 7th edition. Oxford University Press, New York, NY.
- Li, L., Singleton, P., 2019. The effect of workplace inspection on worker safety. *Ind. Labor Relat. Rev.* 72 (3), 718–748.
- Lott, B., 2014. Social class myopia: The case of psychology and labor unions. *Anal. Soc. Issues Public Policy*. 14 (1), 261–280.
- Malinowski, B., Minkler, M., Stock, L., 2015. Labor unions: A public health institution. *Am. J. Public Health* 105 (2), 261–271.
- Mayer G. Union membership trends in the United States. Washington, DC: Congressional Research Service. Cornell University, Industrial and Labor Relations School, Ithaca, NY. Aug 31, 2004. [https://digitalcommons.ilr.cornell.edu/cgi/viewcontent.cgi?article=1176&context=key\\_workplace](https://digitalcommons.ilr.cornell.edu/cgi/viewcontent.cgi?article=1176&context=key_workplace) Accessed February 12, 2020.
- McConnell, C.R., Brue, S.L., Macpherson, D.A., 2017. *Contemporary Labor Economics*, 11th edition. McGraw-Hill, New York, NY.
- Minkler, M., Salvatore, A.L., Chang, C., Gaydos, M., Liu, S.S., Lee, P.T., Tom, A., Bhatia, R., Krause, N., 2014. Wage theft as a neglected public health problem: An overview and case study from San Francisco's Chinatown district. *Am. J. Public Health* 104 (6), 1010–1020.
- Mishel, L. Unions, inequality, and faltering middle-class wages. Economic Policy Institute. Issue Brief #342. August 29, 2012. <https://www.epi.org/publication/ib342-unions-inequality-faltering-middle-class/> Accessed January 27, 2020.
- Mishel, L., Gould, E., Bivens, J. Wage stagnation in nine charts. January 6, 2015. Economic Policy Institute. <https://www.epi.org/publication/charting-wage-stagnation/> Accessed November 21, 2019.
- Monnat, S.M. Deaths of despair and support for Trump in the 2016 election. Pennsylvania State University Department of Agricultural Economics Research Brief, 2021 2016 <https://smmonnat.expressions.syr.edu/wp-content/uploads/ElectionBriefDeathsOfDespair.pdf> Accessed June 27.
- Montgomery, M., 1991. New evidence on unions and layoff rates. *Ind. Labor Relat. Rev.* 44 (4), 708–721.
- Nissen, B., Jarley, P., 2015. Unions as social capital: Renewal through a return to the logic of mutual aid? *Labor Studies Journal*. 29 (4), 1–26.
- Nunn, R., O'Donnell, J., Shambaugh, J. The shift in private sector union participation: Explanation and effects. The Hamilton Project. Economic Analysis. August 2019. [https://www.hamiltonproject.org/assets/files/UnionsEA\\_Web\\_8.19.pdf](https://www.hamiltonproject.org/assets/files/UnionsEA_Web_8.19.pdf) accessed October 22, 2019.
- O'Brien, E., 2003. Employers' benefits from workers' health insurance. *Milbank Q.* 81 (1), 5–43.
- Organization for Economic Cooperation and Development, OECD. Non-standard workers are underrepresented by trade unions: Actual and adjusted ratio of trade union density among non-standard workers relative to standard workers (%), latest available year. OECD Employment Outlook 2019: The Future of Work, OECD Publishing, Paris. 2019. <https://doi.org/10.1787/8d5e0f8e-en>. Accessed January 31, 2020.
- Park, K.-O., Wilson, M.G., Lee, M.S., 2004. Effects of social support at work on depression and organizational productivity. *Am. J. Health Behav.* 28 (5), 444–455.
- Park, T.-Y., Lee, E.-S., Budd, J.W., 2019. What do unions do for mothers? Paid maternity leave use and the multifaceted roles of labor unions. *Ind. Labor Relat. Rev.* 72 (3), 662–692.
- Pickett, K.E., Wilkinson, G.R., 2009. *The Spirit Level. Why Greater Equality Makes Societies Stronger*. Allen Lane Publishers, New York, NY.
- Pierce, J.L., Gardner, D.G., 2004. Self-esteem within the work and organizational context: A review of the organization-based self-esteem literature. *J. Manage.* 30 (5), 591–622.
- Raphael, D., 2011. The political economy of health promotion: part 2, national provision of the prerequisites of health. *Health Promotion International*. 28 (1), 112–132.
- Reeves, A. The health effects of wage setting institutions: How collective bargaining improves health but not because it reduces inequality. *Sociology of Health and Illness*. 2021. e-published ahead of print. <https://onlinelibrary.wiley.com/doi/epdf/10.1111/1467-9566.13272> Accessed April 20, 2021.
- Reeves, A., Loopstra, R., Tarasuk, V., 2021. Wage-Setting policies, employment, and food insecurity: A multilevel analysis of 492 078 people in 139 countries. *Am. J. Public Health* 111 (4), 718–725.
- Reynolds, M.M., Brady, D., 2012. Bringing you more than the weekend: Union membership and self-rated health in the United States. *Soc. Forces* 90 (3), 1023–1049.
- Rosenfeld, J., 2014. *What unions no longer do*. Harvard University Press, Cambridge Mass.
- Weil, D., 1991. Enforcing OSHA: The role of labor unions. *Industrial Relations*. 30 (1), 20–36.
- Ross, N., Wolfson, M., Dunn, J., Berthelot, J.M., Kaplan, G., Lynch, J., 2000. Relation between income inequality and mortality in Canada and in the United States: Cross sectional assessment using census data and vital statistics. *Br. J. Med.* 320 (7239), 898–902.
- Rossin, M., 2011. The effects of maternity leave on children's birth and infant health outcomes in the United States. *J. Health Econ.* 30 (2), 221–239.
- Schnall, P.L., Landsbergis, P.A., Baker, D., 1994. Job strain and cardiovascular disease. *Annu. Rev. Public Health*. 15, 381–411.
- Stuckler, D., Basu, S., Suhrcke, M., Coutts, A., McKee, M., 2009. The public health effect of economic crises and alternative policy responses in Europe: An empirical analysis. *The Lancet*. 374 (9686), 315–323.
- Trejo, S.J., 1993. Overtime pay, overtime hours, and labor unions. *J. Labor Econ.* 11 (2), 253–278.
- Tronsor, W.J., 2018. Unions for workers in the gig economy: Time for a new labor movement. *Labor Law Journal* 69 (4), 181–193.
- Wagstaff, A.S., Lie, J.A.S., 2011. Shift and night work and long working hours—a systematic review of safety implications. *Scand. J. Work Environ. Health* 37 (3), 173–185.
- Western, B., Rosenfeld, J., 2011. Unions, norms, and the rise in US wage inequality. *Am. Sociol. Rev.* 76 (4), 513–537.
- Wolf, J., Schmitt, J. A profile of union workers in state and local government. Economic Policy Institute. June 7, 2018. <https://www.epi.org/publication/a-profile-of-union-workers-in-state-and-local-government-key-facts-about-the-sector-for-followers-of-janus-v-afscme-council-31/>. Accessed April 20, 2021.