

## Flexible labor markets and employee health

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Ferrie JE, Westerlund H, Virtanen M, Vahtera J, Kivimäki M. Flexible labor markets and employee health. *SJWEH Suppl.* 2008;(6):98–110.

Moves towards a more flexible labor market have focused research attention on the health effects of downsizing, temporary employment, and job insecurity. Most published research documents adverse effects on health, although null findings and direct associations have been observed. There is evidence that major downsizing is associated with poor mental health, medically certified sickness absence, and poor physical health, including cardiovascular disease mortality, among the survivors of downsizing. Recent research suggests that repeated exposure to personnel expansion also predicts sickness absence and hospitalization. There is strong evidence that job insecurity adversely affects psychological health and also evidence of increases in poor self-reported physical health, workplace injuries and accidents, sickness absence, and health service use. However, evidence of a link with disease and premature death remains limited. While temporary workers are initially selected for good health, they generally have poorer mental and physical health, including increased premature mortality, in the long term.

**Key terms** downsizing; expansion; job insecurity; narrative review; temporary employment.

Since 1980 large changes have taken place in the structure of the labor market in most industrialized countries, specifically with the aim of creating a flexible workforce. While the main drivers of this restructuring have been deindustrialization, technological innovation, globalization, and a commitment to a free market economy, including the privatization of public services, important manifestations have been downsizing and rapid increases in precarious employment. It is widely agreed that these changes mean that patterns of employment and job security, associated with the social order since the 1950s, have undergone major change (1–3). Like all social transformations these changes have the potential to affect the health of individuals and populations (4).

This new flexible labor force has been described as following a core–periphery structure. The core of employees, who have relatively secure jobs, is surrounded by layers of workers who form a “buffer workforce”. These workers have jobs that decrease in stability and security the further they are from the core. Such jobs are at increasing risk of poor work conditions and carry higher risks of unemployment and other social disadvantages (5). Research carried out during the major

recessions of the 1930s and 1980s provided unequivocal evidence of the adverse effects on health and well-being as a result of being unemployed (6–14). However, no agreement exists as to whether the health and well-being of the employed population is unevenly distributed along this core–periphery structure. Similarly, although job insecurity almost always precedes unemployment, much less research has been carried out on this exposure (15), partly because it is less obvious that temporary work and job insecurity could affect health and partly because organizations undergoing major restructuring are not keen to have uncertainties exacerbated by researchers. The following review presents evidence from research published over the last three decades on the effects of downsizing, temporary employment, and job insecurity on health and health-related outcomes.

### ***Downsizing and expansion—concepts***

Downsizing is the name given to the process whereby an organization reduces its workforce through natural

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wastage, early retirement, or redundancy. This process has been given many euphemisms, such as restructuring, retrenching, rightsizing, and skill mix adjustment, of which downsizing has become the term most widely used. According to Parker et al (16), there are at least two different forms of downsizing, strategic downsizing and reactive downsizing. Strategic downsizing refers to a process which is “well-articulated and designed to support the long-term organisational strategy [p 268]” (17). It is often used in relation to organizational transformations such as moves towards lean production, total quality management, or re-engineering (18). Reactive downsizing usually refers to situations in which staff reductions are undertaken in response to external events and short-term needs (17). An example is an organization that lays off employees as a result of diminishing needs, income, or funds during a period of economic decline. Reactive downsizing is more common than strategic downsizing, and the related empirical evidence is more substantial (16).

While the employees likely to be the worst affected by downsizing are those who lose their jobs, most research on downsizing has focused exclusively on the employees that remain in the downsized organization. Downsizing has been found to elicit considerable stress due to heightened workload, increased job insecurity, and reduced job control for those who remain in employment (19). Recent work that examined work conditions after major and minor downsizing and expansion showed that effects on the psychosocial characteristics of the work environment varied, with different effects on women and men and on the private and public sectors. However, major change (downsizing and expansion) was associated with a greater risk of physical hazards across gender and sector (20). Temporary workers are often the first to lose jobs during the downsizing process, producing the unintended consequence that a higher proportion of work in the downsized organization is done by the remaining permanent employees, who are also older.

### ***Downsizing and mental health***

Several mental health outcomes, such as anxiety, burnout, psychological distress and depression, have been examined among employees who are the survivors of downsizing. Many of these studies have been carried out among public-sector employees, who have been the target of large-scale reactive downsizing and politically driven privatization in several Scandinavian and European countries. One such study showed downsizing to be associated with anxiety and burnout among employees working in the government department dealing with social insurance (21). Other studies have observed asso-

ciations between downsizing and psychological distress among public-sector employees in the United Kingdom (22, 23) and Sweden (24), as well as the United States (US) (25). Studies of employees in the private sector are less common, but they also document adverse associations between downsizing and psychological distress (26). One large study on seamen of the US merchant fleet, which had seen 75% of its jobs disappear during the previous generation’s worklives, also documented a higher rate of psychoneurosis and suicide among deckhands who had survived downsizing (27). In contrast to this raft of findings, one small study of strategic, as opposed to reactive, downsizing found that there was no overall decrease in well-being from before to after downsizing. An examination of characteristics of the work environment in the downsized organization showed that increased demands had been offset by initiatives that improved other characteristics, such as control (16).

The limitation of most studies of major restructuring and mental health outcomes is that either one or both exposure and outcome are self-reported. However, a recent study from Finland was able to take advantage of data from registers to define both the extent of exposure to downsizing derived from employers’ registers and the effects on mental health, as measured by national register data on prescriptions for psychotropic drugs. This study found that men who kept their jobs after downsizing had a significantly higher rate of psychotropic prescriptions than men who worked in nondownsized groups when controlled for predownsizing characteristics. For women, organizational downsizing was associated with a slightly increased psychotropic prescription rate (anxiolytics in particular), but the highest rate of psychotropic prescriptions after downsizing was found for male manual workers who lost their jobs (28).

### ***Downsizing and measures of physical health***

Since the end of the 1990s, evidence has started to accumulate regarding stress-related physical health problems among the survivors of downsizing. One of the first studies in the field was conducted among the municipal employees of Raisio, one of the towns in the Finnish 10-Town Study. The Raisio study found that the risk of health problems, as indicated by musculoskeletal problems and poor self-rated health, was at least two times greater after major downsizing than after no downsizing (29–32). Half of this excess risk was attributable to an elevated level of work stress after major downsizing (30, 32). Later, work among municipal workers from four of the towns in the 10-Town Study showed that cardiovascular mortality was similarly twice as high after major downsizing than with no downsizing. Cardiovascular

disease is another stress-related end point, and no evidence was found for associations between downsizing and mortality from other causes (33). In addition to suicide, the study of US merchant seamen examined other stress-related diseases and documented higher rates of cardiovascular disease, coronary heart disease, hypertension, and asthma (27). No individual data on exposure to downsizing were available; therefore, this study is open to the ecological fallacy (34). However, significant relative increases in two stress markers, blood pressure and body mass index, were observed in a study of restructuring among white-collar workers (22).

Several studies have similarly looked at restructuring, or labor market instability involving threats to jobs, although immediate downsizing of the workforce was not necessarily involved. These studies found restructuring to be associated in cross-sectional analyses with poor self-reported health outcomes, such as health problems and poor physical health functioning (25, 35), and prospectively with adverse changes in self-reported health outcomes, such as self-rated health, health complaints and longstanding illness (22, 24, 26, 36). Interestingly, restructuring has also been shown to have adverse effects on sleep (22, 36), a biologically plausible linking mechanism between exposure to a flexible labor market and disease risk.

### ***Downsizing and recorded health-related outcomes***

Some of the health-related outcomes recorded in company or government registers have been studied in relation to downsizing and restructuring, for example, sickness absence (including hospital admission), disability pensioning, and workplace injuries and violence at work. Of these, by far the most attention has been paid to sickness absence, mainly due to the exceptional data available on participants in the 10-Town Study. The first paper from this study observed that major downsizing was associated with a significant twofold increase in medically certified sickness absence among employees of the town of Raisio (29, 37). Nearly half of this association was explained by increased demands, loss of control and skill discretion, and job insecurity (31).

In the Raisio study, the risk of long-term sick leave after downsizing was especially high for the older employees, employees with a tendency towards hostile reactions, employees with a higher income, and employees in large work units (29, 38). A later paper that used a larger cohort from the 10-Town Study (N=22 430) basically confirmed the earlier findings for sickness absence, although effects were not so strong. Nonetheless, after adjustment for demographic characteristics, pre-downsizing absence rate and town, a dose-response

association was found between the extent of downsizing and an increase in sickness absence between pre- and post-downsizing periods among permanent employees, for downsizing up to and over 20% (33).

As expected, striking differences in the prediction of long and short-term sickness absence were observed in these studies. While the relationship between the degree of downsizing and long periods of absence was linear and direct (the greater the downsizing, the higher the sickness absence), that with short periods was linear but inverse (the greater the downsizing, the lower the sickness absence), indicating the likelihood of sickness presence (attending work while ill) (39), in the face of threat. However, the reduced frequency of short-term absences did not compensate for the increase in long-term absences. On the average, the number of days involved in short periods of absence fell by 14%, but those with long sick leaves rose by 16–31% (40). The association between downsizing and increased rates of sickness absence has also been observed in studies in countries other than Finland (41, 42), and decreases in short periods of sickness absence have similarly been observed in other studies (43). A reduction in long sickness absences was also observed among women after downsizing in one study from Sweden, an effect that was particularly evident among women with a high cardiovascular score (44).

While most studies that have examined recorded health-related outcomes have examined sickness absence, downsizing has also been shown to be a predictor of work-related injury (45), increased violence at work (46, 47), and early retirement on the grounds of ill health (48). In addition to downsizing, the study by Westerlund et al (42), among 24 036 participants in the biennial national Swedish Work Environment Survey, examined exposure to personnel expansion, possibly connected with the centralization of functions, between 1989 and 1999. The study showed that exposure to repeated or prolonged large expansion was related to an increased risk of long-term sickness absence, as well as to hospital admission (42).

### ***Job insecurity—concepts***

Job security is a vital concern for both employees and their organizations (49–51). The general concept has been defined by Hartley and her colleagues as the discrepancy between the level of job security people experience and the level they prefer (52). Job insecurity can also be generated by deteriorating employment conditions and career opportunities; therefore some investigators have extended the concept to include

loss of any valued condition of employment (53, 54). These definitions encompass large numbers of workers who have insecure jobs, often seasonal, part-time, or temporary. For workers in this secondary labor market, job security is not part of the psychological contract, and insecurity is an integral part of their work experience (52, 55). However, the unpredictable nature of postindustrial worklife has also increased perceptions of poor employment security among those in permanent jobs (56), and widespread downsizing, privatization, outsourcing, mergers, and closures have led to the suggestion that job insecurity, even for employees in the primary labor market, is no longer a temporary break in an otherwise predictable worklife pattern, but is becoming a structural feature of the new labor market (57). This new employment insecurity brings employees in the primary labor market closer to those in the secondary labor market, whose worklives are characterized by employment insecurity as opposed to job insecurity. While job security represents the ability to remain in a particular job, employment security represents the likelihood of being able to remain in paid employment, even if it is a succession of jobs (58). Another consequence of this new work-related insecurity is the employees' understanding that it is their responsibility to cultivate their employability continuously (57).

The difficulty in studying the health effects of job insecurity among workers in the secondary labor market is determining whether poor health outcomes can be attributed to job insecurity and unemployment, or whether it is those already in poorer health who are selected into the secondary labor market (59). For this reason, much of the published research has concentrated on workers in the primary labor market.

Job insecurity can be self-reported or externally attributed. Studies of self-reported job insecurity examine workers who say their job is insecure, while studies of attributed job insecurity examine workers deemed to be under threat of job loss because downsizing or workplace closure is expected or is taking place. There is a strong association between self-reported and attributed job insecurity (60, 61). However, as stress levels are determined by the perceived probability and perceived severity of job loss, self-reported job insecurity is generally considered to be the more potent stressor.

### ***Job insecurity and mental health***

Most studies that have examined the effects of self-reported job insecurity on health have looked at psychological ill health as an outcome, often as the only outcome. Every study has documented consistent adverse effects on all measures of psychological health

(35, 60–75). Good evidence for an association between job insecurity and poor psychological health has come from the observation of a dose–response relationship, that is, the higher the level of job insecurity, the greater the increase in psychological ill health (3, 66, 76). Such a dose–response relationship would be observed whether job insecurity increased psychological ill health or ill health increased the likelihood of reporting job insecurity. Thus additional evidence is required to determine the direction of the causal association. Psychiatric morbidity has been shown to be minor among men who are unemployed at the beginning of a study but have obtained secure employment by the time of the follow-up, but it remains high among initially unemployed men who perceive their new jobs to be insecure (62). Additional evidence on the direction of causation has emerged from longitudinal studies that have shown that job insecurity has significant effects on subsequent psychological health and well-being after control for prior levels of such outcomes (67, 68, 76–80), and there is evidence that perceived job insecurity acts as a chronic stressor (64, 76).

To date, the strongest support for the causal precedence of job insecurity comes from a cross-lagged correlation analysis (81) and the study of change in job security (76). In the study of change, it was shown that, in a comparison with employees whose jobs were secure at baseline and follow-up (2.5 years later), self-reported psychological morbidity was higher among those who lost job security. However, residual adverse effects were observed among those who were insecure at baseline but secure by the time of the follow-up, while those exposed to chronic job insecurity experienced the greatest self-reported psychological morbidity (76). A study among middle-aged Australian managers and professionals showed that both job insecurity and job-strain (Karasek model) had adverse effects on depression and anxiety that were independent of each other and were not explained by gender, education, marital status, major life events, part-time or full-time employment, financial hardship, or personality (71). In a subsequent paper, the researchers showed that the two stressors had an additive and a synergistic effect on participants with both high job insecurity and high job strain. Such participants were at a significantly increased risk of depression and anxiety (82). However, a meta-analysis of the association between job insecurity and mental health outcomes in 37 study samples has estimated the effect size to be medium rather than large (83).

Almost all studies of attributed job insecurity have documented an association between insecurity and psychological ill health (22, 84–89). Findings from the most notable exception, an early, factory closure study in the United States, surprised the investigators (90). “In the psychological sphere the personal anguish experienced

by the men and their families does not seem adequately documented by the statistics . . . [p180]" (91). The observation was attributed to imperfect measurement techniques, as numerous adverse psychological outcomes were documented in an eloquent narrative account of the closing (92).

Another notable exception comes from a longitudinal study of white-collar civil servants (93), which took advantage of a "natural experiment". In such "experiments" a "naturally" exposed group is compared with an unexposed reference group. On this occasion, well after the initial survey, one of the 20 departments in the study was unexpectedly sold to the private sector, a transfer of business in which most of the workforce lost their jobs. The study participants whose jobs in this department were deemed to be under threat in the period immediately prior to the privatization were compared with those whose jobs were secure. However, contrary to findings from most other studies of attributed job insecurity, no effects on psychological health were found for either gender in the run up to the sale (94). A possible explanation of the findings from these latter studies, which seem to contradict findings from most studies, recently emerged from a study that took advantage of a similar natural experiment within the Maastricht cohort study on "fatigue at work". One of the government agencies in the study was threatened with closure after the initial survey. Psychological ill health among the employees in this agency was compared with that of the employees in agencies unaffected by threat of closure, adjustment being made for ill health at baseline. Over the 13 months following the closure announcement, the number of new cases of psychological ill health in the closure group was significantly higher than in the nonclosure group. However, the increase in psychological distress among those working in the targeted agency, but who did not think they were at risk of job loss, was not significant; thus self-reported rather than attributed job insecurity appeared to have been driving the association (95).

### ***Job insecurity and measures of physical health***

Evidence is growing that self-reported job insecurity has adverse effects on self-reported general physical health measures, with reasonably consistent results for some health outcomes in both cross-sectional and longitudinal studies (3, 35, 73–76, 80, 96–101). Self-reported job insecurity has been shown to be associated with poor self-rated health, sleep disturbance, chronic insomnia, fatigue, migraine, colds and flu-like symptoms, long-standing illness, and musculoskeletal disorders (35, 74, 98, 99, 101). Evidence of a dose–response relationship (3) and evidence from studies of change have provided

more-convincing evidence of a causal association. Job insecurity in the Maastricht cohort study was associated longitudinally with flu-like illness and health complaints (100). An earlier study by Heaney and her colleagues on job insecurity over 15 months among auto manufacturing workers found that extended periods of job insecurity increased physical symptoms over and above the effects of job insecurity at any one point in time (96). Similarly, a study of change in job security over a 2.5-year period showed that the loss of job security was associated with a significantly increased risk of self-reported morbidity, poor self-rated health, and long-standing illness, while workers exposed to chronic job insecurity had the highest self-reported morbidity (76). Nonetheless, a recent meta-analysis of the association between job insecurity and physical health outcomes in 19 study samples estimated the effect size to be small rather than medium or large (83).

The small number of studies that have been able to examine associations between attributed job insecurity and self-reported measures of physical health have observed associations similar to those for self-reported job insecurity (91, 94, 102–104). Studies of effects on sleep have provided robust evidence of sleep disturbance prior to redundancy (22, 85, 87, 91, 105), but not, to judge from a study in Finland, during a time of economic recession (106).

Very few studies have looked at the effect of either category of job insecurity on biomedical risk factors. There appears to be only two studies that have examined the association between self-reported job insecurity and blood pressure. Both studies found a significant increase in blood pressure among those with job insecurity but not among control workers who did not report job insecurity (76, 107), and data from the Alameda County study, a general population study in the United States, showed self-reported job insecurity was a significant predictor of incident-treated hypertension over a 20-year period. This association was independent of a wide range of potential behavioral and sociodemographic risk factors (108). Two studies of attributed job insecurity similarly found significant increases in blood pressure (88, 109, 110), but another two studies, which examined a change in attributed security, observed either no significant differences or effects in some groups but not in others (79, 87). Studies that have examined effects on body weight similarly report mixed findings, with no change (91), as well as gain and loss in mean weight being observed (22, 76, 89). The resolution of these apparently divergent findings may lie in the observation that job insecurity has bi-directional effects on weight. A study of occupational factors and 5-year weight change among Danish men showed that job insecurity increased the likelihood of weight gain among obese men and weight loss among men who were lean (111).

Apart from two Scandinavian studies, there has been even less interest in biomedical risk factors other than blood pressure and body weight. Attributed job insecurity has been associated with nonsignificant increases in the stress hormone cortisol, and in cholesterol, in a mainly female blue-collar workforce, and levels of adrenal hormones have been shown to be increased among low-grade, white-collar women (85, 112). However, evidence on cholesterol from a longitudinal study of white-collar civil servants is mixed, and it remains uncertain what clinical relevance the observed changes in biomedical risk factors may have (76, 79). Hardly any research has examined the effect of job insecurity on diagnosed diseases. Three studies have documented an association between self-reported job insecurity and various measures of coronary heart disease, but, while the findings were indicative of adverse changes, they were modest and, with the exception of one short-term association, not significant after adjustment for major confounding somatic and behavioral coronary risk factors (113–115). An association has been observed between attributed job insecurity and the risk of ischemia (abnormal electrocardiogram or diagnosed angina) relative to the values of unexposed employees (22, 89). However, overall, the evidence is limited (116).

In part because job insecurity was hardly studied until the recession of the 1990s, there has been little research on the effect of job insecurity on mortality from diseases or suicide. Studies of self-reported job insecurity have not been conducted, and there has not yet been any compelling evidence of an association between attributed job insecurity and premature death. Most research prior to the 1990s was a spin-off from studies of unemployment and health, and it found no significant differences between groups of workers exposed and those unexposed to attributed job insecurity (117).

### ***Job insecurity and recorded health-related outcomes***

A small number of studies has looked at the effect of self-reported job insecurity on safety at work. The main finding from this research is that job insecurity is associated with workplace injuries and accidents, possibly through detrimental effects on employee safety motivation and safety compliance (118, 119). Studies of the effects of job insecurity on sickness absence have largely been conducted in the context of studies on downsizing and temporary employment, and a proportion of the association between these exposures and sickness absence has been identified as being attributed to job insecurity (31, 32, 37). In contrast to these findings, studies of British civil servants and Finnish workers on fixed term

contracts have shown that, in some cases, attributed job insecurity is associated with sickness presence, even when the workforce is known to have a higher risk or level of ill health (33, 79).

### ***Temporary work—concepts***

Temporary employment in a variety of guises has increased in industrialized countries since the recessions of the 1980s and 1990s (120, 121). Apart from so-called “permanent” jobs, all other job contracts can come under the temporary employment rubric, although generally the term is considered to include fixed-term and sub-contracted jobs, project- or task-specific jobs, supply or on-call work, and jobs obtained through temporary-help agencies. Obviously, these arrangements encompass a wide range of jobs of varying levels of skill and stability, and it has been suggested that work conditions and health risk may be stratified according to the level of instability in temporary jobs (52, 122–124). An erosion of income, insufficient benefits, on-the-job training, a lack of prospects for promotion, and exposure to hazardous work conditions have been suggested as additional potential psychosocial and material pathways through which temporary employment can damage health (125–128).

Not all temporary jobs necessarily provide inferior status and higher insecurity (129), and some research has suggested that temporary work benefits workers when it allows them to control their worktime, sample a variety of work experiences, and use their temporary job as a stepping stone into permanent employment (130, 131). However, little research has included jobs in the informal economy in which terms, conditions, and stability are generally much worse than in the formal sector. The greater the instability of employment, the more likely the exposure to “unhealthy” job characteristics or “underemployment” (ie, employment insecurity, low wages, involuntary part-time or seasonal work, a lack of social security, health care, pension and the like, a low level of unionization, and jobs that require less skill) (12, 125, 129, 132). Even in the formal sector, temporary-agency and on-call work is more likely to represent “bad” job characteristics than more regular forms of temporary employment (129, 132). For example, studies of “low instability”, fixed-term jobs in Scandinavia have not indicated large differences in work conditions between fixed-term and permanent workers (133, 134). However, as legislative protection for temporary work arrangements varies between countries (135), exposure to health risks may differ even within the category of temporary employment when cross-country comparisons are made.

### **Temporary work and mental health**

Studies of the effects of temporary employment on mental health have examined several psychological and related health outcomes. The largest studies of temporary work and fatigue or exhaustion have documented direct associations (136, 137), but smaller studies have also produced null findings (138) and inverse associations (139). Studies of sleep have shown no association between temporary work and sleep quality (137, 140). Findings for psychological ill health and depression have been mixed, with direct associations for women, but not for men (56), and null findings for both genders among temporary workers on fixed-term contracts (56), but direct associations among temporary employees with less secure employment (123). All of these studies were cross-sectional. The one prospective study, which examined psychological distress as an outcome, documented null findings for both genders (141), and a recent meta-analysis concluded that, in a comparison with permanent employees, the combined risk estimate for all of the studies indicated higher psychological distress among temporary employees (124).

A recent register-linkage study of municipal employees confirmed this conclusion using linked data on people in two Finnish national registers. This study showed that men and women with temporary employment contracts are at greater risk of antidepressant use and that such use increases as the stability of the temporary job contract decreases. The findings also suggested that the increase in antidepressant medication over time has been faster among women with short-term, temporary, government-subsidized contracts than among women with permanent jobs (142). It has been suggested that the relationship between temporary employment and increased psychological morbidity may reflect the adverse effect of job insecurity and financial instability on mental health (127, 143).

### **Temporary work and measures of physical health**

Studies of the association between temporary work and measures of physical health have produced mixed findings. For example, temporary work has been shown to increase minor health complaints, including stomach symptoms (137, 140, 144), although no association has been found for headaches (138). In Finland, studies that have examined self-rated health have consistently found inverse associations (56, 123, 145), although null and direct associations have been documented in Great Britain and Germany, respectively (146). Given that the effects of health-related selection into employment is likely to be high in the early stages of a temporary con-

tract (147), these results are unsurprising and are likely to depend on the length of exposure to temporary work and the stability of the temporary employment (52, 59, 148). Work to date on chronic diseases has mainly been carried out in Finland. These studies have shown null or inverse associations between fixed-term temporary employment and one or more self-reported, physician-diagnosed chronic diseases (eg, asthma, diabetes, rheumatoid arthritis) (56, 123), but a direct association with less stable temporary employment (123). A meta-analysis of these studies provided no more than an indication that temporary employees are at higher risk of poor physical health (124).

The largest proportion of the studies that have examined associations between temporary employment and physical health has taken musculoskeletal disorders as the outcome. Two of these studies used data on workers' compensation claims from the United States. One of the studies examined nearly 200 000 claims for upper-extremity disorders and the other used nearly 400 000 claims for nontraumatic soft-tissue disorders. Both studies documented direct associations between temporary jobs with employment agencies and these musculoskeletal disorders (149, 150). An analysis of temporary employment in 15 European Union countries also showed direct associations with muscular pain and backache (136). In contrast, a study in Spain found an inverse association between temporary work and back pain (151), and studies in Sweden showed null effects (137, 138).

Only one study appears to have examined associations between temporary work and mortality. The study used prospective register data on municipal workers in Finland and looked at the effect on the mortality of transfer from temporary to permanent employment. Moving from temporary to permanent employment was associated with a significantly lower risk of all-cause mortality, while remaining in temporary employment was associated with a significantly higher risk of death than remaining continuously in permanent employment. A breakdown by cause of death showed that this excess mortality risk was due to deaths from external causes and not to deaths due to cardiovascular disease or cancer (152). While selection of the fittest temporary workers into permanent employment is likely to explain part of this effect, change in exposure to job insecurity may also contribute.

### **Temporary work and recorded health-related outcomes**

Two health outcomes of specific interest to the organization have been studied in relation to temporary

employment, occupational injuries and sickness absence. Almost all of the studies that have examined associations between temporary employment and occupational injuries have demonstrated either null (153, 154) or direct (155–157) associations. Two of the latter were large prospective studies that used register data (156, 157). One of these, with data on nearly 45 000 industrial workers, found a direct association between temporary employment and both fatal and nonfatal injuries (156). The other showed a direct association in data for 250 000 workers from temporary agencies (157). Only one study observed an inverse association between temporary work and occupational injuries; however, this finding applied only to fixed-term employees and not to other temporary workers, for whom there was no association (158). It has been suggested that the higher risk of occupational injuries among temporary employees may be related to their greater inexperience and lack of induction and safety training at workplaces (159, 160). However, no studies to date appear to have considered these potential confounding factors in their analyses.

In contrast to studies on occupational injuries, most studies of temporary employment and sickness absence have observed inverse (33, 136, 141, 145, 158) or null (136, 158, 161, 162) associations. The largest of these studies, a study of medically certified sickness absences in the 10-Town Study over an 8-year follow-up period, observed downsizing to be associated with increased sickness absence among permanent personnel, but not among temporary employees after adjustment for age, gender, socioeconomic status, and sickness absence at baseline (33). In that study, employees with temporary job contracts were the most likely to lose their jobs. For them, high job insecurity may have increased the likelihood of attending work while ill (ie, sickness presence). A meta-analysis of these studies found that the combined risk estimate indicated lower sickness absence rates for temporary employees than for permanent employees (odds ratio 0.77, 95% confidence interval 0.65–0.91). These lower levels of sickness absence may have been a direct reflection of the better physical health among the temporary workers, as suggested in some surveys (56, 141, 145), or may have been related to sickness presence (163, 164). However, studies based on self-reported sickness absence data show no differences in absence between fixed-term and permanent employees (136, 165).

## Discussion

Research to date has tended to examine downsizing, job insecurity, and temporary work as separate exposures, but, as this review indicates, they are overlapping

facets of the new flexible labor market. Employees on temporary contracts tend to be the first to go when organizations have to downsize, and many new employees subsequent to downsizing will have short-term contracts. While some workers with permanent contracts who are not apparently under threat experience and report job insecurity, levels of job insecurity are largely context specific. As a consequence, the evidence on the health effects of the three exposures examined in this review has much in common. For example, there is evidence of associations for downsizing, job insecurity, and temporary work with most measures of mental ill health.

Downsizing and job insecurity have been shown to be associated with several self-reported physical health outcomes. However, as temporary workers are subject to the healthy worker effect at selection into employment, some studies have shown that temporary employment is associated with better physical health. Very little research has examined associations between any of the three exposures and biomedical risk factors. There is some evidence that organizational restructuring and job insecurity are linked with increases in blood pressure and body mass index, and job insecurity is associated with adverse changes in most biomedical risk factors that have been examined, but the effects are mostly nonsignificant. Major downsizing and expansion have been shown to be associated with increased rates of chronic diseases and hospitalization, and there is an indication that attributed job insecurity is associated with an increase in heart disease. Large studies in Finland have shown associations between downsizing and premature mortality from coronary heart disease, as well as between temporary employment and premature mortality from external causes. However, there is little evidence of an association between job insecurity and premature mortality.

Downsizing, temporary work, and job insecurity have all been shown to be associated with higher rates of workplace injuries and accidents. There appears to be a consistent association between downsizing and increases in medically certified sickness absence and between downsizing and decreases in short-term absence among permanent employees who are the survivors of downsizing. For temporary workers and those reporting job insecurity, findings are more mixed. While it seems likely that employees who are insecure or who have temporary contracts experience pressure to attend work rather than take short-term absences, long-term adverse effects on health may result in an increase in long-term sickness absence for all exposures.

Recent work has demonstrated a synergistic adverse effect on mental health among workers exposed to both high job insecurity and high job strain. In the context of downsizing and increased reliance on temporary contracts, perceptions of insecurity are likely to

be widespread and, as fewer people do more, to occur together with increasing levels of job strain. If current trends continue, the number of employees exposed to both job insecurity and job strain will probably increase. Despite its limitations, existing research has much to contribute to policies that will improve the health of employees and prevent unintended adverse effects on the organizations that employ them.

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