Contingent Workers and Contingent Health
Risks of a Modern Economy

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EMPLOYMENT ARRANGEMENTS IN WHICH THE WORKER has a nontraditional relationship with the worksite employer have come to be grouped together in recent years as "contingent" work. Throughout the 1970s and 1980s, as employers sought more flexibility, contingent employment arrangements became more common in the United States. From 1969 to 1993, the number of part-time workers nearly doubled, representing a quarter of all growth in the national workforce.[1] From 1982 to 1990, employment in temporary agencies increased 10 times faster than did the workforce as a whole.[2] During the 1980s, the use of independent contractors in coal mining and of contract company workers in agriculture doubled.[3]

The use of contingent workers has not been limited to the private sector: by 2006, the federal government was spending an estimated $400 billion per year on contractors.[4] Since national data were first collected by the Department of Labor in 1995, contingent workers have consistently represented nearly one-third of the total workforce, reaching 43 million in 2005.[5] However, because only those with fixed addresses are surveyed, this is likely an underestimate. Thus, contingent work has taken hold in the United States, bringing with it concerning implications for health.

Contingent workers are a diverse group, ranging from well-compensated independent financial consultants to low-skilled construction workers. The majority of the contingent workforce is white and aged 25 years or older; however, compared with workers in traditional arrangements, contingent workers are more likely to be young, female, black or Hispanic, and to have lower incomes and fewer benefits (Bureau of Labor Statistics Current Population Survey, http://www.bls.gov/cps/).[6] One analysis of 2005 federal data found that 16% of contingent workers have family incomes less than $20 000, a proportion twice as high as that of noncontingent workers.[5] For some contingent workers, such as day laborers and agency temporary workers, the proportion surpassed 20%. Only 13% of contingent workers (and 9% of those with low family incomes) had health insurance provided by their employer, compared with 72% of noncontingent workers. Earlier reports noted similar wage and benefit discrepancies.[1,6] For instance, in 1999 the median weekly earnings for contingent workers were about half those of noncontingent workers; when limited to full-time workers, those with contingent arrangements earned 77% of the income of their noncontingent counterparts.[6] Furthermore, some contingent workers are excluded, legally or effectively, from laws designed to protect workers—laws that were enacted in most cases before the increase in contingent work arrangements (TABLE).

An increasing body of evidence suggests that contingent workers are at higher risk of work-related injury. For example, a systematic review of international (mainly European) peer-reviewed studies found that 7 of 13 reports showed an increased risk of occupational injuries among contingent workers.[7] A subsequent study in Spain found contingent (including contract and temporary staffing agency) workers had more than 2 times the rate of fatal and nonfatal occupational injuries than noncontingent workers.[8] In the United States, the rate of fatal work injuries among self-employed workers is more than twice the national average.[9] A study of nurses caring for hospitalized patients with AIDS in 11 US cities found that temporary nurses had a needle-stick injury rate 1.65 times higher than that of staff nurses working in the same hospital units.[10] In a 2004 US survey of day laborers—the majority of whom were undocumented immigrants—19% reported work-related injuries that required medical attention in the past year,[11] compared with less than 5% in all private industries and approximately 6% in construction.[9]

Contingent workers may also be at greater risk of illness. By the late 1990s, contract workers conducted the majority of maintenance work at France's state-owned nuclear power facilities, in the process receiving 80% of the collective annual radiation dose of all workers at the plants.[12] In representative cross-sectional surveys of more than 15 000 European Union workers conducted in 1995 and 2000, contingent workers (including self-employed and temporary workers) tended to report higher levels of work-related fatigue, backache, and muscular pain than noncontingent workers.[13]

A Finnish study found that temporary employment was associated with 1.2 to 1.6 times higher all-cause mortality compared with permanent employment, and that workers who

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moved from temporary to permanent employment had lower mortality than those who remained in temporary employment during the study period.[14] Higher cause-specific mortality was observed for alcohol-related causes and smoking-related cancer, raising questions about the psychological effects of contingent arrangements. A meta-analysis of 9 European studies found that contingent workers had a significantly higher odds of psychological distress than noncontingent workers (odds ratio, 1.25).[7] In the United States, analysis of workers' compensation claims in Washington state for nontraumatic musculoskeletal disorders of the neck, back, and upper extremity (eg, rotator cuff syndrome, epicondylitis, and carpal tunnel syndrome) from 1990 through 1998 identified the emergence of temporary staffing agencies as high-risk industries for such conditions.[15] Preliminary analysis of 2000-2004 surveillance data showed that contract coal mine workers with at least 15 years' tenure had a higher prevalence of radiographic changes of pneumoconiosis than the comparable group of noncontract underground coal miners (National Institute for Occupational Safety and Health, unpublished data).

Many hypotheses have been advanced to explain the differential health risks of contingent and traditional work. In some cases, contingent arrangements represent the outsourcing of more hazardous jobs, such that a greater burden of injury, illness, and fatality is carried by contingent workers than by traditional employees.[3,12] Contingent workers may have less experience and familiarity with operations in a dangerous workplace, putting them at higher risk: in the aforementioned Spanish study of occupational injuries, differences in injury rates between contingent and noncontingent workers could be accounted for by adjusting for length of employment with the company.[8]

Lack of safety training and limited availability of personal protective equipment also may play a role. A Swedish study found that contingent workers were more likely than noncontingent workers to report deficiencies in their knowledge of workplace safety issues.[16] A study in the US petrochemical industry prompted by an increase in unintentional injuries and events involving contract workers found that contract workers had fewer hours of safety training than noncontract workers.[3,17] Following Hurricane Katrina, self-employed remediation workers in New Orleans were less likely than company-employed workers to correctly identify appropriate respiratory protection and more likely to report never using such equipment on the job.[18]

Co-employment by a contract company and work-site firm can create confusion about employer responsibilities for protecting workers.[19] For instance, we recently interviewed the health and safety manager of a production facility with respiratory hazards, where respiratory protection was provided to facility employees but not to contract workers. The production facility thought the contract company should provide equipment and training for contract workers, whereas the contract company expected the production facility to do so. Furthermore, contingent workers may have less access to preventive measures such as screening programs. For example, workers exposed to diacetyl and other volatile compounds during the production of food flavorings are at risk for constrictive bronchiolitis obliterans, an irreversible form of obstructive lung disease that can necessitate lung transplantation.[20] In public health investigations, temporary workers in food flavoring production were not

Table. Laws Intended to Protect Workers[a]

Pertinent Law (Year Enacted)	Details[b]
State workers' compensation laws (1911-1940s)	Provide benefits for wage loss and medical care to injured workers. Eligibility rules vary by state. In many states, domestic and agricultural workers must meet time or wage requirements.
National Labor Relations Act (1935)	Guarantees right of employees to organize and bargain collectively. Temporary workers at one site over a regular basis can join collective bargaining unit of permanent employees, if employer(s) agree.
State unemployment insurance laws (1935)	Provide partial wage replacement for workers who lose jobs for economic reasons. Eligibility rules vary by state. Workers must meet time requirements, wage requirements, or both. Agricultural workers on small farms or small work crews may not be covered.
Fair Labor Standards Act (1938)	Establishes minimum wage, overtime, and child labor standards for employees. Excludes agricultural employers from overtime pay and agricultural employers who use ≤500 d of labor in any calendar quarter from minimum wage.
Title VII of Civil Rights Act (1964)	Protects employees from discrimination based on race, national origin, or sex. Applies to employers with ≥15 employees for each of ≥20 calendar weeks in a year.
Age Discrimination in Employment Act (1967)	Protects employees from discrimination based on age. Applies to employers that have ≥20 employees for each working day in each of ≥20 calendar weeks in a year.
Occupational Safety and Health Act (1970)	Requires employers to maintain a safe and healthy workplace for their employees. The party responsible for ensuring safety is the employer in direct control of the workplace. If an accident occurs, the employer that created the hazard, not the temporary worker agency or contract company, is responsible.
Employee Retirement Income Security Act (1974)	Establishes uniform standards for employee pension and health plans in private industry. Does not require employers to provide pension or health plan benefits. Contingent workers can be excluded, if the employer clearly defines the excluded groups.
Americans with Disabilities Act (1990)	Protects employees from discrimination based on disability. Applies to employers that have ≥15 employees for each of ≥20 calendar weeks in a year.
Family and Medical Leave Act (1993)	Provides protection for employees who need time off because of medical problems or birth/adoption. Applies to employees who have been employed for 12 mo by an employer with ≥50 employees who work ≥20 calendar weeks in a year; must have worked ≥1250 h during the past 12 mo.

[a] This table is presented for informational purposes only and has not been subject to legal review by the US Department of Health and Human Services.

[b] By definition, these laws apply only to employees, so self-employed workers and independent contractors are not covered. Other legal exclusions as noted. In addition, some contingent workers may be inappropriately excluded from applicable laws, for example due to misclassification (day laborers classified as independent contractors), confusion over employer responsibilities (contract company workers with more than 1 supervisory employer; direct-hire temporary workers with limited planned tenure), or hesitancy to assert rights (immigrant workers who lack documentation, contract company workers who fear losing a contract, or temporary workers who fear losing their job).

initially invited by work-site employers to participate in mandated medical screening and spirometry testing, despite exposures indistinguishable from those of permanent employees. Ultimately, there is concern that some employers may choose to take advantage of the ambiguities surrounding contingent arrangements to avoid costly worker protections.

Relatively few studies of the health effects of contingent arrangements have been undertaken in the United States, and many questions remain. National occupational health databases do not currently collect information on contingent status[9] and may not fully capture data on contingent workers' injuries and illnesses.[11] Alternative measures that do not rely on employer reporting, such as use of insurer and provider databases, would be valuable.[21]

Investigation of the factors that contribute to poor health outcomes is warranted. The influences of personal characteristics such as age, education, English-language proficiency, legal immigration status, and comorbid physical and mental health conditions are likely to be substantial. Aspects of contingent arrangements including co-employment, voluntariness (more than half of contingent positions are involuntary, in that the worker would prefer a traditional arrangement[6]), and predictability and regularity of a worker's schedule may be important. Variations in workplace factors such as organization,[22] worker decision-making,[23] management-labor relations,[3] communication, and availability of health and safety information and equipment are likely to affect risk. Finally, components of current health and safety regulations and the workers' compensation insurance system, designed during a different economic era, may be relevant. For example, millions of contingent workers (self-employed, independent contractors, and others misclassified as such) are not covered by workers' compensation insurance for medical care for work-related injury and illness.[5]

In 1943, Dr Alice Hamilton, the first woman appointed to the Harvard Medical School faculty, published the memoirs of her pioneering work in occupational medicine under the title *Exploring the Dangerous Trades*. While conditions for US workers have improved greatly since the early 20th century, dangerous trades still exist. How much of that danger relates to contingent employment arrangements has yet to be determined. Even if the influence of contingent arrangements on health at the individual level is modest, the sheer size of the contingent workforce indicates that the magnitude at the population level may be substantial.[24]

Furthermore, in the context of increasing national rates of obesity and diabetes, the potential of contingent work arrangements to exacerbate poor eating and exercise habits, as suggested by an exploratory Australian study,[25] has enormous public health implications. Studying an unaffiliated, transient, and dynamic population of workers undoubtedly poses methodological challenges, and these challenges surely have limited investigative efforts thus far. Yet it is clear that demonstrating the effectiveness of interventions aimed at injury and illness prevention and health promotion for the contingent workforce is of paramount importance to the health of the nation.

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REFERENCES

1. Schroeder P. Does the growth in the contingent work force demand a change in federal policy? *Wash Lee Law Rev*. 1995;52:731-738.
2. Applebaum E. Structural change and the growth of part-time and temporary employment. In: duRivage VL, ed. *New Policies for the Part-Time and Contingent Workforce*. Armonk, NY: ME Sharpe Inc; 1992:1-14.
3. Rousseau DM, Libuser C. Contingent workers in high risk environments. *Calif Manage Rev*. 1997;39(2):103-123.
4. Shane S, Nixon R. In Washington, contractors take on biggest role ever. *New York Times*. http://www.nytimes.com/2007/02/04/washington/04contract.html. February 4, 2007. Accessibility verified January 7, 2008.
5. Robertson RE, Fallavollita BS, Siegel LL, et al. *Employment Arrangements: Improved Outreach Could Help Ensure Proper Worker Classification [GAO-06-656]*. Washington, DC: US Government Accountability Office; 2006.
6. Hipple S. Contingent work in the late 1990s. *Mon Labor Rev*. 2001;124(3):3-27.
7. Virtanen M, Kivimaki M, Joensuu M, Virtanen P, Elovainio M, Vahtera J. Temporary employment and health: a review. *Int J Epidemiol*. 2005;34(3):610-622.
8. Benavides FG, Benach J, Muntaner C, Delclos GL, Catot N, Amable M. Associations between temporary employment and occupational injury: what are the mechanisms? *Occup Environ Med*. 2006;63(6):416-421.
9. Injuries, illnesses, and fatalities. Bureau of Labor Statistics Web site. http://www.bls.gov/iif/home.htm. Accessed December 11, 2007.
10. Aiken LH, Sloane DM, Klocinski JL. Hospital nurses' occupational exposure to blood: prospective, retrospective, and institutional reports. *Am J Public Health*. 1997;87(1):103-107.
11. Valenzuela A Jr, Theodore N, Melendez E, Gonzalez A. On the corner: day labor in the United States. Center for the Study of Urban Poverty, University of California, Los Angeles, Web site. http://www.sscnet.ucla.edu/issr/csup/uploaded_files/Natl_DayLabor-On_the_Corner1.pdf. 2006. Accessed November 5, 2007.
12. Thébaud-Mony A. Contracting and subcontracting by the French nuclear power industry. *Int J Occup Environ Health*. 1999;5(4):296-299.
13. Benach J, Gimeno D, Benavides FG, Martínez JM, Torné Mdel M. Types of employment and health in the European union: changes from 1995 to 2000. *Eur J Public Health*. 2004;14(3):314-321.
14. Kivimäki M, Vahtera J, Virtanen M, Elovainio M, Pentti J, Ferrie JE. Temporary employment and risk of overall and cause-specific mortality. *Am J Epidemiol*. 2003;158(7):663-668.
15. Silverstein B, Viikari-Juntura E, Kalat J. Use of a prevention index to identify industries at high risk for work-related musculoskeletal disorders of the neck, back, and upper extremity in Washington state, 1990-1998. *Am J Ind Med*. 2002;41(3):149-169.
16. Aronsson G. Contingent workers and health and safety. *Work Employment Soc*. 1999;13(3):439-459.
17. Kochan TA, Smith M, Wells JC, Rebitzer JB. Human resource strategies and contingent workers: the case of safety and health in the petrochemical industry. *Hum Resour Manage*. 1994;33(1):55-77.
18. Cummings KJ, Van Sickle D, Rao CY, Riggs MA, Brown CM, Moolenaar RL. Knowledge, attitudes, and practices related to mold exposure among residents and remediation workers in posthurricane New Orleans. *Arch Environ Occup Health*. 2006;61(3):101-108.
19. Morris JA. Injury experience of temporary workers in a manufacturing setting. *AAOHN J*. 1999;47(10):470-478.
20. Kreiss K. Occupational bronchiolitis obliterans masquerading as COPD. *Am J Respir Crit Care Med*. 2007;176(5):427-429.
21. Glazner JE, Borgerding J, Lowery JT, Bondy J, Mueller KL, Kreiss K. Construction injury rates may exceed national estimates: evidence from the construction of Denver International Airport. *Am J Ind Med*. 1998;34(2):105-112.
22. Mayhew C, Quinlan M. Fordism in the fast food industry: pervasive management control and occupational health and safety risks for young temporary workers. *Sociol Health Illn*. 2002;24(3):261-284.
23. Parker SK, Griffin MA, Sprigg CA, Wall TD. Effect of temporary contracts on perceived work characteristics and job strain: a longitudinal study. *Person Psychol*. 2002;55(3):689-719.
24. Benach J, Benavides FG, Platt S, Diez-Roux A, Muntaner C. The health-damaging potential of new types of flexible employment: a challenge for public health researchers. *Am J Public Health*. 2000;90(8):1316-1317.
25. Bohle P, Quinlan M, Kennedy D, Williamson A. Working hours, work-life conflict and health in precarious and "permanent" employment. *Rev Saude Publica*. 2004;38(suppl):19-25.