Workers' compensation in the United States: high costs, low benefits

Boden, Leslie

Annual Reviews

http://hdl.handle.net/2144/1159

Boston University
WORKERS’ COMPENSATION IN THE UNITED STATES: High Costs, Low Benefits

L. I. Boden
Department of Environmental Health, Boston University School of Public Health, Boston, Massachusetts 02118

KEY WORDS: workers’ compensation, occupational safety, occupational health, medical costs, litigation

ABSTRACT

Studies suggest that income replacement is low for many workers with serious occupational injuries and illnesses. This review discusses three areas that hold promise for raising benefits to workers while reducing workers’ compensation costs to employers: improving safety, containing medical costs, and reducing litigation.

In theory, workers’ compensation increases the costs to employers of injuries and so provides incentives to improve safety. Yet, taken as a whole, research does not provide convincing evidence that workers’ compensation reduces injury rates. Moreover, unlike safety and health regulation, workers’ compensation focuses the attention of employers on individual workers. High costs may lead employers to discourage claims and litigate when claims are filed.

Controlling medical costs can reduce workers’ compensation costs. Most studies, however, have focused on costs and have not addressed the effectiveness of medical care or patient satisfaction. Research also has shown that workers’ compensation systems can reduce the need for litigation. Without litigation, benefits can be delivered more quickly and at lower costs.

INTRODUCTION

Over the past 25 years, workers’ compensation has moved from an issue unknown to governors and legislators to a central focus of public debate in
many states. In the 1970s, legislative changes focused on improving coverage of workers and conditions, the adequacy of benefits, and the effective delivery of these benefits. A prime mover was the report of the National Commission on State Workmen’s Compensation Laws (57), created by the Occupational Safety and Health Act of 1970. The National Commission’s report described deficiencies in and made recommendations for improving workers’ compensation systems (57). In the decade that followed, many states changed their statutes, increasing coverage and raising benefits. In 1972, the 50 states complied, on average, with 6.8 of the 19 essential recommendations of the National Commission. By 1980, they had moved to complying with an average of 12.0 of these recommendations (23).

During the past decade, the public policy discussion has changed from delivering benefits to containing costs. Between 1972 and 1992, the costs of workers’ compensation rose from $6 billion to $62 billion (24), an annual rate of growth of 12.5 percent, with workers’ compensation costs going from 1.1 percent to 2.6 percent of payroll.

As employers became aware of the substantial growth in costs, they increasingly looked for ways to reduce them. One obvious way is to lobby for limits on benefits or on compensable conditions, and some states have recently legislated such cutbacks (69). But there are other methods of reducing costs, more consistent with the goals established by Congress in the Occupational Safety and Health Act of 1970 for “an adequate, prompt, and equitable system of compensation.” This review explores some of these other options.

First, prevention of occupational injuries and illnesses reduces the need for workers’ compensation benefits, lowering costs without reducing benefit levels. This article reviews evidence about the impact of workers’ compensation on safety. Unfortunately, we find little evidence that workers’ compensation provides employers with incentives to improve safety. This suggests that government officials look elsewhere for policies to reduce injury and illness rates.

Second, if workers’ compensation systems provide benefits at lower cost, expenditures can be reduced without cutting benefits. Over the past 20 years, medical costs in workers’ compensation have been rising rapidly. Workers’ compensation systems can look for ways to reduce these costs without sacrificing the quality of care. We find evidence that managed care may reduce costs in workers’ compensation, but mixed evidence about the success of fee schedules. Overall, research does not support the contention that employer choice of medical providers reduces medical costs, and virtually no research addresses how cost-control affects the quality of care and patient satisfaction.

Litigation also can generate unnecessary costs. Workers’ compensation sys-
tems were designed to replace common-law liability suits with systems that rendered attorney representation superfluous. However, data suggest that litigation is a substantial and growing aspect of workers’ compensation. We review evidence about the causes of litigation in workers’ compensation.

Finally, even in a cost-conscious environment, the adequacy and equity of workers’ compensation systems remain important issues. We examine how benefits vary among states, among injuries of different severity, and among types of injuries and illnesses. We should find adequate replacement of lost earnings in these categories. Yet, the picture is far from ideal. Benefits vary greatly among states, and the most serious injuries and illnesses are the least well compensated. This finding supports the search for reforms that provide a better match between income losses and benefits.

INCOME BENEFITS: A BRIEF OVERVIEW

Workers’ compensation provides income benefits, medical payments, and rehabilitation payments to workers injured on the job and their families. In the United States, each state has its own system with its own statute, regulations, and administration. Federal systems cover federal employees, longshoremen and harbor workers, and workers employed in the District of Columbia.

Besides benefits to families of fatally injured workers, workers’ compensation pays four types of income benefits, distinguished by whether the worker’s loss is temporary or permanent and whether the loss is partial or total. Temporary total disability benefits cover income losses when injured workers are off work during their healing period. Temporary partial disability benefits cover income losses during the healing period when workers take lower-paying jobs or work part-time.

Most injured workers fully recover from their injuries and return to their preinjury jobs. But some injured workers never completely recover: They remain permanently impaired. The American Medical Association defines impairment as “the loss of, loss of use of, or derangement of any body part, system, or function” (1, p. 236). One possible consequence of impairment is disability, that is a reduction in the ability to earn wages.

If a worker is deemed permanently unable to work, states pay permanent total disability benefits. State workers’ compensation programs treat other injuries with permanent effects in different ways. Some states base benefits on impairment, providing permanent partial benefits based on an impairment rating, a measure of functional losses, between one to 100 percent. Other states use a disability rating, estimating loss of earning capacity, again as a percentage. Still other states use the difference between current earnings and preinjury earnings to calculate benefits; these are called wage-loss systems.
INJURY AND ILLNESS PREVENTION

A principal stated goal of workers' compensation is influencing employers to provide safer working conditions. Given the limitations of regulatory enforcement by the Occupational Safety and Health Administration (OSHA) (67), workers' compensation has been suggested as an alternative to regulation. On the other hand, if both programs are very limited in their impacts, we should look to other approaches to provide the desired improvement in workplace safety (4, 14).

In theory, workers' compensation provides safety incentives to employers because it requires them to pay substantial benefits to injured workers. Because injuries and illnesses are more expensive with workers' compensation than without, employers benefit more from safety activities and, in theory, invest more in hazard reduction, decreasing the number of occupational injuries and illnesses. The extent of these impacts depends on several factors.

Factors Affecting Safety Incentives

SELF-INSURANCE AND EXPERIENCE RATING Russell (67) pointed out that insurance arrangements can attenuate the relationship between benefit payments and the employer's costs, diluting safety incentives. The premiums of very large employers closely reflect recent injury costs through self-insurance (where the employer directly pays benefits) or, when they purchase insurance, experience rating or retrospective rating (33, 73). Yet, the sensitivity of premiums to injury costs varies inversely with size, and the smallest employers pay a fixed premium that depends on their industry, but not on their own injury experience. If they improve safety, their premiums do not fall; and if they become less safe, their premiums do not rise. Because their costs are insensitive to benefit payments, workers' compensation provides minimal safety incentives to smaller employers (67)—where most workers and most injuries occur.

HAZARD WAGES Economists have suggested that without workers' compensation employers still would pay at least part of the costs of occupational injuries, in the form of hazard wages. If workers are well informed and have choices between safer and less-safe jobs, they will demand hazard pay to work in less-safe jobs. Hazard wages reflect the risk of lost wages and medical expenses and in part cover the "pain and suffering" that accompany injuries and illnesses.

Controlling for education, experience, and other labor-market characteristics, research finds that workers receive hazard wages for safety risks

---

1For the rest of this review, "experience rating" will refer to any method of determining premiums based on past experience.
WORKERS' COMPENSATION IN THE U.S. 193

(44, 75). Yet this is not so for risks of chronic occupational diseases (7). And it is unlikely that hazard wages fully reflect the costs of injuries or illnesses.

Where they are present, hazard wages provide incentives to employers to improve workplace safety. If employers improve safety, they can pay lower hazard wages, offsetting safety costs.

But in some situations, the interaction of hazard wages and workers' compensation coverage could reduce workplace safety (68). Without workers' compensation insurance, employers in dangerous industries might pay substantial hazard wages, providing incentives to improve safety. Workers' compensation covers much of workers' out-of-pocket injury costs, reducing their demand for hazard wages, and making the employer's wage costs less responsive to injury rates (73, 76). Workers' compensation premiums of smaller employers are insensitive to injury rates, so their overall incentive to invest in safety declines.

PROBABILITY OF COMPENSATION  If workers' compensation is to provide financial incentives to eliminate hazards, employers must pay benefits when workers become sick or injured. This is a reasonable assumption for most workplace injuries. However, few cases of chronic occupational diseases are compensated (19, 36). When compensation is paid, it is long after exposure, and the responsible managers are unlikely to be held accountable (40). In this case, safety incentives cannot be substantial.

Evidence about Safety Impacts of Workers' Compensation

INCOME BENEFITS AND SAFETY  Table 1 summarizes sixteen studies of the impact of workers' compensation on safety.2 These studies generally focus on income benefit levels. As benefit levels rise, workers' compensation payments per injury rise. Employers' costs become more responsive to injury rates, providing an additional incentive to improve safety conditions. Most studies find that reported injuries increase or remain unchanged when benefit levels rise.

The studies use diverse data sources and methods. Nine of the sixteen studies in Table 1 rely on injury data collected by or reportable to the Bureau of Labor Statistics (BLS) of the US Department of Labor. Employers report annually the total number of injuries and the number of injuries involving one or more days lost from work. Four of the studies use workers' compensation claim data to measure safety. Two rely on self-reported workers' compensation claim information, one from the Current Population Survey and one from the Panel

2This review focuses on injury rates, not days lost from work, as the measure of safety.
### Table 1  Studies of the impact of workers' compensation on injuries

<table>
<thead>
<tr>
<th>Study</th>
<th>Injury measure</th>
<th>Source of data</th>
<th>Unit of observation</th>
<th>Measure of workers' compensation benefits</th>
<th>Association of higher benefits to injury rates</th>
<th>How employer size affects the impact of benefits on injury rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chelius (a) (29)</td>
<td>Injuries per 100 full-time workers</td>
<td>Injuries: BLS,(^a) all injuries and injuries with lost workdays per 100 full-time workers</td>
<td>Two-digit SIC(^a) manufacturing industries(a) in 36 states, 1972–75, 1482 observations ((b)) in 28 states, 1972–78, 1967 observations</td>
<td>Estimate of average proportion of wages replaced in industry and state by temporary total disability benefits</td>
<td>(a) Frequency of injuries rose, and lost-workday rate did not change ((b)) both rates increased</td>
<td>Not tested</td>
</tr>
<tr>
<td>(b) (30)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Butler (26)</td>
<td>Workers' compensation claim rates in South Carolina</td>
<td>South Carolina labor department and workers' compensation agency</td>
<td>South Carolina: 15 industries, 1940–71, 468 observations</td>
<td>Average real annual indemnity payments per worker: temporary total, permanent partial, permanent total, and fatality claims</td>
<td>Using a principal-components benefit measure, all injury rates but temporary total increased</td>
<td>Not tested</td>
</tr>
<tr>
<td>Butler &amp; Worrall (27)</td>
<td>Rates of workers' compensation claims</td>
<td>National Council on Compensation Insurance, temporary total, minor and major permanent partial claims</td>
<td>35 States, 1972–78</td>
<td>Average benefit per claim within each state for each type of claim</td>
<td>Injury rates generally increased or did not change</td>
<td></td>
</tr>
<tr>
<td>Chelius &amp; Smith (32)</td>
<td>Difference between large and small firms in injuries per 100 full-time workers, by industry</td>
<td>BLS, injuries with lost workdays</td>
<td>15 Two-digit manufacturing industries in 37 states, 1979, 305 observations</td>
<td>Temporary total disability statutory payment at industry average wage</td>
<td>5 of 60 estimates show significant reductions at (p &lt; .05); 32 of 60 show reductions</td>
<td>Little or no impact detected</td>
</tr>
</tbody>
</table>
Robertson (63)  
Injuries per 100 full-time workers reported injuries to metal fabrication plants in three states, by individual, size, and industry patterns.

Keeve (62)  
Injuries reportable to BLS, number of states and industries, rate and number of injuries: BLS, BLS Employer's Injury Survey, averaged over 22 states, 1972–78.

Bartel & Thomas (6)  
Injuries per 100 full-time workers with lost workdays, all injuries with lost workdays, all industries by state, 1972–78.

Leigh (53)  
Individual’s receipt of workers’ compensation benefits, studies of workers’ compensation benefits.

Bartel & Thomas (6)  
Injuries per 100 full-time workers with lost workdays, all industries by state, 1972–78.

Leigh (53)  
Individual’s receipt of workers’ compensation benefits, studies of workers’ compensation benefits.

Bartel & Thomas (6)  
Injuries per 100 full-time workers with lost workdays, all industries by state, 1972–78.

Leigh (53)  
Individual’s receipt of workers’ compensation benefits, studies of workers’ compensation benefits.

Bartel & Thomas (6)  
Injuries per 100 full-time workers with lost workdays, all industries by state, 1972–78.

Leigh (53)  
Individual’s receipt of workers’ compensation benefits, studies of workers’ compensation benefits.

Bartel & Thomas (6)  
Injuries per 100 full-time workers with lost workdays, all industries by state, 1972–78.

Leigh (53)  
Individual’s receipt of workers’ compensation benefits, studies of workers’ compensation benefits.

Bartel & Thomas (6)  
Injuries per 100 full-time workers with lost workdays, all industries by state, 1972–78.

Leigh (53)  
Individual’s receipt of workers’ compensation benefits, studies of workers’ compensation benefits.

Bartel & Thomas (6)  
Injuries per 100 full-time workers with lost workdays, all industries by state, 1972–78.

Leigh (53)  
Individual’s receipt of workers’ compensation benefits, studies of workers’ compensation benefits.

Bartel & Thomas (6)  
Injuries per 100 full-time workers with lost workdays, all industries by state, 1972–78.

Leigh (53)  
Individual’s receipt of workers’ compensation benefits, studies of workers’ compensation benefits.

Bartel & Thomas (6)  
Injuries per 100 full-time workers with lost workdays, all industries by state, 1972–78.

Leigh (53)  
Individual’s receipt of workers’ compensation benefits, studies of workers’ compensation benefits.

Bartel & Thomas (6)  
Injuries per 100 full-time workers with lost workdays, all industries by state, 1972–78.

Leigh (53)  
Individual’s receipt of workers’ compensation benefits, studies of workers’ compensation benefits.

Bartel & Thomas (6)  
Injuries per 100 full-time workers with lost workdays, all industries by state, 1972–78.

Leigh (53)  
Individual’s receipt of workers’ compensation benefits, studies of workers’ compensation benefits.

Bartel & Thomas (6)  
Injuries per 100 full-time workers with lost workdays, all industries by state, 1972–78.

Leigh (53)  
Individual’s receipt of workers’ compensation benefits, studies of workers’ compensation benefits.

Bartel & Thomas (6)  
Injuries per 100 full-time workers with lost workdays, all industries by state, 1972–78.

Leigh (53)  
Individual’s receipt of workers’ compensation benefits, studies of workers’ compensation benefits.

Bartel & Thomas (6)  
Injuries per 100 full-time workers with lost workdays, all industries by state, 1972–78.

Leigh (53)  
Individual’s receipt of workers’ compensation benefits, studies of workers’ compensation benefits.

Bartel & Thomas (6)  
Injuries per 100 full-time workers with lost workdays, all industries by state, 1972–78.

Leigh (53)  
Individual’s receipt of workers’ compensation benefits, studies of workers’ compensation benefits.

Bartel & Thomas (6)  
Injuries per 100 full-time workers with lost workdays, all industries by state, 1972–78.

Leigh (53)  
Individual’s receipt of workers’ compensation benefits, studies of workers’ compensation benefits.

Bartel & Thomas (6)  
Injuries per 100 full-time workers with lost workdays, all industries by state, 1972–78.

Leigh (53)  
Individual’s receipt of workers’ compensation benefits, studies of workers’ compensation benefits.

Bartel & Thomas (6)  
Injuries per 100 full-time workers with lost workdays, all industries by state, 1972–78.

Leigh (53)  
Individual’s receipt of workers’ compensation benefits, studies of workers’ compensation benefits.

Bartel & Thomas (6)  
Injuries per 100 full-time workers with lost workdays, all industries by state, 1972–78.

Leigh (53)  
Individual’s receipt of workers’ compensation benefits, studies of workers’ compensation benefits.

Bartel & Thomas (6)  
Injuries per 100 full-time workers with lost workdays, all industries by state, 1972–78.

Leigh (53)  
Individual’s receipt of workers’ compensation benefits, studies of workers’ compensation benefits.

Bartel & Thomas (6)  
Injuries per 100 full-time workers with lost workdays, all industries by state, 1972–78.

Leigh (53)  
Individual’s receipt of workers’ compensation benefits, studies of workers’ compensation benefits.

Bartel & Thomas (6)  
Injuries per 100 full-time workers with lost workdays, all industries by state, 1972–78.

Leigh (53)  
Individual’s receipt of workers’ compensation benefits, studies of workers’ compensation benefits.

Bartel & Thomas (6)  
Injuries per 100 full-time workers with lost workdays, all industries by state, 1972–78.

Leigh (53)  
Individual’s receipt of workers’ compensation benefits, studies of workers’ compensation benefits.

Bartel & Thomas (6)  
Injuries per 100 full-time workers with lost workdays, all industries by state, 1972–78.

Leigh (53)  
Individual’s receipt of workers’ compensation benefits, studies of workers’ compensation benefits.

Bartel & Thomas (6)  
Injuries per 100 full-time workers with lost workdays, all industries by state, 1972–78.

Leigh (53)  
Individual’s receipt of workers’ compensation benefits, studies of workers’ compensation benefits.

Bartel & Thomas (6)  
Injuries per 100 full-time workers with lost workdays, all industries by state, 1972–78.

Leigh (53)  
Individual’s receipt of workers’ compensation benefits, studies of workers’ compensation benefits.

Bartel & Thomas (6)  
Injuries per 100 full-time workers with lost workdays, all industries by state, 1972–78.

Leigh (53)  
Individual’s receipt of workers’ compensation benefits, studies of workers’ compensation benefits.

Bartel & Thomas (6)  
Injuries per 100 full-time workers with lost workdays, all industries by state, 1972–78.

Leigh (53)  
Individual’s receipt of workers’ compensation benefits, studies of workers’ compensation benefits.

Bartel & Thomas (6)  
Injuries per 100 full-time workers with lost workdays, all industries by state, 1972–78.

Leigh (53)  
Individual’s receipt of workers’ compensation benefits, studies of workers’ compensation benefits.

Bartel & Thomas (6)  
Injuries per 100 full-time workers with lost workdays, all industries by state, 1972–78.

Leigh (53)  
Individual’s receipt of workers’ compensation benefits, studies of workers’ compensation benefits.

Bartel & Thomas (6)  
Injuries per 100 full-time workers with lost workdays, all industries by state, 1972–78.

Leigh (53)  
Individual’s receipt of workers’ compensation benefits, studies of workers’ compensation benefits.

Bartel & Thomas (6)  
Injuries per 100 full-time workers with lost workdays, all industries by state, 1972–78.

Leigh (53)  
Individual’s receipt of workers’ compensation benefits, studies of workers’ compensation benefits.

Bartel & Thomas (6)  
Injuries per 100 full-time workers with lost workdays, all industries by state, 1972–78.

Leigh (53)  
Individual’s receipt of workers’ compensation benefits, studies of workers’ compensation benefits.

Bartel & Thomas (6)  
Injuries per 100 full-time workers with lost workdays, all industries by state, 1972–78.
<table>
<thead>
<tr>
<th>How employer size affects the impact of benefits on injury rates</th>
<th>Measure of workers’ compensation benefits</th>
<th>Association of higher benefits to injury rates</th>
<th>Source of data</th>
<th>Unit of observation</th>
<th>Injury measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-insurance associated with fewer accepted workers’ compensation claims</td>
<td>Temporary disability benefit levels</td>
<td>Rates for both types of injuries were higher before benefits cut by 30%</td>
<td>Workers’ compensation claim files of two community colleges in New Jersey</td>
<td>24 quarters at each of two colleges, 1978–84</td>
<td>Frequency of workers’ compensation claims with lost time and of claims with more than seven days’ lost time</td>
</tr>
<tr>
<td>Impact on permanent partial rates lower in industries with larger average employment; impact on other rates lower, but not significantly</td>
<td>Permanent partial rates rose; other rates rose, but not significantly</td>
<td>South Carolina labor department and workers’ compensation agency</td>
<td>South Carolina: 15 industries, 1940–71, 468 observations</td>
<td>Expected workers’ compensation benefits for the average worker</td>
<td></td>
</tr>
<tr>
<td>Reduction in fatality rates greater in larger firms (significant in three of four specifications)</td>
<td>State maximum temporary total disability rate</td>
<td>Fatality rates fell</td>
<td>Injuries: NIOSH National Traumatic Occupational Fatality surveillance system Individuals: Panel Study of Income Dynamics</td>
<td>Injuries: 7 one-digit industries by state, 1980–84 Firm size: Census, one-digit industries by state, 1982 Other data: 1173 individuals, 1982</td>
<td>Fatalities per 100,000 workers</td>
</tr>
<tr>
<td>Ruser</td>
<td>Injuries per 100 full-time workers</td>
<td>(a) BLS, injuries with lost workdays</td>
<td>(a) 2788 (b) 2798 manufacturing establishments, 1979–84, (a) 16,728 (b) 16,788 observations</td>
<td>(a) State maximum temporary total disability rate (b) Estimate of average proportion of wages replaced by temporary total disability benefits</td>
<td>(a) Rates generally increased (b) Rates declined for fatal injuries, but increased for others</td>
</tr>
<tr>
<td>---------------</td>
<td>-----------------------------------</td>
<td>-------------------------------------</td>
<td>---------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>(a) 64</td>
<td></td>
<td>(b) 65</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chelius &amp; Smith</th>
<th>Injuries per 100 full-time workers</th>
<th>BLS, injuries with lost workdays</th>
<th>Washington vs. other states, 1979–81, by three-digit SIC and 7 size classes</th>
<th>Not used</th>
<th>Not tested</th>
<th>Experience-rating of small firms in Washington did not reduce their injury rates relative to large firms</th>
</tr>
</thead>
<tbody>
<tr>
<td>(34)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Study of Income Dynamics. Another study uses data from the National Traumatic Occupational Fatality surveillance system (50), which is based on death certificates.

Most of the studies are ecological, relying on average injury rates by state (27), by industry (6), by industry within a state (26, 79), or by industry and state (29, 30, 32, 34, 63). Three examined injury rates by workplace (31, 64, 65), one used injury data by state and industry, attributing these risks to individuals (55), while three others used data on individuals (52, 53, 62). Most of the studies use least squares regression to fit the data, although one (52) uses probit estimates. One author, Ruser (63–65), uses methods designed for count data (number of injuries).

Only one of the nine studies using BLS injury rates (64) found an inverse relationship between injury rates and benefit levels. The six studies in Table 1 using workers' compensation claim rates all failed to show a safety impact of benefit levels. Two studies, using data on individuals, also could not find a safety impact (52, 53). In fact, these studies generally found that injury rates rose when benefits increased.

Because these studies rely on reported injuries, we cannot draw the firm conclusion that higher benefits lead to less-safe working conditions. This is because benefit levels affect injury reporting. When benefit levels rise and paying benefits becomes more expensive, we expect employers to discourage the filing of workers' compensation claims more frequently and to encourage earlier return to work (31, 68). At the same time, workers lose less income if they miss work, so they may report more injuries and stay off work longer (45, 46). Even if injury rates fell as benefits rose, reported injury rates might rise.

EXPERIENCE RATING, SELF-INSURANCE, AND SAFETY Recognizing this ambiguity, some researchers have looked for ways to minimize the impact of reporting on measures of the safety impact of workers' compensation. One method compares the effect of benefits on injuries among employer-size groups, looking for an "experience-rating" effect.

The impact of benefit changes on workers' incentives to report injuries should be similar in smaller and larger firms. Small firms are not experience rated, and thus lack incentives to improve safety when benefits arise. Differences in the response of small and large firms to benefit changes thus should reflect the impact of benefits on injury rates for large firms. As benefits rise, we expect to find that injury rates in large firms decline relative to those in small firms.

Two studies by Chelius & Smith did not find an experience-rating effect (32, 34). On the other hand, studies by Worrall & Butler (79), Moore & Viscusi (55), and Ruser (63, 64) found experience-ratings effects. As benefits rose,
injury rates in large firms fell relative to those in small firms. Ruser’s most recent study (65) had similar findings for nonfatal injuries with lost workdays and for injuries without lost workdays. However, he did not find an employment-size relationship for fatal injury rates.

A related study suggests that the measured impact of experience-rating on safety could reflect reporting changes by employers and not real changes in injury rates (31). Two community colleges more aggressively challenged the compensability of claims after switching to self-insurance. Self-insurance tied workers’ compensation costs more closely to injury costs, leading employers to report fewer injuries. Similarly, when benefits rise, experience-rated employers may discourage claim-filing and reject more workers’ compensation claims. Spieler (69) notes that, if employers initiate aggressive loss-control programs, injured workers may fear retaliation and avoid filing injury claims. Rising costs also may cause employers to institute safety contests with group rewards for injury-free periods. Pressure from fellow workers may then decrease reporting by injured workers. Other studies also have found that financial incentives affect employer reporting of injuries (66) and hazardous conditions (16). Employers who deny workers’ compensation claims also are unlikely to report the injuries to the BLS.

EVIDENCE FROM “OBJECTIVE” INJURIES  To control for reporting bias, some studies focus on injury types that are less likely to be subject to systematic reporting bias. Robertson & Keeve (62) compared the impact of benefit levels on sprains and strains to the impact on more “objective” injuries, like lacerations and fractures. They found, in both cases, that reported injuries increased with increasing benefits, although the effect was stronger for sprains and strains.

Other researchers have used a similar approach, focusing on fatalities—clear-cut events, and injured workers are unlikely to overreport them. Still, Butler (26) estimated benefit impacts on fatal injury rates and found that benefit increases were associated with higher fatality rates. On the other hand, Moore & Viscusi (55) and Ruser (65) concluded that increases in workers’ compensation benefits reduced fatality rates. Moore & Viscusi used a measure of injury rates only at a very aggregated (one-digit) industry level. Also, in Ruser’s 1993 study, the estimated impact on fatalities did not decline with employment size (65). This is inconsistent with experience-rating and self-insurance as mechanisms that presumably generate safety incentives. If these function as expected, the sensitivity of premiums to injury experience should increase with size.

Few studies have found evidence for a safety effect, and, where such evidence exists, it can be explained by incentives for employers to discourage and contest expensive injuries. In all the studies to date, the investigators did not control the collection of injury data and thus could not distinguish safety
effects from reporting effects. Attempts to control statistically for reporting bias have had only limited success.

Despite many studies addressing this question, we cannot be confident that workers' compensation reduces injury rates, even for large experience-rated or self-insured firms. This is puzzling, since workers' compensation has become a significant and growing business cost. Several studies provide evidence that organizational and managerial shortcomings block employers from taking action that would be in their self-interest. A survey of employers suggests that they rarely know the size of their workers' compensation premiums (49). Another study showed that risk managers and engineering departments communicated poorly (40). Sometimes, large companies may treat workers' compensation costs as fixed overhead. Employers may assume that "accident-prone" workers cause injuries or that many reported injuries are fraudulent (69). Still, ignorance and inefficient behavior are less than satisfactory explanations of the limited impact of workers' compensation on safety behavior. Perhaps further study will conclude that the net financial incentives of workers' compensation costs are smaller than we believe them to be.

MEDICAL CARE AND MEDICAL COSTS

Despite the widespread interest in the cost and quality of medical care, researchers only recently have begun to study this issue in the workers' compensation setting. Studies of medical care in other settings have relevance to workers' compensation, but some distinctive features suggest that behavior in workers' compensation may be quite different. In workers' compensation:

- Medical care is fully covered; deductibles and copayments cannot be used to control utilization.
- The employer or insurer pays both income and medical benefits.
- Physicians often provide information that determines income benefits, including whether an injury is compensable when a worker is ready to return to work, and assessments of permanent impairment.
- Because of the physician's role in determining income benefits, patient-physician communication may be impaired, affecting the quality of care.
- Some injuries are litigated, which can interfere with medical treatment.

Workers' Compensation Medical Costs

From 1980 to 1985, workers' compensation medical costs rose at an average annual rate of 14.7 percent, compared to an annual increase of 9.8 percent outside workers' compensation (15, 17). Between 1985 and 1990, this trend continued (70).

A study of medical costs in Minnesota provides additional evidence that
workers' compensation medical costs are higher than nonworkers' compensation costs. It analyzed a matched sample of claims from Minnesota's largest workers' compensation insurer and major nonworkers' compensation insurer (71). Workers' compensation treatment averaged 2.4 times as expensive as nonworkers' compensation treatment. Using regression analysis to control for the quantity of medical services used, workers' compensation charges remained over twice those outside workers' compensation. A reanalysis of these data came to the same conclusion and found charges for specific services to be higher in workers' compensation (5). This suggests that prices, not utilization, caused most of the disparities in costs between the two systems.

Another study reported substantially higher medical costs in workers' compensation claims than in group health claims (37). This study of claims from Florida, Illinois, Oregon, and Pennsylvania analyzed treatment costs, using regression analysis to control for state, year, diagnosis, and cost-containment controls used in workers' compensation. It found workers' compensation costs between 1.65 and 2.3 times group health costs. Controlling further for provider mix, number of outpatient service dates, and length of hospital stays, the difference between workers' compensation and group health disappeared. From this, the authors concluded that the differences between workers' compensation and group health costs were caused by greater utilization of medical services and not by higher prices.

Controlling for gender, age, utilization measures, case mix, and severity, another study estimated that workers' compensation prices in California were 25 percent below nonworkers' compensation prices (59). Nevertheless, workers' compensation medical costs per episode averaged 21 percent higher than group medical costs after adjusting for case mix, which suggests that higher utilization caused the difference in overall costs. The stringent workers' compensation fee schedule in effect in California may in part explain why workers' compensation prices there are lower than group health prices.

While the three studies disagree about the relative importance of prices and utilization, they agree that workers' compensation medical care is much more expensive.

**Workers' Compensation Medical Cost Control**

Over the past several years, many states have adopted one or more methods of containing medical costs. In the year before July 1, 1991, 15 states added one or more new cost-containment initiatives or were developing them (18). In the next 15 months, 19 states had added or were developing additional cost-containment activities (70).

**CHOICE OF PROVIDER** Employers and insurers support employer choice of medical provider and managed care to achieve control over medical-care costs.
Organized labor, on the other hand, supports control over medical care by the injured worker. Each side has argued that its preferred option is more effective in producing high-quality care and low costs.

A 1989 report of preliminary results (35) found higher medical costs among states that allowed workers to choose their own medical providers. In another (74), Victor & Fleischman reported that changes to employee choice in Illinois and Texas led to increased medical costs.

Several studies, however, have come to the opposite conclusion. One (17) looked at eight states that changed their laws about provider choice during the 1965–1985 period. Except for one state, Illinois, no major changes in medical cost growth occurred when states changed their laws regarding provider choice. Pozzebon (60, 61) found that, controlling for other factors, states limiting employee choice of provider had average medical payments 10 to 15 percent higher than other states. A study by Appel & Durbin found analogous results. In states with employee choice of provider, claims tended to be considerably shorter and thus less costly (2).

The debate about this issue transcends interest in containing medical costs (42, 43). When they choose the medical provider, employers and insurers have a greater say about the provider’s behavior in litigated cases. In many workers’ compensation systems, treating providers furnish information about when a worker is ready to return to work (and temporary disability benefits may be terminated) or the worker’s level of impairment (affecting permanent disability benefits). Because provider choice can affect income benefits, it would be in contention even if everybody agreed it had no impact on medical costs.

**MEDICAL FEE SCHEDULES**

The use of medical fee schedules in workers’ compensation has engendered less controversy. Yet evidence of effectiveness is also in dispute. Preliminary results cited above (35), Borba (21), and Levy & Miller (54) all found lower medical costs among states with fee schedules. However, another study showed that, in 1980–1985, there was no correlation between the growth of medical costs and the use of medical fee schedules (17). Controlling for other factors, Pozzebon did not find that average growth rates of medical costs in fee-schedule states were lower than in other states during 1979–1987 (60, 61).

Another study of workers’ compensation fee schedules helps to explain these seemingly inconsistent results. This study (41) found substantial variability among states in the stringency and coverage of medical fee schedules, suggesting that we should not expect similar effects from all fee schedules. In the four most restrictive states, fee-schedule limits averaged between 54 and 64 percent of nonworkers’ compensation medical charges in 1992. In the four least restrictive states, they averaged 103 to 112 percent of nonworkers’ compensation charges. If a fee schedule allows fees above typical charges, it does
not constrain medical costs. In fact, providers billing below the fee schedule may use it as a signal to raise fees. The study also found that the percentage of workers' compensation charges covered by fee schedules varied from a low of 57.5 percent to a high of 100 percent (41).

MANAGED CARE In recent years, states have begun to look to managed care to reduce workers' compensation medical costs. Oregon undertook the earliest and most extensive move in this direction in 1991. If an employer in Oregon has designated an approved managed-care organization, Oregon requires injured workers to receive medical care from the managed-care organization in most circumstances. In 1992, Minnesota established a similar program, and the legislature in North Dakota required its exclusive state fund to establish a managed-care program. The legislatures in Montana and Ohio enacted laws in 1993 to require copayments from workers who elect to receive treatment outside designated managed-care organizations. These states previously allowed injured workers the initial choice of medical provider.

Despite this growing activity, little research has assessed the impact of managed care on workers' compensation costs. A 1991 study compared the workers' compensation experience of postal employees in Massachusetts enrolled in a health maintenance organization (HMO) with those in a fee-for-service plan (80). It found lower medical payments and somewhat lower income benefits among the HMO enrollees. Using analysis of variance to control for age, job category, and injury type, the reduction in medical costs was significant (p.<05).

The HMO was paid on a fee-for-service basis for workers' compensation injuries. Still, providers at the HMO continued to give lower-cost care than their fee-for-service counterparts. This suggests that the more cost-conscious practice style of the HMO carried over to the fee-for-service workers' compensation services. Additional fees for workers' compensation services increased the income of the HMO, so this arrangement provided incentives to maximize the number of conditions classified as work related (39). Yet workers' compensation claim rates were slightly lower among the fee-for-service enrollees. Organizational financial incentives did not affect the behavior of the HMO's providers.

A pilot program providing workers' compensation managed care to state government employees in south Florida also appears to have reduced medical costs. Beginning in 1991, the State of Florida paid a fixed monthly premium per enrolled worker to an HMO providing workers' compensation medical care. Costs were tracked, and the state and the HMO shared equally in any surplus or deficit, providing the HMO an incentive to reduce costs.

An evaluation (3) compared payments to the HMO with those to fee-for-
service providers. Medical payments were almost 60 percent lower in the HMO group. Accounting for HMO administrative fees and controlling for differences in demographic and injury characteristics, savings remained close to 50 percent. Payments of income benefits also were reduced substantially. Consistent with other research on HMOs, hospital costs were reduced more than physician costs.

The authors caution against generalizing from their findings. The pilot nature of this study may have induced a “Hawthorne effect,” leading the HMO to watch costs more carefully than it might if providing ongoing care. Also, south Florida is an area of high medical costs, possibly with more leeway to generate savings than other areas.

We draw the tentative conclusion that managed care in workers’ compensation can achieve substantial cost-savings. More research in different settings and over longer periods will clarify the size of these savings.

**Medical Care Quality and Patient Satisfaction**

Few studies address the public health and labor union concerns about the noncost implications of medical cost controls. Two exceptions highlight the importance of these issues. The Florida pilot study included a survey of workers’ satisfaction with their medical care. The respondents in the HMO program were less satisfied than the fee-for-service control group with their doctor’s treatment, the medical tests they were given, and the appointment scheduling. The response rate to this survey was only 23 per cent.

Another study shows that reducing medical care for injured workers delays return to work and increases income losses. This implies that single-minded attention to medical costs is misplaced. How cost-control methods affect outcomes remains an important question.

**National Health Reform and Workers’ Compensation**

The discussion about reform of the US health care system has engendered a debate over the relationship of workers’ compensation to general health care. Much of this debate centers on whether integration of workers’ compensation medical care into the general health care delivery system would increase or decrease costs. Baker & Krueger reanalyzed the Minnesota data described above, and they come to the same conclusion—that workers’ compensation medical prices are more than twice prices outside workers’ compensation. The authors suggest that shifting to an integrated system would eliminate price differences between the currently separate systems and thus reduce workers’ compensation costs by half or more. They also suggest other, more speculative,
sources of savings, including easier use of managed care and utilization review, reduced administrative and legal costs, and less medical testing for legal purposes.

Even in an integrated system, many important differences will remain. For example, litigation in workers' compensation will continue to complicate patient-physician communication, making treatment less effective and possibly more costly. Providers will still spend more time on workers' compensation claims because of special reporting requirements, and they will test more often to provide information needed to determine compensability or the level of income benefits. And, finally, it is very unlikely that copayments and deductibles will be introduced into workers' compensation. We cannot therefore expect the entire difference in costs to evaporate in an integrated system.

Grannemann & Victor (48) have pointed out that integrated systems would separate responsibility for paying income and medical benefits. They note that medical providers in health plans, chosen by workers, may lean toward allowing workers more time off than would providers chosen by employers or insurers. Of course, this would only be relevant in the states that now restrict the worker's choice of provider. Another concern is that capitated medical-care plans, intent on holding down medical costs, might forgo medical treatment that would accelerate return to work. This might harm both the worker and the employer. Of course, it is also possible that capitated plans or standardized treatment protocols might eliminate unnecessary and expensive procedures that both increase medical costs and delay return to work.

Integration would affect the choice of provider, now governed by state workers' compensation laws. In employer-choice states, employers would lose some control over providers, while in employee-choice states the reverse would occur. Both sides understand that choosing the provider may give them added say in medical decisions that affect nonmedical outcomes—in particular, income benefits to injured workers. The AFL-CIO has supported integration, viewing it as more like employee choice than employer choice (42, 43). Also, integration might block the move in some "employee-choice" states to workers' compensation managed-care organizations chosen by employers and insurers.

Finally, integration of workers' compensation medical care into a national health care system offers unique opportunities to provide improved surveillance of occupational injury and illness and data for research on medical care in workers' compensation. Currently, there is little standardization of medical data in workers' compensation. A national, integrated system could require standard billing forms, including uniformly coded information on occupation, industry, employer, diagnosis, and procedure. To the extent possible, these could be stored electronically, rather than on paper. Analyses of these data could identify industries where workers face excess risks. They also could
provide data to compare prices and utilization in and outside workers' compensation.

LITIGATION

Before workers' compensation, injured workers and their families generally bore the costs of their work-related injuries. To get compensation, workers had the difficult task of proving in a court of law that employer negligence caused their injuries. If workers won negligence suits, payments were made long after they were injured, and a large amount of each settlement was diverted for legal fees. Today, workers with minor injuries covered by workers' compensation generally can expect to receive payments promptly and without contest. Less than 10 percent of claims for occupational injuries are contested.

Causes and Effects of Litigation

Employers and insurers can contest workers' compensation claims because they do not consider the injury to be work-related, for example, or because the workers want greater benefits than the employers or insurers are willing to pay. In most injury cases the employer or insurance carrier has little incentive to contest because proof of eligibility is easy, and the potential gain to the insurer of postponing or eliminating small payments is not enough to offset the legal costs of pursuing a claim.

For expensive injury claims like permanent disability and death claims, insurance companies are much more likely to deny claims or contest benefits. Workers, through their attorneys, more frequently maintain that they deserve additional benefits. In most states, claims for permanent disability and death are litigated more than half the time, compared to less than 5 percent of claims for temporary disability (56). Employers and insurers also contest claims for chronic occupational disease and cumulative trauma much more frequently than claims for injuries (8, 12, 19).

Studies of litigation of permanent partial disability low-back injuries have shown that states vary considerably in how frequently these claims are litigated. In Maryland and New Jersey, workers retain attorneys in more than 90 percent of these claims. However, attorney representation in Oregon and Wisconsin is much less common (20). Information from workers' compensation insurers shows considerable variation among states in attorney involvement, and also suggests that litigation became more frequent during the 1980s (Table 2) (56).

Litigation imposes substantial costs on injured workers, employers, and insurers, and administrative costs on workers' compensation systems. In litigated permanent disability claims, these added costs absorb about one third of income benefits (13). Savings from reducing litigation could be used to improve benefits for injured workers or to reduce insurance premiums paid by
WORKERS' COMPENSATION IN THE U.S. 207

Table 2  Litigation rate, claims with income benefits, insured employers

<table>
<thead>
<tr>
<th>State</th>
<th>1980</th>
<th>1985</th>
<th>1989</th>
</tr>
</thead>
<tbody>
<tr>
<td>Florida</td>
<td>6.9</td>
<td>8.2</td>
<td>16.0</td>
</tr>
<tr>
<td>Georgia</td>
<td>9.5</td>
<td>14.9</td>
<td>27.6</td>
</tr>
<tr>
<td>Illinois</td>
<td>23.1</td>
<td>23.8</td>
<td>29.5</td>
</tr>
<tr>
<td>Kentucky</td>
<td>11.9</td>
<td>10.7</td>
<td>12.0</td>
</tr>
<tr>
<td>Maine</td>
<td>14.1</td>
<td>17.1</td>
<td>12.7</td>
</tr>
<tr>
<td>Massachusetts</td>
<td>11.3</td>
<td>14.4</td>
<td>20.5</td>
</tr>
<tr>
<td>Michigan</td>
<td>23.8</td>
<td>15.0</td>
<td>8.8</td>
</tr>
<tr>
<td>Minnesota</td>
<td>4.5</td>
<td>7.6</td>
<td>7.3</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>3.1</td>
<td>4.3</td>
<td>5.2</td>
</tr>
<tr>
<td>Average</td>
<td>12.1</td>
<td>13.0</td>
<td>17.1</td>
</tr>
</tbody>
</table>

Source: National Council on Compensation Insurance (56)

employers. Litigation also delays the delivery of benefits, often by more than a year.

System and Insurer Factors Affecting Litigation

Studies of permanently disabling back injuries in two litigious states and two less-litigious states identified features that can cause high litigation rates (20). Laws and regulations in the litigious states do not provide clear guidance about benefits owed to injured workers. Workers' compensation agencies in these states do not provide injured workers with information about the benefits they are entitled to, and they do not ensure that insurers and employers pay permanent partial disability benefits in a timely manner. Also, if claims are litigated, adjudicators tend to "split the difference" between disparate medical assessments by defense and claimant experts. In these states, attorneys provide workers with valuable information and services. Without opinions from physicians chosen by their attorneys, injured workers must rely only on the assessments of partisan defense physicians, accepting a lower payment—or none at all.

Less-litigious systems provide employers and insurers with reasonable certainty about what they owe and provide injured workers with information about the benefits they should receive. Practices and rules encourage the use of nonpartisan experts, typically treating physicians, in the evaluation process. With more than one physician opinion, adjudicators do not split the difference,
typically relying on the treating physician's opinion. Also, the workers' compensation agency provides information to injured workers and ensures that insurers and employers pay permanent partial disability benefits on time. When insurers and employers make timely payments of amounts that workers expect, workers feel well treated and their cases are resolved promptly and without litigation.

Another study, based on surveys of workers with permanent disabilities in California, provides complementary information about how insurance company behavior can affect the propensity of workers to hire attorneys (22). Using probit regression, this study estimated the impact of injury characteristics, worker characteristics, benefits, and perceptions of insurer behavior on attorney representation. It found that when workers believed that the insurer kept them well informed or were satisfied with the insurers' overall handling of the claim, they were much less likely than otherwise to hire an attorney. Still, from these data, we cannot tell to what extent workers' satisfaction reflected insurer behavior or workers' attitudes.

These studies suggest that states can design workers' compensation systems to provide an environment that reduces litigation without jeopardizing the protection that attorneys afford injured workers.

INCOME BENEFITS UNDER WORKERS' COMPENSATION

Separate workers' compensation systems in fifty states, the District of Columbia, and two federal jurisdictions have established their own benefit structures. Injured workers should face similar benefits wherever they are injured. Yet statutory income benefits vary considerably, suggesting that identical workers with identical injuries can expect to receive different benefits in different jurisdictions.

After comparing overall benefits among jurisdictions, we turn to measures of benefit adequacy for the two most common types of injuries involving lost earnings: temporary total and permanent partial disabilities. For each, we review knowledge about the proportion of lost income replaced by workers' compensation benefits. For temporary disabilities, some states are more generous than others, but workers receiving workers' compensation income benefits typically recover between 80 and 100 percent of after-tax lost earnings. We use after-tax earnings because neither state nor federal income taxes apply to workers' compensation income benefits. Studies of replacement rates for permanently disabling injuries show that, on average, workers' compensation replaces a small proportion of earnings losses of permanently disabled workers. Some also raise the possibility that, among workers with permanent earnings losses, permanent disability benefits are distributed inequitably.
Table 3 Maximum weekly benefits for total disability: selected states (on January 1, 1994)

<table>
<thead>
<tr>
<th>Jurisdiction</th>
<th>Fraction of workers' wage</th>
<th>Maximum weekly benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arizona</td>
<td>2/3</td>
<td>328</td>
</tr>
<tr>
<td>Arkansas</td>
<td>2/3</td>
<td>267 (70% of SAWW)</td>
</tr>
<tr>
<td>California</td>
<td>2/3</td>
<td>366</td>
</tr>
<tr>
<td>Connecticut</td>
<td>3/4 of after-tax income</td>
<td>638 (SAWW)</td>
</tr>
<tr>
<td>Florida</td>
<td>2/3</td>
<td>444 (SAWW)</td>
</tr>
<tr>
<td>Georgia</td>
<td>2/3</td>
<td>250</td>
</tr>
<tr>
<td>Indiana</td>
<td>2/3</td>
<td>394</td>
</tr>
<tr>
<td>Iowa</td>
<td>4/5 of spendable earnings</td>
<td>797 (200% of SAWW)</td>
</tr>
<tr>
<td>Kentucky</td>
<td>2/3</td>
<td>394 (SAWW)</td>
</tr>
<tr>
<td>Louisiana</td>
<td>2/3</td>
<td>319 (75% of SAWW)</td>
</tr>
<tr>
<td>Michigan</td>
<td>4/5 of spendable earnings</td>
<td>441 (90% of SAWW)</td>
</tr>
<tr>
<td>Minnesota</td>
<td>2/3</td>
<td>508 (105% of SAWW)</td>
</tr>
<tr>
<td>Mississippi</td>
<td>2/3</td>
<td>244 (2/3 of SAWW)</td>
</tr>
<tr>
<td>North Carolina</td>
<td>2/3</td>
<td>466 (110% of SAWW)</td>
</tr>
<tr>
<td>Ohio</td>
<td>72% first 12 weeks, then 2/3</td>
<td>482 (SAWW)</td>
</tr>
<tr>
<td>Oklahoma</td>
<td>7/10</td>
<td>307 (3/4 of SAWW)</td>
</tr>
<tr>
<td>Oregon</td>
<td>2/3</td>
<td>479 (SAWW)</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>2/3</td>
<td>493 (SAWW)</td>
</tr>
<tr>
<td>Tennessee</td>
<td>2/3</td>
<td>356 (82% of SAWW)</td>
</tr>
<tr>
<td>Texas</td>
<td>7/10</td>
<td>466 (SAWW)</td>
</tr>
<tr>
<td>Washington</td>
<td>6/10 to 3/4*</td>
<td>517 (105% of SAWW)</td>
</tr>
<tr>
<td>West Virginia</td>
<td>7/10</td>
<td>420 (SAWW)</td>
</tr>
</tbody>
</table>

*a Lower proportion if no dependents.

Key: SAWW = State's average weekly wage; NAWW = national average weekly wage.
Source: US Chamber of Commerce. (72).

Interstate Variation in Benefit Payments

Workers' compensation is a state program, and benefits differ substantially from state to state. One commonly used measure of benefit levels is the maximum weekly rate for temporary total disability (Table 3). Temporary disability benefits are calculated as a proportion (usually two thirds) of the worker's preinjury wage, up to a maximum weekly amount. By this measure, states exhibit considerable variation. In 1994, the lowest maximum weekly temporary disability benefits ($244 in Mississippi) were less than one third those in the most generous state ($797 in Iowa) (72). Statutory benefits for permanent disability exhibit similar variation.

Column 1 of Table 4 shows a broad measure of benefit levels, average workers' compensation benefits paid per worker annually (25). Benefits per worker range from a low of $177 in Indiana to a high of $712 in West Virginia. This measure captures variation in benefit levels, wage levels and injury frequency, and injury severity. Column 3 shows workers' compensation ben-
<table>
<thead>
<tr>
<th>State</th>
<th>Average benefits paid per covered worker: 1990</th>
<th>Benefits as a percentage of wages</th>
<th>Ratio of benefits paid to lost wages&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arizona</td>
<td>314</td>
<td>1.50</td>
<td>68.0</td>
</tr>
<tr>
<td>Arkansas</td>
<td>311</td>
<td>1.75</td>
<td>87.7</td>
</tr>
<tr>
<td>California</td>
<td>494</td>
<td>1.92</td>
<td>90.7</td>
</tr>
<tr>
<td>Connecticut</td>
<td>502</td>
<td>1.72</td>
<td>83.8</td>
</tr>
<tr>
<td>Florida</td>
<td>468</td>
<td>2.29</td>
<td>66.7</td>
</tr>
<tr>
<td>Indiana</td>
<td>177</td>
<td>0.82</td>
<td>76.0</td>
</tr>
<tr>
<td>Iowa</td>
<td>214</td>
<td>1.13</td>
<td>94.2</td>
</tr>
<tr>
<td>Kentucky</td>
<td>340</td>
<td>1.72</td>
<td>98.8</td>
</tr>
<tr>
<td>Louisiana</td>
<td>530</td>
<td>2.54</td>
<td>92.9</td>
</tr>
<tr>
<td>Michigan</td>
<td>353</td>
<td>1.38</td>
<td>109.9</td>
</tr>
<tr>
<td>Minnesota</td>
<td>318</td>
<td>1.39</td>
<td>79.9</td>
</tr>
<tr>
<td>North Carolina</td>
<td>179</td>
<td>0.91</td>
<td>62.5</td>
</tr>
<tr>
<td>Oklahoma</td>
<td>436</td>
<td>2.17</td>
<td>91.0</td>
</tr>
<tr>
<td>Oregon</td>
<td>515</td>
<td>2.46</td>
<td>98.5</td>
</tr>
<tr>
<td>Tennessee</td>
<td>304</td>
<td>1.51</td>
<td>76.8</td>
</tr>
<tr>
<td>Texas</td>
<td>645</td>
<td>2.84</td>
<td>115.5</td>
</tr>
<tr>
<td>West Virginia</td>
<td>712</td>
<td>3.45</td>
<td>105.4</td>
</tr>
<tr>
<td>Median state</td>
<td>353</td>
<td>1.72</td>
<td>90.7</td>
</tr>
</tbody>
</table>

Data in columns 1–4 from Burton & Schmidle (25).<sup>a</sup> Calculated from data in columns 1 and 3 and lost workdays per 100 full-time equivalent workers; lost-workday data supplied to the author by Bureau of Labor Statistics, US Department of Labor.<sup>b</sup> This rough approximation is calculated by the author, under the assumption of a 200-day work year as: (benefits/wages)/(annual lost workdays per worker/200).

Benefits as a proportion of covered wages. To facilitate comparison, this measure is presented as a proportion of the value for the median state in Column 4. Finally, Column 6 shows an estimate of benefits paid per dollar of lost wages—also as a proportion of the value for the median state. This measure is closest to a replacement rate, although it includes both medical and income benefits. It probably overestimates generosity in states with a greater proportion of severe injuries, because the lost-workday rate underestimates losses for severe injuries. Still, by this measure, the highest-benefit state is three times as generous as the lowest-benefit state.

Rankings of states vary for the different measures in Table 4, but they are quite different from those in Table 3. The two states with the highest maximum
temporary disability rate are Iowa and Connecticut, but Iowa is very low and Connecticut is the median state based on the ratio of benefits paid to lost wages. Florida and Louisiana, the median states by temporary disability rate, are two of the highest using the ratio of benefits to lost wages.

Statutory benefit rates are not the only factors affecting the level of income replacement. States can vary in the probability that injured workers will be compensated, the typical duration of temporary disability benefits for similar injuries, or the probability that workers with similar injuries will receive permanent disability benefits, or the degree of permanent disability assigned to similar injuries.

We know that states vary widely in their propensity to pay permanent disability benefits. In recent years, 43 percent of compensated workers in California and 52 percent in Oklahoma received these benefits. In Alabama and Wisconsin, this proportion was 16 and 15 percent, respectively (57). If these states, all of which had three-day waiting periods, had similar distributions of injury severity, disparities would reflect the relative difficulty of qualifying for permanent disability benefits in Alabama and Wisconsin.

This considerable variation raises questions about the adequacy of benefits in different jurisdictions. None of the statistics presented above directly addresses this question, and only a few studies have done so. These studies have attempted to measure the replacement rate, the ratio of income benefits received by workers to their economic losses. Some have examined replacement rates for injuries involving only temporary total disability. Others have estimated replacement rates for the largest group of severe injuries, those involving permanent partial disability benefits.

Ideally, each study should address several important substantive aspects of the replacement rate. First, because workers' compensation income benefits are not taxed, the replacement rate should compare after-tax income losses with workers' compensation benefits. Second, lost income should include the value of fringe benefits foregone. For injuries involving permanent partial disability, estimates of lifetime earnings should be compared with estimates of lifetime benefits. Where possible, income benefits should be calculated net of litigation costs paid by the worker.

Studies have met these criteria to varying degrees, although none has accounted for loss of fringe benefits. All the statistical studies suffer from another limitation: Their samples do not include workers with permanent earnings losses who received no permanent disability benefits. For this reason, they overestimate average replacement rates.

4If time lost from work does not extend past a state's waiting period, workers' compensation does not reimburse lost wages. States with longer waiting periods pay income benefits for fewer minor injuries, so lost-time injuries are more severe, on average.
Studies in this area indicate workers' compensation replaces a reasonable proportion of lost wages for most workers with minor, temporarily disabling injuries. But permanently disabled workers fare much less well. Average replacement rates for chronic occupational diseases are even lower than those for severe injuries.

**Replacement Rates for Temporary Total Disability**

In a series of studies of temporary total disability, the Workers' Compensation Research Institute (WCRI) has used a computer model to develop a distribution of after-tax replacement rates based on the applicable workers' compensation statute, the wage distribution of covered workers, and the applicable state and federal tax laws (9, 76). Calculated replacement rates assume that all injured workers receive the appropriate workers' compensation payments and that only work-related injuries are compensated. They do not consider the impact of the waiting period, which would reduce the average replacement rate.

These studies conclude that temporary total disability benefits typically replaced between 80 and 100 percent of preinjury after-tax earnings. Most states provided this level of benefits to between 70 and 85 percent of injured workers. Of 21 states listed in recent comparisons, the WCRI model estimates that only Pennsylvania had a replacement rate over 100 percent for more than 25 percent of injured workers. Six of these 21 states (Arkansas, Georgia, Indiana, Louisiana, Mississippi, and Washington) had replacement rates below 80 percent for more than 25 percent of injured workers.

**Replacement Rates for Permanent Partial Disability**

A primary goal of workers' compensation is providing adequate benefits to seriously injured workers. However, the most recent published studies of replacement rates for severely injured workers cover injuries that occurred more than 20 years ago. Despite the lack of recent data, the qualitative conclusions of this research probably remain true today.

In a study of California workplace injuries during the 1950s, Cheit found considerable variation in replacement rates (28). He estimated that more than half of these workers received permanent disability benefits without any permanent earnings losses. For workers who experienced permanent income losses, however, permanent partial disability benefits typically replaced only a small fraction. For workers with ratings under 70 percent, benefits typically replaced less than 10 percent of losses. Benefits covered 36 percent of losses for workers with the highest disability ratings.

Berkowitz (10) calculated permanent partial disability benefits on the assumption that workers declared 50 percent disabled actually lost half their post-injury lifetime earnings. Using statutory benefits in effect for 1972, Berkowitz calculated the proportion of income losses replaced by permanent partial disability
benefits for a 35-year-old worker with average wages. For 29 jurisdictions, the pretax replacement rate ranged between 12.9 percent and 25.9 percent.

Ginnold (47) studied workers in Wisconsin who had an occupational injury in 1968 resulting in permanent disability benefit payments. Permanent disability benefits averaged 16.4 percent or 24.6 percent of lifetime earnings losses, using five percent and ten percent discount rates, respectively.

In a study of people injured at work during 1968 in Florida, California, or Wisconsin, Berkowitz & Burton (11) calculated income benefits net of legal fees for 1968 through 1973. Pretax replacement rates in Wisconsin averaged 75 percent. In Florida they averaged 59 percent, whereas in California they were only 46 percent.

Replacement rates estimated by Berkowitz & Burton for permanently disabling injuries for 1968 in Wisconsin are much higher than those derived by Ginnold. Average benefits paid in the two studies were similar, but Ginnold calculated much higher future earnings, and thus higher earnings losses. The primary difference between the two estimates appears to be that Berkowitz & Burton focused only on the six years after the injury, whereas Ginnold projected earnings losses (but not benefits, which are nearly all paid by six years after injury) to the expected working life of the injured workers. In this light, the Berkowitz & Burton approach appears to overstate the replacement rate substantially.

Johnson et al (50) measured income replacement among workers with permanent impairment ratings of at least 10 percent. These workers were injured between 1968 and 1970 in California, Florida, New York, Washington, or Wisconsin. The authors calculated after-tax replacement rates, focusing on workers whose earnings losses were at least $500. About one third of the injured workers in this study suffered earnings losses less than $500, averaging a $45 loss. This group received average benefits of $163.

Overall, studies show that workers suffering large income losses have had little of their income losses replaced by workers' compensation. Still, two studies (28, 51) showed that some injured workers with little or no permanent income loss received permanent disability benefits.

Workers' compensation almost certainly replaces an even smaller proportion of income losses for occupational diseases than for injuries. Occupational disease claims tend to be litigated more frequently, so legal costs (which the worker usually pays) are higher. This reduces the net benefit to the injured worker. Also, workers file claims for only a small proportion of occupational diseases.

The authors expressed concern that losses less than $500 "may have been an artifact of the estimation methods" (51, p.109). One third of the sample had losses less than $500. In this group, losses averaged $45 and benefits averaged $163.
Many victims do not even suspect that their disease is job related. For those who do and wish to make a claim, the causal relationship between disease and workplace exposures may be very difficult to establish. A study of asbestos insulators who died of asbestos-related causes (19) showed that fewer than half of asbestos-related fatalities among insulation workers led to workers' compensation claims. Of those who filed claims, the pretax replacement rate was only 22 percent. Overall, the pretax replacement rate was 10 percent. Because asbestos is the best-known cause of occupational disease and these workers were members of an active and well-informed union, we can be sure that other occupational diseases enter the workers' compensation system much less frequently. A study of occupational disease in Washington and California revealed that workers' compensation claims were filed for only three percent of identified cases of occupational disease (36).

CONCLUSION

Although workers' compensation costs have risen dramatically in the past 20 years, research has not found income benefits to be excessive. Despite considerable variation among states, studies suggest that replacement of lost income is low for many workers with serious occupational injuries and illnesses. This suggests that benefits for these injuries and illnesses should be improved, although additional research must verify the extent and nature of this problem. Current knowledge generally does not support a strategy of reducing workers' compensation costs by cutting benefits or limiting conditions eligible for compensation.

This review has discussed three potential areas for reducing workers' compensation costs to employers while raising benefits to workers: improving safety, containing medical costs, and reducing litigation.

In theory, workers' compensation increases the costs to employers of injuries and so provides incentives for improving safety. Taken as a whole, however, research does not provide convincing evidence that workers' compensation reduces injury rates. Few studies found evidence for a safety effect, and, where such evidence exists, it can be explained by incentives for employers to discourage and contest expensive injuries. Perhaps workers' compensation does affect safety, but, if so, its impacts are blurred, if not overwhelmed, by reporting bias.

Moreover, unlike safety and health regulation, workers' compensation focuses the attention of employers on specific workers and their injuries. Employers and insurers typically see "loss control," not just injury control, as their objective. This can lead to employers discouraging workers' compensation claims, increased conflict between workers and employers over when workers
should return to work, and discrimination against workers perceived to be "injury prone" (despite the strictures of the Americans with Disabilities Act).

This does not imply that we cannot reduce workers' compensation costs through better safety performance. It only suggests that workers' compensation premiums have limited value as weapons in the safety arsenal.

Perhaps in response to these limitations, we have seen an expansion of novel efforts to improve safety through workers' compensation. More than a dozen states mandate premium discounts for employers with safety programs. In some, the safety programs must meet defined criteria or must be certified by the state. A growing number of states mandate safety committees through workers' compensation statutes and regulations and through state safety codes. Oregon and Washington, for example, require all employers with more than 10 employees to maintain safety committees. Twenty states require insurers to provide safety services. For instance, in California, insurers must submit to the workers' compensation agency safety plans targeting high-hazard employers and must provide certified safety services to all employers. Other states, including Connecticut, Michigan, and New York, have assessed surcharges on workers' compensation premiums to fund occupational safety and health education. Still, we know virtually nothing about the effectiveness of any of these methods.

Controlling medical costs holds promise as a method of reducing workers' compensation costs without reducing benefits. As in nonworkers' compensation settings, managed care appears to reduce costs. Well-designed fee schedules also may reduce costs. However, research to date has focused on impacts on costs and not on the quality of care. The only information currently available suggests that injured workers are less satisfied with the care provided in an HMO setting than in a fee-for-service setting. Taken as a whole, the evidence does not support the hypothesis that employer choice of medical provider reduces medical costs. But the choice of treating provider may affect how quickly workers return to work and the level of benefits they receive. Although these issues are at the periphery of research, they are central concerns of both employers and labor unions.

Reducing litigation also can improve the functioning of workers' compensation systems. Without litigation, benefits can be delivered more quickly and at lower costs. In states where litigation is common, injured workers need attorneys to give them information and to ensure they receive all the benefits to which they are entitled. To protect workers' rights, attempts to reduce litigation must include provisions for the workers' compensation agency to provide information to workers about benefits due and to ensure that employers and insurers pay these benefits.

Workers' compensation systems are very inefficient, providing limited benefits to injured workers at excessive costs. Additional research, evaluating options for more effective delivery of benefits, could be of great value.
AKNOWLEDGMENTS

I would like to thank Charles Levenstein, David Ozonoff, and Emily Spieler for reading early drafts. Their helpful comments significantly improved this review.

Any Annual Review chapter, as well as any article cited in an Annual Review chapter, may be purchased from the Annual Reviews Preprints and Reprints service. 1-800-347-8007; 415-259-5017; email: arpr@class.org

Literature Cited

22. Borba PS, Appel D. 1987. The propen-
51. Johnson WC, Cullinan PR, Curington WP. 1978. The adequacy of workers'


