From John Burton's Workers' Compensation Resources

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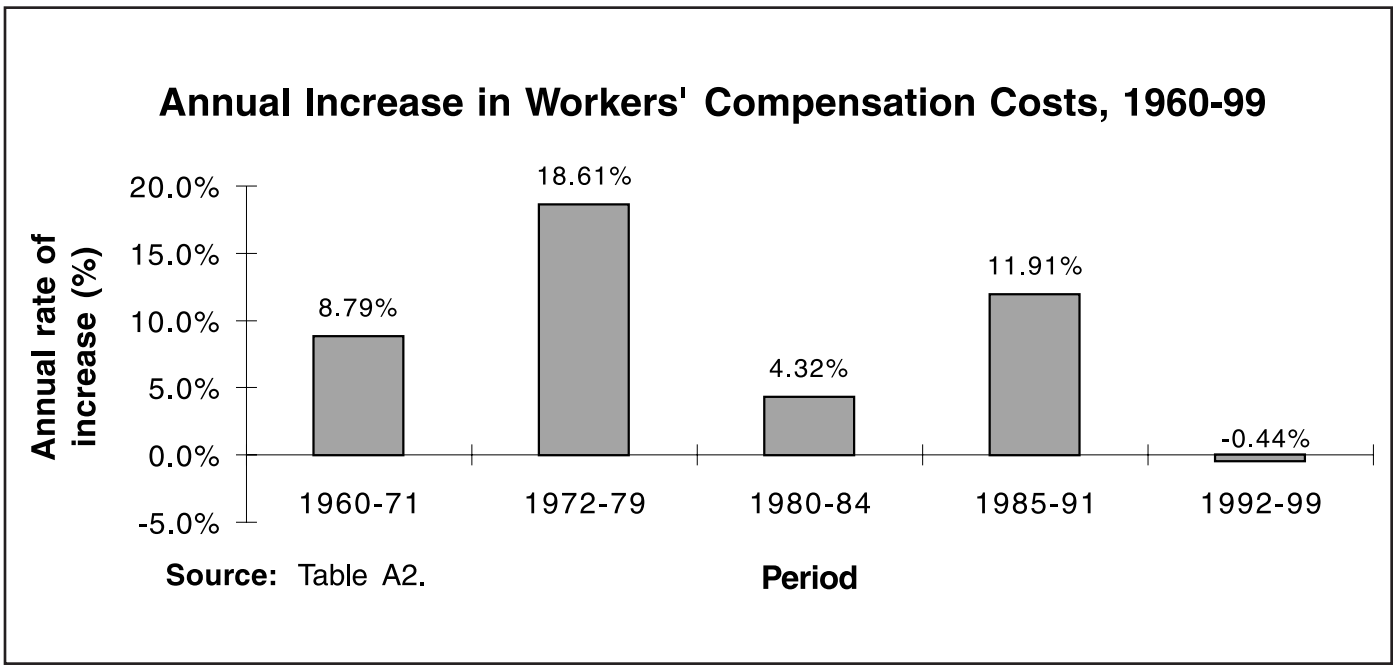
FEATURED TOPICS

Summary of the Contents

The first article examines developments in workers' compensation programs since 1960 and provides an outlook for benefits and costs. Devotees of workers' compensation in the last decade have experienced a period when costs and benefits have declined and then made a modest recovery as measured by total dollar amounts, and have significantly declined relative to payroll. But, as the figure below makes clear, the 1992 to 1999 period has not been representative of the decades since 1960. I try to identify the causes of these variations in costs in the last forty years, and then (with some trepidation) I forecast likely developments for costs and benefits in the next few years.

The article by Dr. Nortin Hadler provides a strong attack on the proposition that physical demands of tasks (including work tasks) are an important cause of disabling back and arm pain. Dr. Hadler has been a critic of much of the research that purports to justify the ergonomics standard, which was promulgated by OSHA in the waning days of the Clinton Administration and was subsequently scuttled by Congress and President Bush earlier this year. As a result of his views, many proponents of the ergonomics standard have criticized Dr. Hadler. I am pleased to present his view on this topic for several reasons. First, Dr. Hadler is a distinguished scholar who is widely published in scientific journals. Second, Dr. Hadler is not a conservative defender of the current workers' compensation system. He is, for example, responsible for my wrestling with and ultimate rejection of the validity of the work-related test for many medical conditions. Third, Dr. Hadler recognizes that all scholars do not accept his views on the topics covered in his article, and he has helped me identify potential authors for contrary viewpoints who will be invited to submit articles to the *Workers' Compensation Policy Review*. Fourth, Nortin is a friend whom I respect.



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Workers' Compensation: Developments Since 1960 and Prognostications for Benefits and Costs

by John F. Burton, Jr.

This article reviews developments in workers' compensation programs during recent decades that provide a basis for speculation about possible developments in benefits and costs during the next few years.[1] The historical overview of workers' compensation developments begins with the 1960s, which was a relatively tranquil period for workers' compensation, at least for employers and carriers. However, criticisms of the coverage and benefits of the workers' compensation program grew in the 1960s and early 1970s, and culminated in the indictment of the state programs as "in general . . . inadequate and inequitable" by the National Commission on State Workmen's Compensation Laws in 1972. One result was a flurry of activity by the states to update their laws, which resulted in higher benefits - improving the adequacy of the cash benefits in the program — but which also led to higher costs. Workers' compensation costs also increased after the mid-1980s because of the rapid escalation of payments for medical benefits. By the early 1990s, an almost inevitable backlash against higher costs of the program occurred, which resulted in "reforms" that affected workers' compensation throughout the 1990s.

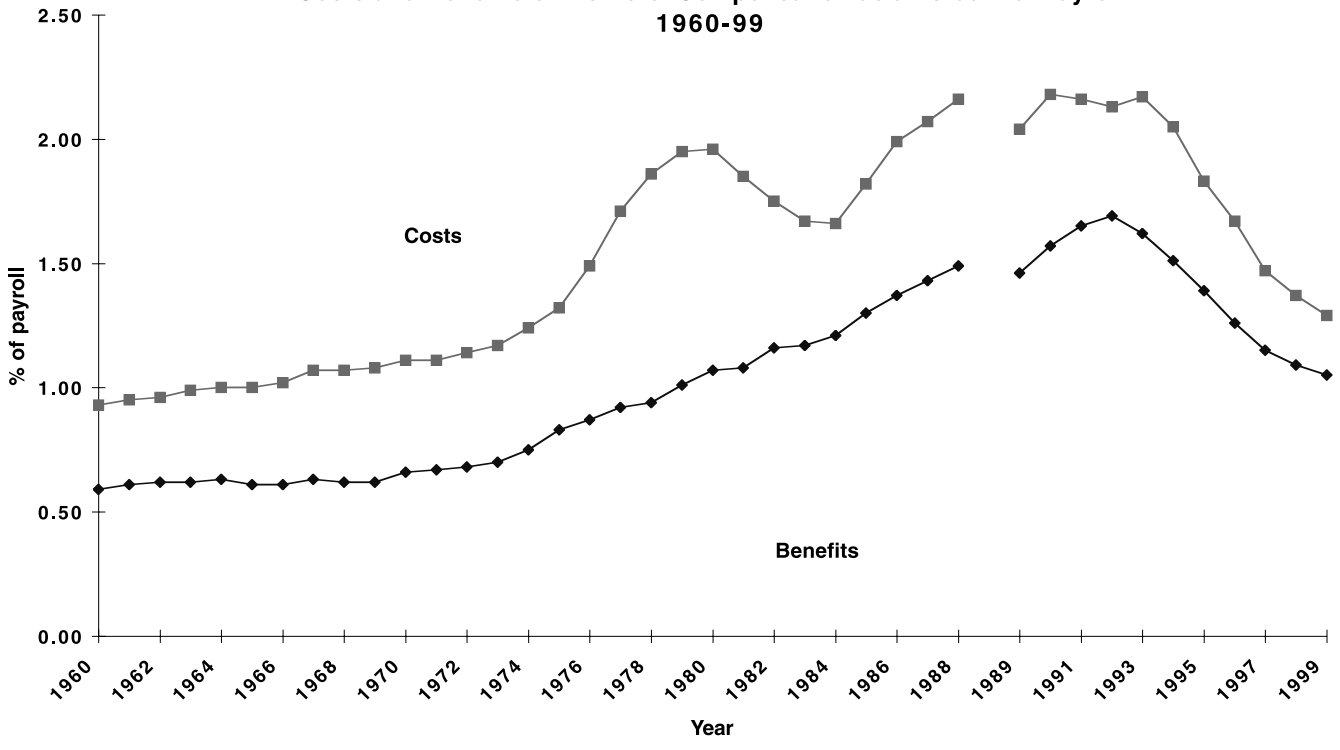
To be sure, the compressed history in the preceding paragraph is simplistic - because it ignores such important factors as the role of high interest rates in temporarily suppressing the employers' costs of the program in the early 1980s, and the role of private carriers in spearheading the cost-cutting reforms of the early 1990s. And that brief history also ignores the changes in workers' compensation insurance arrangements, which were arguably both a cause and a consequence of the changes in workers' compensation costs in recent decades. I attempt to tell the more complex and more accurate - and, I trust, more compelling - story in this article.

BENEFITS AND COSTS: DEVELOPMENTS SINCE 1960

Costs to employers and the benefits paid to workers as a percent of payroll, which are two measures of interest to all aficionados of workers' compensation, fluctuated significantly from 1960 to 1999, as shown in Figure 1.[2] Employers' costs as a percentage of payroll ranged from a low of 0.93 percent in 1960 to a high of 2.18 percent in 1990, followed by a decline to 1.29 percent in 1999. Over the same period, benefits as a percent of payroll started at 0.59 percent in 1960, peaked at 1.69 percent in 1992, and then dropped to 1.05 percent in 1999.

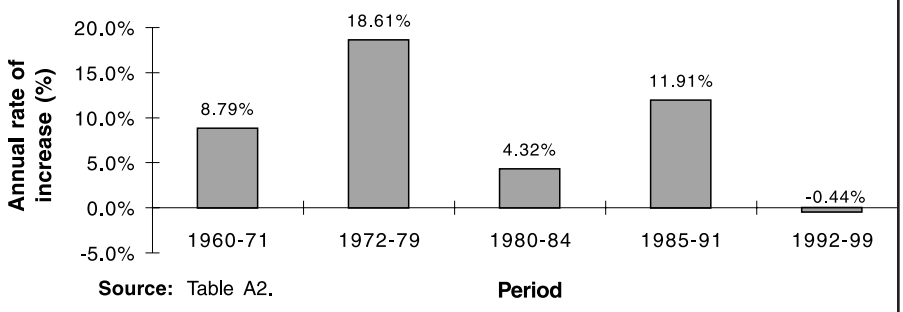
There were significant variations in the rates of increase or decrease of workers' compensation costs between 1960 and 1999, as shown in Figure 2. I divided

Figure 1
Costs and Benefits of Workers' Compensation as a Percent of Payroll
1960-99



Source: Table A1.

Figure 2
Annual Increase in Workers' Compensation Costs, 1960-99



Source: Table A2.

the post-1960 experience into subperiods, defined by whether total costs of the program were increasing relatively slowly (defined by those years in which costs increased on average by less than 10 percent a year) or were increasing relatively rapidly (defined by those years in which costs increased on average by 10 percent or more a year). Analysis of these subperiods allows us to identify the dynamics of the last 40 years that have affected the benefits, costs, and insurance arrangements in the program.

The Era of Tranquility: 1960-71

The period from 1960 through 1971 was relatively tranquil for workers' compensation, at least for employers and insurance carriers. Employers' costs increased from $2.1 billion in 1960 to $5.2 billion in 1971, which is an 8.8 percent annual rate of increase (Figure 2).[3] The costs grew more rapidly than wages, and thus workers' compensation costs increased from 0.93 percent of payroll in 1960 to 1.11 percent in 1971 (Figure 1). Benefits paid to workers increased from $1.3 billion in 1960 to $3.2 billion in 1971, which represented an annual rate of increase of 8.5 percent (Figure 3). Benefits as a percent of payroll increased from 0.59 percent of payroll in 1960 to 0.67 percent in 1971 (Figure 1).

Despite the increase in benefits paid relative to payroll during this period, workers' compensation programs were increasingly criticized for failing to provide adequate benefits and coverage. The statutory benefits had not been improved since the beginning of World War II to keep up with increases in the average wage level, and in most jurisdictions the maximum weekly benefits were lower relative to wages in the 1960s than they had been in 1940.[4] Indeed, as of 1972, the maximum weekly benefit for temporary total disability in more than half the states was less than $79.56, the national poverty level for a non-farm family of four (National Commission 1972:61). Moreover, the extent of coverage of workers by workers' compensation did not match the coverage of other social insurance programs, such as the Social Security (OASDHI) and unemployment insurance programs.

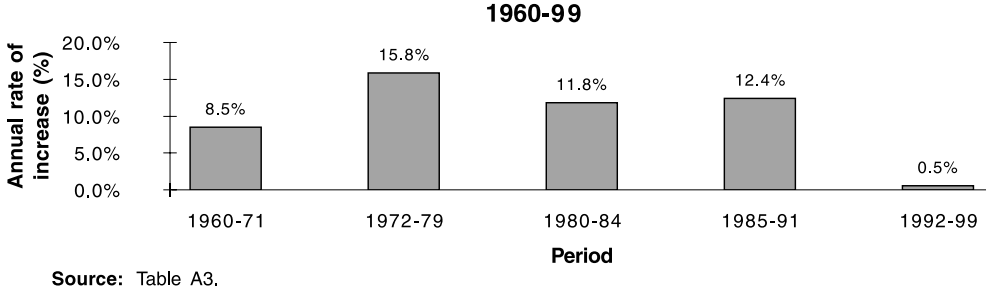
Other related developments in this era provided the impetus for subsequent changes in the workers' compensation program. The number of disabling work injuries increased in the 1960s, resulting in more deaths, permanent disabilities, and temporary total disabilities (Williams and Barth 1973: 3). A 1968 explosion in a West Virginia coal mine served as the catalyst for the enactment of the federal Coal Mine Health and Safety Act of 1969, which *inter alia* provided benefits to disabled coal miners and their survivors (Barth 1987:12-13). Many viewed this law both as an indicator of increased federal concern regarding inadequacy of state compensation for occupational diseases and as a harbinger of increased federal involvement in the workers' compensation arena.

The Era of Reform: 1972-79

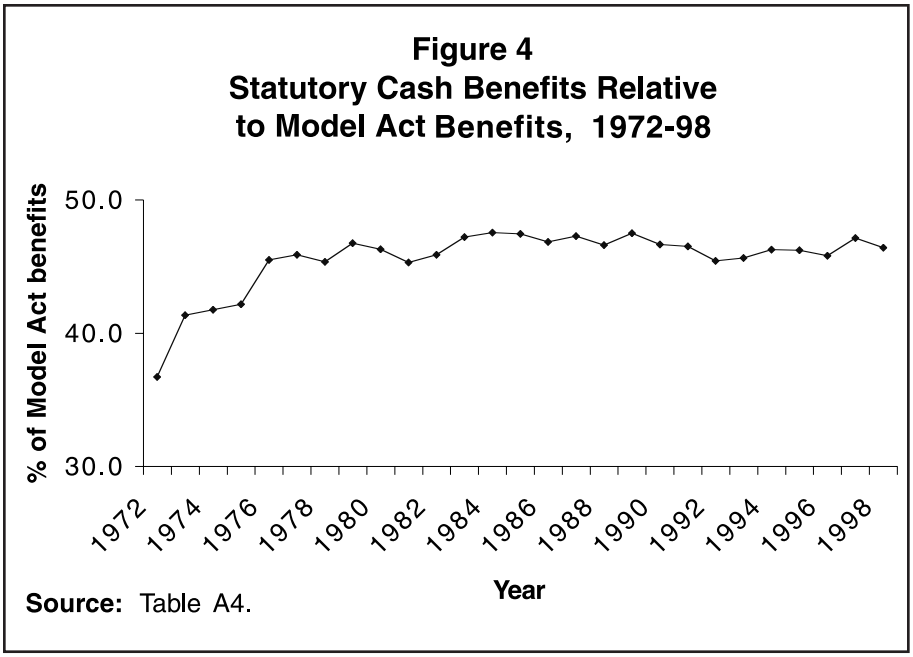
Concern about deteriorating workplace safety and the increasing criticisms of the state workers' compensation program prompted Congress to create the National Commission on State Workmen's Compensation Laws (National Commission) as part of the Occupational Safety and Health Act of 1970. The National Commission conducted a series of hearings, sponsored extensive research, and intensively deliberated over a 15-month period. The result was a 1972 *Report* that was critical of the state workers' compensation programs and concluded that state laws "in general are inadequate and inequitable" (National Commission, 1972: 119). The Commission made 84 recommendations for state workers' compensation programs, designated 19 of the recommendations as essential, and urged Congress to enact federal minimum standards incorporating the essential recommendations if the states did not improve their laws by 1975.

Congress did not enact federal standards. One reason is that state laws were significantly improved in the 1970s in response to the threat of federal

Figure 3
Annual Rates of Increase in Workers' Compensation Benefits, 1960-99



Source: Table A3.



intrusion into the traditional domain of the states. One way of measuring improvements in states' workers' compensation laws is the extent to which they complied with the Council of State Government's "Model Act (Revised)," which incorporated the recommendations of the National Commission. The cash benefits provided by the state statutes on average increased between 1972 and 1979 from 36.7 percent to 46.7 percent of the benefits prescribed by the Model Act (Figure 4).[5] Another example of the rapid improvements in state laws after the submission of the National Commission *Report* is that one of the Commission's recommendations - that the maximum weekly benefit for temporary total disability benefits be at least 100 percent of the state's average weekly wage - was complied with by one state in 1972; by 1979, 28 states complied.

The changes in statutory benefits translated into higher benefit payments to workers.[6] Benefits as a percent of payroll rose from 0.67 percent to 1.01 percent of payroll between 1971 and 1979 (Figure 1). The costs to employers as a percent of payroll increased from 1.11 percent in 1971 to 1.95 percent in 1979 (Figure 1).

While costs and benefits grew rapidly during this period, private carriers were generally able to increase premiums fast enough to cover the higher benefit payments. Three measures of underwriting experience — the pure loss ratio, the combined ratio, and the overall operating ratio — are shown in Table 1.[7] Lower levels of each of these measures are preferable for the insurance industry, and represent higher profits (or lower losses). The overall operating ratio is the most comprehensive measure of profitability since it includes both underwriting experience and investment income. An overall operating ratio in excess of 100 indicates that the insurance industry is experiencing a net loss on operations.

Underwriting experience in the workers' compensation line from 1973 to 2000 is depicted in Figure 5. The data indicate that underwriting experience deteriorated from 1973 to 1976, but then improved from 1976 to 1979. The insurance industry by the end of the 1970s had accommodated to the higher benefit payments of the decade by increasing workers' compensation premiums at a sufficient rate to achieve satisfactory underwriting results.

The Squeeze of Benefits and Costs: 1980-84

The growth in workers' compensation benefit payments decelerated in the early 1980s, dropping to 11.8 percent a year from the 15.8 percent annual rate of increase in the 1972-79 period (Figure 3). The slowdown in part reflected the slower pace of state reform as the threat of federal standards for state workers' compensation programs vanished in wake of the 1980 election of President Reagan. Between 1980 and 1984 the expected cash benefits provided by state statutes on average only increased from 46.3 to 47.5 percent of the benefits prescribed by the Model Act (Figure 4). Actual benefits paid as a percent of payroll nonetheless increased from 1.01 to 1.21 percent of payroll between 1979 and 1984 (Figure 1).

Table 1
Workers' Compensation Underwriting Experience, 2000[a]

Line 1	Pure Loss Ratio (Incurred Losses)[b]		71.2
2	Loss Adjustment Expenses[b]	+	15.9
3	Losses and Adjustment Expenses Incurred [(1) + (2)][b]		87.1
4	Underwriting Expenses Incurred[c]	+	26.5
5	Dividends to Policyholders[b]	+	4.5
6	Combined Ratio After Dividends [(3) + (4) + (5)]		118.1
7	Net Investment Gain/Loss and Other Income[b]	-	19.6
8	Overall Operating Ratio [(6) - (7)]		98.5

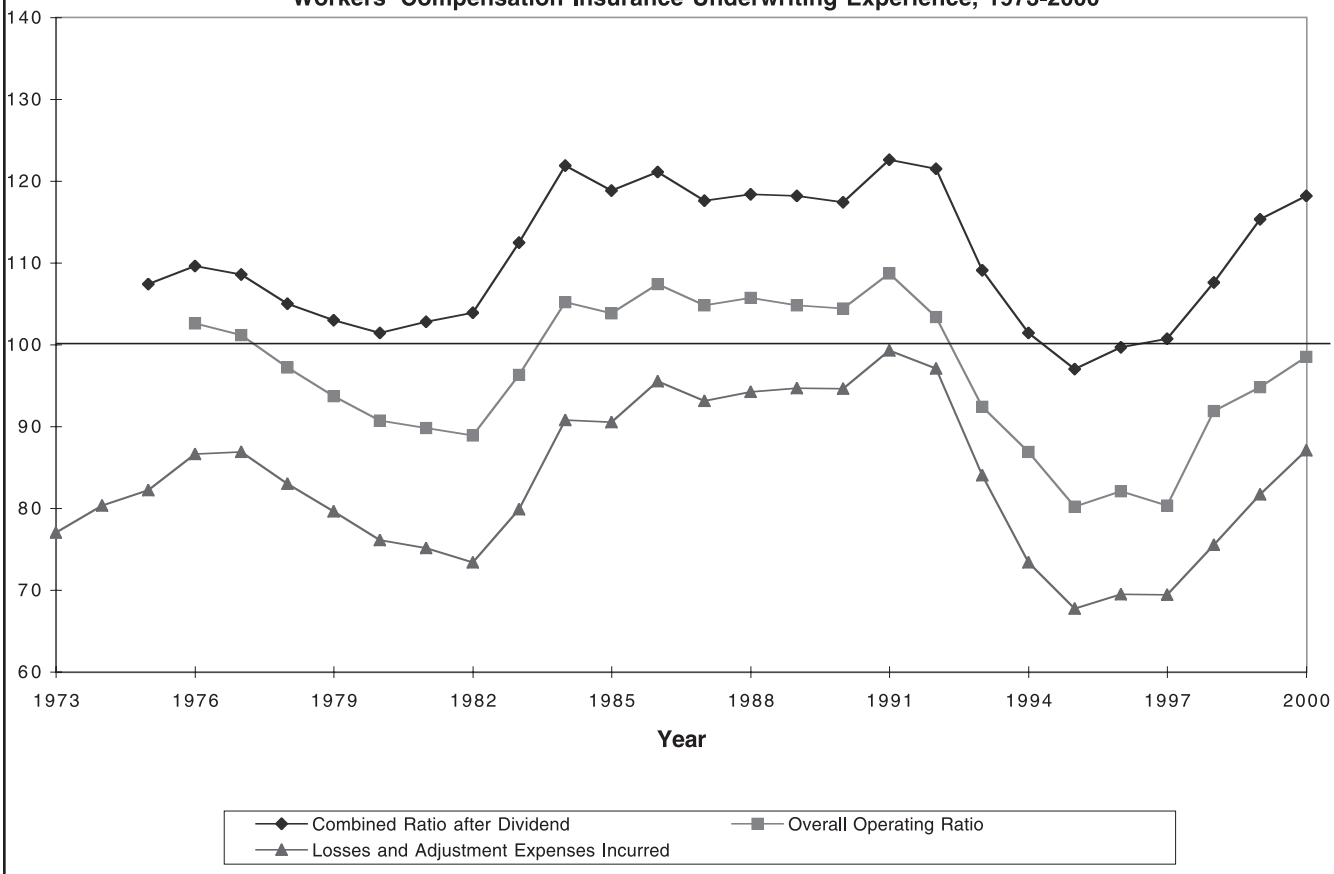
Source: *Best's Aggregates & Averages, Property/Casualty*, 2001 Edition and prior Editions, C.A.M. Best Company - used with permission.

[a] Terms are explained in Thomason, Schmidle, and Burton (2001), Appendix B.

[b] Ratios expressed as a percent of net premiums earned.

[c] Ratios expressed as a percent of net premiums written.

Figure 5
Workers' Compensation Insurance Underwriting Experience, 1973-2000

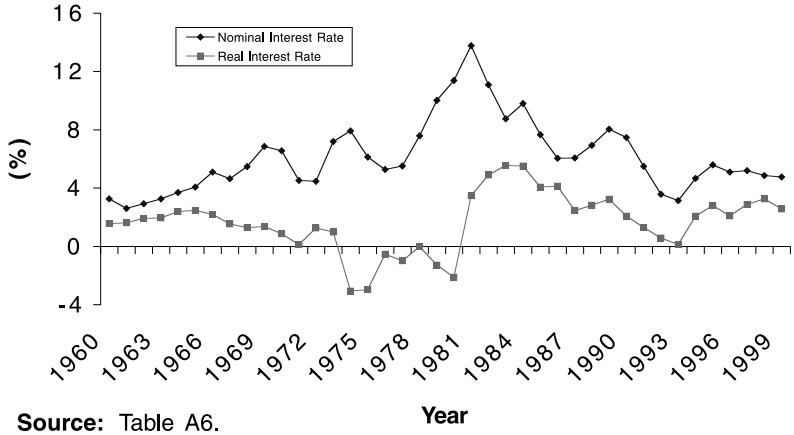


Source: Table A5.1

Workers' compensation costs grew at a modest annual rate of 4.3 percent from 1980 to 1984 (Figure 2), not even matching total payroll growth. As a result, costs as a percent of payroll plummeted from 1.95 percent in 1979 to 1.66 percent in 1984 (Figure 1).

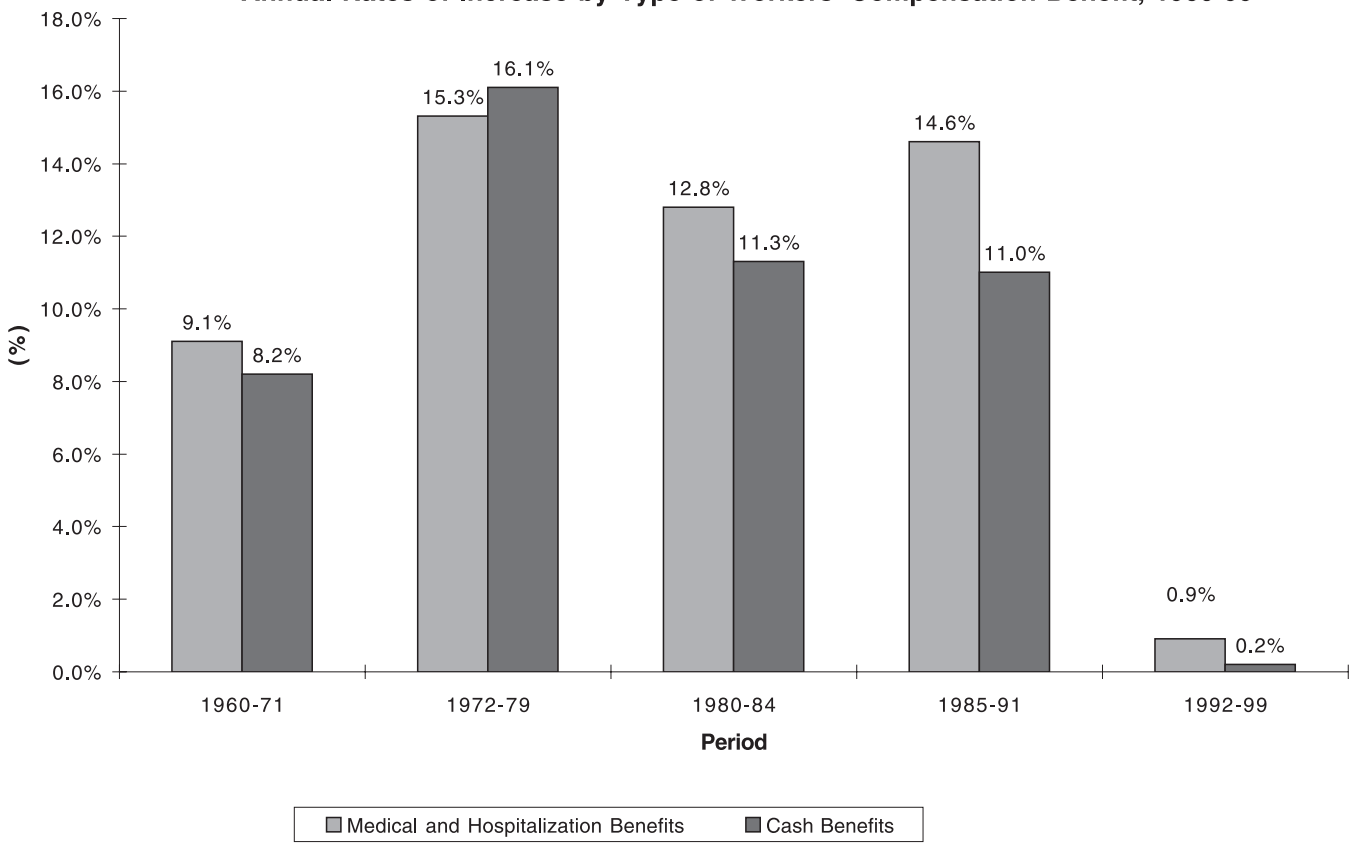
The squeeze between costs and benefits can be explained by macro-economic developments. Rapid inflation of the late 1970s and early 1980s led to high interest rates and bond yields (Figure 6), which resulted in favorable investment opportunities for workers' compensation carriers and substantial improvements in net investment income. Investment income increased from 9.2 percent of premiums in 1979 to 16.7 percent in 1984, which is reflected in the increasing spread in Figure 5 between the combined ratio (which measures underwriting experience) and the overall operating ratio (which measures overall profitability, including investment income). The higher investment income allowed carriers to compete for business by reducing insurance rates, despite increasing benefit payments. For most of the period, this strategy worked: from 1979 to 1983, the overall operating ratio in workers' compensation insurance ranged from 96.3 to 88.9, indicating industry profitability. However, the loss ratio deteriorated rapidly after 1982, and by 1984 the overall operating ratio exceeded 100.

Figure 6
Nominal and Real Interest Rates, 1960-99



Source: Table A6.

Figure 7
Annual Rates of Increase by Type of Workers' Compensation Benefit, 1960-99



Source: Table A3.

The Seeds for Neo-Reform Are Sown: 1985-91

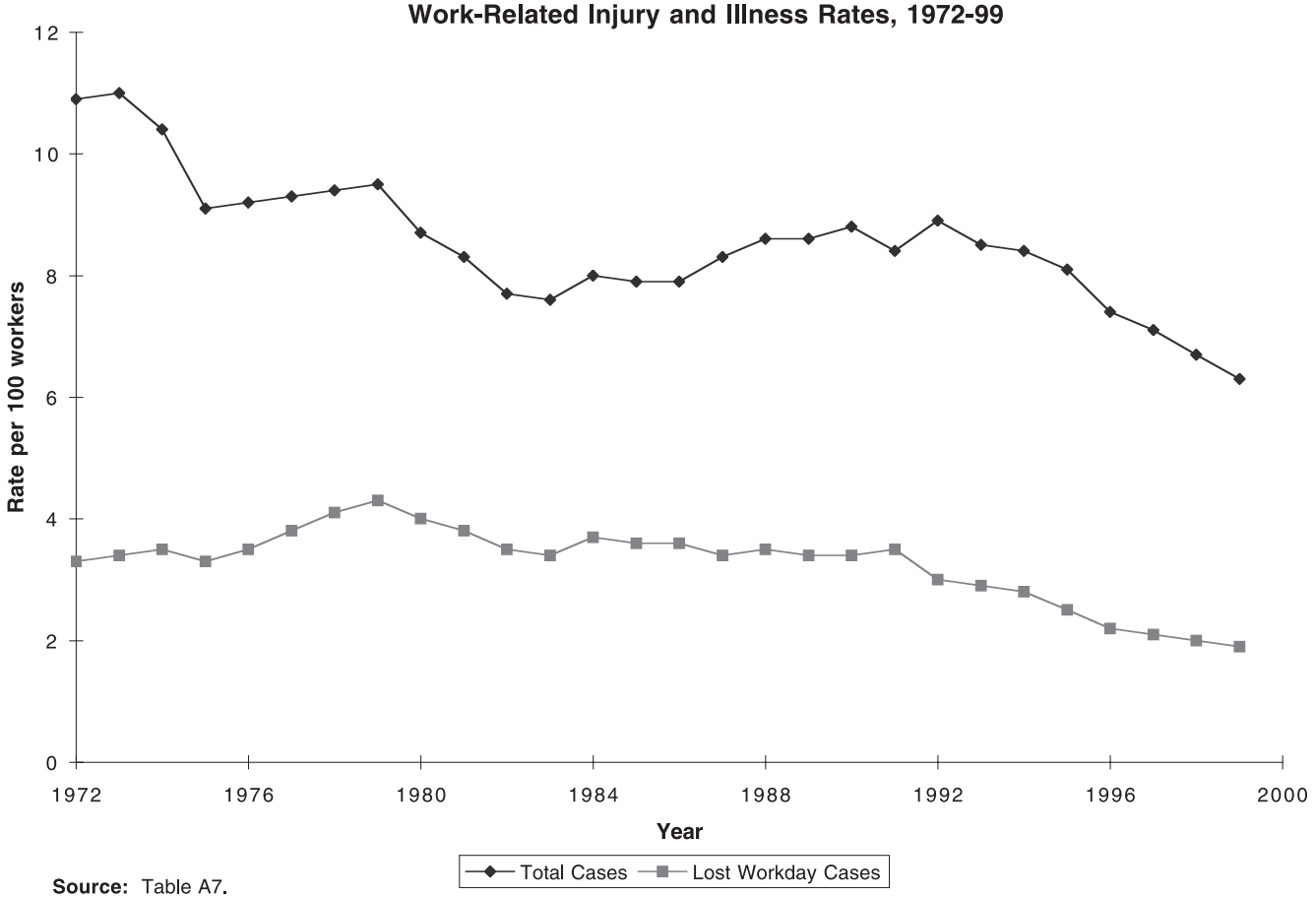
The falling workers' compensation costs that characterized the early 1980s did not persist through the balance of the decade. There was a rapid escalation in the employers' costs of workers' compensation, increasing from $25.1 billion in 1984 to $55.2 billion in 1991, or an average of 11.9 percent a year (Figure 2), which far outpaced payroll growth. As a result, workers' compensation costs as a percent of payroll increased rapidly, rising from 1.66 percent in 1984 to 2.16 percent in 1991 (Figure 1).

Workers' compensation benefits also increased during this period, from $18.0 billion in 1984 to $40.8 billion in 1991, or an average annual increase of 12.4 percent (Figure 3). Payroll grew at a slower rate than benefits, and so benefits increased from 1.21 percent of payroll in 1984 to 1.64 percent in 1991 (Figure 1). Medical benefits increased by 14.6 percent per year between 1985 and 1991, more rapidly than both the annual increase of 11.0 percent in cash benefits (Figure 7)[8] and the high rate inflation for general health care costs. The sources of the rapid escalation in medical costs in the workers' compensation program included the rapid spread of managed care through the health care system used for non-occupational medical conditions and the resulting cost shifting to the workers' compensation health care system.[9]

Throughout the late 1980s and early 1990s, many employers became concerned, if not alarmed, about the increasing costs of the workers' compensation program.[10] In addition to cost increases resulting from higher statutory cash benefits and escalating medical benefits, employers were also concerned about what they perceived to be wide-spread fraud and rampant litigation, especially involving conditions, such as workplace stress, that employers felt were outside the proper domain of the program.

The workers' compensation insurance industry was particularly agitated with the developments concerning the relationships between benefits and costs. Several factors contributed to the industry's problems. Benefit payments reaccelerated during this period. Nonetheless, in many states, carriers were unable to gain approval from regulators for the significant premium increases the industry believed were actuarially justified. As a result, loss ratios, which were always below 71 from 1979 to 1983, were always above 80 from 1984 to 1991 (Figure 5). Furthermore, even though net investment income remained relatively high from 1984 to 1991 (always exceeding 12 percent of premium), underwriting losses were so substantial that the overall operating ratio was 103.8 or higher in every year between 1984 and 1991. In other words, the workers' compensation insurance indus-

Figure 8
Work-Related Injury and Illness Rates, 1972-99



Source: Table A7.

try lost money in every year during this period, even after taking into consideration returns on investments.

The major legacy of the period from 1985 to 1991 was the planting of the seeds for reform that bloomed in the 1990s. Employers were concerned about the increases in the costs of workers' compensation, which (as a percent of payroll) had more than doubled from the 1960s by 1991 (Figure 1), with much of that increase having occurred since 1984. At the same time, private carriers experienced serious financial difficulties as the workers' compensation line was unprofitable every year between 1984 and 1991.

The Neo-Reform Era: 1992-99

Escalating costs from 1985 to 1991 galvanized political opposition by employers and insurers to workers' compensation programs that had been liberalized in the wake of the National Commission's report. Opposition to growth in workers' compensation costs led to significant changes in many states' programs. Over half of the state legislatures passed major amendments to workers' compensation laws between 1989 and 1996, generally reducing benefits and attempting to contain health care costs. There were five significant developments in workers' compensation related to these efforts, as identified by Spieler and Burton (1998).

First, the statutory level of cash benefits was reduced in a number of jurisdictions, particularly with regard to benefits paid for permanent disabilities. Second, eligibility for workers' compensation benefits was narrowed due to changes in compensability rules. From the perspective of employers and carriers, much of the narrowing of eligibility was justified in order to eliminate fraud and marginally work-related conditions from the program.

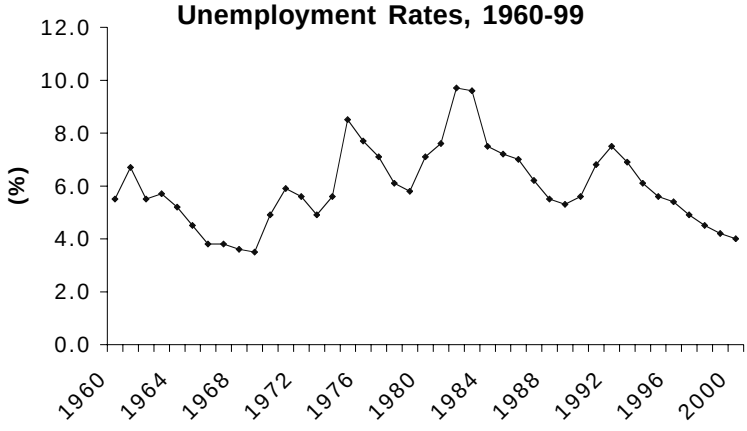
Third, the health care delivery system in workers' compensation was transformed, most notably by the introduction of managed care. The fourth development was the rise of disability management by employers and carriers, largely due to unilateral actions by these parties in response to the higher costs of the workers' compensation program, but also in part as a result of inducements provided by state legislation. Finally, in a development that ultimately could result in higher employers' costs outside the workers' compensation program, the exclusive remedy doctrine was challenged by several court decisions, due in part to judicial reactions to the increasing limitations on the availability of workers' compensation benefits.

In addition to these five developments, another factor that helps explain the decline in cash and medical benefits during the 1990s is the significant drop in

the work-related injury rate in the decade (Figure 8). This decline does not appear to be due to more effective enforcement of the Occupational Safety and Health Act (OSHAct)[11] or a shift in the national economy towards employment in safer industries and occupations.[12] The improved safety record may be due to an increase in employer prevention activities resulting from the extra stimulus provided by experience rating of workers' compensation premiums as the costs of workplace injuries increased, or due to greater accident prevention efforts by employers for reasons other than experience rating. In addition, some of the decline in reported injury rate may be due to the indirect consequences of tightened eligibility rules for workers' compensation.[13] If conditions that previously qualified for workers' compensation benefits are no longer compensable, the employer may be less likely to record the injury on the OSHA forms that are the source of the BLS data on workplace injuries.[14]

Favorable conditions in the labor market are another possible reason for the reductions in workers' compensation benefits paid during the 1990s. The sustained economic expansion during the 1990s produced national unemployment rates that dropped every year between 1993 and 2000, a seven-year achievement that is unprecedented in U.S. history (Figure 9). The frequency of work injuries normally increases when the economy is expanding, because, e.g., inexperienced workers are hired, and workers tend to work longer hours and become fatigued. Therefore, as the unemployment rate decreased, more workers' compensation claims could have been expected. As already discussed, the injury rate actually declined during the 1990s, contrary to what usually happens when labor market conditions improve. In any case, the duration of workers' compensation benefits paid to injured workers typically declines when unemployment rates are low because employers are more willing to accommodate disabled workers when workers are generally unavailable and because injured employees are more likely to be recalled to work or find alternative jobs in tight labor markets.[15]

Figure 9
Unemployment Rates, 1960-99



Source: Table A8.

As a result of these various factors, workers' compensation benefits increased modestly or even declined in the 1990s, depending on the measure used. Benefits paid to workers increased from $40.8 billion in 1991 to $42.4 billion in 1999, which represented only a 0.5 percent annual rate of increase (Figure 3). Benefits as a percentage of payroll peaked at 1.69 percent of payroll in 1992 and then declined to a low of 1.05 percent of payroll in 1999 (Figure 1). The multi-year decline in benefits paid relative to payroll is unprecedented in duration and magnitude since at least 1948, when the annual data were first published for successive years (Burton and Schmidle 1995, III-28).

Cash benefits paid to injured workers increased from $24.1 billion in 1991 to $24.4 billion in 1999, which represented a modest 0.2 percent annual growth rate (Figure 7). Part of the slowdown in cash benefits was due to the relative stability in statutory benefits during this period, with the average state's benefits decreasing from 46.5 percent of the Model Act in 1991 to 46.4 percent in 1998 (Figure 4). Medical benefits actually paid to workers declined from $16.7 billion in 1991 to $15.6 billion in 1997, before increasing to $18.0 billion in 1999, which is a 0.9 percent per year increase between 1991 and 1999.

As a result of these modest increases in payments of benefits to workers, the employers' costs of workers' compensation as a percent of payroll (Figure 1) peaked in 1990 and then declined significantly. Also, as benefits and costs declined in the 1990s, the profitability of private carriers quickly improved (Figure 5). The loss ratio (incurred losses as a percent of premium) plummeted from a peak of 87.8 in 1991 to 55.2 in 1995, and then increased only slightly (to 55.6 percent) in 1997. Furthermore, the overall operating ratio (which includes net investment income) fell from a peak of 108.7 in 1991 to a low of 80.2 in 1995, and then increased slightly (up to 80.3 percent) in 1997. The four years from 1994 to 1997, when the operating ratio was below 90 in every year, represent the most profitable stretch of years in at least 20 years for workers' compensation insurance. The deteriorating underwriting results beginning in 1998 are discussed later in this article.

INSURANCE ARRANGEMENTS: DEVELOPMENTS SINCE 1960

The previous section spelled out a series of dynamic events that disturbed the tranquillity of workers' compensation that had existed in the 1960s - starting with the significant reforms in the 1970s precipitated by the National Commission's call for federal standards, if necessary, to improve state workers' compensation programs - and culminating in the statutory "reforms" of the 1990s that reduced cash and medical benefits in many states.

This section reviews salient developments since 1960 in the insurance

arrangements in workers' compensation.[16] I first examine the relative importance of benefit payments from state funds, private carriers, and self-insuring employers. Developments involving state funds are then discussed more intensively. I then examine the private insurance market, which evolved from a highly regulated industry in the 1960s and 1970s into a relatively deregulated industry in the 1980s and 1990s.[17] Finally, I review the residual market for workers' compensation insurance.

Shares of Benefits by Type of Insurance Arrangement

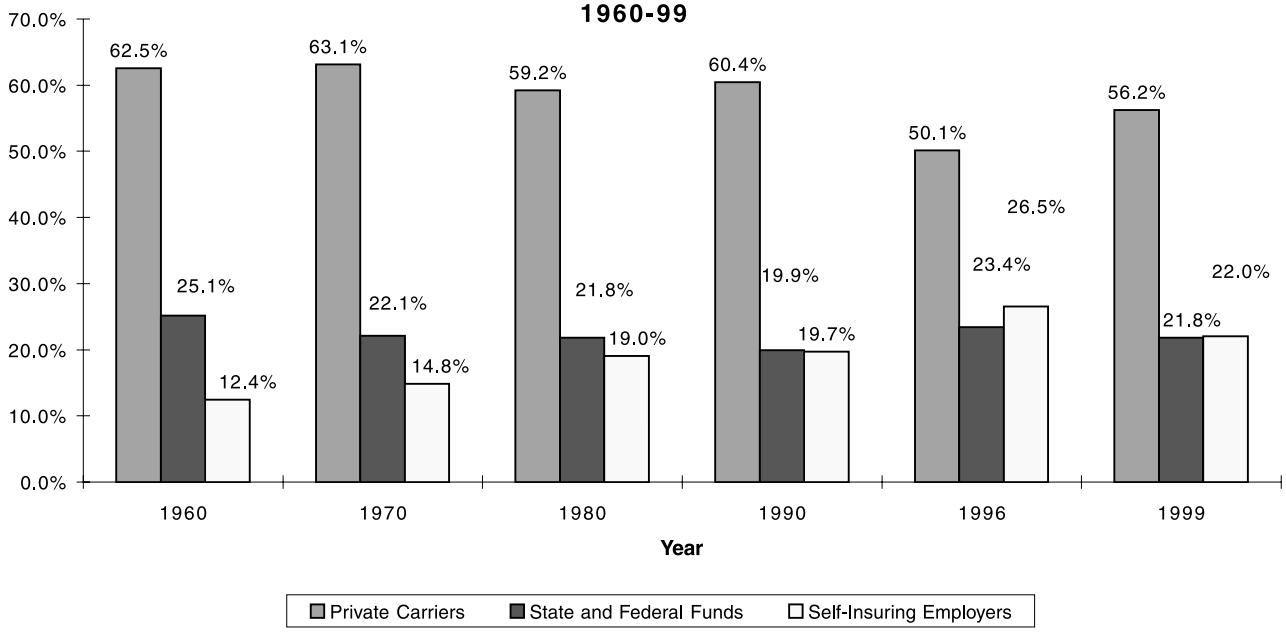
The share of benefits paid by private carriers, state and federal funds, and self-insuring employers over the period 1960-99 is shown in Figure 10. Private carriers accounted for the predominant share of benefit payments throughout this period; for example, from 1960 to 1990, private carriers paid for about 60 percent of all benefits. During the mid-1990s, however, the private carriers' share dropped to about 50 percent, reflecting in part their reluctance to provide coverage during the unprofitable years of the early 1990s. However, the favorable underwriting results in the mid-1990s subsequently resulted in some carriers aggressively pricing workers' compensation insurance, which in turn led to an increase in the share accounted for by private carriers to 56.2 percent in 1999.

Another significant development in the workers' compensation insurance market during recent decades is the increasing share of benefits paid by self-insuring employers. The share increased from 1990 to 1996 (from 19.7 percent to 26.5 percent of all benefit payments), continuing a long-term trend (Figure 10). The increased importance of self-insurance between 1990 and 1996 can be explained by three developments. First, many carriers decided to leave an unprofitable line of business in the early 1990s (which is a development that was reversed with increased profitability). Second, many employers paid increasing attention to disability management (including prevention) in response to the higher costs of workers' compensation, which led some employers to self-insure in order to assume greater control over their workers' compensation programs. Finally, some employers decided to self-insure in order to avoid assessments on policies sold in the voluntary market that were used to subsidize losses in the residual market.

As shown in Figure 10, the share of benefits accounted for by self-insuring employers declined between 1996 and 1999. This was largely due to the attractive rates offered by private carriers as they attempted to increase market share in response to the improved profitability of workers' compensation insurance in the mid-1990s.

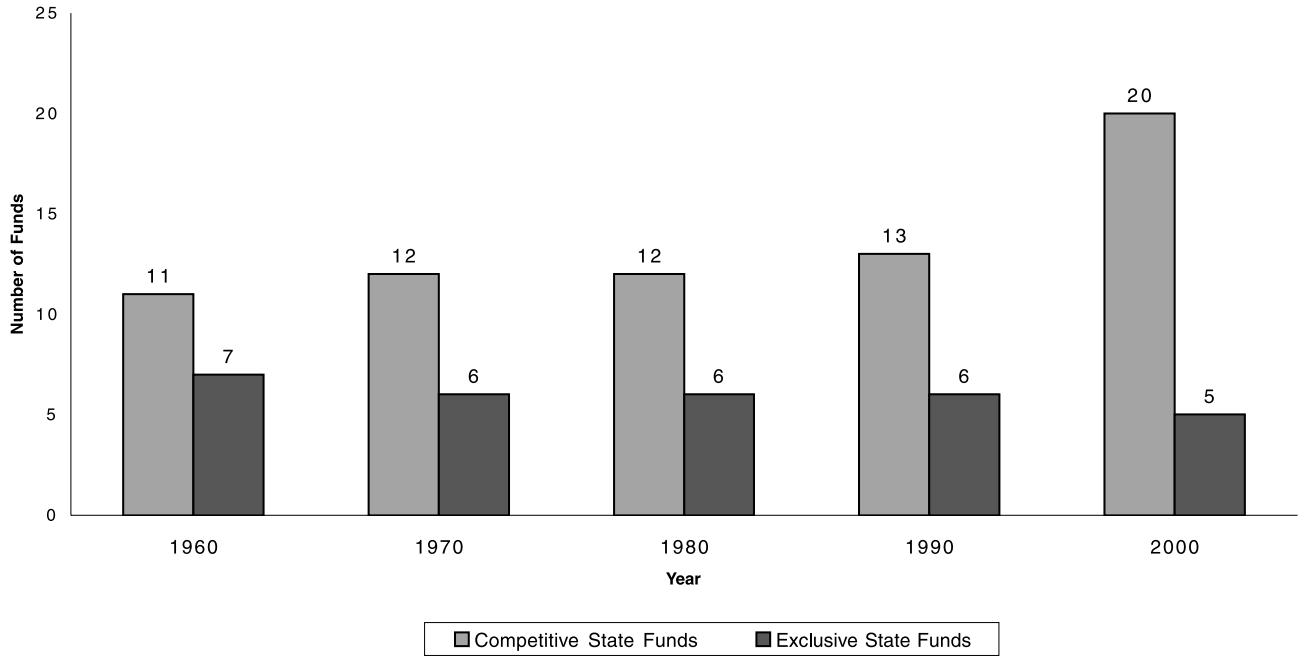
The emergence of several new state funds in recent years (discussed below) helps explain why the share of benefits paid by state and federal workers' compensation funds increased from 19.9 percent in 1990 to 23.4 percent in 1996, reversing the downward trend in the share of benefits provided by government funds that occurred between 1960 and 1990 (Figure 10). However, the share accounted for by government funds slipped to 21.8 percent in 1999, again probably due to the loss of business to the private carriers who were aggressively seeking customers.

Figure 10
Workers' Compensation Benefits by Type of Insurance Agreement, 1960-99



Source: Table A9.

Figure 11
Number of State Workers' Compensation Funds, 1960-2000



Source: Table A10.

State Workers' Compensation Funds

Workers' compensation has relied on a mixture of state funds, private carriers, and self-insurance from its origin in most states between 1910 and 1920. From the beginning, there were arguments concerning the merits of the various insurance arrangements. State funds were lauded because of lower overhead (notably the absence of a broker's fee) and because proponents thought that profits were inappropriate in a mandatory social insurance program. Private carriers were praised because they promoted efficiency and were considered more compatible with our capitalist society. The arguments that prevailed varied from state to state: some jurisdictions created exclusive state funds; some authorized only private carriers to provide insurance; and some permitted private carriers to compete with state funds.

As shown in Figure 11, as of 1960 there were seven exclusive state funds, the youngest of which was the North Dakota fund established in 1919. There were also 11 competitive state funds (those in competition with private carriers): as of 1960, the youngest was the Oklahoma fund established in 1933.

The numbers and types of state funds were relatively constant for half a century. Oregon converted its exclusive state fund into a competitive state fund, which began operation in 1966; this represented the only change in state funds between the early 1930s and the early 1980s.

One of the significant developments in the workers' compensation insurance market in the last two decades was the emergence of several new competitive state funds. The "pioneer" of the modern movement was Minnesota, which established a competitive state fund in 1984. Then, in the 1990s, seven new competitive state funds began operation by 1995. However, in a contrarian move, the long-existing Michigan competitive state fund was privatized effective in 1994 and the Nevada exclusive state fund was privatized in 1999.

The state legislators' motives for establishing the new state funds were (1) to reduce costs of workers' compensation in the state and/or (2) to provide an alternative source of insurance for employers who could not purchase policies in the voluntary market or who did not like the surcharges or other conditions imposed on policies purchased in the residual or assigned-risk markets (discussed below).

Regulation of the Workers' Compensation Insurance Market[18]

In contrast to the deregulation movement that generally occurred in property/casualty insurance in the 1970s, rate setting in workers' compensation insurance continued to be highly regulated until the 1980s. The deregulation of workers' compensation insurance was resisted on several grounds: the distinctive characteristic of workers' compensation as a mandated social insurance program (and the resultant concern with both rate levels for employers and for solvency of carriers); the existence of competitive measures other than price competition for workers' compensation insurance (primarily through dividends); and the need for a comprehensive data base (with uniform rate classes and information on the experience of a large number of insurers). These arguments helped delay even partial deregulation of workers' compensation in most states until the 1980s and

1990s, and still operate to preserve "pure" administered pricing in a few states and vestiges of regulation in most states.

The administered pricing approach to rate-setting for workers' compensation involved several components. A rating organization was selected in each state. [19] The rating organization prescribed standardized reporting forms and established an elaborate system of industrial and occupational insurance classifications. The rating bureau collected detailed information on benefits paid and premiums collected by all private carriers providing workers' compensation insurance in the state. [20] These data were then used to establish pure premiums (expected losses) for each insurance classification. The pure premiums were then increased by a loading factor, consisting of an allowance for loss adjustment and other expenses and for profits, to produce manual rates for each insurance classification. [21] Manual rates were stated as dollars per $100 of payroll (thus bakeries, Class 2003 in a typical state, might have a manual rate of $2.40 per $100 of payroll).

The rating bureau then filed the manual rates with the state insurance commissioner. The rates could not be used without prior approval of the commissioner, who could reject and/or modify the proposed rates if they were "excessive, inadequate, or unfairly discriminatory." Each carrier was obliged to belong to the rating bureau, to provide data to the bureau, and to adhere to the manual rates approved by the insurance commissioner.

Even in administered pricing states, the premiums paid by many employers were not simply the product of total payroll times the applicable manual rate, because there were several modifying factors, such as premium discounts for larger employers and experience rating modifications for a medium or large firm based on the firm's previous experience.[22] The modifying factors were precisely defined in rules established by the rating bureau and approved by the insurance commissioner, and had to be closely followed by each workers' compensation carrier. One additional feature of the workers' compensation insurance market was that most carriers - including mutual and stock companies - paid dividends to policyholders based on their underwriting experience.

In sum, under the administered pricing approach to workers' compensation rate-setting, all carriers were required to start with the same manual rates, and the various modifications to those rates involved either 1) formulas or constants to which all carriers had to adhere and which modified the manual rates at the beginning of the policy period, or 2) dividends that were paid only after the policy period ended. In short, there was virtually no chance for carriers to compete in terms of price at the *beginning* of the policy period with any of these modifications. [23]

Deregulation of the Workers' Compensation Insurance Market

The Types of Deregulation. Administered pricing is no longer the dominant approach to workers' compensation insurance pricing in the United States. A fundamental result of the deregulation of the workers' compensation insurance market that has taken place in the last two decades is that private carriers can now compete for business by varying the insurance rates at the beginning of the policy period. Most jurisdictions now allow deviations and schedule rating, and a number of jurisdictions have moved to more comprehensive forms of deregulation, which generally fall under the rubric "open competition" or "competitive rating."

If a state allows deviations, individual carriers may deviate from the published manual rates and charge lower (or occasionally higher) rates than those promulgated by the rating organization.

Schedule rating plans have also been introduced in most jurisdictions. Under these plans, insurers can change (usually decrease) the workers' compensation insurance rate an individual employer would otherwise pay.

While deviations and schedule rating constitute widely adopted forms of partial deregulation, even more comprehensive reforms have been adopted in a number of states during the last 20 years. [24] These reforms involve various combinations of three different changes to the regulatory environment. First, some states have dropped the requirement that insurers become members of the rating organization or adhere to bureau rates. Second, other jurisdictions no longer require insurers to obtain regulatory approval prior to using rates. Third, some states prohibit the rating organization from filing fully developed rates; instead, these organizations file loss costs or pure premiums. Each carrier in these states has to decide what loading factor should be used in conjunction with the pure premiums to produce the equivalent of manual rates. [25]

These three approaches to deregulating workers' compensation insurance rate-setting have been adopted by the states in various combinations. Arkansas, for example, in 1981 dropped the requirement that insurers adhere to bureau rates. However, Arkansas continued to require that carriers obtain regulatory approval prior to the implementation of new rates and that the rating bureau file fully developed rates. The South Carolina rating bureau began to file pure premiums rather than fully developed rates in 1990, but insurers were required to rely on bureau estimates of pure premiums in developing their own manual rates and to obtain prior approval before implementing these manual rates. Kentucky, beginning in 1982, dropped prior approval and adherence requirements, and the bureau was prohibited from filing fully developed rates. Despite the differences among the three states in their approach to deregulation, each is described by the NCCI in the *Annual Statistical Bulletin* (2001 and prior years) as having adopted "competitive rating" legislation. [26]

The Initial Phase of Deregulation. Deregulation of the workers' compensation insurance market began in the early 1980s. One type of deregulation - "competitive rating," often referred to as "open competition" - was introduced in nine states between 1981 and 1985, according to the NCCI (Figure 12).

Several factors help explain the onset of deregulation. First, the overall political climate became more hostile to the notion that "big government" could do a better job than competitive forces in determining prices and allocations of resources,

Figure 12
Number of States Enacting Open Competition Statutes, 1981-99

Source: Table A11.

and one consequence was a general move towards deregulation, involving industries such as airlines and trucking, as well as the insurance industry. A second factor, particularly relevant for workers' compensation, was the increasing cost of the program during the 1970s, which concerned employers and state legislators. They hoped that deregulation would reduce the costs of workers' compensation insurance by, for example, promoting efficiency. A third factor was a perception among some legislators, unions, and employers that profits in the workers' compensation insurance line were excessive. Again, the hope was that deregulation would help reduce costs by squeezing out excess profits. Not surprisingly, most workers' compensation insurers resisted deregulation during this period. [27]

Deregulation in the 1990s. After the initial spurt of deregulation in the early 1980s, there was a slow down in the introduction of open competition in the balance of the 1980s (Figure 12). The reduced pace can perhaps be explained by the general unprofitability of workers' compensation insurance in this period: legislators saw little chance to reduce workers' compensation costs by deregulating an industry in financial distress. However, one consequence of the unprofitability of workers' compensation insurance was the beginning of a change in attitude towards deregulation by many in the insurance industry. Deregulation was now seen as a way to escape from the "onerous" decisions of insurance regulators and to establish rates that would allow carrier profitability. Thus, some of the seven states that adopted open competition between 1986 and 1990 (Figure 12) did so with at least the tacit support of the insurance industry.

Deregulation re-emerged with vigor during the 1990s: open competition statutes became effective in 18 states between 1991 and 1995, and in an additional 3 states after that date (Figure 12). Deregulation in some of these states - especially those that adopted open competition in the early 1990s when the industry was still experiencing losses - reflected support from the insurance industry, while deregulation in other states, most notably California, where rate filings had generally been approved by the insurance commissioner, was generally resisted by the industry.

While deregulation has been proceeding in recent decades, significant developments that could also affect the employers' workers' compensation premiums were occurring in the residual markets for workers' compensation insurance.

Residual Markets

Workers' compensation is (with limited exceptions) a mandatory program for employers. A minority of employers (typically large and financially sound) self-insure their workers' compensation obligations with approval of the state. Those employers who do not qualify to self-insure must purchase workers' compensation insurance.

The five exclusive state workers' compensation funds must accept all applicants for insurance, as must most competitive state funds. Private insurers and some competitive state funds, on the other hand, can reject applicants who are considered undesirable. Because the employers whose applications are rejected must have insurance in order to comply with their state's statutory workers' compensation requirements, states that do not have a state fund obligated to accept all employers have established assigned risk plans.

There are two categories of assigned risk programs (Williams 1969:48-49). Under the first approach, applicants who have been unable to secure insurance in the voluntary market are assigned to individual carriers in proportion to the carriers' market shares in the state. Under the second approach, an assigned-risk

pool underwrites the insurance. Employers insured by the pool are assigned to one of a limited number of carriers who administer claims on behalf of the pool. All carriers insure the policies written by the pool in proportion to their voluntary market shares.

The traditional reasons why employers were unable to obtain workers' compensation policies in the voluntary market were that the applicant was engaged in some activity that was unusually hazardous relative to the experience of other firms in the appropriate insurance classification, or had a poor loss record, or was so small that the premium did not adequately compensate the insurer for its expenses (Williams 1969:48). In the 1960s, most assigned risk programs provided for a standard eight percent surcharge, and the premium was adequate to cover losses and loss adjustment expenses. The assigned risk market accounted for no more than 3.2 percent of all premiums nationally between 1960 and 1965 (Williams 1969: 52).

The assigned risk share of all premiums accounted for only 4.6 percent of all premiums nationally in 1975 (Figure 13). However, as the cost of workers' compensation insurance increased after 1975, the residual market share almost tripled by 1978-79, when the premiums there accounted for 12.7 of all premiums nationally. The share then dropped back to 5.5 percent in 1984, reflecting the generally profitable conditions in the workers' compensation insurance market and the declining cost of workers' compensation insurance.

The fiscal stress that the workers' compensation insurance market was under during the years from the mid-1980s to the early 1990s is clearly evident in the explosion of the residual market share from 5.5 percent of all premiums nationally in 1984 to a peak of 28.5 percent in 1992. In addition to the traditional reasons for applicants being forced to purchase in the residual market, which were basically due to the unattractiveness of individual risks, the dominant factor contributing to residual market growth in the 1985-92 period was the general inadequacy of workers' compensation insurance rates because of the reluctance of insurance regulators in many states to approve rate filings with substantial rate increases for the voluntary market. Carriers in such jurisdictions became unwilling to write policies in the voluntary market because they could not make an adequate (or, in many cases, any) profit.

Several states were particularly noteworthy for the share of workers' compensation insurance provided through the residual market: 79.9 percent of total premium in 1991 in Louisiana; 88.6 percent of total premium in 1992 in Rhode Island; and 90.6 percent of 1989 total premium in Maine. A vicious cycle ensued in some of these states: rates were held down in the voluntary market by regulators; carriers were unwilling to write policies in the voluntary market at the approved rates, which forced some employers into the residual market; in addition, regulators sometimes responded to political pressures and held insurance rates in the residual market well below the levels that were warranted, which induced some employers who were able to purchase policies in the voluntary market to obtain policies in the residual market because the rates were so low; the residual markets ran substantial deficits because of inadequate rates; the carriers in the voluntary market were assessed substantial sums to cover the assigned risk markets deficits; and when the carriers tried to pass on these assessments to policyholders still in the voluntary market, many employers shifted to the residual market in order to obtain coverage at the suppressed rates, which only increased the size of the aggregate losses in the residual market and increased assessments in the voluntary market.

The rapid decline in the national share of total premium accounted for by the residual market that occurred after 1994 (shown in Figure 13) is due to three major factors. First, the overall profitability of the workers' compensation insurance line quickly improved after 1992 (Figure 5). Second, several states established competitive state funds or other special public or quasi-public funds to provide policies to employers who could not find policies in the voluntary market. For example, the Louisiana competitive state fund became operative in 1992; the Maine competitive state fund began payments in 1993; the Kentucky state fund specifically created for assigned risk policies started operations in 1995; and the Rhode Island competitive state fund became operative in 1996.

The third factor that helps explain the national decline in the residual market after 1994 is the series of changes made in assigned risk policies during the last 15 years that made these policies more expensive and reduced the subsidy from the voluntary market to the residual market. For example, many states introduced separate manual rates for the residual market that were substantially higher than the rates for the voluntary market. In addition, many states either eliminated premium discounts or introduced special experience-rating plans that tied premiums more closely to each firm's own benefit payments in the residual markets. [28]

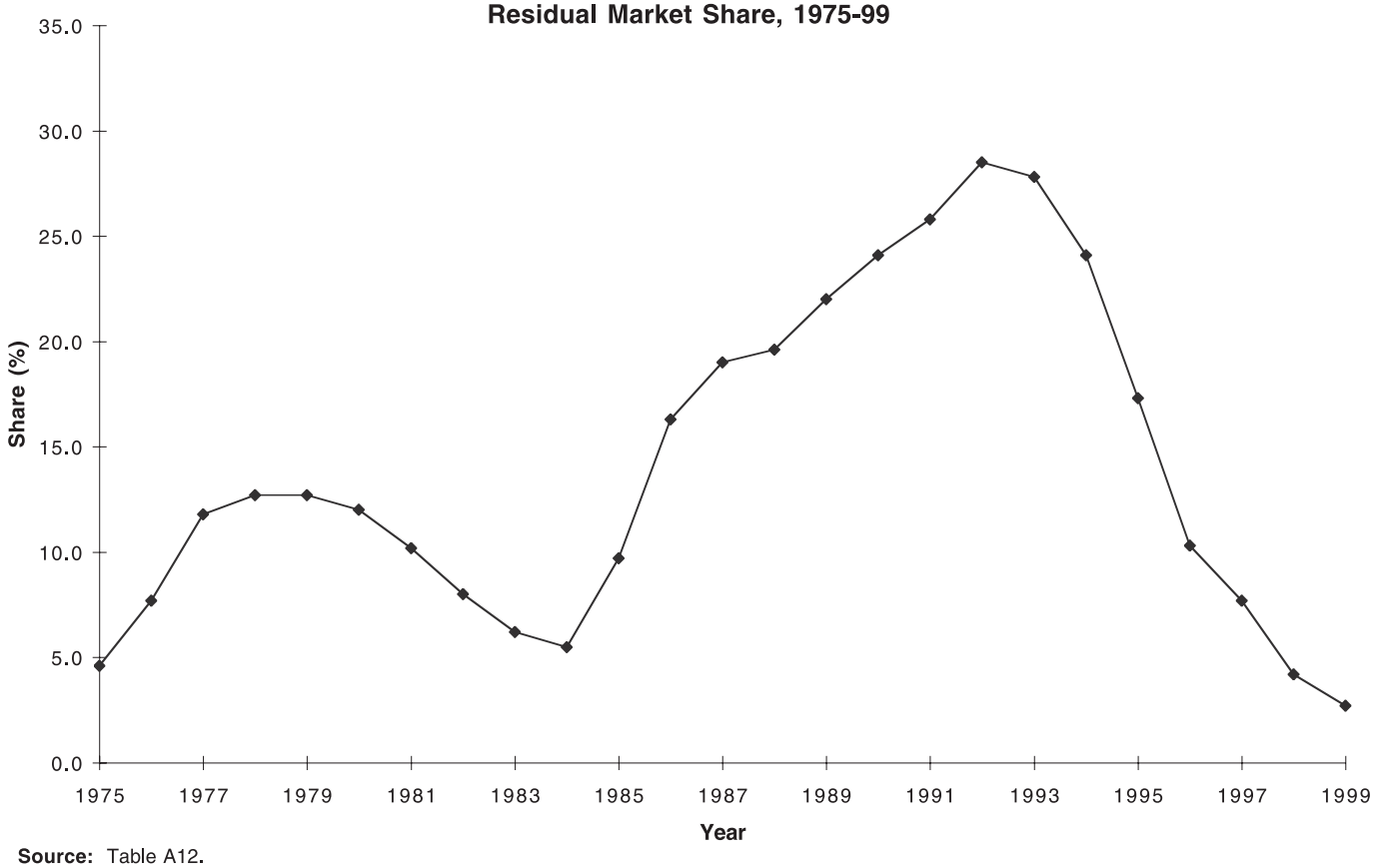
PROGNOSTICATIONS

What are the likely developments in workers' compensation benefits and costs in the next several years? Are the declines in costs and benefits since the early 1990s likely to persist, or are we approaching turning points for benefits and costs, which Figure 1 makes clear are characteristic of the last 40 years? I begin this discussion with a warning that my record of predicting major turning point is sullied. In 1986, for example, I published an article (Burton 1986) discussing the recent moderation in workers' compensation costs - only to subsequently learn when the data were subsequently published that employers' costs as a percentage of payroll had reached a nadir in 1984 and by 1985 were already sharply escalating.

The Economy

Prognostications are particularly difficult in the autumn of 2001 because of the uncertain status of the economy. The GNP had slowed to a virtual halt by mid-year and unemployment was up sharply by the end of the summer, while stock market indices and interest rates were significantly down - and these adverse developments all preceded the con-

Figure 13
Residual Market Share, 1975-99



Source: Table A12.

founding economic consequences of the September 11 assault on the country. I assume that further deterioration in the U.S. economy will occur in the next year.

Prior to the 1990s, the injury rates usually declined when the economy slowed, but that pattern was broken in the 1990s. This means a reliable prediction about the effect of a higher unemployment rates on the frequency of injuries is almost impossible. What appears more likely is that the higher unemployment rates will lead to longer durations of workers' compensation benefits because partially impaired workers are less likely to be recalled by their old employers or hired by new employers.

Another consequence of the slowdown in the economy is that the drop in interest rates and stock prices will adversely affect the underwriting experience of workers' compensation carriers. Net investment gain and other income - which represent the difference between the combined ratio after dividends and the overall operating ratio shown in Figure 5 - averaged 17.2 percent of premium for workers' compensation carriers between 1991 and 2000, and was still at 19.6 percent of premium in 2000. It appears highly unlikely that the same return on investments will be sustained in 2001, which will put pressure on carriers to increase insurance rates. Moreover, as shown in Figure 14, while the worker' compensation insurance line had been more profitable than the total of all commercial lines of insurance during most of the 1990s, the overall operating ratio of workers' compensation exceeded the ratio of the other lines in 2000, again suggesting that workers' compensation insurance rates are under pressure to increase.

Insurance Arrangements

What about developments involving workers' compensation insurance arrangements? As shown in Figure 12 and discussed earlier, the workers' compensation insurance market for private carriers was substantially deregulated in the 1980s and 1990s. Thomason, Schmidle, and Burton (2001) found that comprehensive deregulation - the use of loss costs (instead of manual rates) that were not subject to prior approval by the state before carriers could establish the rates they would charge - reduced the costs of workers' compensation insurance by about 11 percent below the rates that would have been charged if states had continued to rely on administered pricing. Thomason, Schmidle, and Burton (2001a) also found that partial deregulation - for example, states that continued to rely on manual rates but that allowed carriers to deviate from those rates - resulted in higher workers' compensation insurance rates than would have been paid by employers under administered pricing.

Looking to the next few years, the potential additional effects of deregulation on costs appear limited. There are still a few laggard states that rely on ad-

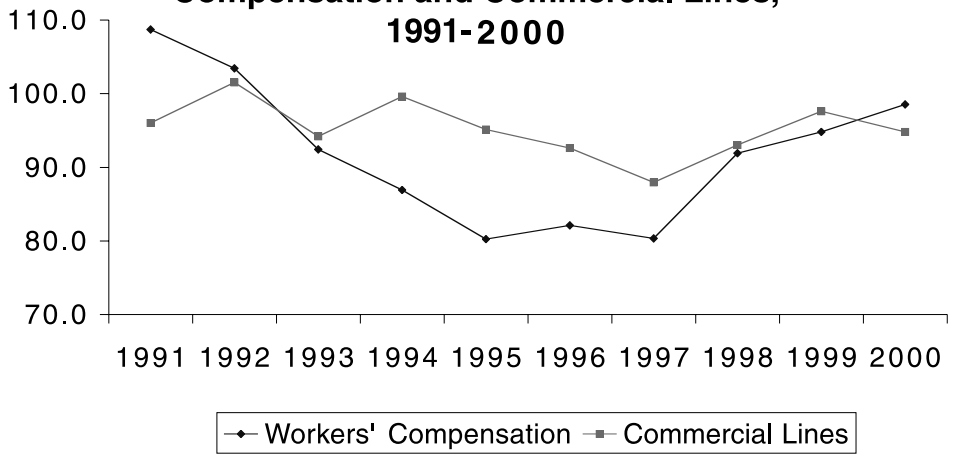
ministered pricing (such as New Jersey, New York, and Wisconsin) and a number of other states that have only partially deregulated their insurance markets, and if these move to comprehensive deregulation, some additional cost savings are possible. However, most states have already significantly deregulated and so there are no additional reductions to be achieved in these states.[29] In addition, California, which deregulated in January 1995, experienced several years of cutthroat competition in the workers' compensation insurance market that has resulted in bankruptcy for some leading carriers. There may well be a substantial increase in insurance rates in California to reestablish a more traditional relationship between losses and premiums. Given the size of the insurance market in California, any increases in insurance rates there that represent a delayed reaction to deregulation are likely to offset savings in other states that move to more comprehensive deregulation.

Another effect of the deregulation of the private insurance market that has occurred in most states is that the ability of insurance regulators to deny rate increases has been significantly shackled. Part of the profitability problems of the insurance industry during the late 1980s and early 1990s was due to the squeeze between losses and premiums. However, as a result of deregulation, changes in losses can be quickly transformed into higher insurance rates by carriers - assuming they have the collective will to engage in this strategy. At least the insurance industry will no longer be able to blame the regulators if they experience adverse underwriting results in the 2000s.

Another restructuring of workers' compensation insurance markets of the last two decades is also likely to affect future developments involving the relationship between losses and insurance rates. During the late 1980s and early 1990s, as losses were mounting and insurance rates were partially suppressed in some states, some carriers stopped selling policies in voluntary markets. Employers then turned to the residual markets, for which carriers were required to share the losses from inadequately priced policies. In the short run, employers who purchase insurance in the residual market were the beneficiaries. However, as previously discussed, the pricing arrangements for the residual markets were significantly modified in most states during the 1990s in order to increase the chances that rates are sufficient to cover losses. As a result, if employers cannot find polices at attractive prices in voluntary markets, they are not going to find much solace in the residual markets.

There have been significant changes in the number of state funds in recent decades, as shown in Figure 11. Thomason, Schmidle, and Burton (2001b) found there were no differences in insurance costs between states with exclusive state insurance funds and state with private carriers, after controlling for other factors that influence interstate differences in costs, such as injury rates and benefit levels. Among states with private carriers, Thomason, Schmidle, and Burton (2001b) found that states with competitive state funds have insurance costs that are nearly 18 percent higher than the costs in states that only have private carriers. Thomason, Schmidle, and Burton (2001b: 7) concluded that "states have introduced competitive state funds in the last two decades, presumably because they thought that costs would be reduced. Based on our findings, we conclude that such a strategy is naïve and misguided." If workers' compensation insurance costs start to escalate in the current decade, other states may decide to turn to competitive state funds to help ameliorate the rate increases. The evidence suggests that this strategy will at best be a futile gesture, and at worst will be counterproductive.

Figure 14
Overall Operating Ratio, Workers' Compensation and Commercial Lines, 1991-2000



Source: Tables A5.1 and A5.2.

Injury Rates

The prospects that injury rates will extend the downward trend of the 1990s into the 2000s are clouded by several factors. First and foremost is that (as previously discussed) the reasons for the decline in the 1990s - and especially the magnitude of the drop - are unknown. Second, one possible source of the decline may have been the increased intensity of safety activity by employers in response to the rapidly escalating workers' compensation rates in the late 1980s and early 1990s. The decline in injury rates after 1992 may have been a delayed response to these higher costs. The

question now is: will the rapid drop in insurance costs through most of the 1990s cause employers to decrease their attention to workplace safety and health during the 2000s? If so, then obviously injury rates and workers' compensation costs could increase from this diminution of zeal for prevention.

Cash and Medical Benefits

Cash and medical benefits both declined rapidly during most of the 1990s. There are reasons why such declines are problematic for the next few years. One reason is that medical benefits have accounted for an increasing share of all workers' compensation benefits during the last few decades. In 1960, 33.6 percent of all benefits were for medical and hospitalization payments; by 1999 the corresponding figure was 42.4 percent, with cash benefits accounting for the other 57.6 percent of benefits (Mont, Burton, Reno, and Thompson 2001:Table 9). There is already some evidence that workers' compensation medical benefits have started to increase, as payments for medical care increased from $15.6 billion in 1997 to $18.0 billion in 1999. Even more disturbing are the reports of double-digit increases in health care insurance rates for employers' group health plans in 2001.[30] These increases seem likely to spread to the workers' compensation program.

The prospects for cash benefits in coming years are less clear. Total cash benefits were $24.4 billion in both 1997 and 1999, (Mont, Burton, Reno, and Thompson 2001: Table 9), although cash benefits relative to wages continued to decline. The prospects for legislative reform involving cash benefits are mixed. In California, the evidence from the RAND studies indicating that permanent partial disability benefits replace an inadequate portion of lost wages appears likely to result in statutory changes liberalizing benefits. [31] Also, it will be harder for the insurance industry in the next few years to mount a successful legislative campaign scaling back eligibility and the amount of cash benefits similar to the largely successful efforts in the early 1990s. The insurance industry may be experiencing some financial difficulties now reminiscent of its plight a decade ago. However, the contexts are fundamentally different, since benefits payments were increasing at double-digit rates then (as shown in Figure 3), while in recent years, benefits have been stable in terms of total dollars of payments and have continued to decline relative to wages. In short, the current problems for the workers' compensation industry are not due to run-away costs, but inadequate premiums - which the industry will have a hard time convincing legislatures is not a problem of its own making. Moreover, unlike the late 1980s and early 1990s, when all employers - whether purchasing insurance or self-insuring - were experiencing escalating costs, employers have continued to experience declining costs relative to payroll through 2001, as reported in Burton (2001b). The insurance industry will have a more difficult time convincing employers under these circumstances that they should join a coalition to persuade legislatures to further reduce costs.

One other development in recent years reduces the chances of constricting workers' compensation eligibility rules in order to reduce benefit payments, similar to what happened in the 1990s. Harmon (1991a and 1991b) examined the tension between the narrowing of compensability standards and the protection provided to employers by the exclusive remedy provision. The essence of the workers' compensation principle is that injured workers gave up their right to sue for damages in tort suits in exchange for workers' compensation benefits provided on a no-fault basis. In her survey of decisions from eight states, Harmon found that when states restricted the ability of workers to obtain workers' compensation benefits for certain types of medical conditions, the courts in six of the states held that employers could no longer rely on the exclusive remedy provision to shield them from tort suits. While most of these decisions involved interpretation of workers' compensation statutes, the Oregon Supreme Court recently held unconstitutional an attempt by the Oregon legislature to explicitly protect employers from tort suits for work-related injuries that were no longer compensable under the state's workers' compensation statute. [32] These decisions should place a damper on efforts to restrict eligibility for workers' compensation benefits, and should also require some states, such as Oregon, to remove the restrictions in their statutes lest employers be liable for tort suits for work-place injuries and diseases.

CONCLUSION

I reaffirm the limitations in my ability to predict turning points in the trends of the data measuring workers' compensation benefits and costs. Indeed, I find the current situation particularly confounding, if for no other reason than the uncertain prospects for the economy, which will inevitably have an impact on developments in workers' compensation. There are, in addition to the unpredictable economic developments that will affect the workers' compensation program, several other factors that may jeopardize the record of declining costs and benefits during the last decade, most notably the deteriorating underwriting results of the workers' compensation insurance industry, the pressure to increase cash benefits in California and to increase the scope of compensability in Oregon and other states, and the surge in general health care costs that appears likely to spread to the workers' compensation program. Offsetting these factors are possible continuing improvements in workplace safety and possible further changes in workers' compensation statutes to reduce eligibility and benefits. In the next several years, it should be particularly interesting to see which set of factors dominates.

ENDNOTES

1. This article is based in part on Chapter 1 of Thomason, Schmidle, and Burton (2001a).

2. The data pertain to all states and all types of insurance arrangements, including self-insuring employers.

3. Within the 1960s, there was a sub-period from 1965-69 when costs increased 11.3 percent a year. In order to simplify the analysis, I include this sub-period with the rest of the years from 1960-71.

4. In 1940, the maximum weekly benefit for temporary total disability benefits was at least 66.7 percent of the state's average weekly wage in 38 jurisdictions. In 1966, only three jurisdictions met this standard (National Commission 1972: 61).

5. The Model Act, officially known as the *Workmen's Compensation and Rehabilitation Law (Revised),* was published by the Council of State Governments in 1974. The Model Act and the methodology used to measure state workers' compensation statutory provisions relative to the Model Act are discussed in Appendix 4A of Thomason, Schmidle, and Burton (2001a).

6. The change in statutory benefit levels resulted in higher benefit payments in part because of the utilization effect: workers were encouraged to file for benefits and to extend their periods of disability. The utilization effect is further discussed in Chapter 9 of Thomason, Schmidle, and Burton (2001a).

7. These measures of underwriting experience are other insurance terms are discussed in Appendix B of Thomason, Schmidle, and Burton (2001a).

8. Between 1985 and 1991 the cash benefits provided by the average state statute declined slightly from 47.5 to 46.5 percent of the benefits prescribed by the Model Act (Figure 2.4).

9. Conflicting evidence on the cost-shifting hypothesis and other explanations for the rapid increase in health care costs in the workers' compensation program during the 1985-91 period are examined in Burton (1997) and Spieler and Burton (1998).

10. Typical employer reactions to the spiraling costs of workers' compensation are provided in Chapter 1 of Thomason, Schmidle, and Burton (2001a).

11. The annual number of OSHA inspections of workplaces averaged about 45,000 during the first Bush Administration (fiscal years 1989 to 1992). The number of inspections declined considerably during the Clinton Administration, from about 40,000 per year in fiscal years 1993 and 1994 to a record low of 24,024 in fiscal year 1996.The decline was in part due to budgetary constraints imposed by Congress and, as the fiscal situation for OSHA improved in fiscal year 1997, the number of inspections increased to about 35,5000 per year in fiscal years 1997-2000. The significant decline in OSHA inspections after 1992 roughly corresponded to the period when the workplace injury rate rapidly dropped, which makes me skeptical that OSHA should take much credit for the improvements in occupational safety in the last decade.

12. Mont, Burton, Reno, and Thompson (2001: 25-26) analyze the decline in the injury and illness rate in the private sector between 1991 and 1999 and conclude that the drop is due mainly to declining injury rates within most injuries rather than a shift in employment towards industries with lower injury rates.

13. Professor Les Boden provided preliminary unpublished results at the 2001 National Symposium on Workers' Compensation that approximately one-eighth of the decline in the injury rates reported by the U.S. Bureau of Labor Statistics was associated with changes in workers' compensation statutes.

14. A more comprehensive examination of the possible explanations of declining injury and fatality rates is provided in Durbin and Butler (1998). They indicate, e.g., that the threshold level of premium to qualify for experience rating has increased (which would tend to reduce the impact of experience rating on safety), and that there has been an increasing use of deductibles in workers' compensation policies (which would tend to increase safety incentives for employers).

15. While duration of benefits typically declines with reductions in the unemployment rates, Barry Llewellyn of the National Council on Compensation Insurance reported at the 2001 National Symposium on Workers' Compensation that the severity of workers' compensation claims has been increased in recent years. This is one more anomaly of the 1990s involving the relationship between improved labor markets and frequency and severity of workplace injuries.

16. The definitive treatment of insurance arrangements in workers' compensation through the 1960s is Williams (1969).

17. The workers' compensation insurance market has become relatively deregulated in the 1990s compared to its status prior to 1980. Thomason, Schmidle, and Burton (2001a) examined the significant movement towards deregulation in Chapters 2, 5, and 6. Despite this deregulation, the workers' compensation insurance market remains the most heavily regulated commercial insurance line in terms of prices, policy forms, data reporting requirements, and market conduct. Regulators still retain the authority and responsibility to ensure that rates are not excessive, inadequate, or unfairly discriminatory.

18. A discussion of the historical origins of regulation in the property/casualty insurance line is provided in Thomason, Schmidle, and Burton (2001a: 36-38).

19. Most states relied on the National Council of Compensation Insurance as the rating organization. Several states, including California, Delaware, Massachusetts, Minnesota, New York, New Jersey, and Pennsylvania, instead established "independent" rating bureaus.

20. In some of the states with competitive state workers' compensation funds, the state fund also provided data to the rating bureau.

21. The loading factor was a uniform percentage for all classifications.

22. These and other modifying factors are examined in considerable detail in Chapter 3 and Appendix 3A of Thomason, Schmidle, and Burton (2001a).

23. A few states did permit deviations or schedule rating prior to the 1980s, but their use was limited even in these states. These competitive devices are explained in the next section of the text.

24. These more comprehensive reforms are discussed in more detail in Thomason, Schmidle, and Burton (2001a).

25. This three-way characterization of reform is a simplification because there are substantial variations in the configurations of regulation and deregulation. For example, some states permit the rating bureau to file both pure premiums and fully developed rates, and have one set of rules that apply to the pure premium filing and a different set of rules for the manual rates. Missouri allows downward deviations from bureau rates, but not upward deviations. Oklahoma allows insurers to use rates without prior approval as long as the rate increase is less than 15 percent, but the Insurance Commission must approve higher rate increases.

26. While the NCCI categorization is sufficient for this article, Thomason, Schmidle, and Burton (2001a) used a far more complex classification scheme for deregulation, which also allows them to capture the effects of changes in the various approaches to deregulation.

27. The states that adopted open competition in the 1980s were rather eclectic (geographically, economically, and politically), and empirical efforts at modeling the determinants of the adoption of open competition have been rather unavailing, See, for example, Schmidle (1994).

28. More details on these changes in the residual market are provided in Thomason, Schmidle, and Burton (2001a), Appendix 3A.

29. By 1995, 26 states had regulatory regimes that relied on loss-cost filings, and 15 of those states did not require adherence to those loss-cost filings by carriers when they established the rates they charged, as indicated by Thomason, Schmidle, and Burton (2001a), Figure 7.2, p. 197.

30. An example of reports indicating that health care premiums would be increasing rapidly is Freudenheim (2000), who indicated that employers were expecting increases between 10 and 30 percent in 2001.

31. Robert Reville at the RAND Institute and his co-authors have produced a series of studies raising questions about the adequacy and equity of benefits provided by the California workers' compensation program. The latest (Reville 2001) indicates that in the first five years after their injuries, workers at self-insured firms receive workers' compensation benefits that replace 48 percent of their lost earnings due to the

injuries, while the replacement rate for workers at firms who purchase insurance is 53 percent.

32. The Oregon decision, *Terry L. Smothers v. Gresham Transfer, Inc.,* 23 P.2d 333 (Or. 2001), is discussed by Burton (2001a) and Harmon (2001b). Excerpts from the case are included in the Employment Law Course (Fall 2001) section of www.workerscompresources.com.

References

Barth, Peter S. 1987. *The Tragedy of Black Lung: Federal Compensation for Occupational Disease.* Kalamazoo, Michigan: W.E. Upjohn Institute for Employment Research.

Burton, John F., Jr. 1997. "Workers' Compensation, Twenty-Four Hour Coverage, and Managed Care." In Virginia P. Reno, Jerry Mashaw, and Bill Gradison, eds. *Disability: Challenges for Social Insurance, Health Care Financing, and Labor Market Policy.* Washington, DC: National Academy of Social Insurance.

————————-. 2001a. "A Synopsis of the Oregon Major Contributing Cause Study." *Workers' Compensation Policy Review* 1 (May/June): 21-22, 27.

————————-. 2001b. "Workers' Compensation Costs for Employers: Mixed Messages for 2001." *Workers' Compensation Policy Review* 1 (July/August): 2-6.

Burton, John F., Jr. (with H. Allan Hunt and Alan B. Krueger). 1986. "The Recent Moderation in Workers' Compensation Costs in Michigan and the Nation." In *The Economic Outlook 1986.* (Proceedings of the Thirty-Third Annual Conference on the Economic Outlook, sponsored by The University of Michigan.)

Burton, John F., Jr., and Timothy P. Schmidle, eds. 1995. *1996 Workers' Compensation Year Book.* Horsham, Pennsylvania: LRP Publications.

Durbin, David and Richard J. Butler. 1998. "Prevention of Disability from Private Work-Related Sources: The Roles of Risk Management, Government Intervention, and Insurance." In Terry Thomason, John F. Burton, Jr., and Douglas Hyatt, eds., *New Approaches to Disability in the Workplace.* Madison, WI: Industrial Relations Research Association.

Freudenheim, Milt. 2000. "Consumers Across the Nation Are Facing Sharp Increases in Health Care Costs in 2001." *The New York Times,* Dec. 10, 2000, p. 54.

Harmon, Sara T. 2001a. "Statutory Compensability Standards." *Workers' Compensation Policy Review* 1 (March/April): 15-20, 28.

————————. 2001b. "The Impact of Higher Compensability Standards on the Exclusive Remedy Shield." *Workers' Compensation Policy Review* 1 (May/June): 23-27.

Mont, Daniel, John F. Burton, Jr. Virginia Reno, and Cecili Thompson. 2001. *Workers' Compensation: Benefits, Coverage, and Costs, 1999 New Estimates and 1996-1998 Revisions.* Washington, DC: National Academy of Social Insurance.

National Commission. [The National Commission on State Workmen's Compensation Laws.] 1972. *The Report of the National Commission on State Workmen's Compensation Laws.* Washington, D.C.: U.S. Government Printing Office.

NCCI. [National Council on Compensation Insurance] 2001. *Annual Statistical Bulletin.* 2001 edition. Boca Raton, Florida: National Council on Compensation Insurance.

Reville, Robert. 2001. Workers' Compensation Outcomes Differ Little at Self-Insured and Insured Firms. Available at www.rand.org/publications/RB/RB9035/ Santa Monica, CA: RAND Institute for Civil Justice.

Spieler, Emily A., and John F. Burton, Jr. 1998. "Compensation for Disabled Workers: Workers' Compensation." In *New Approaches to Disability in the Workplace,* Terry Thomason, John F. Burton, Jr., and Douglas E. Hyatt, eds., 205-244. Madison, Wisconsin: Industrial Relations Research Association.

Thomason, Terry, Timothy P. Schmidle, and John F. Burton, Jr. 2001a. *Workers' Compensation: Benefits, Costs, and Safety Under Alternative Insurance Arrangements.* Kalamazoo, MI: W.E. Upjohn Institute for Employment Relations.

————————. 2001b. "The Employers' Costs of Workers' Compensation under Alternative Insurance Arrangements." *Workers' Compensation Policy Review* 1 (March/April): 3-7.

Williams, C. Arthur, Jr. 1969. *Insurance Arrangements under Workmen's Compensation.* Washington, D.C.: U.S. Department of Labor, Wage and Labor Standards Administration, Bureau of Labor Standards.

Williams, C. Arthur, Jr., and Peter S. Barth. 1973. *Compendium on Workmen's Compensation.* Washington, D.C.: National Commission on State Workmen's Compensation Laws.

The 'Ergonomics Injury' as a Social Construction

by Nortin M. Hadler

Introduction

For over 60 years, science has sought associations between the physical demands of tasks and the likelihood of suffering disabling regional back pain. And for over 25 years, I have been working to improve our understanding of the plight of those amongst us who are otherwise well, but in the course of their usual life activities face compromised function because a particular anatomical region, such as the low back or arm, is painful to move. I coined the term "regional musculoskeletal disorders" to denote this morbidity nearly 20 years ago. [1] Gainful employment is one realm in which function is placed at risk by a regional musculoskeletal disorder. When that is the case, the morbidity is termed an "injury," recently an "ergonomics injury."

From such a conceptualization, there has followed nearly 60 years of attempts to alter the ergonomics - the physical content of work - to prevent such "injuries." In spite of a dearth of evidence for effectiveness, that approach has gained in credibility, if not panache, and today is engendering ergonomic-based regulatory efforts across the industrialized world. But the "illness of work incapacity" is not the only morbidity, nor is the workplace the only context relevant to the regional musculoskeletal disorders. The fact that work incapacity from the regional disorders has engendered ergonomic-based regulatory efforts is a social construction that bears close scrutiny.

A social construction is a belief system, supported by consensus among the believers so that the idea is promulgated as common sense. There is nothing inherently wrong with social constructions; they provide the underpinnings of daily life. However, they can be wrong, can go wrong, and can be harmful. Our safeguard is the mandate to recognize them as operational hypotheses, and to test them systematically. As long as they withstand testing, then we have no better option than to accept them as the truth of the moment. In this essay, I examine the social construction that physical demands of tasks are *an* important cause, if not *the* important cause, of disabling back and arm pain. I am not alone in examining the literature for this purpose. Others might argue, based on the spate of systematic reviews that have appeared in the past five years, that the scientific questions that are relevant to this social construction have been asked and have been answered. Some are convinced that the ergonomic social construction is true.

I will show you why those who so argue are deficient in their understanding of the history of science, and woefully deficient in their understanding of the philosophy of science, if not epistemology in general. Otherwise they could not affirm the ergonomic construction with certainty. To the contrary, they would be capable of seeing through to its fatal flaws.

The fact that work incapacity from the regional disorders has engendered ergonomic-based regulatory efforts is a social construction that bears close scrutiny.

It is true that many investigators were involved in examining the literature relating to disabling musculoskeletal disorders by the National Institute of Occupational Safety and Health and the National Academy of Sciences in order to produce the NIOSH[2] and the NAS[3] documents in the United States. Scientists in other countries have undertaken similar exercises in the past several years. [4,5,6,7] In any such exercise, the participants must reach methodological consensus as to which papers will be considered to be high in quality and utilized as such, and which are marginal and ignored. The process invokes small group psychology, perhaps much more small group psychology than rigorous science. No wonder these bodies of scientists examine the same literature and reach very different conclusions. For example, whereas NIOSH discerned "strong" evidence that non-neutral posture was a risk factor for disabling neck pain, another group found the evidence "inconclusive." But none of these interactive groups of systematic literature reviewers were willing to step back and ask whether the literature tests the ergonomic social construction *in toto*. That is not a surprise to those of us who are students of the philosophy of science.

An Analogy

When I was a medical student, epidemiologists observed that the risk for Down's Syndrome, trisomy 21, was not uniform among siblings. The youngest child was more likely to be afflicted with this congenital disorder. That led to hypotheses and research as to what was it about the multiparous uterus that caused the fertilized egg to divide abnormally.

Several years later, epidemiologists returned to this issue to test whether they had missed the real association. The younger the child, the older the mother. Could it be that the likelihood of bearing a child with Down's syndrome is associated more with maternal age than birth rank? The answer proved to be yes. The old hypothesis was superseded and research shifted to the biology of the aging ovary.

Several years later, epidemiologists returned to this issue to test whether they had missed the real association. The older the mother, the older the father. Could it be the father was the cause of the malady? The answer was yes and no. The likelihood of bearing a child with Down's syndrome is associated with both maternal and paternal age. The old hypothesis was superseded and research shifted to the biology of the aging ovary and testis.

Such is the scientific method. We learn from the old hypotheses and the old false starts. And we move on. Today, no

one would consider studies of the microenvironment of the multiparous uterus as relevant to the pathogenesis of Down's syndrome. Scientists who were only prepared or willing to continue in that previous vein of research could no longer effectively study Down's syndrome. To advance the research and our understanding of Down's syndrome, they had to retrain and redirect their efforts.

We have a compelling science that tests the ergonomic social construction and finds it lacking. Furthermore, this science suggests that promulgating the ergonomic social construction is worse than sophistical; it deprives the hurting worker of insights that could lead to substantive relief. The small group psychology that underlies the systematic reviews by NIOSH and NAS meant the reviewers were unwilling to subjugate studies that were designed only to seek ergonomic associations to studies that asked whether there are other exposures in the workplace that associate more closely with the incidence of disabling regional musculoskeletal disorders. Such studies challenge the Holy Grail of ergonomists, if not their *raison d'être*. Yet such studies exist, and in impressive and growing abundance. We will return to these studies.

The "Injury" Construct

First let us deconstruct the social construction. What is an "ergonomics injury?" To deconstruct requires a review of the following aspects of the epidemiology of the regional musculoskeletal disorders. Who is at risk? How common is the morbidity? What are the options for coping? What drives the choice of option? Notice that I continue to use the term "regional musculoskeletal disorder." I am willing to specify the region: knee, low back, neck, shoulder, hand, and the like. But seldom am I willing to apply a label that suggests I know what is hurting. For nearly all the regional musculoskeletal disorders, there is no way today to generate confidence that any anatomically exact label is valid. Nearly always, there is nothing that can be observed by the physician or measured by a monitoring device. All our wonderful techniques for imaging anatomy seldom shed any light. Either no pathology is demonstrated or that which is demonstrable is non-specific; it is commonly found in age-matched individuals who are not hurting, is likely to have been present in the person who is hurting before the onset of pain, and is likely to persist when the pain has remitted. The non-specificity of findings is dramatic for the spine. Rare is the adult whose spine has no degenerative changes. So the state of art (a.k.a. medical science) allows one to label a person who reports a low back pain as having a backache, with elbow pain as having pain on one side or the other of the elbow, with a painful knee has having knee pain, and so forth, without the "smoking gun" of psychological indicia. Labels such as facet syndrome, tendinitis, epicondylitis, ligamentous strain, and the like are hypotheses at best. Labels such as arthritis are unsupportable.

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Yes, there are individuals who suffer arthritis of a knee or tendinitis in their hand where the overt inflammation, the redness, warmth and swelling, are objective signs of acute or chronic tissue inflammation. But these individuals are too rare to appear in any of the workplace surveys. Furthermore, never should anyone assume that overt inflammation is an extreme example of the regional musculoskeletal disorders. In all likelihood, someone so afflicted has a systemic rheumatic disease, such as rheumatoid arthritis, and deserves attention for such.

While we're at the business of truth in labeling, let's take a look at the concept of "wear and tear arthritis" as a synonym for osteoarthritis. Analyses of magnetic resonance images (MRI) of the spines[8,9] and knees [10] of identical twins have demonstrated that genetic predisposition accounts for virtually all of the severity of these degenerative changes; the influence of physically demanding activities is barely discernible. Furthermore, cohort studies suggest that the weight-bearing surfaces of the knee are not harmed by habitual physical activity.[11,12] So totters "wear and tear" as a useful construct. It is but one of many commonly held preconceived notions, social constructions if you will, that will fall in this essay. Another is the notion that repetitive upper extremity motion places the median nerve at the wrist at risk for damage and the person at risk for carpal tunnel syndrome. Alas, for those who harbor such a maxim, there are two studies that monitor the median nerve conduction velocities of groups of workers over five years; [13,14] there is no impairment consequent to the physical demands of tasks at work. Moreover, there are multiple cross-sectional studies that support that conclusion, one published by the Mayo Clinic just a couple of months ago.[15] Carpal tunnel syndrome simply is not a consequence of arm usage at work.

Carpal tunnel syndrome simply is not a consequence of arm usage at work.

Alas (again), regional musculoskeletal pain is rather an intermittent and remittent predicament of life - for all of us. It is distinctly unusual to live a year without having had to cope with a backache, or three years without having to cope with arm pain. We know this from surveys where volunteers keep diaries of the morbidity they experience each day and from surveys where recall of regional musculoskeletal disorders is elicited. The response varies depending on how the questions are asked, but the message is inescapable: regional musculoskeletal pain is an intermittent and remittent predicament of life. [16,17] In the past decade, there have been a number of investigations which explore the fashion in which people cope with these episodes. Coping does not occur in a vacuum; common wisdom and advice abounds, as do many purveyors of putative remedies. For most of us, most of the time, we can and do cope according to our fashion. For most of us, most of the time, the predicament passes and is not even memorable. [18] What

makes it memorable? What causes us to seek care from a provider? If you think the answer relates to the severity of the pain, you need to be disabused.

Adverse aspects of life confound coping and thus render regional musculoskeletal disorders more memorable and less tolerable. Measures of feeling undervalued, [19] of being actually undervalued, [20] of feeling disavowed, and of diminished self-reported health status [21] associate positively with the likelihood of remembering and seeking care for back, knee, [8,22] or arm pain. [23] We have known for decades that measures of the severity of the pain correlate poorly or not at all with the need to seek medical care. [24] No doubt there is the exceptional person who is faced with a regional disorder of such intensity and persistence that it overwhelms all attempts to cope. Such a person deserves the empathetic care we would offer anyone with any other of life's morbid challenges, such as a severe case of flu or of despondency caused by the death of a spouse. But these are unusual circumstances; most people either on their own or with guidance discover ways to circumvent painful use of the region that is hurting until, in days, occasionally weeks, rarely months, the disorder remits sufficiently that life goes on and the episode is forgotten. When someone finds the disorder insurmountable or even unforgettable, it is likely that coping was confounded by the psychosocial context in which the morbidity was suffered. [25] These psychosocial aspects of life operate to render the episode memorable, and to cause one to register the complaint to a primary care provider or to a health officer in the workplace.

This is not to dismiss the backache or regional arm pain as trivial or to belittle the effort involved in coping. We will all face such challenges and I hope we will all have the wherewithal to cope effectively. But I can assure you, if you are trying to cope with a backache and your life is not in order, or if there are coincident challenges at home or work, then the backache will seem the last straw. In our culture, the social construction demands that we hold the backache as the chief culprit, impugn the usages and motions that exacerbate the pain as our nemesis, and seek remedies both for the pain and the nemesis. However, this social construction, in its entirety, does not withstand scientific testing designed to identify the true source of our condition, and should be retired.

There is no information as to whether we can alter the likelihood that we will suffer our next regional musculoskeletal disorder. There have been attempts to alter the likelihood that we will not cope on our own, but instead will report our back or neck pain to a health care provider outside or in the context of work. Recently, several such attempts have been scientifically tested in randomized controlled trials. Back schools, [26] back belts, [27] and instructional programs[28] in so-called ergonomically sound usage have withstood scientific testing so poorly that further attempts at such interventions make little sense to me. Furthermore, to quote Linton and van Tulder, who recently published a systematic review of this literature, [17] "Because no properly controlled trials were found for ergonomic interventions or (ergonomic) risk factor modification, there was not good quality evidence available to draw a conclusion" as to whether such interventions might be effective.

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The "Ergonomics Remedy" Construct

As previously noted, for over 60 years science has sought associations between the physical demands of tasks and the likelihood of suffering disabling regional back pain. For 30 years, there have been parallel studies between physical demands of tasks and disabling arm pain. Associations have been found, but they are inconsistent and weak. There were hints 30 years ago, [29] but science has really risen to the challenge in the past decade of asking whether a more important association was being ignored. I reviewed this transition in a lengthy editorial in the *Journal of Occupational and Environmental Medicine* last fall. [30] I reviewed the number of cross-sectional and longitudinal studies that have attempted to probe for associations between disabling regional back or arm pain and aspects of *both* the physical content of tasks and psychosocial context of work. Designing such studies is demanding. How do you measure either physical or psychosocial exposures given the enormous temporal variability and individual differences? You do the best you can. The result of these multivariate studies is that the associations with the physical content of tasks are weaker and even more inconsistent than when these factors are studied ignoring psychosocial factors. The associations with the psychosocial context of work are also weak, but they are more consistent and generally dominate the associations between the physical content of tasks and the reports of regional pain.

I could belabor this new literature; it deserves scrutiny. However, I am particularly repulsed by the insistence on relying on the older literature in the systematic reviews that are promulgated by NIOSH, NAS and the other systematic reviewers. Any study that considers only the association between the physical demands of tasks and the likelihood of a disabling regional musculoskeletal disorder is out of date, even if it is ongoing or proposed. The state-of-the-science has moved beyond the testing of that hypothesis to newer hypotheses that promise to be more informative.

Let me illustrate first with two small area analyses. There are large companies that have multiple work sites, each with similar facilities and similar demographics of the workforce. The incidence of disabling back or arm pain varies from site to site, sometimes dramatically. That offers the opportunity to explore whether measurable differences in task content, demographics, or psychosocial context associate best with the variability in the incidence of disabling regional musculoskeletal disorders. Independently, inves-

tigators from NIOSH and I performed such a small area analysis in US West directory assistance operations. [31,32,33] Neither the NIOSH investigators nor I could explain the site-to-site variability in the incidence of disabling arm pain by any aspect of task content. However, multiple aspects of the psychosocial context of work did associate: fear of redundancy, work pressure, and lack of decision authority to mention a few. Interestingly, the more overtime and the more hours spent at the computer, the *less* likely the operator was to have found arm pain disabling.

Another small area analysis was performed by UPS. A detailed ergonometric analysis was performed at a number of UPS hubs, where the tasks involve the sorting of parcels. There is not even a hint of an association between physical task demands and the likelihood of recorded disabling arm or back pain.

What do I mean by invoking the psychosocial context of work as a critical factor? What is the human implication of these small area analyses and nearly all multivariate cross-sectional and longitudinal studies that detect associations between the psychosocial context of working[34,35,36,37,38,39] and the likelihood of reporting to a health officer in the workplace that your regional arm or back pain is disabling? I do not mean to impugn the veracity or the motivation of any worker who reports such an affliction. Nor am I suggesting that the inflammatory social construction, "It's in your head," pertains. I believe they hurt and I am saddened that their pain is insurmountable. I also know that the remedies offered by the providers of today are no matches for this dilemma; [40,41] at best they are minimally helpful, and most are useless and offer the specter of iatrogenesis. However, the science of today forces me to conclude that their back or arm pain is rendered incapacitating because elements of the psychosocial context in which they work impede coping.

The frontier for epidemiology is to further define "psychosocial context." That's a daunting exercise.[42] Some of the common threads emerging from studies in the workplace include aspects of job "stress,"[43] "strain,"[44] "allostatic load," and motivational "flow."[45] These measures are sampling such complex psychological functions as satisfaction, autonomy, and security on the job, as well as perceived psychological demand, motivation, collegiality, and the like. No wonder associations with "psychosocial" variables are weak, even inconsistent. There may be much that is idiosyncratic, peculiar to one person's dilemma. However, that does not diminish the implications. The sad fate of the hurting worker is predetermined if he or she is trapped in a malignant psychosocial milieu.

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There are four cohort studies that bear witness. Two are "natural" experiments in that a captive workforce was followed through an interval when the psychosocial environment was purposely perturbed. In the early 1990s, the Finnish economy suffered a considerable setback lasting several years. Many workers were dismissed. The effect of impending downsizing on the local-government employees in one small city was monitored.[46] The rate of absenteeism escalated, most markedly for sick leave ascribed to regional musculoskeletal disorders, particularly among employees over the age of 50.

The "Whitehall" studies are cohort studies of British civil servants that long ago documented an inverse relationship between civil service grade and mortality rate, particularly mortality from cardiovascular disease. In recent years it has become clear that the association with grade paled next to the association with psychosocial job "stress," particularly job "control," regardless of grade. [47] Similar relationships with job "stress" pertain to sickness absence from disabling regional back pain. [48]

The ongoing nature of Whitehall studies made it possible to take scientific advantage of a natural experiment. [49] In 1988, the British government announced a major restructuring. The Property Services Agency was to be "privatized" to which end its function was "outsourced" in 1992. These Orwellian terms fool no one, particularly the thousands of bureaucrats whose jobs were at risk. They realized that many of them would be without jobs, as was the fate of 41 percent in 1992, and that employment in the private sector was predictably insecure. What they couldn't have foretold was that their health would deteriorate during the three years anticipating "downsizing" and that sick leave would escalate. None of the trends could be ascribed to health-adverse behavior. Impending downsizing wreaks havoc on the psychosocial context of work inflicting "stress" and "strain" on all. [50] Downsizing accelerates that noxious, insalubrious, and lethal process we are denoting as an adverse "psychosocial" work context. And it does so without regard for prior station in life.

Even without the inflammatory influences of downsizing, an adverse psychosocial context works its harm. Slowly it will deprive one of favorable "self-rated health" (SRH). Like socioeconomic status, SRH is a powerful predictor of all-cause mortality, let alone the likelihood that one will seek care for regional musculoskeletal disorders. [51] In a cohort of 5,001 Danish workers, adverse "psychosocial" work context was shown to erode SRH over the five years of observation. [52] A similar association has emerged from analysis of the nurses' health study; a perception that psychosocial work conditions were unfavorable predicted declining functional status among some 21,000 nurses followed for four years. [53]

Conclusion

There are many lessons from the century of disabling regional backache.[54,55] Most germane to the thesis of this essay, there is no ergonomic solution. Ergonomics has a role in designing workplaces that are comfortable when we are well and accommodating when we are ill or aging. But ergonomic interventions

will not decrease the likelihood that a worker will find his or her next episode of regional musculoskeletal pain disabling. And an ergonomic regulation will certainly prove harmful. Such a regulation will medicalize the workforce; no longer will it seem reasonable to cope with back or arm pain without demanding remedies that, for the moment, do not exist. It will perpetuate the sophism that task content is the culprit, and thereby inflame resentment. It will lead to task modifications that have never been shown to be helpful. And most importantly, the regulations enforce a sophistical social construction so that progress in science or policy is impeded.

We know better.

About the Author

Nortin M. Hadler, MD, FACP, FACR, FACOEM (AB Yale University, MD Harvard Medical School) trained at the Massachusetts General Hospital, the National Institutes of Health in Bethesda, and the Clinical Research Centre in London before joining the faculty of the University of North Carolina where he is Professor of Medicine and Microbiology/Immunology. He serves as Attending Rheumatologist at the University of North Carolina Hospitals.

For 25 years he has been a student of "the illness of work incapacity"; nearly 200 papers and 10 books bear witness to this interest. He has lectured widely, garnered multiple awards, and served Visiting Professorships in England, France, Israel and Japan. He has been elected to membership in the American Society for Clinical Investigation and the National Academy of Social Insurance. He is a student of the approach taken by many nations to the challenges of applying disability and compensation insurance schemes to such predicaments as back pain and arm pain in the workplace. He has dissected the fashion in which medicine turns disputative and thereby iatrogenic in the process of disability determination, whether for back or arm pain or a more global illness narrative such as is labeled fibromyalgia. Finally, he is widely regarded for his critical assessment of the limitations of certainty regarding medical and surgical management of the regional musculoskeletal disorders.

His latest monograph, the second edition of *Occupational Musculoskeletal Disorders,* was recently published by Lippincott Williams & Wilkins and provides a ready resource as to his thinking on all these topics.

His comments in this article are based upon his presentations of April 26, 2001 before the Subcommittee on Labor, Health and Human Services, Education and Related Agencies of the Committee on Appropriations of the U.S. Senate at the Hearing on Ergonomics, and of July 16, 2001 at the Forum on Ergonomics convened by Labor Secretary Elaine Chao.

ENDNOTES

1. Hadler, Nortin M. 1984. *Medical Management of the Regional Musculoskeletal Diseases.* New York: Grune & Stratton: 1-323.

2. Bernard, B.P. Ed. 1977. *Musculoskeletal Disorders and Workplace Factors.* US DHHS (NIOSH) Publication No. 97-141.

3. Barondess, J.A. 2001. *Musculoskeletal Disorders and the Workplace: Low Back and Upper Extremities.* National Research Council and Institute of Medicine. Washington, DC: National Academy Press.

4. Ariëns, G.A.M. et al. 2000. "Physical Risk Factors for Neck Pain." *Scandinavian Journal of Work Environment and Health* 26:7-19.

5. Hoogendoorn, W.E. et al. 1999. "Physical Load During Work and Leisure Time as Risk Factors for Back Pain." *Scandinavian Journal of Work Environment and Health* 25:387-403.

6. Vingård, E. et al. 2000. "To What Extent Do Current and Past Physical and Psychosocial Occupational Factors Explain Care-Seeking for Low Back Pain in a Working Population?" *Spine* 25:493-500.

7. Van der Windt, D.A.W.M. et al. 2000. "Occupational Risk Factors for Shoulder Pain: A Systematic Review." *Occupational and Environmental Medicine* 57:433-42.

8. Videman, T. and Battié, M.C. 1999. "The Influence of Occupation on Lumbar Degeneration." *Spine* 24:1164-8.

9. Sambrook, P.N., MacGregor, A.J., and Spector, T.D. 1999. "Genetic Influences on Cervical and Lumbar Disc Degeneration." *Arthritis and Rheumatism* 42:366-72.

10. Spector, T.K., Cicutini, F., and Baker, J., et al. 1996. "Genetic Influences on Osteoarthritis in Women; A Twin Study." *British Medical Journal* 312:940-3.

11. Cooper, C., Snow, S., and McAlindon, T.E., et al. 2000. "Risk Factors for the Incidence and Progression of Radiographic Knee Osteoarthritis." *Arthritis and Rheumatism* 43:995-1000.

12. Hannan, M.T., Felson, D.T., Anderson, J.J., and Naimark, A. 1993. "Habitual Physical Activity is Not Associated With Knee Osteoarthritis: The Framingham Study." *Journal of Rheumatology* 20:704-9.

13. Nathan, P.A., Keniston, R.C., Myers, L.D., Meadows, K.D. 1992. "Longitudinal Study of Median Nerve Sensory Conduction in Industry: Relationship to Age Gender, Hand Dominance, Occupational Hand Use, and Clinical Diagnosis." *Journal of Hand Surgery* 17A:850-7.

14. Nilsson, T., Hagberg, M., Berström, L., and Lundström, R. 1995. "A five-year follow-up of nerve conduction over the carpal tunnel. Stockholm Workshop 94. Hand-arm vibration syndrome." *Arbete Och Hälsa Vetenskaplig Skriftserie* 5:117-20.

15. Stevens, J.C., Witt, J.C., Smith, B.E., and Weaver, A.L. 2001. "The Frequency of Carpal Tunnel Syndrome in Computer Users at a Medical Facility." *Neurology* 56:1568-70.

16. Hadler, N.M. and Carey, T.S. 1998. "Low Back Pain: An Intermittent and Remittent Predicament of Life." *Annals of the Rheumatic Diseases* 57:1-2.

17. Hadler, N.M. 1999. *Occupational Musculoskeletal Disorders.* Second Edition. Philadelphia: Lippincott Williams & Wilkins: 1-433.

18. Croft, P. 2000. "Is Life Becoming More of a Pain?" *British Medical Journal* 320:1552-3.

19. Papageorgiou, A.C., Macfarlane, G.J., and Thomas, E., et al. 1997. "Psychosocial Factors in the Workplace - Do They Predict New Episodes of Low Back Pain?" *Spine* 22:1137-42.

20. Heistaro, S., Vartiainen, E., Heliövaara, M., and Psuka, P. 1998. "Trends of Back Pain in Eastern Finland, 1972-1992, in Relation to Socioeconomic Status and Behavioral Risk Factors." *American Journal of Epidemiology* 148:671-82.

21. Thomas, E., Silman, A.J., and Croft, P.R., et al.1999. "Predicting Who Develops Chronic Low Back Pain in Primary Care: A Prospective Study." *British Medical Journal* 318:1662-7.

22. Hadler, N.M. 1992. "Knee Pain is the Malady: Not Osteoarthritis." *Annals of Internal Medicine* 116:598-9.

23. Macfarlane, G.J., Hunt, I.M., Silman, A.J. 2000. "Role of Mechanical and Psychosocial Factors in the Onset of Forearm Pain: Prospective Population Based Study." *British Medical Journal* 321:676-9.

24. Horal, J. 1969. "The Clinical Appearance of Low Back Disorders in the City of Gothenburg, Sweden - Comparisons of the Incapacitated Probands with Matched Controls." *Acta Orthopaedica Scandanavica Supplement:* 118.

25. Hoogendoorn, W.E., van Poppel, M.N.M., Bongers, P.M., Koes, B.W., and Bouter, L.M. 2000. "Systematic Review of Psychosocial Factors at Work and Private Life as Risk Factors for Back Pain" *Spine* 25:2114-25.

26. Linton, S.J., and van Tulder, M.W. 2001. "Preventive Interventions for Back and Neck Pain Problems." *Spine* 26:778-87.

27. Hadler, N.M. and Carey, T.S. 2000. "Back Belts in the Workplace." *Journal of the American Medical Association* 284:2780-1.

28. Daltroy, L.H., Iversen, M.H., and Larson, M.G. et al. 1997. "A Controlled Trial of an Educational Program to Prevent Low Back Injuries." *New England Journal of Medicine* 227: 431-3.

29. Hadler, N.M. 1997. "Workers with Disabling Back Pain." *New England Journal of Medicine* 337:341-3.

30. Hadler, N.M. 2000. "Comments on the 'Ergonomics Program Standard' Proposed by the Occupational Safety and Health Administration." *Journal of Occupational and Environmental Medicine* 42:951-969.

31. Hadler, N.M. 1992. "Arm Pain in the Workplace: A Small Area Analysis." *Journal of Occupational Medicine* 34:113-9.

32. Hales, R.R., Sauter, S.L., and Peterson, M., et al. *1989 NIOSH Health Hazard Evaluation Report* (HETA 1989-299-2230, U.S. West Communications). Washington, DC: Department HSS, PHS, CDCP, NIOSH.

33. Hales, T., Sauter, S.L., and Peterson, M.R., et al. 1994. "Musculoskeletal Disorders Among Visual Display Terminal Users in a Telecommunications Company." *Ergonomics* 37:1603-21.

34. Linton, S.J. 2000. "A Review of Psychological Risk Factors in Back and Neck Pain." *Spine* 25:1148-56.

35. Marmot, M. 1999. "Importance of the Psychosocial Environment in Epidemiologic Studies." *Scandinavian Journal of Work Environment and Health* 25(suppl 4):49-53.

36. Heliövaara, M. 1999. "Work Load and Back Pain." *Scandinavian Journal of Work Environment and Health* 25:385-6.

37. Krause, N., Ragland, D.R., Fisher, J.M., and Syme, S.L. 1998. "Psychosocial Job Factors, Physical Workload, and Incidence of Work-related Spinal Injury: A 5-year Prospective Study of Urban Transit Operators." *Spine* 23:2507-16.

38. Burton, A.K. 1997. "Back Injury and Work Loss: Biomechanical and Psychosocial Influences." *Spine* 22:2575-80.

39. Papageorgiou, A.C., Macfarlane, G.J., Thomas, E., Croft, P.R., Jayson, M.I.V., and Silman, J.A. 1997. "Psychosocial Factors in the Workplace - Do They Predict New Episodes of Low Back Pain?" Spine 22:1117-1142.

40. Hansson, T.H. and Hansson, E.K. 2000. "The Effects of Common Medical Interventions on Pain, Back Function, and Work Resumption in Patients with Chronic Low Back Pain." *Spine* 25:3055-64.

41. Van Tulder, M.V., Koes, B.W., and Bouter, L.M. 1997. "Conservative Treatment of Acute and Chronic Nonspecific Low Back Pain. A Systematic Review of Randomized Controlled Trials of the Most Common Interventions." *Spine* 22:2128-56.

42. Davis, K.G. and Heaney, C.A. 2000. "The Relationship Between Psychosocial Work Characteristics and Low Back Pain: Underlying Methodological Issues." *Clinical Biomechanics* 15:389-406.

43. Israel, B.A., Baker, E.A., Goldenhar, L.M., and Heaney, C.A.1996. "Occupational Stress, Safety ad Health: Conceptual Framework and Principles for Effective Prevention Interventions." *Journal of Occupational Health Psychology* 1:261-86.

44. Karasek, R.A. and Theorell, T. 1990. *Healthy Work.* New York: Basic Books.

45. Guastello, S.J., Johnson, E.A., and Rieke, M.L. 1999. "Nonlinear Dynamics of Motivational Flow." *Nonlinear Dynamics, Psychology, and Life Sciences* 3:259-73.

46. Vahtera, J., Kivimäkl, M., and Pentti, J. 1997. "Effect of Organisational Downsizing on Health of Employees." *Lancet* 350:1124-8.

47. Bosma, H., Peter, R., Siegrist, J., and Marmot, M. 1998. "Two Alternative Job Stress Models and Risk of Coronary Heart Disease." *American Journal of Public Health* 88:68-74.

48. Hemingway, H., Shipley, M.J., Stansfeld, S., and Marmot, M. 1997. "Sickness Absence from Back Pain: Psychosocial Work Characteristics and Employment Grade Among Office Workers." *Scandinavian Journal of Work Environment and Health* 23:121-9.

49. Ferrie, J.E., Shipley, M.J., Marmot, M.G., Stansfeld, S.A., and Davey Smith, G. 1998. "An Uncertain Future: The Health Effects of Threats to Employment Security in White-Collar Men and Women." *American Journal of Public Health* 88:1030-6.

50. Reissman, D.B., Orris, P., Lacey, R., and Hartman, D.E.1999. "Downsizing, Role Demands, and Job Stress." *Journal of Occupational and Environmental Medicine* 41:289-93.

51. Croft, P., Schollum, J., and Silman,A. 1994. "Population Study of Tender Point Counts and Pain as Evidence of Fibromyalgia." *British Medical Journal* 309:696-9.

52. Borg, V., Kristensen, T.S., and Burr, H. 2000. "Work Environment and Changes in Self-Rated Health: A Five Year Follow-up Study." *Stress Medicine* 16:37-47.

53. Cheng, Y., Kawachi, I., Coakley, E.H., Schwartz, J., and Colditz, G. 2000. "Association Between Psychosocial Work Characteristics and Health Functioning in American Women: Prospective Study." *British Medical Journal* 320:1432-6.

54. Hadler, N.M. 1999. "Laboring for Longevity. An Annotated Poem." *Journal of Occupational and Environmental Medicine* 41:617-21.

55. Hadler, N.M. 1999. *Occupational Musculoskeletal Disorders.* Second Edition. Philadelphia: Lippincott Williams & Wilkins: 1-433.

The following are a sample of supplemental source data tables for the article "Workers' Compensation: Developments Since 1960 and Prognostications for Benefits and Costs." Space limitations prevent us from including all tables in this issue. To view these and the rest of the source data tables online, please visit our website at www.workerscompresources.com.

Table A1 Workers' Compensation Costs and Benefits, 1960-99

Year	Col. 1 Benefits (as % of payroll)	2 Costs (as % of payroll)
1960	0.59	0.93
1961	0.61	0.95
1962	0.62	0.96
1963	0.62	0.99
1964	0.63	1.00
1965	0.61	1.00
1966	0.61	1.02
1967	0.63	1.07
1968	0.62	1.07
1969	0.62	1.08
1970	0.66	1.11
1971	0.67	1.11
1972	0.68	1.14
1973	0.70	1.17
1974	0.75	1.24
1975	0.83	1.32
1976	0.87	1.49
1977	0.92	1.71
1978	0.94	1.86
1979	1.01	1.95
1980	1.07	1.96
1981	1.08	1.85
1982	1.16	1.75
1983	1.17	1.67
1984	1.21	1.66
1985	1.30	1.82
1986	1.37	1.99
1987	1.43	2.07
1988	1.49	2.16
1989	1.46	2.04
1990	1.57	2.18
1991	1.65	2.16
1992	1.69	2.13
1993	1.62	2.17
1994	1.51	2.05
1995	1.39	1.83
1996	1.26	1.67
1997	1.15	1.47
1998	1.09	1.37
1999	1.05	1.29

Source:
Columns (1)-(2): 1960-88 data: *Social Security Bulletin, Annual Statistical Supplement* (1995), Table 9.B1. 1989-99 data: Mont, Burton, Reno and Thompson (2001), Table 13.

Table A4 Statutory Cash Benefits: Average State Benefits as Percentage of Model Act Benefits, 1972-98

Year	Mean
1972	36.7
1973	41.3
1974	41.8
1975	42.2
1976	45.5
1977	45.9
1978	45.3
1979	46.7
1980	46.3
1981	45.3
1982	45.9
1983	47.2
1984	47.5
1985	47.5
1986	46.8
1987	47.3
1988	46.6
1989	47.5
1990	46.6
1991	46.5
1992	45.4
1993	45.6
1994	46.3
1995	46.2
1996	45.8
1997	47.1
1998	46.4

Table A5.1 Workers' Compensation Insurance Underwriting Experience, 1973-2000

Year	Col. 1 Losses Incurred*	2 Loss Adjustment Expenses*	3 Losses and Adjustment Expenses Incurred*	4 Underwriting Expenses Incurred**	5 Dividends to Policyholders*	6 Combined Ratio After Dividends	7 Net inv. Gain/Loss and Other Income	8 Overall Operating Ratio
1973	68.5	8.5	77.0	19.8				
1974	71.6	8.7	80.3	19.6				
1975	74.0	8.2	82.2	18.9	6.3	107.4		
1976	78.2	8.4	86.6	17.6	5.4	109.6	6.9	102.6
1977	78.0	8.9	86.9	16.7	5.1	108.6	7.4	101.2
1978	74.4	8.7	83.0	16.4	5.6	105.0	7.8	97.2
1979	70.4	9.2	79.6	16.8	6.5	103.0	9.2	93.7
1980	67.6	8.4	76.1	17.4	8.0	101.4	10.8	90.7
1981	66.1	9.0	75.1	19.0	8.7	102.8	13.0	89.8
1982	64.3	9.1	73.4	20.6	9.9	103.9	15.0	88.9
1983	70.6	9.2	79.9	22.0	10.6	112.5	16.2	96.3
1984	81.0	9.8	90.8	21.2	9.9	121.9	16.7	105.2
1985	81.0	9.5	90.5	19.0	9.3	118.8	15.0	103.8
1986	85.4	10.2	95.5	18.0	7.6	121.1	13.7	107.4
1987	82.2	10.9	93.1	18.0	6.4	117.6	12.8	104.8
1988	83.4	10.8	94.2	17.8	6.4	118.4	12.7	105.7
1989	83.3	11.4	94.7	17.4	6.1	118.2	13.4	104.8
1990	83.8	10.7	94.6	17.6	5.1	117.4	13.0	104.4
1991	87.8	11.5	99.3	18.5	4.9	122.6	14.0	108.7
1992	83.9	13.2	97.1	19.8	4.6	121.5	18.1	103.4
1993	71.6	12.4	84.0	20.4	4.7	109.1	16.7	92.4
1994	60.3	13.1	73.4	21.7	6.3	101.4	14.5	86.9
1995	55.2	12.5	67.7	23.3	6.0	97.0	16.8	80.2
1996	55.8	13.7	69.5	25.4	4.8	99.7	17.6	82.1
1997	55.6	13.8	69.4	25.9	5.4	100.7	20.4	80.3
1998	60.2	15.3	75.5	26.7	5.3	107.6	15.7	91.9
1999	65.9	15.8	81.7	28.0	5.6	115.3	20.5	94.8
2000	71.2	15.9	87.1	26.5	4.5	118.2	19.6	98.5

Source:
Best's Aggregates & Averages, *Property/Casualty*, 2001 Edition and prior Editions, C.A.M. Best Company - used with permission.

Notes:
Losses Incurred (also termed the pure loss ratio) (1) plus Loss Adjustment Expenses (2) equals Losses and Adjustment Expenses Incurred (3). Losses and Adjustment Expenses Incurred (3) plus Total Underwriting Expenses Incurred (4) plus Dividends to Policy Holders (5) equals Combined Ratio after Dividends (6). Combined Ratio after Dividends (6) minus Net Investment Gain/Loss and Other Income (7) equals Overall Operating Ratio (8). As of 1992, the methodology for allocating investment income changes slightly; as a result, 1992-97 numbers in the last two columns are not directly comparable to those for earlier years.

* Percentage of net premiums earned
** Percentage of net premiums written

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