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Featured Topics

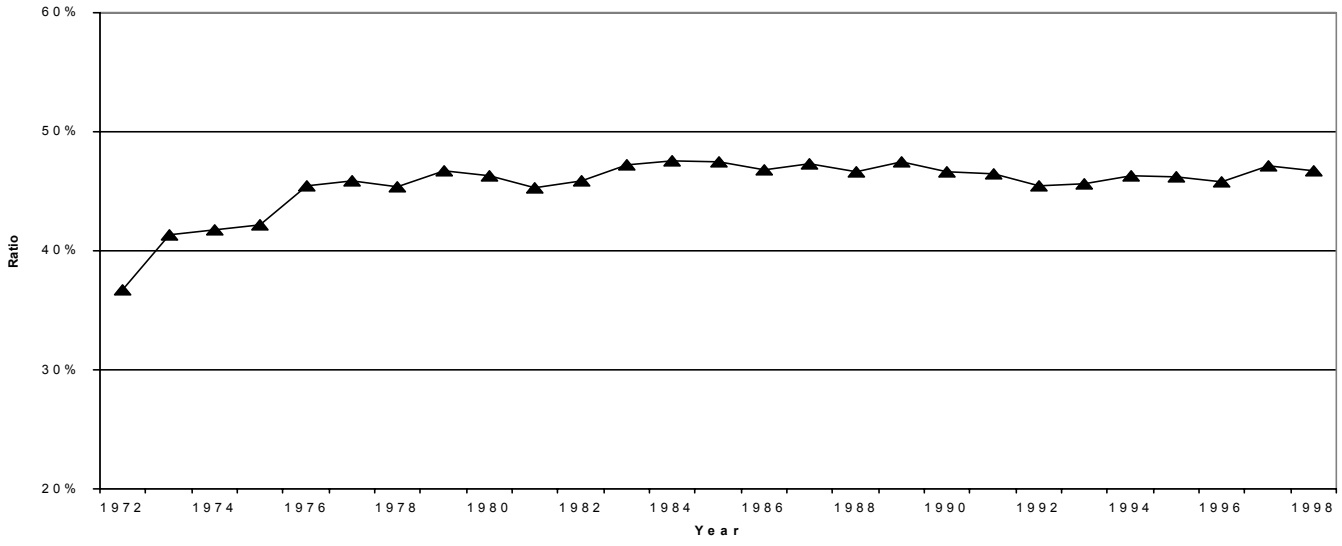
Summary of the Contents

Medical benefits have become a more important component of workers' compensation programs in recent decades. They accounted for only 33 percent of all workers' compensation benefits in 1981 but rose to 42 percent by 1999. Many states reacted with cost-containment approaches ranging from limiting employees' choice of treating physicians to the introduction of various forms of managed care.

More recently, attention has turned to the quality of the health care benefits offered by the workers' compensation program, including access to benefits, the effectiveness of the treatments, and workers' satisfaction with their care. Leading this concern over quality of care has been the Workers' Compensation Health Initiative (WCHI) at the University of Massachusetts Medical School. Supported by the Robert Wood Johnson Foundation, the WCHI sponsored 21 research and demonstration projects involving various aspects of health care in workers' compensation. The first article, written by several WCHI scholars, summarizes some of the results from those projects and pulls together other information on the accessibility, costs, and quality of workers' compensation medical care.

The second article focuses on workers' compensation cash benefits. The authors use actuarial procedures to calculate the cash benefits prescribed by state workers' compensation statutes. As shown in Figure A, between 1972 and 1998, the cash benefits prescribed by the average state were less than 50 percent of the *Model Act* benefits issued by the Council of State Governments in 1974. By this standard, workers' compensation cash benefits have been seriously deficient for decades.

Figure A
Ratio of Statutory to Model Act Benefits,1972-98



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The Accessibility, Costs, and Quality of Workers' Compensation Medical Care

by Sharon E. Fox, Ph.D., Allard E. Dembe, Sc.D., Ann G. Lawthers, Sc.D., and Jay S. Himmelstein, M.D.

Approximately six million individuals report suffering from occupational injuries and illnesses in the United States each year. Nearly one-third of these individuals loses time from work.[1] The primary mechanism for paying wage-loss and medical benefits to workers who suffer occupational injuries or illnesses is through workers' compensation insurance, which covers 95 percent of the nation's workforce.[2] A recent report released by the National Academy of Social Insurance (NASI) (Mont et. al 2001) estimates that the annual cash and medical benefit expenditures for workers' compensation were $43.4 billion in 1999. Approximately 42 percent of these costs are associated with direct medical and rehabilitative treatment, with the remainder reflecting cash payments to workers for compensation of lost wages. As recently as 1981, medical and rehabilitation benefits accounted for only 33 percent of all workers' compensation benefits (Mont et. al 2001, Table 9).

Driven in part by a "cost crisis" that developed during the late 1980s and early 1990s, the past decade has been characterized by substantial legislative activity targeted at reforming state workers' compensation systems (Dembe et al. 1997; Spieler and Burton 1998). Many of these reforms focused on applying various cost containment techniques, such as discounted fee schedules, limited provider networks, utilization review, treatment guidelines, and intensive case management to workers' compensation medical care (Tanabe 1999). Against this backdrop, interest within research and public policy communities regarding the impact of these programs on workers' compensation medical care has intensified.

NEW CONTRIBUTIONS

Until recently, there were few attempts to apply health services research techniques to the study of workers' compensation. However, within the past few years, with support from the Robert Wood Johnson Foundation, the National Institute for Occupational Safety and Health, and other organizations, there has been an increasing emphasis on using health services research strategies to better inform the major public policy issues surrounding workers' compensation medical care (J. Himmelstein et al. 1999). This paper contributes to the field of medical care research by synthesizing a growing body of literature on the medical care provided to injured workers under workers' compensation from the perspectives of the accessibility, costs, and quality of care. We summarize where progress has been made within the field of workers' compensation medical care research and identify existing gaps in knowledge for which further investigation is needed.

Because workers' compensation systems historically have been concerned with health care and related disability, they provide potentially fertile ground for policymakers and researchers to more fully understand the complex relationships between health, health care, work, productivity, and disability. Thus, the secondary goal of this paper is to provide a foundation for discussing issues of work and disability within the context of general health care systems.

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AN OVERVIEW OF WORKERS' COMPENSATION MEDICAL BENEFITS

Several factors distinguish the medical care offered through workers' compensation insurance from that offered under typical health insurance plans.

Financing

Workers' compensation medical and wage-replacement benefits (which are customarily called cash benefits) are generally financed through insurance premiums paid entirely by employers. In some states, employers who meet specific financial criteria have the option to self-insure the risk of occupational injuries and diseases (or they may elect to provide coverage through a group self-insurance fund). Federal government workers are covered by the Federal Employee's Compensation Act (FECA), and certain private sector workers are covered by the Longshore and Harbor Workers' Compensation Act (another federal law); both provide benefits and features similar to the state-regulated plans. Under all programs and insurance arrangements, employers are required to pay for the entire cost of necessary medical care, without any premiums, co-payments, or deductibles paid by the injured worker.

Delivery

Workers' compensation medical care is delivered primarily on a fee-for-service basis. The introduction of managed care arrangements into workers' compensation has lagged behind general health care. However, the 1990s saw the adoption of new managed care techniques and strategies in workers' compensation. Initial strategies focused on limiting the prices paid for medical services through the use of medical fee schedules, hospital payment regulation, and bill review. Other strategies, including restrictions on provider choice, utilization review, treatment guidelines, and case management, have sought to control costs by limiting utilization. By 1999, 49 states had placed some type of restriction or limit on an employee's ability to select or change his or her treating provider. More than half (26) of the states had some sort of explicit policy regulating or mandating the use of managed care organizations (Tanabe 1999).

Coverage, Eligibility, and Compensability

Virtually all employment is covered by workers' compensation insurance. However, some states specifically exempt certain types of occupations or industries from coverage requirements. For example, farm labor, domestic servants, casual employees, and sole proprietors are often exempt. Texas is the only state where coverage is elective for all private-sector employers.

Despite the nearly universal nature of the coverage of workers' compensation laws, eligibility for benefits is not automatic. In general, eligibility depends on proving that there is a work-related cause of injury or illness. Most states have adopted statutory language that limits workers' compensation benefits to "personal injury caused by accident out of or in the course of employment." This is referred to as the "work-relatedness test" (Burton and Spieler 2001).

Unlike the system of care provided through traditional health care insurance, only specific types of disorders — those established to be work-related — are reimbursable through workers' compensation programs. Although workers' compensation was originally designed to respond to the problem of acute traumatic injuries, currently most work-related cases involve conditions such as back pain, nonspecific musculoskeletal disorders, respiratory illnesses, and other disorders for which there is often indistinct etiology and a range of possible contributing causes. This increases the uncertainty in the medical decision-making process for determining causation in workers' compensation cases (Dembe 1996).

A treating physician generally makes the initial determination of whether a particular condition is work-related. The physician thus is placed in the position of determining both the patient's eligibility for benefits and the provider's eligibility for payment. This introduces unique dynamics into the patient-physician encounter that do not typically characterize most non-occupational medical care visits.

States have taken other steps to limit workers' eligibility for workers' compensation benefits by placing limits on the compensability of specific types of injuries and diseases under workers' compensation statutes. Recently, some states have placed limits on the compensability of claims for mental stress and other psychological conditions (Spieler and Burton 1998).

The filing of a workers' compensation claim with the employer is a prerequisite for the initiation of benefits through workers' compensation. Following notification from the worker of an injury, the employer (or the employer's insurance carrier) typically has 14 to 21 days to investigate the claim and either accept or deny the loss as compensable. Many states allow for benefits to be initiated voluntarily without accepting liability pending a determination on the claim's compensability (known as "payment-without-prejudice"). In some cases, this may help to ensure that workers receive needed medical treatment and wage-loss benefits during the investigation period.

Even if a workers' compensation claim is determined to be compensable, there are other considerations that affect whether the injured worker can receive medical treatment under workers' compensation. For example, the treatment provided to the worker must be directly related to the compensable injury. In addition, the treatment must be considered to be reasonable and necessary to "cure and relieve" the worker from the effects of the injury. Also, charges for medical services must be within established guidelines or determined to be reasonable and customary for the geographical area.

Medical Benefits and Services

Workers' compensation insurance generally pays for all necessary diagnostic, therapeutic, and rehabilitative expenses related to the workplace injury or disease. This includes medical, surgical, chiropractic, and hospital treatment; nursing services; medications; medical and surgical supplies; crutches, prosthetic and orthotic devices; and related services. Medical treatment is usually provided without regard to specific dollar or time limits.[3]

Medical providers also commonly conduct a variety of non-medical activities required for legal and administrative purposes, including the assessment of a worker's permanent impairment and readiness to return to work. Thus, clinicians qualified to provide occupational health care should possess not only conventional medical knowledge, but also an acquaintance with patients' workplace and job demands, vocational processes and requirements, and the administrative and legal exigencies of the workers' compensation system.

Since workers' compensation insurance provides both medical benefits and cash benefits, there is an

inevitable connection between the medical treatment provided and the management of ensuing work disability. Because of this, primary medical evaluation and treatment of work-related disorders frequently need to be closely coordinated with rehabilitation, therapy, retraining, job accommodation, and return-to-work efforts.

ACCESS TO WORKERS' COMPENSATION MEDICAL CARE

Defining, measuring, and evaluating access to medical care are topics of considerable interest to health services researchers and policymakers (Gold and Stevens 1998). Early definitions of access to care in the general health field emphasize health insurance coverage as the primary factor in determining entry into the health care system. However, more recent definitions focus on non-financial barriers to access and the relationship between system entry, the quality of care, and the ultimate outcomes of care (Weissman and Epstein 1994). Various conceptual frameworks have also been developed for categorizing and measuring the factors comprising effective access to care.[4] These models provide a context for highlighting unique access issues and potential barriers within workers' compensation.

To facilitate a discussion of research on access issues within the context of workers' compensation medical care, we apply an access model previously developed by Bierman et al. (1998). Within this Bierman model, primary, secondary, and tertiary access issues are described. In applying this model to workers' compensation, injured workers must first gain entry into the workers' compensation medical care system (primary access), then navigate through potential structural barriers (secondary access), and ultimately obtain appropriate care and effective outcomes from providers who understand and address workers' specific needs (tertiary access). We discuss below recent research that describes potential access barriers within each of these categories.

Primary Access Issues

Insurance Coverage. Despite state laws requiring employers to provide workers' compensation insurance for their employees, estimates of the proportion that fail to do so are not well-documented. The 14th Statewide Grand Jury of the Supreme Court of Florida recently found that more than 13 percent of Florida employers fail to comply with these requirements (AFL-CIO 2000). There have been few systematic studies that provide insight into the ability of injured workers to access medical treatment in the absence of coverage by their employer. However, Lucas and Sanford (1998) found that frequent users of emergency care in an urban university hospital were less likely to have workers' compensation coverage than expected.

Establishing Causation. An injured worker must be able to establish that a condition is caused or aggravated by work in order to have a claim accepted in the workers' compensation insurance system. In many cases, this determination may be difficult to make with medical or legal certainty. Physicians can sometimes fail to recognize occupational causes of patients' conditions. A study by researchers from Harvard University found that physicians at a large HMO failed to properly diagnose and report cases of occupational asthma 21 percent of the time, in part because they did not obtain detailed work histories (Milton et al. 1998).

Claim Denials. Reliable data on the proportion of workers' compensation claims that are denied are not available. In some cases, the state workers' compensation agency may require employers and insurers to submit information on claim denials, but the generalizability of these statistics across different state systems is limited. Minnesota is one state that regularly reports denial information. According to its most recent report, approximately 15 percent of claims involving lost time and 5 percent of medical-only claims were denied by insurers in 1997 (Minnesota Department of Labor and Industry 2000).

A study of patients receiving care for hand and wrist disorders at an academic health clinic in New York City illustrates how insurance denials may impede access to appropriate medical care (Herbert, Janeway, and Schechter 1999). Seventy-nine percent of 135 workers diagnosed with occupational carpal tunnel syndrome had their workers' compensation claim initially disputed by the employer's insurance carrier. Ultimately, 96 percent of the disputed claims were decided in favor of the worker, but it took an average of 429 days for the decision to be made. During that period, payment for medical care was unavailable either from the workers' compensation insurance carrier or through the workers' general health care plan (which excludes care for work-related cases filed under workers' compensation).

Under-reporting. There is growing evidence to suggest that despite the no-fault nature of workers' compensation insurance, many injured workers never file for workers' compensation benefits (Rosenmann et al. 2000). Little is known about whether these workers seek treatment through other mechanisms, although one study conducted at a community-based free clinic in central Massachusetts reported that as many as 11 percent of its patients were receiving care for work-related conditions that should have been covered under workers' compensation insurance (Dembe 2001).

Workers may be reluctant to report work-related ailments for a variety of reasons including fear of reprisal, a belief that pain is an ordinary consequence of work activity or aging, a lack of management support after prior reports, and a desire not to lose their usual job (Roberts 1997). Employer-sponsored safety award programs based on decreasing claim

frequency rates create an additional disincentive for appropriate reporting of work injuries (Pransky et al. 1999).

The rate of under-reporting may differ for certain types of injuries or occupations. Data from a Michigan surveillance system indicate that only nine to 45 percent of workers diagnosed with an occupational disease file for workers' compensation benefits (Biddle et al. 1998). A Connecticut study estimates that just 10.6 percent of workers with work-related chronic upper extremity pain file a workers' compensation claim for their condition (Morse et al. 1998).

Secondary Access Issues

Restricted Provider Choice. Many states have adopted laws or regulations permitting employers and/or their insurance carriers to exercise considerable control over the selection of treating physicians for injured workers under workers' compensation. Thirty-seven (37) states specifically limit an injured workers choice of provider for their care; thirty-two (32) limit a worker's ability to change his or her provider. Only three states allow workers to have complete choice of provider throughout the course of treatment.

Studies of workers' compensation managed care plans in Washington State, Oregon, Florida, and New Hampshire have shown that the introduction of managed care networks and other utilization controls generally diminishes workers' satisfaction with access to care (Dembe 1998). For example, a recent study in Washington State found that less than 58 percent of injured workers were satisfied with overall access to medical care for their injuries, compared with a 69 percent satisfaction rate in the control group (Kyes et al. 1999). This study traces much of the dissatisfaction to patients' inability to contact participating network providers at convenient locations close to their homes or workplaces.

Additionally, waiting times, the inability to get an appointment quickly, and delayed or restricted access to specialists can interfere with the delivery of effective care. A survey of injured workers conducted by the Gallup Organization, for instance, found that only 54 percent of injured workers were able to see a doctor on the first day of their work-related injury or illness, and 13 percent had to wait more than one week to get an appointment (Intracorp 1995). One study from New York found that among 23 patients with work-related low back pain, unnecessary delays in access to specialized medical treatment and physical therapy lengthened the duration of work disability, thereby increasing costs by an average of 25 percent (Gallagher and Myers 1996).

Authorization and Utilization Review. As of 1998, twenty states mandated that private payers and/or managed care organizations perform retrospective, prospective, or concurrent utilization review. However, the effects of utilization review programs on workers' compensation medical costs are poorly understood. One study using data on 9,319 claims between 1991 and 1993 found that the estimated gross-savings resulting from reduced hospitalization time (1.9 days) and decreased outpatient care was approximately $5 million (Wickizer, Lessler, and Franklin 1999). Focus group data from Michigan suggest that prospective utilization review mechanisms may cause delays in accessing treatment (Roberts and Gleason 1994). The impact of utilization review programs on quality remains to be demonstrated.

Out-of-Pocket Expenses. Although care for compensable cases is supposed to be paid entirely by the employer's workers' compensation insurance plan, employees may actually need to make considerable out-of-pocket expenditures that can create an access barrier. For example, obtaining prescription drugs in a non-hospitalized setting typically requires an injured worker to pay for the medication at retail prices, and then to submit receipts for reimbursement through workers' compensation. One study by Morse et al. (1998) documented that workers in Connecticut, on average, spent $489 annually on out-of-pocket expenses for work-related musckuloskeletal disorders.

Geography. As is the case in many rural and geographically isolated areas, workers may encounter difficulties in accessing medical providers that specialize in occupational medicine and these regions may lack the resources for providing aggressive management of the medical treatment for work-related injuries. Approved practitioners may not be conveniently located to workers' homes and job sites. As discussed earlier, this was cited as a major reason for dissatisfaction with access to care in a Washington-state study of care provided under an MCO (Kyes et al 1999).

Tertiary Access Issues

Sociocultural. Language, cultural, and ethnic characteristics of patients can create sociocultural barriers inhibiting effective access to medical care. In the case of working populations, these problems can be magnified because differential patterns of employment create disparities in exposure to workplace hazards among vulnerable subpopulations (Frumkin, Walker, and Friedman-Jiménez 1999). In addition, restrictions regarding the choice of provider may impede a worker's ability to see a provider in his or her own community who is familiar with the worker's language, customs, orientation towards medical care, and unique needs. Fewer than half of the states disseminate materials about workers' rights and responsibilities under workers' compensation statutes in Spanish or other languages (Ballantyne 1999).

Education of Workers, Employers, and Providers. A lack of knowledge among workers, employers, and providers about their rights and responsibilities under workers'

compensation systems may impose barriers to access to care and other benefits (Dembe 2001). A variety of studies indicate that injured workers feel they receive inadequate information and communications from employers both before and after the occurrence of workplace accidents (Intracorp 1997).

THE COSTS OF WORKERS' COMPENSATION MEDICAL CARE

Of the three areas we examine in this study, researchers have paid more attention to understanding and documenting the costs of workers' compensation medical care than to quality or access issues. Existing studies of workers' compensation medical costs can be categorized as follows: (1) descriptive analyses of aggregate data that record levels and trends in medical costs on a national and state basis; (2) descriptive analyses of the frequency and costs associated with particular types of injuries or illnesses, or with the incidence of workers' compensation claims within specific industries and populations of workers; (3) evaluations of the impact of clinical interventions and procedures on the medical costs of specific types of injuries; and (4) evaluations of new medical care financing and delivery models, such as managed care and case management. The key studies in each of these areas are summarized below.

Workers' Compensation Cost Data – National Trends and Interstate Comparisons

How Much Does it Cost Employers to Provide Workers' Compensation Benefits? The National Academy of Social Insurance (NASI) has provided an analysis of the employer costs of workers' compensation consisting of premium payments made by employers who purchase insurance from private carriers, plus payments made directly by employers under self-insurance and deductible provisions. For self-insured employers, the NASI data include cash and medical benefit payments, along with associated administrative costs (Mont et. Al 2001). From 1989 to 1993, the total costs of workers' compensation for employers increased from $48.0 billion to $60.8 billion, representing an annual average increase of approximately 7 percent. This is more than twice the annual rate of inflation for this same period. Between 1993 and 1999, however, total employer costs decreased from $60.8 billion to $53.3 billion, representing an annual average decrease of about 2 percent per year.[5]

How Much is Spent Each Year on Workers' Compensation Medical Benefits? Medical expenditures paid under workers' compensation represent only a fraction (1.5 percent) of the nation's total health care expenditures. In 1999, general health care expenditures were $1,211 billion (Health Care Financing Administration - Table 1: National Health Expenditures Aggregate and per Capita Amounts, Percent Distribution, and Average Annual Percent Growth, by Source of Funds: Selected Calendar Years 1960-99), while payments for workers' compensation medical benefits totaled $18 billion (Mont et. al 2001). Between 1985 and 1992, national health care expenditures grew at rate of about 10 percent per year, while workers' compensation medical costs grew at a rate of about 15 percent per year (Tanabe 1999).[6]

This period of rapid growth drew the attention of policymakers and others seeking to curb the costs of medical care and stimulated many of the medical cost containment initiatives that have recently been put into place (Tanabe 1999). Data for the period of 1992 to 1999 indicate that general health care costs increased at a rate of about 6 percent per year (from $836.6 billion in 1992 to $1,211 billion in 1999). Total medical costs in workers' compensation began to decrease beginning in 1992 and have since returned to 1992 levels (from $18.1 billion in 1992 to a low of $15.6 billion in 1997 and back up to $18 billion in 1999) (Mont et. al 2001). This suggests that workers' compensation medical costs have recently grown at a slower rate than general health care costs.

How Do Workers' Compensation Medical Costs Compare Across States? Based on incurred data for the most recent policy period for privately insured claims, the National Council on Compensation Insurance (NCCI 2001) reports differences of more than 300 percent in the average medical cost per claim among various states – from a high of $5,195 in Florida to a low of $1,510 in Indiana. However, there is an inherent danger in making these sorts of comparisons since these data do not reflect differences across states in system features, injury severity, or industry mix – factors that could influence the validity of interstate comparisons.

A recent study of eight states issued by the Workers Compensation Research Institute revealed differences of over 200 percent in the average medical benefit per lost-time claim (Fox, Casteris, and Telles 2000). Texas' average medical payment per claim ($6,495 for claims with more than seven days of lost time) was much higher than in other states, such as Florida ($5,264) and Georgia ($5,659). Of the states studied, the average medical payment was lowest in Massachusetts ($2,909 per claim with more than seven days of lost time). Examinations of intrastate trends in medical costs using these data suggest that states also have varying experiences with respect to changes in medical costs over time.

Analyses of the causal relationships between interstate variation in the statutory and/or regulatory features of states' workers' compensation systems and interstate variation in costs (and other outcomes) are crucial to ongoing policy debates about the merits of particular reform proposals. For example, medical fee schedules are one policy tool that is often used to contain workers' compensation medical costs. A 1996 analysis of fee schedules used by state

workers' compensation systems illustrates considerable variation in states' fee schedules when compared against three benchmarks (the national median workers' compensation fees, the Medicare fee schedule, and average charges) (Burstein 1996). Several studies have examined the relationships between fees for workers' compensation medical care and non-workers' compensation medical care and their impact on costs and utilization. One study found that a large workers' compensation insurer in Minnesota paid more than a general health insurer for the treatment of similar injuries (Johnson et al. 1993). Similar results were reported in California (Johnson, Baldwin and Burton 1996).

Medical Benefits Represent What Proportion of all Benefits Provided? According to data published by NASI, workers' compensation medical benefits in 1999 accounted for approximately 42 percent of total workers' compensation benefit payments (Mont et. al 2001, Table 9). Recent data published by NCCI indicate medical benefits will comprise about 56 percent of the total costs of claims for injuries sustained in 1997 (NCCI 2001, Exhibit X).[7]

Analyses of Medical Costs for Specific Injuries or Industries

Several studies published during the past decade describe and document the incidence rates and associated medical and indemnity costs of particular types of occupational injuries, including eye injuries (Baker et al. 1999; Lipscomb et al. 1999); occupational hearing loss (Daniell et al. 1998); upper extremity cumulative trauma disorders (Feuerstein et al. 1998; Webster and Snook 1994a); and low back injuries (Butterfield et al. 1998; Williams et al. 1998; Hashemi, Webster, and Clancy 1998; Webster and Snook 1994b). Within specific populations of workers, published studies have examined medical costs associated with the claims of construction workers (Dement and Lipscomb 1999); home health care workers (Meyer and Muntaner 1999); ballet dancers (Garrick and Requa 1993); and workers whose primary occupation is manual materials handling (Dempsey and Hashemi 1999). These studies establish benchmarks that can facilitate decisions about the allocation of resources for more cost-effective management and prevention of work disability (Williams et al. 1998).

The Impact of Clinical Interventions on Medical Costs

Several studies have evaluated the cost-benefit impact of clinical interventions and medical procedures on specific types of work-related injuries. Among the specific clinical and surgical interventions that have been studied are: open vs. endoscopic carpal tunnel release (Vasen et al. 1999); prework functional screening tools (Nassau 1999); the use of holium laser vs. electrocautery in arthroscopic acromioplasty (Murphy et al. 1999); laminectomy vs. laparoscopic diskectomy vs. outpatient laparoscopic diskectomy (Slotman and Stein 1998); hand function and single ray amputation (Peimer et al. 1999); spinal fusion (Hacker 1997); and rotator cuff surgery (Savoie, Field, and Jenkins 1995).

By comparing and contrasting the medical costs of specific procedures with return-to-work and patient satisfaction data, the findings of these studies help clinicians evaluate the efficacy of specific treatment modalities. For example, Hacker (1997) compared two groups of patients surgically treated for disabling low back pain. One group was treated with lumbar anteroposterior fusion and the other was treated with posterior lumbar interbody fusion (PLIF-BAK) and an interbody fixation device. Comparisons of the two treatment groups on a variety of measures were conducted and revealed that individuals in the PLIF group had lower costs, decreased hospitalization time, faster return to work, and comparable satisfaction.

The Impact of Managed Care and Medical Cost Containment Strategies

There is a growing body of research on the impact of managed care arrangements and other system features on workers' compensation costs and other outcomes. A study recently published by the Workers Compensation Research Institute reported that the use of restricted provider networks in California, Connecticut, and Texas was associated with lower medical costs (between 13 and 46 percent lower depending on the type of claim and the nature of the injury), and that those savings were not associated with an increase in the duration of disability or in indemnity benefit costs among claims treated within the networks (Johnson, Baldwin, and Marcus 1999). The study did not address the impact of the use of networks on measures of quality, such as workers' health, functioning, or satisfaction.

The Washington State Workers' Compensation Managed Care Pilot Evaluation examined the impact of changing several aspects of the financing and delivery of medical services to injured workers (Cheadle et al 1999). This pilot program, which involved 120 firms and 7,700 enrollees, represented a move from a fee-for-service arrangement to experience-rated capitation. Trained occupational physicians provided care under this program that was designed to improve the coordination of services and foster a timely return to work. In an evaluation of the program, researchers found that managed care costs were 27 percent lower than fee-for-service care and that no difference could be detected in functional outcomes between those enrolled in the managed care program and those not enrolled (Cheadle et al. 1999). Enrollees in the managed care program also experienced lower incidences of disability and shorter durations of lost time. However, the study also showed that workers who received their treatment within the managed care arrangement were *less* satisfied with

certain aspects of their medical care, particularly with the kind of treatment, the attending physician, and access to care (Kyes et al. 1999).

Other studies have examined managed care programs in Florida, New Hampshire, and Oregon. These studies have demonstrated varying degrees of cost-reductions under managed care (Borba, Appel, and Fung 1994; Oregon Workers' Compensation Division 1997; Witcraft and Appel 1995). The Florida and Oregon studies examined aspects of satisfaction. Each of these studies found that workers in the managed care group were generally less satisfied with the quality of their care than workers in the control group. Caution must be used when interpreting these results since different survey instruments and methodologies were employed.

Another study examined whether an ergonomic program, medical treatment guidelines, nurse case management, and utilization of a preferred provider organization consisting of academic physicians reduces the rate of the claims and surgery in a population of predominantly health care and university workers. The claims frequency rate and surgical frequency rates per 1,000 employees and per 1,000 claims was significantly lower during the managed care period than during the year prior to the initiation of managed care. The distribution of surgical procedures, as well as the duration of disability, were different after the initiation of managed care (1993-1997) than during the fiscal years prior to the initiation of this form of managed care (1990-1992) (Bernacki and Guidera 1998). A separate analysis documented a 50 percent reduction in total expenditures in the managed care cohort. The hospital component of the system experienced a decrease of 62 percent for temporary total disability claims and 38 percent decrease for permanent partial disability claims. Medical expenditures also decreased 50 percent (Green-McKenzie, Parkerson, and Bernacki 1998). Other studies have focused specifically on managed care preapproval (Jarvis, Phillips, and Danielson 1997) and case management (Bernacki and Tsai 1996; McGrail, Tsai, and Bernacki 1995).

QUALITY

According to the Institute of Medicine (1990), "Quality of care is the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge." There is a small, but growing, body of empirical evidence about the quality of workers' compensation medical services. However, research to date has been limited by the absence of standardized, generally accepted measures of quality for worker's compensation (Greenberg and Leopold 1998). The three major dimensions or aspects of quality have been defined as clinical or technical quality, access, and patient experience (Donabedian 1991, Palmer 1991). These aspects of quality can be measured using data about the structure, process, and outcomes of health care (Donabedian 1980; Lohr 1997).

Assessing quality of medical care in workers' compensation involves two unique issues. First, return to work (RTW) is considered a major outcome for workers' compensation systems (Mueller 1998) and its assessment is complicated by the need to account for multiple episodes of lost time and determining which metric best captures RTW experiences of affected workers (Baldwin, Johnson, and Butler 1996; Krause et al. 1999). Vocational functioning is another important category of outcomes specific to occupational medicine (Atlas et al. 1996; Mayer et al.1998). Measuring vocational function involves identifying and evaluating activities and health states, such as concentration and manual dexterity, which mark appropriate work functioning.

Evidence of Quality Problems in Workers' Compensation

In contrast to what is known about quality in general health care, relatively little published evidence exists about quality as it pertains to workers' compensation medical care (J. Himmelstein et al. 1999; Rudolph 1998). This dearth in information is partly attributable to a lack of consensus in the workers' compensation field about which aspects of the quality of medical care are most important to assess, e.g. clinical aspects, such as outcomes, access or perhaps worker satisfaction.

Initial work on quality in workers' compensation medical care has focused on documenting variation in the costs and quantity of workers' compensation medical services (Johnson, Baldwin, and Burton 1996; Johnson et al. 1993 ; Miller and Levy 1999). A handful of studies have provided evidence suggesting that there is overutilization of medical services in workers' compensation. For example, a recently published study by Tacci et al. (1999) described how practitioners manage new-onset, uncomplicated low back workers' compensation disability cases. This study found that diagnostic imaging was overutilized, not only in terms of the number of studies done (65 percent had plain films, 22 percent had magnetic resonance imaging scans) but also in the time frame in which they were performed (38 percent had plain films on the first clinic visit). Ninety percent of the patients in this study received at least one medication, and 38 percent received more than one prescription for opioid analgesics. Expensive non-steroidal anti-inflammatory drugs were prescribed more often than acetaminophen (61 percent versus 6 percent, respectively). Sixty-two percent received physical therapy that often included modalities with as yet unproven efficacy.

An earlier study by Tacci et al. (1998) of a group of people with low-back disorders documented that the provision of care in urgent care centers and emergency departments for both initial and main sources of care occurred more frequently than was needed. Specialist care was frequently provided (36 percent of the sample

was seen by a surgeon, while only 2 percent received surgery) and referrals to specialists (other than occupational medicine specialists) were made early in the course of treatment, with a median of 13 days for such referrals. In one of the few studies linking volume variations to outcomes, spinal fusion surgery among injured workers led to increased pain following surgery in almost 70 percent of cases (Franklin et al. 1994).

Measuring variations is an early step in quality measurement; future research should focus on the *appropriateness* of care as determined by a strong body of scientific literature linking the process of care to specific outcomes (Leape et al. 1990; Chassin et al. 1987).

The Effect of Service Delivery Organization on Quality

Organizational structure and organizational culture also impact the quality of workers' compensation medical care. For example, the quality of care in investor-owned HMOs is lower than in non-profit HMOs providing service to people with work-related maladies (D. Himmelstein et al. 1999). The advent of managed care has raised fears that restrictions on access or use of services would inappropriately restrict the use of needed services and negatively affect patient outcomes. While it appears that patients tend to be less satisfied by certain aspects of the restrictions of managed care, broader evidence of the impact of managed care on quality is inconclusive (Hellinger 1998; Greenfield at al. 1995; Ware et al. 1996). Similarly, available evidence indicates that workers' compensation patients may be less satisfied with the medical care provided under managed care arrangements, owing to their concerns about restrictions on patient choice of physician, reduced geographic convenience in accessing care, and their perceptions that the quality of care is inferior under managed care arrangements (Dembe 1998).

One study by Swedlow et al. (1992) examined the patterns of use of three services – physical therapy, psychiatric evaluation, and magnetic resonance imaging (MRI) – among physicians treating patients under workers' compensation. In this study, the rates of use among physicians who referred patients to facilities of which they were owners (self-referral group) were compared with the rates among physicians who referred patients to independent facilities (independent-referral group). Of all the MRI scans requested by the self-referring physicians, 38 percent were found to be medically inappropriate, as compared with 28 percent of those requested by physicians in the independent-referral group. There was no significant difference in the cost per case between the two groups.

Workers' Outcomes

Patient compliance with treatment recommendations is essential to achieving good outcomes (Wright 1993; Miller et al. 1997). Good patient-physician communication is one aspect of care that positively influences patient outcomes, e.g. better blood pressure and blood glucose control (Kaplan, Greenfield, and Ware 1989). Considering the worker's perspective has only recently attracted attention in the field of workers' compensation (Maizlish, Rudolph, and Young 1999). Many types of information about worker outcomes, such as functional status or satisfaction, can best be collected from the worker (Beaton, Bombardier, and Hogg-Johnson 1996; Atroshi et al. 1997).

Quality Measurement in Workers' Compensation

Quality measurement in workers' compensation is just getting under way with initiatives such as the American Healthcare Accreditation Commission/Utilization Review Accreditation Commission's (URAC) project designed to develop a set of measures to be used by workers' compensation managed care organizations. The dimensions of care selected by the URAC project include health outcomes, work outcomes, satisfaction, appropriateness, coordination, communication, access, cost and utilization. These prototype measures have yet to be tested.

The Texas School of Public Health is conducting a feasibility study for establishing a uniform data collection methodology that can be used to create a national research database for studying the outcomes and the quality of medical care. Efforts are also being undertaken by state government organizations in Rhode Island and Maine. The goal of the program in Rhode Island is to develop and implement a state-based data collection system concerning quality of care. Also, in an effort to increase awareness and promote quality of care in Maine, program officials created a stakeholder study group which will lay the foundation for the development of a statewide workers' compensation medical care database.

Quality Improvement in Workers' Compensation

Quality improvement has yet to be systematically studied in workers' compensation. However, that is likely to change as the National Institute for Occupational Safety and Health issued a report from its Occupational Health Services Research Team that identified quality in occupational health care as being among the current research needs in the field. In addition, the Agency for Health Research and Quality (formerly the Agency for Healthcare Policy and Research) has also identified quality as a priority area for its research and grant-making activities in the area of improving worker health. Analyses of the effectiveness of various therapies in reducing work disability need to be key components of the workers' compensation research agenda (Mayer et al. 1998; Atlas et al. 2000).

Concerns about the adequacy of private market mechanisms to pro-

mote quality medical care have prompted legislative and regulatory action on the part of state governments. For example, the state of Florida has identified measurable indicators to help evaluate the impact of its managed care mandate on the quality of care provided to injured workers. Other states, including Georgia, New Hampshire, and New York have also invested in data collection and analytical tools specifically to evaluate their managed care programs on an ongoing basis. New Hampshire requires that certified managed care organizations have specific quality assurance measures in place, including adequate provider training, case management for all care, return-to-work programs, access to second opinions outside of the network of providers, and qualified case management assistance. Other regulatory mechanisms may include the credentialing and licensing of providers.

Clinical practice guidelines as a quality improvement tool. Clinical practice guidelines may reduce variation and improve the quality of care. As of late 1999, 15 states had adopted treatment guidelines for low back injuries. Other guidelines are in place for chronic pain, thoracic outlet syndrome, reflex sympathetic dystrophy, occupational asthma, and dermatitis, among others. Several authors have promoted the advantages of guidelines for workers' compensation (Bruckman and Harris 1998). A series of recent studies details the lessons learned during the development and dissemination of the American College of Occupational and Environmental Medicine guidelines used by occupational health care providers (Harris et al. 2000a; Harris et al. 2000b; Harris et al. 2000c; Mueller et al. 2000).

Several studies have analyzed the impact of treatment guidelines on medical treatment. One study of Minnesota's treatment guidelines showed a compliance rate of approximately 71 percent based on a sample of 626 claims (Stratis Health 1999). A study of guidelines for lumbar spine fusion in Washington found that after guidelines went into effect, the state fusion rate declined 33 percent, whereas rates for nonfusion operations essentially were unchanged (Elam et al. 1997). An earlier study showed that the use of standard treatment protocols appeared to be associated with a reduction in lost time and surgery (Weisel, Boden and Feffer 1994).

IMPLICATIONS FOR RESEARCH AND PUBLIC POLICY

Of the three broad areas we examined, access to medical care for work-related conditions has received the least attention by researchers. Several studies illustrate that access can be complicated by a number of legal, procedural, and organizational factors, including issues relating to insurance coverage, determining eligibility for benefits, and compensability. Other potential access barriers include the willingness of providers to treat workers' compensation cases, restrictions on choice of provider driven by the introduction of managed care techniques, and educational, cultural and linguistic differences. While this evidence helps clarify our understanding of potential barriers to access, there have been no systematic studies of the adequacy of access to appropriate workers' compensation medical care.

Because there are no systematic approaches to measuring or detecting access problems in workers' compensation, discussions about improving access rely primarily on anecdotal perceptions of the problems and potential solutions. For example, one approach that some states regularly use to improve access to workers' compensation insurance is a statutory "payment without prejudice" provision. Under a payment without prejudice provision, the employer/insurer has the option to initially provide medical and wage-loss benefits without accepting liability. The insurer also retains the option of denying the claim within a specified period of time. We could not find any studies that directly evaluate the impact of payment without prejudice provisions on claiming behavior or access to workers' compensation benefits.

Cost considerations for employers are among the primary drivers of change in workers' compensation systems. The "cost crisis" of the late 1980s precipitated a wave of state-based reform designed to decrease medical and cash benefit costs by expanding the use of managed care and other medical cost containment techniques. Such techniques included fee schedules, utilization review, case management, treatment guidelines, and payment regulations. Available evidence suggests that the use of managed care in workers' compensation can reduce claim costs, but several initial studies suggest that worker satisfaction with access to care may be diminished when compared to workers who received treatment under traditional fee-for-service arrangements.

Available research to date represents the first step towards developing a broader understanding of how managed care arrangements impact workers' compensation medical care costs. Existing studies illustrate the importance of looking at multiple measures of outcomes when making assessments of the relative costs and benefits of these programs. Clearly, several unanswered questions remain and more work is needed to generalize results across states and across types of managed care arrangements. To date, the potential cost-savings of managed care arrangements appears to be driven primarily by using fee schedule discounts to control prices, by decreasing the utilization of medical services, and by lowering the incidence and duration of indemnity claims (Dembe 1998). However, there is a need to understand how treatment patterns may differ under managed care and how workers fare under different treatment protocols. Measures of cost-savings should be balanced with considerations of whether the workers who received treatment through managed care ar-

rangements were as satisfied with their medical care, and whether they experienced comparable degrees of recovery and return to work rates. While it is premature to make generalizations about the impact of managed care arrangements, existing studies help illustrate an important point: policymakers and others confront complex tradeoffs when making assessments of the relative costs and benefits of particular programs.

Quality of medical care in workers' compensation is a new and evolving area of inquiry. Within workers' compensation, the quality of medical care may be assessed using traditional methods of looking at processes of care. However, consideration of the impact of health care on physical functioning, vocational status and the ability to return to work, as well as patient and employer satisfaction, have become components of research efforts to measure quality within workers' compensation. At present, there is a growing body of evidence upon which to base assessments or make generalizations about the quality of workers' compensation medical services, and additional efforts in this area are increasing.

CONCLUSIONS

After a decade of experimentation and reform, workers' compensation systems are now directing their attention towards evaluating the impacts of the reforms. At the forefront of future debates will be demands that policymakers strike a balance between cost considerations and issues of maintaining or improving access to quality medical care and the best possible outcomes for injured workers. Questions that are likely to confront policymakers include: Have workers' compensation systems gone too far in limiting injured workers' choice of physician or access to medical and rehabilitative services? What types of managed care arrangements will most likely lead to desired outcomes in terms of worker satisfaction and successful return to work? In addition, many employers are wondering if improved disability outcomes being reported from many workers' compensation managed care programs have crossover significance to their non-workers' compensation benefit programs. As this paper demonstrates, the field of workers' compensation is just beginning to have answers to these critical questions and considerable work is still needed in order to generalize the results of studies across different populations of workers and time periods.

The results of these research efforts potentially have significant implications for broader issues in general health care. For example, techniques honed in the workers' compensation setting to assess and manage vocational disability may hold substantial promise for successful transference to the primary care setting, as evidenced by preliminary studies underway in Minnesota (McGrail, Tsai, and Bernacki 1995). Similarly, workers' compensation programs to facilitate better communications between employers and medical providers potentially can be extended to help minimize absenteeism related to a variety of nonoccupational chronic conditions, such as arthritis and diabetes. As more research data is collected about the impact of working conditions on heart disease, cancer, and other common ailments, the distinctions between general health care and workers' compensation will continue to blur, making it more important for all health professionals to have a basic familiarity with the existing research evidence concerning costs, quality, and access to care for job-related disorders.

ENDNOTES

1. The injury and illness data cited here reflect the total number of private industry occupational injury and illness cases reported in 1999 (Bureau of Labor Statistics 2000).

2. Data on the total number of workers in 1999 is 130.2 million and is based on the Current Population Survey (CPS). The actual number of workers covered by workers' compensation is not collected on a national basis. The National Academy of Social Insurance (Mont et. al 2001, Table 3) estimated that the number of workers covered by workers' compensation programs in 1999 was 123.9 million, which is 95 percent of all workers.

3. Ten states do not designate which specific practitioners are authorized to be treating providers; forty provide specific definitions of what types of providers or specialists can be designated as treating providers under workers' compensation. Nearly all of these 40 states designate medical doctors, dentists, osteopaths, and chiropractors as treating providers. Less common providers are podiatrists, occupational therapists, physical therapists, nurses, acupuncturists, spiritual healers, social workers, and Christian Science practitioners (Tanabe 1999).

4. Many of these build on the work of Aday, Anderson, and colleagues, who, during the 1970s and 1980s, proposed a conceptual model of health care access that divided relevant factors into three groups: predisposing variables (those that affect an individual's propensity to seek care), enabling variables (those, like income and insurance coverage, that provide the means to utilize the system), and health status variables (including disease and disability) that affect a person's level of system need. Recently, expanded conceptual models further elaborate the diversity of financial, structural, and personal characteristics comprising access to care, along with indicators of realized access including utilization rates, and patient self-reported satisfaction with access to care.

5. When employers' costs are measured relative to payroll, workers' compensation costs increased 6 percent between 1989 and 1993 from $2.04 per $100 of payroll to $2.17 in 1993. The cumulative inflation rate during this period was 17 percent. Between 1993 and 1999, workers' compensation costs as a function of payroll decreased 41 percent from $2.17 in 1993 to a low of $1.29 in 1999 (Mont et. al 2001).

6. Workers' compensation medical care is a component of the larger health care environment and therefore one can expect that, while there may be lags, trends in workers' compensation will mirror trends in general health care. However, in addition to forces that drive general medical costs (inflation, insurance market forces, the economy, etc.), disputes over non-health related benefits may have a substantial impact on the quantity, quality, and price of workers' compensation medical care (Boden, Johnson, and Smith 1992). A report recently released by the American Academy of Actuaries (2000) identifies several of the workers' compensation cost drivers, including changes in claim rates and injury severity, lags in the implementation of medical cost containment programs, and changes in the industrial composition of the workforce.

7. These discrepancies are most likely the result of different accounting methods: the NASI data are based on actual payments made for all claims within a given calendar year while the NCCI data are based on estimates of what the expected costs will be for all claims within a given policy year.

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- News updates of current events in workers' compensation.
- Posting of Job Opportunities and Resumes for those seeking candidates or employment in workers' compensation or related fields.
- The full text of the *Report of the National Commission on State Workmen's Compensation Laws.* The report was submitted to the President and the Congress in 1972 and has long been out of print.

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The Adequacy of Cash Benefits Prescribed by Workers' Compensation Statutes

by Terry Thomason and John F. Burton, Jr.

Workers' compensation programs provide cash benefits, medical care, and rehabilitation services to workers who experience work-related injuries and diseases.[1] Each state has a statute that prescribes the features of its workers' compensation program, including the scope of workers and employers who are covered, the types of injuries that are compensable, and the amounts of benefits that workers receive. The cash benefits provided by workers' compensation programs are particularly complex because benefit formulas differ between temporary and permanent disability, between total and partial disability, and between injuries that result in disability and injuries that result in death.

We examine the relative generosity of the cash benefits prescribed by state workers' compensation statutes for the period from 1972 to 1998. We rely on an actuarial program that is adapted from the procedure used by the National Council on Compensation Insurance (NCCI) to evaluate the effects of changes in state laws.[2] We also evaluate the adequacy of the cash benefits prescribed by the state programs by relying on previous efforts to provide benchmarks for adequacy.

STANDARDS FOR ADEQUACY

The Advisory Committee on Workmen's Compensation[3] of the Council of State Governments drafted a proposed *Workmen's Compensation and Rehabilitation Law*, generally referred to as the *Model Act*, which was published in the 1960s.[4] Arthur Larson, a Professor at the Duke University School of Law and a former Undersecretary of Labor in the Eisenhower administration, chaired the Committee. The other members included representatives from employers, insurance carriers, state and federal agencies, labor unions, physicians, and academics, all with an expertise in workers' compensation. The *Model Act* contained statutory language for all aspects of a workers' compensation program, including detailed specifications for cash benefits.

The Occupational Safety and Health Act of 1970 created the National Commission on State Workmen's Compensation Laws (National Commission) and directed the National Commission to "undertake a comprehensive study and evaluation of State workmen's compensation laws in order to determine if such laws provided an adequate, prompt, and equitable system of compensation." The National Commission was comprised of 18 members, of whom 15 were appointed by President Nixon to represent state agencies, insurance carriers, employers, labor, and others with expertise in workers' compensation.[5] The 1972 Report of the National Commission[6] included a unanimous judgment: "The inescapable conclusion is that State workmen's compensation laws in general are inadequate and inequitable."[7] In terms of cash benefits, the judgment was equally harsh: "Except in a few states, workers' compensation benefits are not adequate."[8]

Based on these conclusions and an analysis of the objectives of a modern workers' compensation program, the National Commission made 74 recommendations, which were designed to extend coverage, ensure sufficient medical and rehabilitative services for injured workers, encourage safety, provide an effective delivery system, and, importantly, improve cash benefit adequacy. Nineteen of these recommendations were designated as "essential elements of a modern workmen's compensation program," and the National Commission recommended that "compliance of the States with these essential recommendations be evaluated on July 1, 1975, and, if necessary, Congress with no further delay in the effective date should then guarantee compliance with these recommendations."[9]

The average state currently only complies with 12.89 of the 19 essential recommendations of the National Commission.[10] Despite this record, Congress has not enacted the Federal guarantees unanimously supported by the National Commission. However, one salutary effect of the National Commission Report is that a revision of the *Model Act* was published in 1974 to incorporate the 84 recommendations of the Commission.[11] Twenty-seven recommendations pertaining to cash benefits were used to prepare the *Model Act (Revised)*. When there was a conflict between the original *Model Act* and the National Commission's recommendations, the *Model Act* was revised to incorporate the National Commission's recommendations. Because the National Commission did not make spe-

About the Author

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cific recommendations for permanent partial disability benefits, the provisions for the duration of this type of benefit in the original *Model Act* were incorporated into the *Model Act (Revised)*.[12]

PLAN FOR THE ARTICLE

The purpose of this article is to examine the generosity of cash benefits prescribed by workers' compensation statutes, how the generosity has changed over time, and how generosity varies across jurisdictions. This is not an trivial task because workers' compensation benefits are contingent on a variety of factors, including the claimant's pre-injury wage, the severity of the claimant's injury, and the claimant's marital and family situation, among other things. The complexity of the benefit formulae used by the various state workers' compensation programs precludes an accurate assessment of benefit generosity using one or two parameters.

We estimate the average statutory benefit for a disabled workers' compensation claimant in each state for the years 1972 through 1998 by applying the law in effect on January 1 of each year to an identical distribution of workers' compensation claimants. This claimant distribution, which is a national distribution obtained from the NCCI, includes most of the relevant variables used by statutory benefit formulae.

The Appendix describes the methodology we used to construct the estimates of statutory generosity. In the next section, we present and discuss national estimates of expected statutory benefits for the period 1972 through 1998. These estimates are reported in both current and constant dollars for the entire period. We also report estimates disaggregated by state for 1998. In addition, these statutory benefit estimates are compared with those that would have been paid under the *Model Act (Revised)* published by the Council of State Governments. The parameters of the *Model Act (Revised)*, which are summarized in Appendix Table A1, serve as criteria against which the adequacy of statutory cash benefits may be judged.

ESTIMATES OF STATUTORY BENEFIT GENEROSITY

Data on expected cash benefits for workers' compensation claimants in the United States are presented in Figure 1. These are the benefits than an injured worker could expect to receive based on the workers' compensation statutory provisions applicable to the worker. These data as well as the other time-series data discussed in this article are also reported in Table 1. The observations are for the 50 states plus the District of Columbia for each of the years from 1972 to 1998. For each year, we report the weighted national average (mean) of expected statutory benefits, as well as the average plus and minus one standard deviation.[13] These data in Figure 1 are reported in current dollars; that is, they have not been adjusted to account for changes in the cost of living.

Figure 1
Expected Statutory Benefits, 1972-98

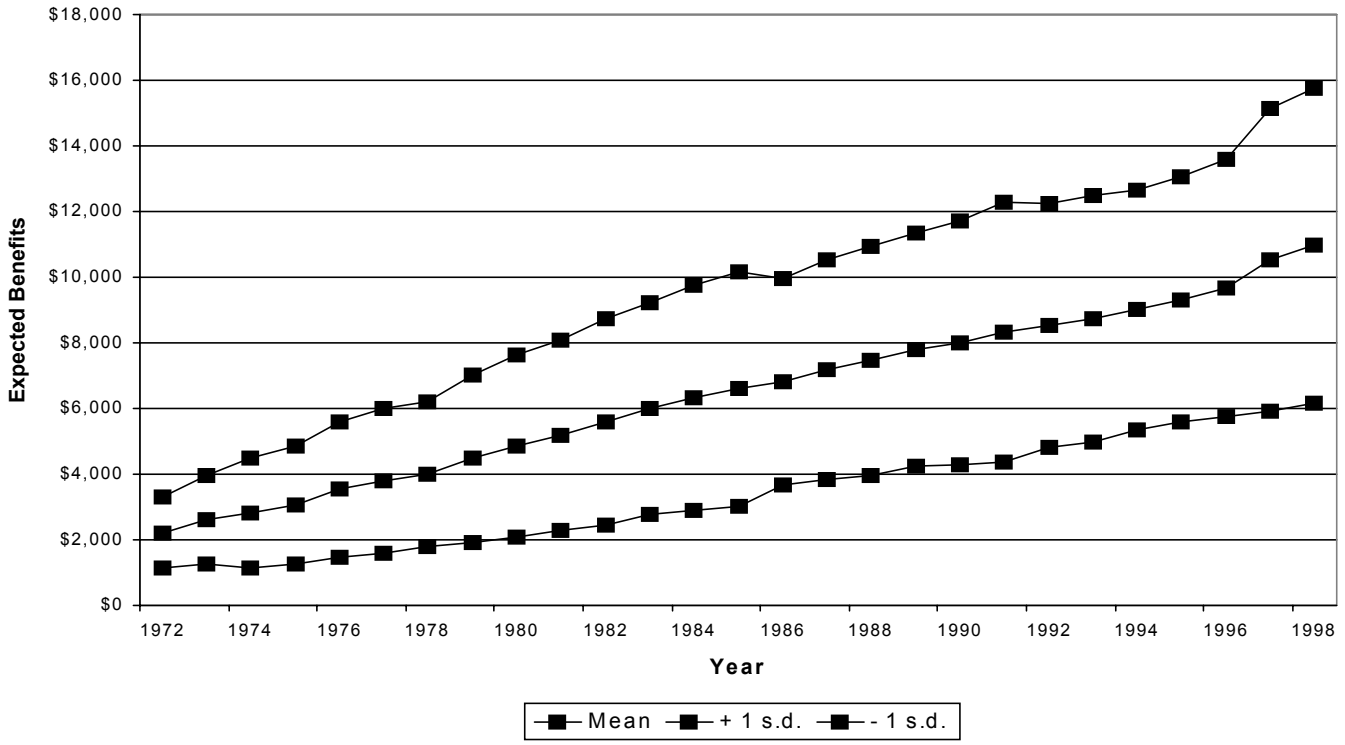
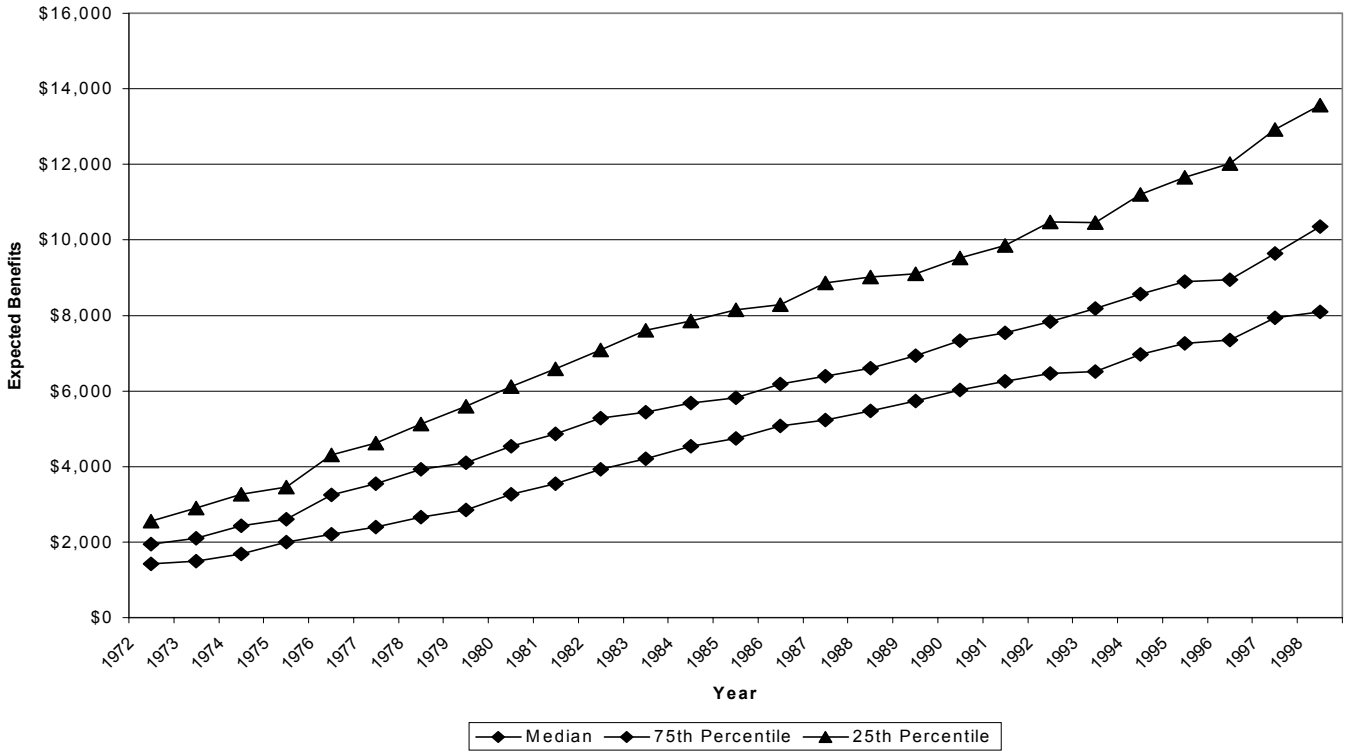


Table 1
Summary Statistics, Real and Nominal Expected Benefits and Ratio of Model Act Benefits to Benefits under Current Law, 1972-98

	Nominal Expected Benefits					Real Expected Benefits (1998 $)		Ratio of Benefits under Current Law to Benefits under Model Act	
Year	Mean	Standard Deviation	Median	75th Percentile	25th Percentile	Mean	Standard Deviation	Mean	Standard Deviation
1972	$2,218	$1,073	$1,952	$1,430	$2,552	$8,710	$4,216	36.7%	17.1%
1973	$2,603	$1,356	$2,100	$1,488	$2,904	$9,623	$5,015	41.3%	20.9%
1974	$2,823	$1,665	$2,439	$1,678	$3,273	$9,401	$5,544	41.8%	27.0%
1975	$3,060	$1,805	$2,607	$1,997	$3,462	$9,336	$5,508	42.2%	27.4%
1976	$3,532	$2,074	$3,245	$2,198	$4,302	$10,191	$5,985	45.5%	28.5%
1977	$3,791	$2,207	$3,539	$2,389	$4,620	$10,270	$5,980	45.9%	29.0%
1978	$4,000	$2,198	$3,925	$2,650	$5,121	$10,072	$5,535	45.3%	27.8%
1979	$4,474	$2,544	$4,092	$2,856	$5,598	$10,117	$5,753	46.7%	29.3%
1980	$4,858	$2,788	$4,533	$3,265	$6,116	$9,679	$5,554	46.3%	29.2%
1981	$5,174	$2,895	$4,862	$3,543	$6,586	$9,345	$5,229	45.3%	28.1%
1982	$5,583	$3,145	$5,283	$3,922	$7,089	$9,498	$5,350	45.9%	28.6%
1983	$6,004	$3,216	$5,442	$4,206	$7,609	$9,896	$5,302	47.2%	28.0%
1984	$6,322	$3,425	$5,682	$4,530	$7,852	$9,998	$5,417	47.5%	28.2%
1985	$6,592	$3,581	$5,815	$4,748	$8,142	$10,058	$5,463	47.5%	28.2%
1986	$6,806	$3,147	$6,181	$5,075	$8,283	$10,185	$4,709	46.8%	21.5%
1987	$7,176	$3,349	$6,385	$5,237	$8,853	$10,361	$4,836	47.3%	21.4%
1988	$7,454	$3,481	$6,603	$5,470	$9,021	$10,335	$4,826	46.6%	19.8%
1989	$7,807	$3,559	$6,932	$5,740	$9,108	$10,335	$4,712	47.5%	19.6%
1990	$7,999	$3,711	$7,330	$6,024	$9,517	$10,055	$4,665	46.6%	19.4%
1991	$8,311	$3,957	$7,546	$6,261	$9,846	$10,025	$4,773	46.5%	19.7%
1992	$8,544	$3,717	$7,829	$6,471	$10,478	$10,005	$4,353	45.4%	17.7%
1993	$8,729	$3,752	$8,183	$6,507	$10,453	$9,931	$4,269	45.6%	17.2%
1994	$9,003	$3,661	$8,558	$6,964	$11,197	$9,979	$4,058	46.3%	16.9%
1995	$9,326	$3,730	$8,889	$7,269	$11,659	$10,053	$4,020	46.2%	16.6%
1996	$9,659	$3,916	$8,947	$7,342	$12,018	$10,108	$4,098	45.8%	16.5%
1997	$10,530	$4,624	$9,643	$7,935	$12,928	$10,773	$4,730	47.1%	18.8%
1998	$10,963	$4,806	$10,358	$8,091	$13,575	$10,963	$4,806	46.7%	18.8%

Figure 2
Expected Benefits, Median, 25th and 75th Percentiles, 1972-98



The data in this figure show that in 1972, the average workers' compensation claimant could expect to receive a little over $2,200 in benefits as the result of his or her work injury. By 1998, average expected workers' compensation benefits had risen to around $11,000, a five-fold increase.

The distance between the top and bottom lines depicted in Figure 1 is a measure of the variation among states with respect to expected workers' compensation benefits.[14] These data suggest that state workers' compensation programs became more heterogeneous over time. The variance in expected benefits increased from 1972 through 1985, then declined markedly in 1986 before increasing again throughout the remainder of the period.

Figure 2 reports the median expected cash benefits among the 51 jurisdictions included in our study as well as benefits paid at the 25th and 75th percentiles. A comparison of the median in this figure with the mean in Figure 1 suggests that the distribution of expected cash benefits across states is skewed right. That is, a few very high benefit states in the right hand tail of the distribution are pulling the national average (mean) up relative to the median. This is also reflected in the distance of the 25th and 75th percentiles from the median. As can be seen, throughout the period the median is much closer to the 25th than to the 75th percentile, but particularly toward the end of the study period.

Real expected benefit data – in 1998 constant dollars – for the 50 state workers' compensation programs plus the District of Columbia are reported in Figure 3. As expected, the slopes of the lines in these figures are much flatter than the current dollar benefit data depicted in Figures 1 and 2. The weighted average of real benefit for the United States was about $8,700 in 1972, rose to about $10,300 in 1976 – around a 15 percent constant dollar increase – then declined slightly in the early 1980s, before increasing once again during the rest of the 1980s. Real benefits declined again in the early and mid-1990s, before increasing somewhat in the last two years to reach almost $11,000 in 1998.

The immediate post-1972 increase in real benefits is probably attributable to the effect of the *Report of the National Commission on State Workmen's Compensation Laws*, which recommended a number of changes to state laws liberalizing benefits and which recommended federal standards for state workers' compensation programs if the states failed to improve their laws.

There is little indication in Figure 3 and Table 1 that interstate variations in real benefits increased over the study period. The gap between one standard deviation below and one standard deviation above the mean increased over the first few years (1972 to 1976), but declined between 1976 and 1985. It declined markedly in 1986 and again in 1991. Between 1991 and 1996, interstate variation continued to decline, although at a slower

Figure 3
Real Expected Benefits, 1998 Dollars, 1972-98

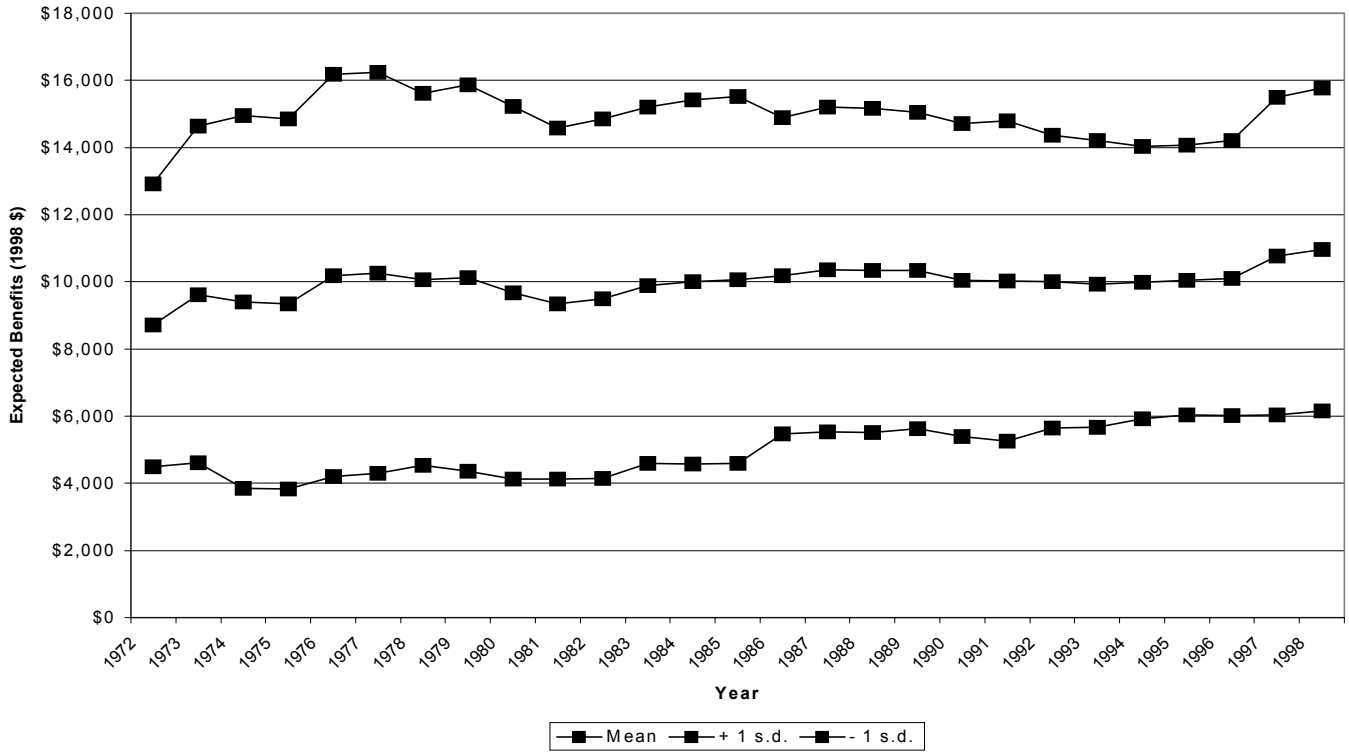
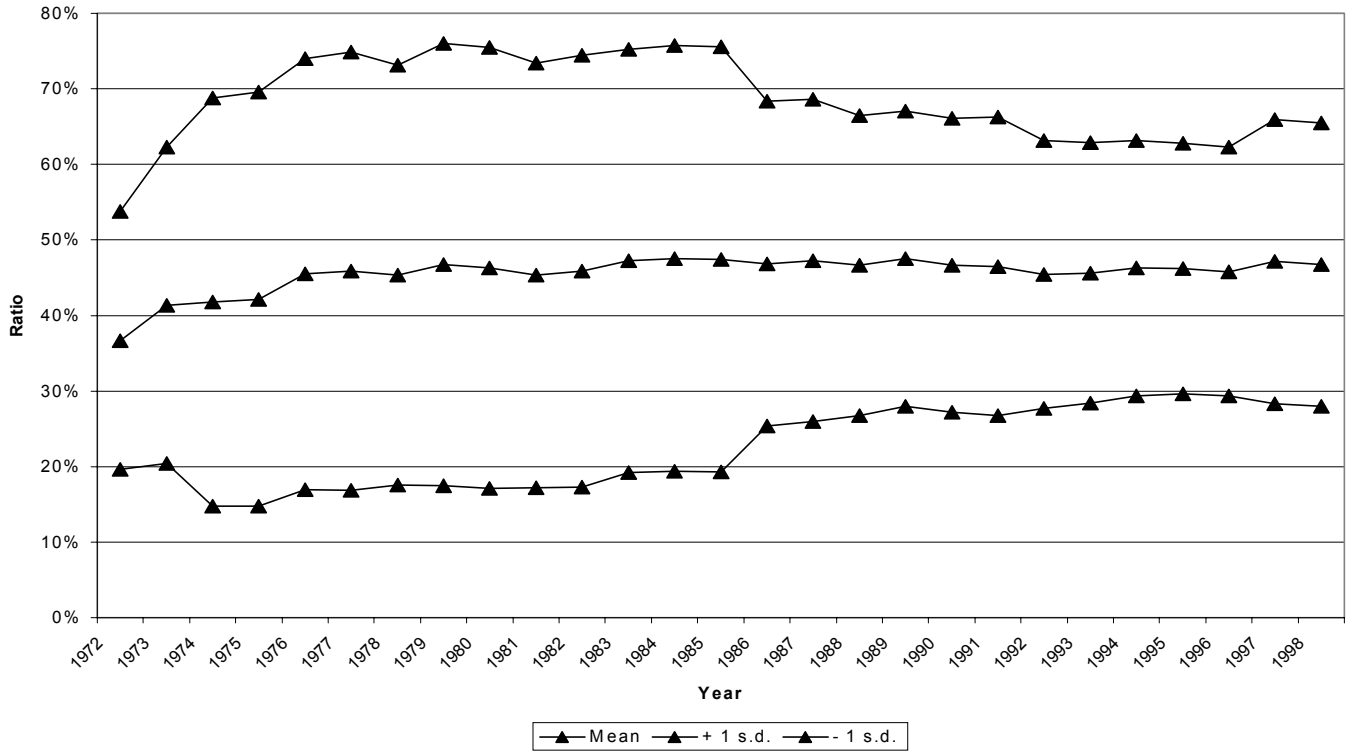


Figure 4
Ratio of Statutory to Model Act Benefits, 1972-98



pace. In the last two years, variation once again increased.

Data comparing expected benefits under the actual statutory parameters with the benefits prescribed by the provisions of the *Model Act (Revised)* are presented in Figure 4. The weighted average (mean) benefit provided by state workers' compensation statutes improved slightly in terms of adequacy during the first five years of the period, rising from slightly less than 37 percent of the benefits prescribed by the *Model Act (Revised)* in 1972 to about 46 percent in 1976. The ratio of actual statutory benefits to *Model Act (Revised)* benefits was relatively unchanged over the remainder of the period, although it declined slightly from 1992 through 1996 before increasing somewhat over the last two years.

Once again, these data indicate that interstate benefit variation increased from 1972 through 1979, and then remained unchanged until 1986 when it fell markedly. Thereafter, the standard deviation of the benefit ratio declined steadily until 1997, when it once again increased. Assuming that the *Model Act (Revised)* represents a reasonable criterion by which to judge the income-replacement adequacy of workers' compensation benefits, the data in Figure 4 suggest that statutory benefit levels have been and remain woefully inadequate in the overwhelming majority of states. Over one-half of the states prescribe benefits that are less than half the benefits that are prescribed by the Model Act.

Finally, Figures 5 and 6 and Table 2 present benefit measures for individual states for 1998.[15] These data indicate there is substantial interstate variation in the generosity of cash benefits. Figure 5 shows that expected statutory benefits for a workers' compensation claimant in 1998 ranged from $30,907 for injured workers in the District of Columbia to $4,395 for identical injured workers in Louisiana. Figure 6 reports the

Figure 5
Expected Benefits under Current Law, By State, 1998

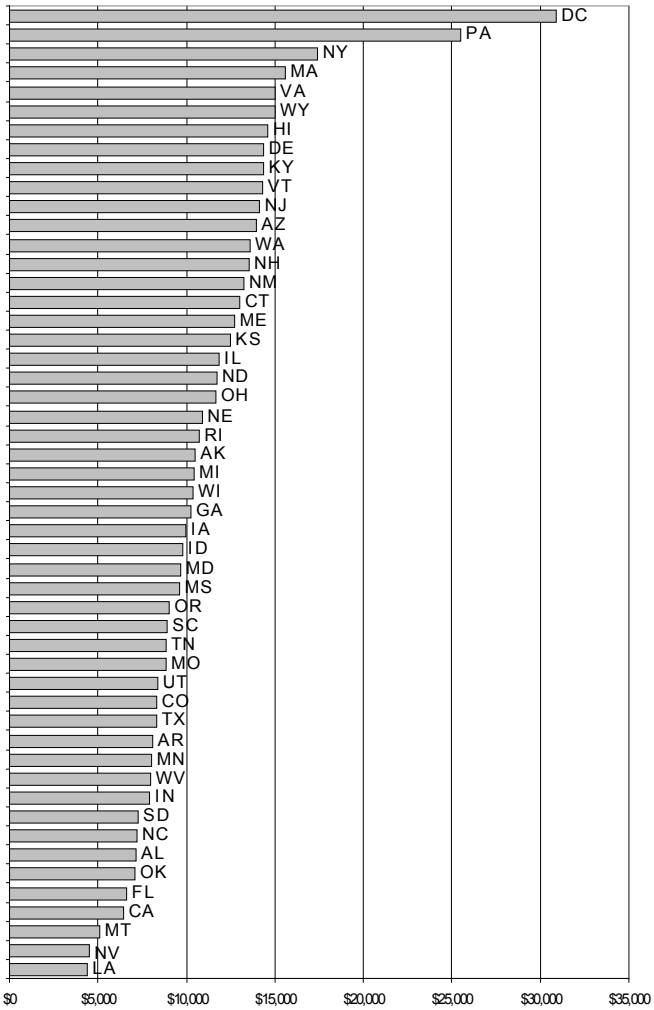


Figure 6
Ratio of Benefits under Current Law to Model Act Benefits, By State, 1998

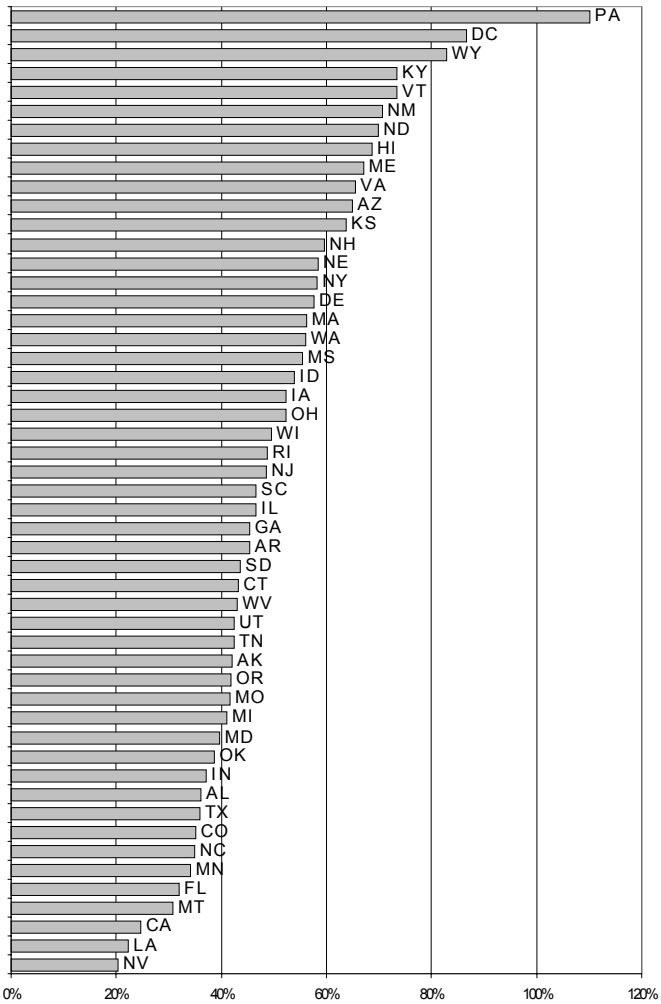


Table 2
Expected Benefits and Ratio of Statutory Benefits to Model Act Benefits, 1998, By State

State	Expected Benefits	Ratio of Benefits under Current Law to Benefits under Model Act
Alabama	$7,142	36.1%
Alaska	$10,479	42.1%
Arizona	$13,940	64.9%
Arkansas	$8,091	45.3%
California	$6,421	24.7%
Colorado	$8,319	35.2%
Connecticut	$12,995	43.2%
Delaware	$14,353	57.6%
District of Columbia	$30,907	86.7%
Florida	$6,608	32.0%
Georgia	$10,242	45.3%
Hawaii	$14,603	68.7%
Idaho	$9,790	53.8%
Illinois	$11,871	46.5%
Indiana	$7,902	37.0%
Iowa	$9,977	52.4%
Kansas	$12,515	63.7%
Kentucky	$14,347	73.5%
Louisiana	$4,395	22.3%
Maine	$12,725	67.2%
Maryland	$9,675	39.6%
Massachusetts	$15,603	56.2%
Michigan	$10,436	41.1%
Minnesota	$8,012	34.1%
Mississippi	$9,636	55.4%
Missouri	$8,830	41.7%
Montana	$5,085	30.7%
Nebraska	$10,907	58.4%
Nevada	$4,501	20.3%
New Hampshire	$13,522	59.6%
New Jersey	$14,140	48.6%
New Mexico	$13,256	70.6%
New York	$17,413	58.2%
North Carolina	$7,191	34.9%
North Dakota	$11,716	69.8%
Ohio	$11,656	52.3%
Oklahoma	$7,106	38.7%
Oregon	$9,042	41.8%
Pennsylvania	$25,513	110.2%
Rhode Island	$10,749	48.7%
South Carolina	$8,930	46.7%
South Dakota	$7,254	43.7%
Tennessee	$8,846	42.5%
Texas	$8,303	35.9%
Utah	$8,355	42.5%
Vermont	$14,295	73.4%
Virginia	$15,028	65.4%
Washington	$13,575	56.1%
West Virginia	$7,963	43.0%
Wisconsin	$10,358	49.6%
Wyoming	$14,989	83.0%

ratio of actual to *Model Act (Revised)* benefits for individual states. Using this measure, workers' compensation benefits are most generous in Pennsylvania, where the statutory benefits prescribed by the Pennsylvania workers' compensation program were 110 percent of the benefits prescribed by the *Model Act (Revised)*. On the opposite end of the spectrum, statutory cash benefits for claimants in Nevada were a little over 20 percent of the benefits that would have been prescribed if the state had adopted the *Model Act (Revised)*. Once again, the data in Figure 6 indicate that in most states benefits are inadequate if the *Model Act (Revised)* is used as an adequacy criterion.

CONCLUSIONS

Our results provide strong evidence that cash benefits prescribed by state workers' compensation statutes have barely improved since the submission of the *National Commission Report*. Our statutory benefit index has a number of advantages over other measures of benefit generosity, namely the average amount of benefits actually paid by workers' compensation programs, either per claim or per injured worker. First, actual benefit measures are not easily benchmarked using a standard like the *Model Act (Revised)*. Second, there is substantial variation among state workers' compensation programs with respect to the kind and quality of data they collect on actual benefit payments, limiting interstate comparability. Finally, actual benefits paid measures do not control for variation in the industrial, occupational, and demographic composition of employment, either across jurisdictions or over time, and this variation could significantly bias actual benefit payment measures. Simply put, a state with a high proportion of employment in relatively risk occupations would have higher actual benefit payments than a state with a lower proportion of high-risk occupations, even if the benefit formulae in effect in the two states were identical.

There are, however, some limitations to our data. Differences in the administration of workers' compensation programs can result in substantial differences between benefits expected on the basis of an actuarial assessment of state statutes and the benefits actually paid to injured workers. Actual benefits will be higher in states that administer the law in a way more favorable to claimants, while the opposite will be true for states with less liberal administration.

Overall, our data indicate that, while cash benefits prescribed by state workers' compensation programs improved somewhat in the first few years following the National Commission's report, most states' statutory benefits continue to be woefully inadequate when judged against the standards promulgated in the *Model Act (Revised)*. Only Pennsylvania prescribes benefits that meet or exceed those that would be required under this standard of adequacy. In some states, the workers' compensation statutes provide injured workers benefits that are only 20 percent of those required by the *Model Act (Revised)*. On average, state workers' compensation statutes prescribe cash benefits that are only half those that would be provided if states adopted the provisions of the *Model Act (Revised)*.

ENDNOTES

1. We use "injuries" to include injuries and diseases for the balance of this article.

2. The National Council on Compensation Insurance (NCCI) provides ratemaking and statistical services to insurers, local ratemaking organizations, and other stakeholders in about 40 jurisdictions (states plus the District of Columbia).

3. Workers' compensation programs were generally referred to as workmen's compensation programs until the late 1970s.

4. The *Model Act* was published in the 1963 and 1965 volumes of the *Program of Suggested State Legislation*, and was subsequently reprinted as *Workmen's Compensation and Rehabilitation Law With Section by Section Commentary* (Lexington, KY: Council of State Governments, 1973).

5. The three members of the National Commission who were *ex officio* members were the Secretaries of Labor, of Commerce, and of Health, Education, and Welfare.

6. National Commission on State Workmen's Compensation Laws, *The Report of the National Commission on State Workmen's Compensation Laws* (Washington, DC: Government Printing Office), 1973, hereafter the *National Commission Report*. The *National Commission Report* can be downloaded from www.workerscompresources.com.

7. *National Commission Report*, p. 119.

8. *National Commission Report*, p. 53.

9. *National Commission Report*, p. 26.

10. Glenn A. Whittington, Office of Workers' Compensation Programs, U.S. Department of Labor Employment Standards Administration, *State Workers' Compensation Laws in Effect on January 1, 2001 Compared with the 19 Essential Recommendations of the National Commission on State Workmen's Compensation Laws* (Washington, DC: U.S. Department of Labor), 2001.

11. *Workers' Compensation and Rehabilitation Law (Revised)* (Lexington, KY: Council of State Governments, 1974), hereafter *Model Act (Revised)*.

12. The maximum weekly benefit of 200 percent of the state's average weekly wage recommended by the National Commission for other types of cash benefits was used for PPD benefits.

13. State data on annual employment covered by the unemployment insurance program are used as weights.

14. The variation among states in expected workers' compensation benefits is measured by the standard deviation.

15. State specific data on real expected benefits paid to workers with at least one day of disability, for the period 1975 to 1995 may be found in Terry Thomason, Timothy P. Schmidle, and John F. Burton, Jr., *Workers' Compensation: Benefits, Costs, and Safety under Alternative Insurance Arrangements* (Kalamazoo, MI: The Upjohn Institute for Employment Research), 2001, Appendix D, pp. 402-5.

16. Each state workers' compensation statute provides a nominal replacement rate for each type of cash benefit. A typical nominal replacement rate is 66 2/3 percent of preinjury gross wages. However, a worker's actual replacement rate can be less than the nominal replacement rate if the worker is a high-wage worker whose benefits are limited by the program's maximum weekly benefit. Conversely, a worker's actual replacement rate can be higher than the nominal replacement rate if the worker is a low-wage worker whose benefits are increased by the program's minimum weekly benefit. We consider the effects of the maximum and minimum weekly benefits on the nominal replacement rate in our calculations of the average weekly benefit received by injured workers.

17. Our methodology is explicated in Terry Thomason, Timothy P. Schmidle, and John F. Burton, Jr., *Workers' Compensation: Benefits, Costs, and Safety under Alternative Insurance Arrangements* (Kalamazoo, MI: The Upjohn Institute for Employment Research), 2001, Appendix D, pp. 393-407.

18. The distribution of dependency status is based on fatal cases.

19. Social security benefits are based on the claimant's wage history over a lengthy period rather than the pre-injury weekly wage. Since we lacked information on the earnings history of workers' compensation claimants and how that history relates to our wage distribution, we assumed that the pre-injury wage accurately reflects current annual earnings, which, in turn, accurately reflects the claimant's wage history.

20. The workers will qualify for medical benefits and may also qualify for PPD benefits if their injury results in a permanent impairment even if they do not qualify for TTD benefits.

21. We used the same wage for each state that was used to calculate the expected temporary total disability benefits based on actual provisions in the state workers' compensation statute (shown in Figure A.1) to calculate the expected temporary total disability benefits in the state if the Model Act provisions were in effect in the state.

22. Of course, not all claimants will experience all four periods, depending on the age and family status.

23. A few states (e.g., New Mexico, California, and Montana) use formulae that incorporate factors such as the level of education, occupation, and age to determine lost earning capacity for a given functional impairment. In those states, we use CPS employment data and claims data from the New York State Workers' Compensation Board to determine the average lost earnings capacity for a given degree of functional impairment, which is then linked with the NCCI PPD distribution.

24. Monroe Berkowitz and John F. Burton, Jr., *Permanent Disability Benefits in Workers' Compensation* (Kalamazoo, MI: The W.E. Upjohn Institute for Employment Research), 1987.

25. In many states benefit payments to dependent children may continue while the child is enrolled in an educational institution after the age of majority until a somewhat later age, typically age 21 or 22.

APPENDIX

Methodology Used to Calculate Statutory Benefit Generosity

Assessing the relative generosity of the cash benefits paid by the various workers' compensation programs is difficult, in part because benefits are based on a number of parameters that vary substantially across jurisdictions. Each beneficiary typically receives a periodic payment (usually a weekly benefit), which depends on the injured worker's pre-injury wage, the severity of the claimant's disability, and the statute applicable to the worker. The duration of these benefit payments depends on the severity of the claimant's disability, although there are limits on benefit duration that vary both across states and, within a state, among injury types.

Thus, it is difficult to accurately assess the generosity of statutory benefit formulae across states or over time using only a few parameters, such as the nominal replacement rate (e.g., benefits are 66 2/3 percent of the worker's preinjury wage) or the weekly benefit maximum.[16] Instead, an accurate evaluation of generosity requires the evaluation of the cash benefits paid to a representative distribution of workers' compensation claims that varies along most of the dimensions used to determine benefits in the various state programs. We apply each state's statutory formulae to determine the benefits paid to each claim in that distribution, and we then calculate the average benefit paid to all claims in the distribution. In this article, we use this type of actuarial procedure to assess cash benefits paid by state workers' compensation programs for each year in the period from 1972 to 1998.

Workers' compensation statutes typically use a four-part classification scheme to categorize cash benefits: temporary total disability (TTD); permanent total disability (PTD); permanent partial disability (PPD); and fatalities (Fatals). For each type, total expected benefits are equal to the product of: (1) the average weekly benefit and (2) the duration of benefit payments in weeks. We calculate these two components separately using appropriate wage or duration distributions; we then take the product to obtain the total expected benefit amount for each benefit type. These separate benefit type estimates were then combined, using a national distribution of claims by type, to produce an overall expected benefit estimate for all disabling injury and illness claims. In the remainder of the Appendix, we describe the methods used to calculate each component of the overall estimate.[17]

Weekly Benefits

Similar methods were used to calculate weekly benefits for all four types. The basic procedure was to first construct a hypothetical wage distribution for each state, by centering a national wage distribution on the average weekly wage paid to workers covered by unemployment insurance in the state. We then calculate benefits paid to each worker in this distribution using the nominal replacement rate and the weekly benefit minimums and maximums prescribed by the state statute in effect on January 1 of each year in our study. An average weekly benefit for each state and year was then obtained by averaging across all workers in the distribution.

In some jurisdictions, it was necessary to modify this basic amount for one of at least four reasons. First, in some states weekly benefits depend on the number of the persons dependent on the claimant at the time of injury. In those instances, a distribution of claims by the injured worker's family status[18] – which is described in more detail below – was combined with the wage distribution, benefits were calculated for each claim in the combined distribution, and an average was taken for the entire claim distribution.

Second, in most states the nominal replacement rate is a percentage of the worker's preinjury gross weekly wage. However, in some states the nominal replacement rate is a percentage of spendable earnings (or after-tax income). In those cases, the before-tax wage distribution was converted to an after-tax wage distribution by deducting the estimated federal and state income taxes as well as FICA. Taxes were calculated on the basis of the claimant's presumed tax status given the number of dependents assumed by the combined wage-family status distribution. Once again benefits were calculated for each claim in the distribution and an average was taken.

Third, in some states weekly benefit payments are reduced by the payment of other benefits, most notably social security old age and survivors (OAS) and social security disability (SSDI) benefits. This amount, otherwise known as an offset, was calculated for each claim in the combined wage-family status distribution to determine the social security monthly benefit due the claimant, which was converted to a weekly amount. We assumed that SSDI only applied to PTD claims, that OAS benefits only applied to PTD and fatal claims, and that other offsets (such as unemployment insurance) were not applied to any workers' compensation benefits.[19]

Finally, in some states the weekly benefit is indexed to changes in the cost of living or the state's average weekly wage. In those states, we have inflated the duration of PTD, PPD, or fatal claims as appropriate to account for inflation. If benefits were indexed to the CPI, benefits were increased by four percent annually. If benefits were tied to the state's average weekly wage, we assumed a six percent inflation rate for benefits.

Temporary Total Disability Benefits

Duration. Statutory provisions may limit the duration of TTD benefit duration in three ways. First, in all states, claimants do not receive payment for the first few days of disabil-

ity. This form of a deductible, known as a waiting period, is three to seven days (depending on the state). Claimants with disabilities that are less than the waiting period receive no TTD benefits.[20] Second, if the disability continues for a longer period – known as the retroactive period, which is 10 days to two weeks in most states – the claimant will be retroactively compensated for disability during the waiting period. Third, a handful of states limit the number of weeks the claimant and/or the dollar amount of TTD benefits the claimant may collect.

A national distribution of TTD claim durations, provided by the NCCI, was used to calculate average TTD benefit duration for each state and year after applying the statutory parameters with respect to the waiting and retrospective periods as well as any limits on TTD duration or benefits.

Temporary Total Disability Benefits in 1998. For each state in each year between 1972 and 1998, average duration for temporary total disability benefits was multiplied by the average weekly benefit to yield the total benefits paid to TTD claims. The expected temporary total disability benefits by state for 1998 are shown in Figure A1. The averages ranged from $2,173 per worker in the District of Columbia to $569 per worker in Oklahoma.

Table A1
Model Act Provisions

- **Temporary Total Disability**
  - ***Weekly Benefit***
    - Maximum = 200 percent of state average weekly wage (SAWW) lagged three years
    - Minimum = 20 percent of SAWW lagged three years
    - Nominal replacement rate = 66 2/3 percent
  - ***Duration***
    - Waiting period = 3 days
    - Retroactive period = 14 days
    - No other limit on duration

- **Permanent Total Disability**
  - ***Weekly Benefit***
    - Same as TTD
    - Indexed to change in SAWW
  - ***Duration***
    - No limit

- **Permanent Partial Disability -- Unscheduled**
  - ***Weekly Benefit***
    - Maximums and minimums identical to TTD
    - Nominal replacement rate = 66 2/3 % of lost wage-earning capacity
  - ***Duration***
    - No limit

- **Fatalities**
  - ***Weekly Benefit***
    - Maximum = 200 percent of state average weekly wage (SAWW) lagged three years
    - Minimum = 50 percent of SAWW lagged three years
    - Nominal replacement rate = 66 2/3 percent
    - Offset by 100 percent of Social Security retirement benefits
    - Indexed to change in SAWW
  - ***Duration***
    - Ceases upon remarriage
    - Upon remarriage, spouse receives two years of benefits

- **Permanent Partial Disability – Scheduled injuries**
  - ***Weekly Benefit***
    - Minimum & maximum identical to TTD
    - Nominal replacement rate = 55 % of wage loss, except for scheduled injuries involving total loss or total loss of use of a major member, for which the nominal replacement rate is 66 2/3% of lost wage-earning capacity.
  - ***Duration***
    - Determined by following schedule:

Injury Type	Weeks	Injury Type	Weeks
Arm, above elbow	360	4th finger, 1st phalange	8
Arm, below elbow	324	4th finger, 2nd phalange	16
Hand	324	Leg, above knee	240
Thumb, 1st phalange	65	Leg, below knee	168
Thumb, 2nd phalange	130	Foot	168
1st finger, 1st phalange	40.5	Great toe, 1st phalange	15
1st finger, 2nd phalange	81	Great toe, 2nd phalange	30
2nd finger, 1st phalange	32.5	Lesser toe, 2nd phalange	12
2nd finger, 2nd phalange	65	One ear	35.28
3rd finger, 1st phalange	16	Two ears	208
3rd finger, 2nd phalange	32	Eye, enucleation	150
		Eye, loss of vision	150

Figure A1
TTD Benefits, By State, 1998

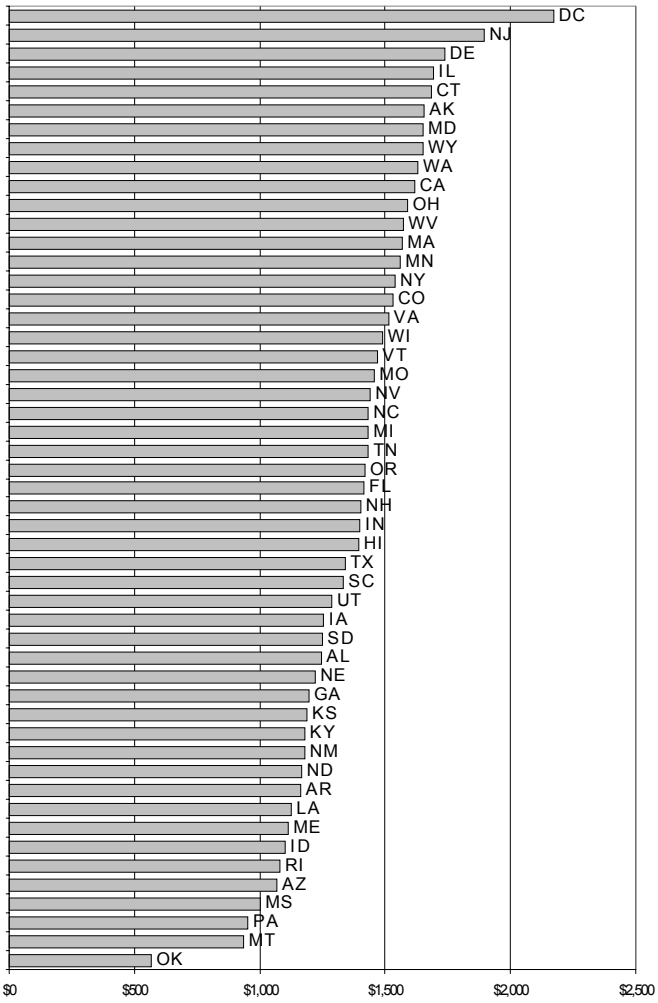
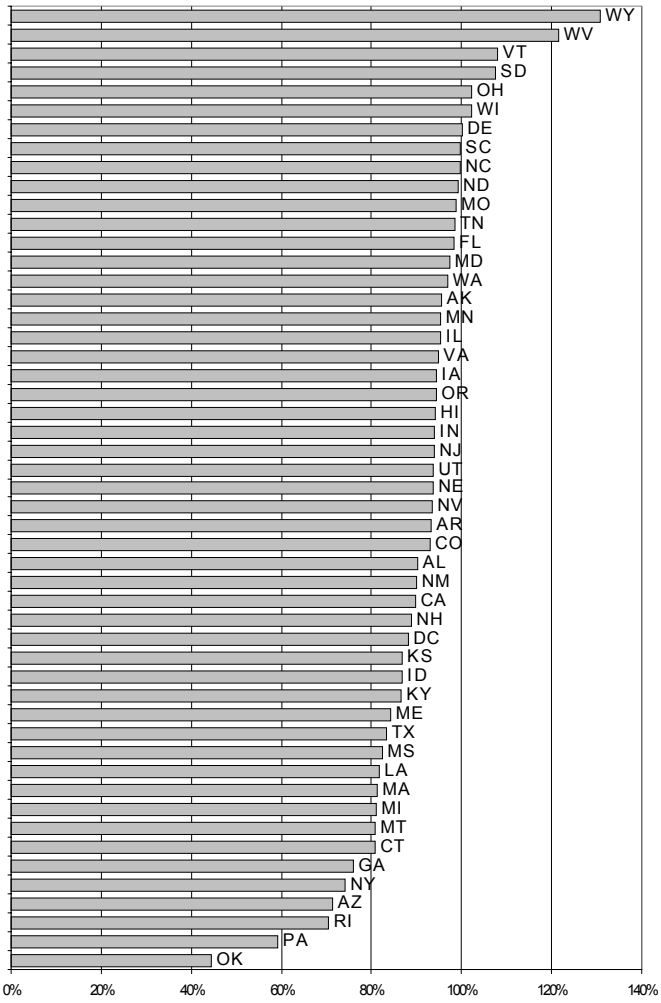


Figure A2
TTD Benefits, Ratio to Model Act, By State, 1998



As a basis for evaluating the adequacy of the temporary total disability benefits prescribed by state workers' compensation statutes, we also calculated the benefits that would have been paid by each jurisdiction if it had adopted the provisions of the *Model Act (Revised)*, which are summarized in Table A1.[21] As we previously discussed, the *Model Act (Revised)* parameters offer a widely accepted standard by which to judge the adequacy of cash benefits provided by state workers' compensation statutes. Figure A2 shows the ratio of actual statutory temporary total benefits to *Model Act (Revised)* temporary total benefits for individual states. Using this measure, temporary total disability benefits are most generous in Wyoming, where the benefits prescribed by the statute were 130 percent of the benefits prescribed by the *Model Act (Revised)*. Temporary total disability benefits in 1998 were least generous in Oklahoma, where the benefits prescribed by the statute were less than 45 percent of the benefits prescribed by the *Model Act (Revised)*.

Permanent Total Disability Benefits

Duration. Some jurisdictions limit the duration of PTD benefits and/or or the total amount of benefits paid. Unless such a limit was specifically mentioned in the statute, we assumed that PTD benefits were paid for life. In either case, we determined the duration of PTD benefits using an age distribution of PTD claims provided by the NCCI and a mortality table from the U.S. Census Bureau. The expected benefit duration, discounted at 3.5 percent and adjusted for mortality, was calculated for every claimant in the age distribution, which was then multiplied by the average weekly benefit to obtain expected total benefits.

Where the workers' compensation statute indicates that PTD benefits are offset by SSDI, the benefit period is divided into four periods: a six-month waiting period during which we assume the claimant receives no social security benefits; a period dur-

ing which SSDI includes benefits for dependent children; a period, after the children are presumed to have reached majority, during which only SSDI is paid; and a period, beginning at age 62, when SSDI benefits are no longer paid.[22] Benefit duration is calculated for each of these periods, adjusted for mortality and discounted at 3.5 percent; each component is multiplied by the applicable weekly benefit for that period.

Where social security retirement benefits offset workers' compensation, benefit duration is broken into two sub-periods – before and after age 65 – and a separate duration of each sub-period, adjusted for mortality and discounted at 3.5 percent, is calculated and then multiplied by the appropriate weekly benefit (offset or not offset).

Permanent Total Disability Benefits in 1998. For each state in each year between 1972 and 1998, average duration for permanent total disability benefits was multiplied by the average weekly benefit to yield the total benefits paid to PTD claims. The expected permanent total disability benefits by state for 1998 are shown in Figure A3. The averages ranged from $867,459 per worker in Vermont to $71,102 per worker in Louisiana.

As a basis for evaluating the adequacy of the permanent total disability benefits, we also calculated the benefits that would have been paid by each jurisdiction if it had adopted the provisions of the *Model Act (Revised)*, which are summarized in Table A1. Figure A4 shows the ratio of actual statutory permanent total benefits to *Model Act (Revised)* permanent total benefits for individual states. Using this measure, permanent total disability benefits are most generous in Vermont, where the benefits prescribed by the statute were 71 percent of the benefits prescribed by the *Model Act (Revised)*. Permanent total disability benefits in 1998 were least generous in Louisiana, where the benefits prescribed by the statute were less than

Figure A3
PTD Benefits, by State, 1998

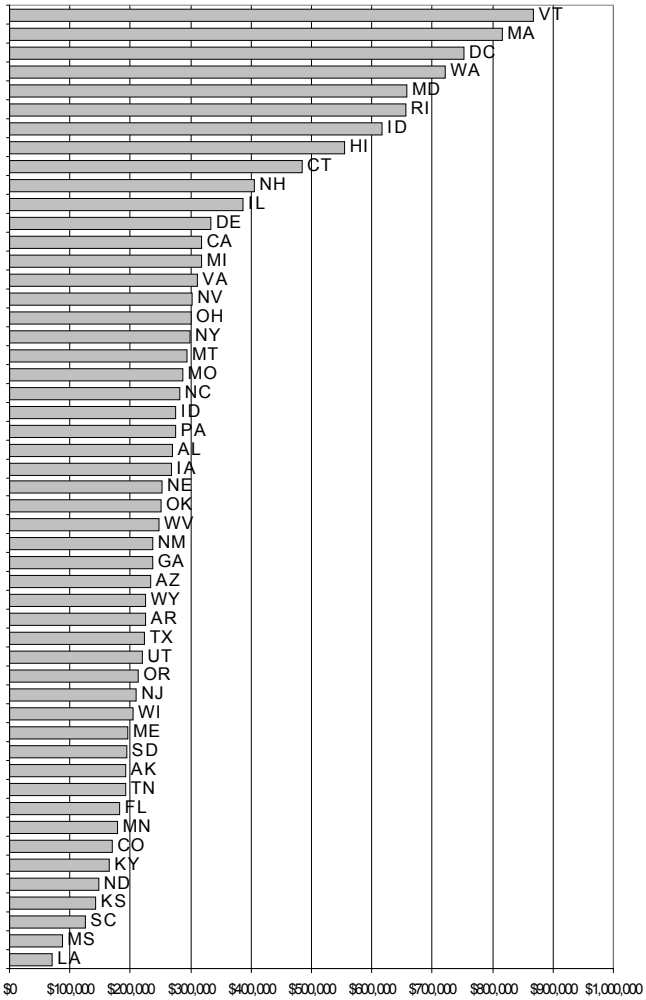
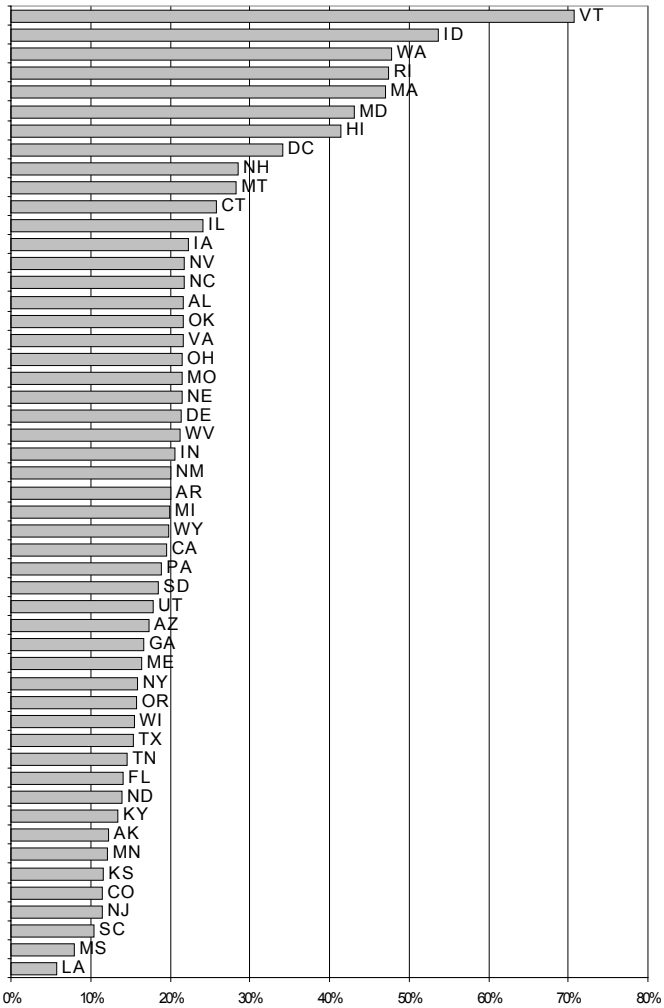


Figure A4
PTD Benefits, Ratio to Model Act, 1998



six percent of the benefits prescribed by the *Model Act (Revised)*.

Permanent Partial Disability Benefits

Duration. Most state statutes recognize two different types of PPDs: scheduled and nonscheduled. Scheduled PPD benefits are paid to claimants who have suffered injuries to an extremity (such as a leg or hand), an eye, or an ear that are included in a list or schedule in the statute. The maximum durations of scheduled benefits for the physical loss or loss of use of these body members are specified by statute. For example, in New York, a claimant who loses the use of a leg is entitled to 288 weeks of benefits, whereas a claimant who loses an arm is entitled to 312 weeks of benefits. In the event of a partial loss of a scheduled body part, benefits are pro-rated based on the amount specified for the entire loss, so that a New York claimant who suffers a 50 percent loss of an arm is entitled to 156 weeks of benefits.

The basis for nonscheduled PPD benefits – that is, PPDs involving a body part that is not specifically mentioned in the statute -- varies widely among states. In some states, nonscheduled benefits are based on the extent of permanent impairment or functional limitation – which is essentially a medical determination – while other jurisdictions evaluate the claimant's lost earning capacity, which considers the seriousness of the injury plus factors such as the worker's age, education, and work experience. In a handful of states, including New York, nonscheduled benefits are proportional to the extent of actual wage-loss, i.e., the difference between the claimant's pre and post-injury wages.

In some states, the duration of nonscheduled PPD duration is identical for all such injuries, and the weekly amount varies according to the severity of the injury, while in other states the duration varies according to the severity of the injury (i.e., the extent of lost wage-earning

Figure A5
PPD Benefits, By State, 1998

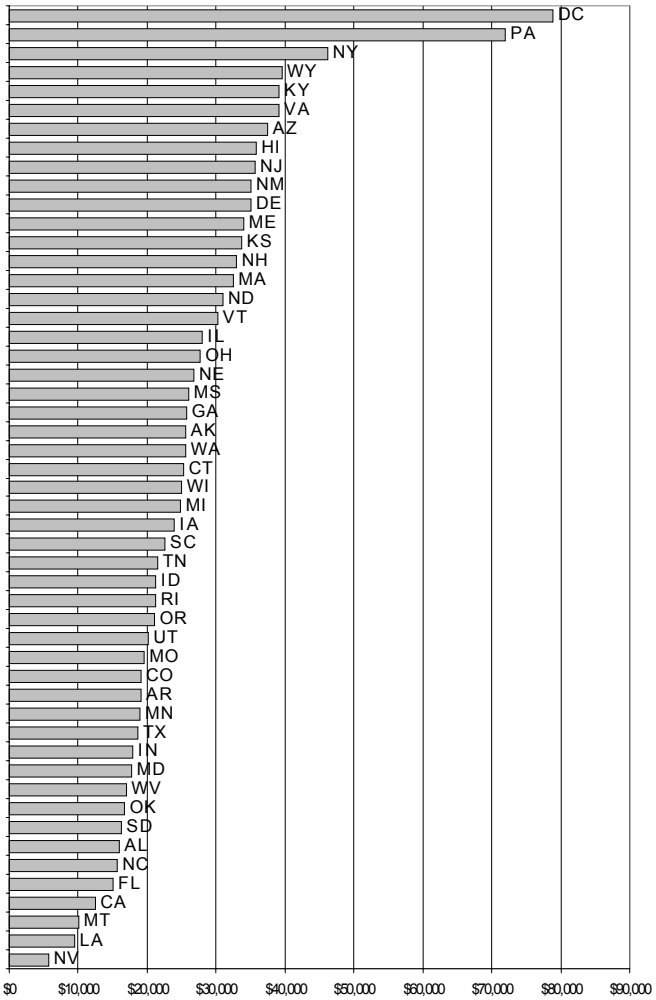


Figure A6
PPD Benefits, Ratio to Model Act, 1998

capacity or functional impairment), while the weekly benefit does not vary by severity.

For permanent impairment or loss of earning capacity jurisdictions, we utilized a national distribution of PPD claims that varied by body part and the degree of impairment.[23] For wage-loss states, we used a wage-loss distribution derived from a study by Berkowitz and Burton[24] to determine the extent of wage-loss associated with a given degree of permanent impairment. This relationship between permanent impairment and wage-loss figure was the linked with the NCCI's distribution of PPD claims by severity to create a wage-loss distribution for PPD claimants.

Statutory information was combined with the resulting PPD distribution (wage loss, earning capacity, or permanent impairment) to determine average disability duration. Similar to PTD claims, PPD benefit durations were adjusted for mortality and a 3.5 percent discount rate.

Permanent Partial Disability Benefits in 1998. For each state in each year between 1972 and 1998, the average duration for permanent partial disability benefits was multiplied by the average weekly benefit to yield the total benefits paid to PPD claims. The expected permanent partial disability benefits by state for 1998 are shown in Figure A5. The averages ranged from $78,891 per worker in the District of Columbia to $5,765 per worker in Nevada.

As a basis for evaluating the adequacy of the permanent partial disability benefits, we also calculated the benefits that would have been paid by each jurisdiction if it had adopted the provisions of the *Model Act (Revised)*, which are summarized in Table 1A. Figure A6 shows the ratio of actual statutory permanent partial disability benefits to *Model Act (Revised)* permanent partial disability benefits for individual states. Using this measure, permanent partial disability benefits are most generous in Pennsylvania, where the benefits prescribed by the statute

Figure A7
Fatal Benefits, By State, 1998

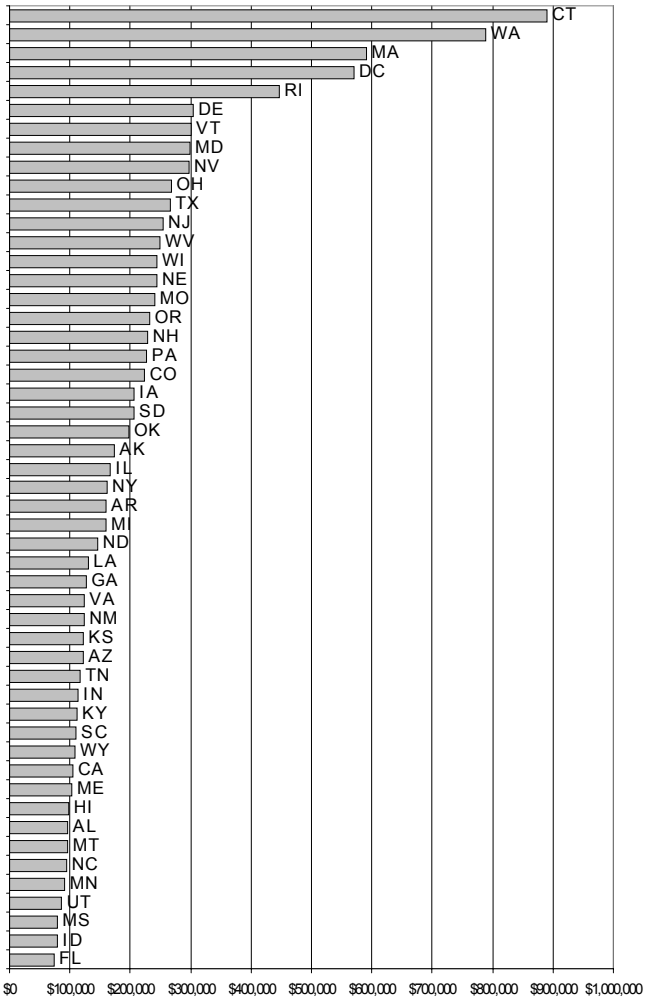
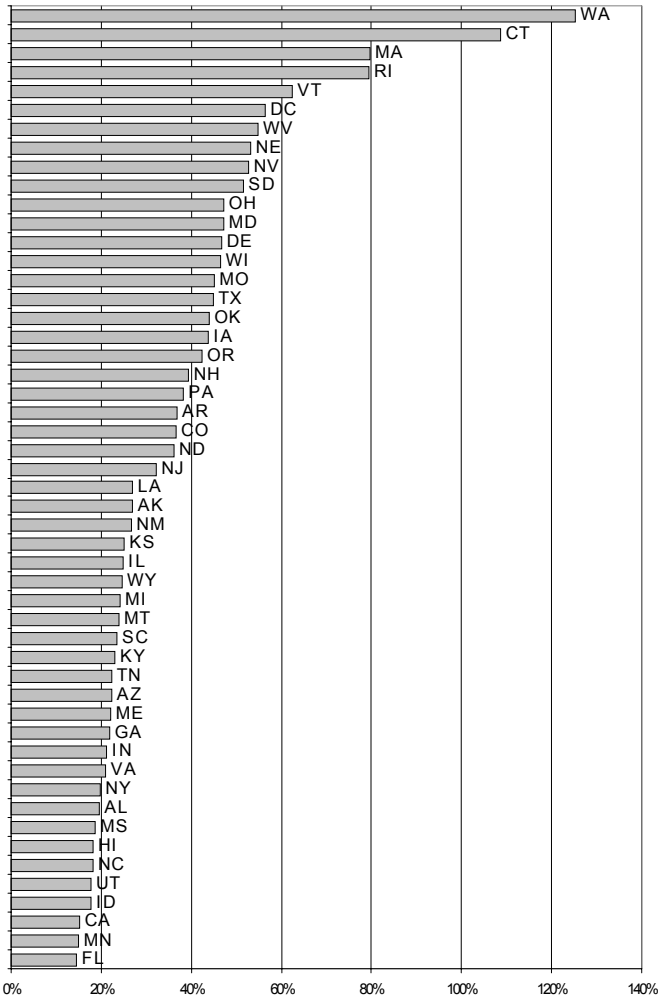


Figure A8
Fatal Benefits, Ratio to Model Act, By State, 1998



were 146 percent of the benefits prescribed by the *Model Act (Revised)*. Permanent partial disability benefits in 1998 were least generous in Nevada, where the benefits prescribed by the statute were 12 percent of the benefits prescribed by the *Model Act (Revised)*.

Table A2
Injury Distribution

Fatal Injury Claims	0.23570%
Permanent Total Disability Claims	0.31620%
Major Permanent Partial Disability Claims	8.52930%
Minor Permanent Partial Disability Claims	24.08630%
Temporary Total Disability Claims	66.83240%

Death Benefits

Duration. While states pay death benefits to a variety of dependents, NCCI claim data indicate that over 95 percent of all fatal work injury claims involve: (1) workers with no dependents entitled to benefits or (2) workers whose sole dependents are their spouses, or their spouses and children. Consequently, our death benefit estimates were based only on these two categories of fatal injury claims (and did not consider other categories of dependency, such as parents).

In most states, the death benefit is paid to the spouse until his or her death or remarriage, while death benefits are paid to children of the deceased worker until the age of majority.[25] Most states also pay a lump sum amount, typically equivalent to two years of benefits, to the remarried spouse. In some jurisdictions, there is a limit on the duration of fatal benefit payments and/or on the total amount of death benefits paid to all dependents. Finally, all states pay for funeral benefits up to a specified maximum. We assumed that maximum funeral benefits are paid in every case.

The NCCI provided us with a distribution of fatal injuries by family status, i.e., the proportion of fatal claims involving no dependents, a spouse as the only dependent, a spouse and one child, etc. These data were combined with statutory parameters to determine an average death benefit duration, adjusted for mortality and the probability of remarriage and discounted at 3.5 percent, which, in turn, was multiplied by the average weekly benefit to obtain an average total benefit for fatal claims. We also included an expected lump sum remarriage amount as well as the maximum payment for funeral expenses.

In some states, the weekly benefit payment varied with the number of dependents. For example, in Alabama the replacement rate for a spouse with no dependent children is 50 percent of the pre-injury wage, while for a spouse with dependent children, the replacement rate is 66 2/3 percent of the wage. In these cases, we calculated two average durations for fatal benefits – the duration before the children reached the age of majority and the duration thereafter – and two average weekly benefit payments for those claimants with dependent children, one based on the amount paid to a spouse with no dependent children and the other based on the amount paid to a spouse with dependent children.

Death Benefits in 1998. For each state in each year between 1972 and 1998, average duration for death benefits was multiplied by the average weekly benefit to yield the total benefits paid to death claims. The expected death benefits by state for 1998 are shown in Figure A7. The averages ranged from $889,348 per worker in Connecticut to $74,463 per worker in Florida.

As a basis for evaluating the adequacy of the death benefits, we also calculated the benefits that would have been paid by each jurisdiction if it had adopted the provisions of the *Model Act (Revised)*, which are summarized in Table 1A. Figure A8 shows the ratio of actual statutory death benefits to *Model Act (Revised)* death benefits for individual states. Using this measure, death benefits are most generous in Washington, where the benefits prescribed by the statute were 125 percent of the benefits prescribed by the *Model Act (Revised)*. Death benefits in 1998 were least generous in Florida, where the benefits prescribed by the statute were 14 percent of the benefits prescribed by the *Model Act (Revised)*.

All Types of Cash Benefits

To obtain an overall measure of the generosity of cash benefits, the separate components described above were combined using the relative frequency of each type of benefit as weights. To illustrate the procedure for 1998, we combined the data shown in Figure A1 (temporary total disability benefits), Figure A3 (permanent total disability benefits), Figure A5 (permanent partial disability benefits), and Figure A7 (death benefits) to produce an expected cash benefit for all types of claims. We used the national injury distribution shown in Table A2 for this purpose. The resulting 1998 averages for all types of cash benefits are shown in Figure 5, which is in the main body of the article. A similar procedure was used for all years between 1972 and 1998 to produce the state observations that in turn were used to produce the figures and tables in this article.

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