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Workplace Injuries and Diseases: Prevention and Compensation - Essays in Honor of Terry Thomason

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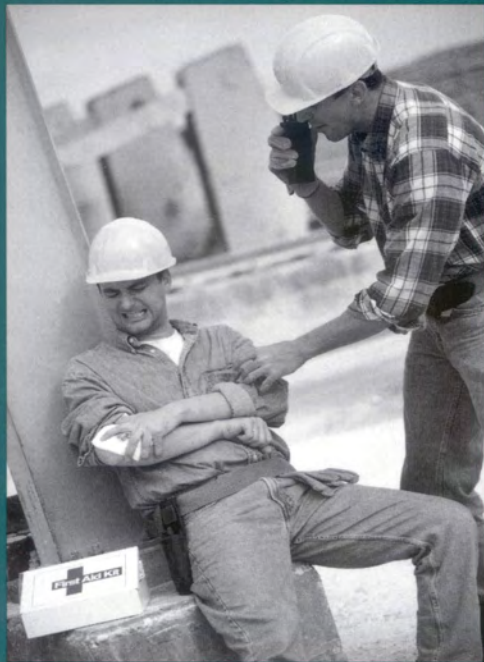
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Workplace Injuries and Diseases

**Prevention
and Compensation**



**Essays in Honor of
Terry Thomason**

**Karen Roberts
John F. Burton, Jr.
and Matthew M. Bodah
Editors**

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Preface

On March 27, 2004, a conference entitled “Workers’ Compensation: Current and Emerging Issues” was held at the University of Rhode Island. The conference was convened in memory of Terry L. Thomason, who served as director of the university’s Schmidt Labor Research Center from the summer of 1999 until the time of his death on April 20, 2002. The chapters in this volume were first presented as papers at the conference.

Special thanks go to all the authors who prepared papers and presentations for the conference, and subsequently revised their work for inclusion in this volume. Their hard work and dedication honors Terry Thomason’s memory.

Thanks go as well to the conference’s additional speakers: Honorable George E. Healy, chief judge of the Rhode Island Workers’ Compensation Court; George H. Nee, secretary-treasurer of the Rhode Island AFL-CIO; and Sheldon Sollosy, chairman of the board, Beacon Mutual Insurance Company. Conference moderators Charles T. “Ted” Schmidt, Amy Tabor, and Timothy P. Schmidle are also thanked, as are Richard Scholl, current director of the Schmidt Labor Research Center; Mary Pinch, the Center’s secretary, who handled conference logistics; and graduate students Andrea Cecconi and Mohammad Abbas Ali.

The conference could not have taken place without the generous financial support of the following sponsors: Beacon Mutual Insurance Company, Julie Grand-Landau, the Rhode Island Department of Labor and Training, Greater Rhode Island Industrial Relations Research Association, and the faculty of the Schmidt Labor Research Center.

Finally, neither the conference nor this volume would have been possible without the support and guidance of Terry’s wife, Julie Grand-Landau. Julie provided both moral and financial support to the project from the very beginning. All of us involved in this volume intend it to be a lasting tribute to Terry and a gift from our hearts to Julie.

Matthew M. Bodah

Foreword

This volume is dedicated to the memory of Terry Thomason, who was a distinguished scholar, an outstanding teacher and administrator, and a good friend of those who contributed chapters to this endeavor. Terry died April 20, 2002, at his home in Newport, Rhode Island, at the age of 51. His death extinguished a life and career much too soon. Yet, Terry left a legacy in his research and his contributions to his profession, his family, and his friends that will persist for decades.

Born in California and raised in Alabama, Terry received an undergraduate and two graduate degrees from the University of Alabama in the 1970s. He then worked as supervisor of personnel for the Newport News Shipbuilding and Dry Dock Company for almost five years, where he mastered the real-life lessons of labor relations. He enrolled in the Ph.D. program in Industrial Relations at Cornell University in 1984, where I met him. We worked on several research projects together, I served as the chair of Terry's dissertation committee, and he became a virtual member of our family.

Terry joined the faculty of management at McGill University as an assistant professor in 1988 and was promoted to associate professor in 1994. Although he was a relatively junior faculty member, Terry assumed much of the responsibility for maintaining the industrial relations program at McGill. Terry then became the director of the Schmidt Labor Research Center and a professor at the University of Rhode Island (URI) in 1999. During his brief tenure at URI he took the lead in revising the graduate curriculum and earned the admiration of his colleagues.

Active in the Industrial Relations Research Association (IRRA), Terry co-edited a volume on disability in the workplace, contributed chapters to that and other IRRA research volumes, and was a member of the IRRA Editorial Committee. He was also active in the National Academy of Social Insurance, where he served on the Steering Committee on Workers' Compensation and served on a committee that examined the adequacy of workers' compensation benefits.

Terry published more than 40 articles, chapters, books, and studies. I will only mention a few here in order to illustrate the depth and breadth of his research. He is probably best known for his research on workers' compensation and related topics, which corresponds to the scope of this volume. One aspect of his research concerned dispute resolution and claims handling. His research on the New York workers' compensation program (Thomason and Burton 1993) found that the use of lawyers increased the probability that workers would settle their claims with a lump sum (rather than receive continuing cash

benefits) and that the settlements substantially reduced the amount of benefit received by the workers. He was subsequently a coauthor of a survey of disputes and dispute resolution with two contributors to this volume (Thomason, Hyatt, and Roberts 1998).

Another strain of Terry's research on workers' compensation pertained to the effect of experience rating on workplace safety. In theory, experience rating should encourage employers to promote safety since fewer injuries result in lower insurance premiums. But some scholars, including Les Boden, another contributor to this volume, have expressed reservations about the effect of experience rating, in part because employers can reduce their insurance premiums by fighting claims as well as improving safety. Terry and Silvana Pozzebon (2002) sent a questionnaire to Quebec employers to try to separate these possible reactions by employers to experience rating, and found that both types of behavior occurred. Terry also wrote a chapter (Thomason 2003), published posthumously in a volume dedicated to his memory, that examined the relationships between workplace safety and experience rating and other economic incentives. This is an excellent overview of research in this area, including Terry's own work, and is reprinted as a chapter in this volume.

Two other strains of Terry's research on workers' compensation are health care costs in workers' compensation and comparisons of the U.S. and Canadian workers' compensation programs. Silvana Pozzebon and Terry (1993) provide an example of the intertwining of these strains. More recently, Thomason and Burton (2001) documented the increasing disparity in medical costs between the Ontario workers' compensation programs and the programs in the United States. This finding is one of the topics examined in the chapter by Cam Mustard and Sandra Sinclair included in this volume.

Terry's major contribution in recent years in workers' compensation involved the study of the effect of alternative insurance arrangements on the employers' costs of insurance and on safety in the workplace. Although Timothy Schmidle and I had both written dissertations examining the determinants of interstate differences in the costs of workers' compensation insurance, Terry considerably expanded the theoretical sophistication and rigor of the statistical analysis in this area in Thomason, Schmidle, and Burton (2001). Among the most significant findings is that the deregulation of the insurance market in most states in recent decades had been associated with a substantial (approximately 11 percent) reduction in insurance rates after controlling for a myriad of factors, such as the level of benefits and the injury rates in the various states. The quality of this study was recognized when the Industrial Relations Section at Princeton University selected it as one of the *Noteworthy Books in Industrial Relations and Labor Economics, 2001*.

Terry's research interests included areas other than workers' compensation. A recent volume, again published after Terry's death and dedicated to him, contained a chapter (Thomason and Burton 2003) examining the changes in the extent of unionization in the public and private sectors. Terry was responsible for the most provocative part of the study, which examined the extent of privatization between 1983 and 2002 in four sectors: hospitals, urban transit, sanitary services, and elementary and secondary education. In all of these sectors, the share of employment in the private sector increased, and in three of the sectors, the proportion of the total workforce (public and private) unionized declined. In education, the private share of employment increased modestly, but the unionization rate of the total workforce was stable, in part because the proportion of teachers in the private sector who were unionized increased.

Terry was also interested in unions and collective bargaining in Canada and in international comparisons. In Thomason and Pozzebon (1998), he and Silvana reported on a survey of union organizers in Quebec and Ontario and found much less evidence of management opposition to unions in these provinces than other studies have found among managers in the United States. They attributed part of the difference to the legal environment in the two countries.

This survey, though truncated, should convey the range of interests, the productivity, and the quality of Terry's research. I was fortunate to have collaborated with Terry on several of these studies. Originally, I was the teacher and Terry was the student, but over the 15 years of our association, he became the senior scholar and I was the learner. He became a master of abstract theory and modern econometrics. He also became an excellent writer who could translate complicated relationships into comprehensible manuscripts. He was also a great collaborator, as was particularly evident in the volume on insurance arrangements involving Terry, Tim Schmidle, and myself, where we each found our area of comparative advantage and we interacted to produce a product that exceeded our individual contributions. Terry also had the ability to prod his colleagues into moving the project along, an attribute affirmed by Silvana Pozzebon, who reports that Terry was "infinitely patient when it came to running regressions, [but] was less so when it came to some of the other, more 'boring' aspects of the research project . . . I suspect my perfectionist tendencies drove Terry crazy."

Even if Terry may have occasionally shown exasperation with his research colleagues, it is hard to imagine a nicer person to work with or—of greater significance—to be around outside of the workplace. One reason is that he always had nonwork interests that could be kindled. In 1990s, as his devotion to the University of Alabama football waned due to the distance between Tuscaloosa and Montreal and the lack of Tide luster on the gridiron, he became a fan of the Montreal Expos. As their fortunes wilted, Terry turned to the study of

Canadian politics for his avocation. His specialty was the separatist movement in Quebec. Not bad for a McGill Professor who spoke French with a southern accent!

At his memorial service, both Matt Bodah and Barbara Webster described Terry as “a gentle spirit,” and Les Boden called him “a lovely, gentle person.” His death was a loss to his wife, Julie Grand-Landau, his mother, Betty (Oates) Thomason, his brother, Kevin Thomason, and all his friends, including the contributors to this volume. We are all honored to dedicate this volume to his memory.

John F. Burton Jr.

A Selected Bibliography of Terry Thomason's Publications

1976

(with Dennis Runcie, A.A. Baumeister, and K.C. Gilbert) "Negative Transfer: Choice Reaction Times to Paired Associates." *American Journal of Psychology* 89(3): 431–442.

1988

(with John F. Burton Jr.) "The Extent of Collective Bargaining in the Public Sector." In *Public Sector Bargaining*, Benjamin Aaron, Joyce Najita, and James Stern, eds. Madison, WI: Industrial Relations Research Association, pp. 1–51.

1991

"Are Attorneys Paid What They're Worth? Contingent Fees and the Settlement Process." *Journal of Legal Studies* 20(January): 187–223.

1992

(With Harris L. Zwerling and Pankaj Chandra) "Labor Relations in the Canadian Textile Industry." In *Industrial Relations in Canadian Industry*, Richard P. Chaykowski and Anil Verma, eds. Toronto, ON: H.B.J. Holt Publishers.

1993

(with John F. Burton Jr.) "Economic Effects of Workers' Compensation in the United States: Private Insurance and the Administration of Compensation Claims." *Journal of Labor Economics* 11(1): Part 2, January: S1–S37.

(with Silvana Pozzebon) "Medical Benefit Costs of Workers' Compensation in Canada: A Comparative Perspective." *Benefits Quarterly* 9(4): 32–41.

1994

"The Effect of Accelerated Certification Procedures on Union Organizing Success in Ontario." *Industrial and Labor Relations Review* 47(2): 207–226.

1995

(with Harris L. Zwerling) "Collective Bargaining and the Determinants of Teachers' Salaries." *Journal of Labor Research* 16(4): 467–484.

(with Silvana Pozzebon) "The Effect of Benefits on Workers' Compensation Claims Incidence in Canada: A Micro-Level Analysis." In *Research in Canadian Workers' Compensation*, Terry Thomason and Richard P. Chaykowski, eds. Kingston, ON: IRC Press.

(with Francois Vaillancourt, Terrance J. Bogyo, and Andrew Stritch) *Chronic Stress: Workers' Compensation in the 1990s*. Toronto, ON: Howe Institute.

1997

(with Doug Hyatt) "Workers' Compensation Costs in Canada, 1961–1993." In *Transition and Structural Change in the North American Labour Market*, Michael Abbott, Charles Beach, and Richard Chaykowski, eds. Kingston, ON: Industrial Relations Centre and John Deutsch Institute, Queen's University, pp. 235–255.

1998

(with Silvana Pozzebon) "Managerial Opposition to Union Certification in Ontario and Quebec." *Relations Industrielles* 53(4): 751–772.

(with Douglas Hyatt and Karen Roberts) "Disputes and Dispute Resolution." In *New Approaches to Disability in the Workplace*, Terry Thomason, John F. Burton Jr., and Douglas Hyatt, eds. Madison, WI: Industrial Relations Research Association, pp. 269–297.

2000

"Fatality Benefits: Rationale and Practice." In *Injury and the New World of Work*, Terrence Sullivan, ed. Vancouver, BC: University of British Columbia Press, pp. 284–304.

(with John F. Burton Jr.) "The Cost of Workers' Compensation in Ontario and British Columbia." In *Workers' Compensation: Foundations for Reform*, Morley Gunderson and Douglas E. Hyatt, eds. Toronto, ON: University of Toronto Press, pp. 261–298.

2001

(with Timothy P. Schmidle and John F. Burton Jr.) *Workers' Compensation: Benefits, Costs, and Safety under Alternative Insurance Arrangements*. Kalamazoo, MI: W.E. Upjohn Institute for Employment Research.

(with John F. Burton Jr.) *The Employers' Costs of Workers' Compensation in Ontario and Other Canadian and U.S. Jurisdictions*. Report prepared for the Ontario Workplace Safety and Insurance Board.

2002

(with Silvana Pozzebon) "Determinants of Firm Workplace Health and Safety and Claims Management Practices." *Industrial and Labor Relations Review* 55(2): 286–307.

2003

"Economic Incentives and Workplace Safety." In *Preventing & Managing Disabling Injury at Work*, Terrence Sullivan and John Frank, eds. London: Taylor & Francis, Inc, pp. 183–203.

(with John F. Burton Jr.) "Unionization Trends and Labor-Management Cooperation in the Public Sector." In *Going Public: The Role of Labor-Management Relations in Delivering Quality Government Services*, Jonathan Brock and David B. Lipsky, eds. Ithaca, NY: Cornell University Press (with Industrial Relations Research Association), pp. 69–105.

1

Introduction

Karen Roberts
Michigan State University

The chapters in this volume were originally presented at a conference to honor Terry Thomason, held at the University of Rhode Island in March, 2004. This volume is designed to be a tribute to Terry in several ways. It is about workplace safety and health and issues related to prevention and compensation for occupational injuries and illnesses, a topic to which Terry devoted much of his research life. All of the authors in this volume are recognized experts on various areas of workers' compensation, but more importantly had known Terry, perhaps been able to work with him, and admired his work. The volume is intended to serve as a detailed introduction to the workers' compensation novice but also provide insights to those more familiar with the area. We hope this mirrors Terry's own approach to his research, clear and insightful, but also accessible to those less familiar with workers' compensation than he. The second chapter of this volume is a reprint of a book chapter Terry wrote on economic incentives in workers' compensation. This chapter is demonstrative of some of Terry's best qualities as a workers' compensation scholar—his instinct for the important policy and welfare questions and his ability to communicate the key issues clearly to the reader.

Since its inception, workers' compensation systems have wrestled with questions about how to best structure benefits. Traditionally, there has been a triumvirate of criteria used to evaluate benefits of workers' compensation: adequacy, equity, and efficiency. Chapters 3 and 4 deal with this problem of benefit structure and evaluation. In Chapter 3, Boden, Reville, and Biddle examine the adequacy and equity of wage replacement benefits. They frame their discussion in terms of the trade-off between benefit adequacy and cost to discuss the nature of the data that would be necessary to inform the policy discussion about benefit

levels. They begin with the topic of how to define “adequate” benefits, citing the debate and logic behind the commonly used two-thirds of gross preinjury earnings. They then move on to the challenge of measuring the unobservable lost earnings and describe the approaches in use in most of the literature. They then review the literature on benefit adequacy for all cases and permanent disability cases, showing that most studies find that the benefits fall short of adequacy norms.

Finding that the real replacement rates tend to be inadequate, Boden, Reville, and Biddle then examine the question of benefit equity—both horizontal (similar losses should receive similar benefits) and vertical (different losses should receive benefits proportional to those losses). They note the empirical difficulty of determining benefit equity but do cite examples of useful policy data, including comparing whether or not cases with similar temporary benefit durations receive permanent disability or other benefits, and the examination of whether benefit differences are proportional to loss ratings in permanent partial disability (PPD) cases. They conclude their chapter with several policy suggestions designed to improve benefit levels for those at the bottom of the benefit scale, thus at a minimum improving benefit equity, and a set of questions that, if answered, would lead to better policy.

Permanent partial disability is the most vexatious type in workers’ compensation. It is by nature complex because of the variability of the degree of injury and the effect of injury on the ability to work. Compensation for PPD is even more complex, as states vary considerably in their approaches to this sort of disability. In Chapter 4, John Burton presents a detailed discussion of the various models used in the different states for evaluating disability and structuring benefits, and then discusses a list of criteria that might be used to evaluate these different models.

Burton begins with a presentation of a conceptual framework for understanding PPD that discusses the nature of permanent injuries, possible compensation schemes, and the determination of which types of permanent injuries should be compensated, with particular emphasis on whether compensation should be for the impairment or the earnings loss and whether noneconomic losses that do not directly affect earning capacity should be compensated. Following that, Burton describes how this framework is implemented by the states. He discusses three basic approaches: 1) the permanent impairment approach, 2) the loss of

earnings capacity approach, and 3) the wage loss approach. He then discusses how the states structure benefits for these various definitions of loss. The complex set of potential PPD benefit systems begs the question Burton raises next: What criteria should be used to evaluate these different benefit delivery systems? He presents five: 1) benefit adequacy, 2) benefit equitability, 3) delivery system efficiency, 4) prevention and rehabilitation efficiency, and 5) affordability. Burton raises several research questions including whether or not these criteria are the right ones and, assuming that they are, how the different state approaches measure up.

The chapters on benefit structure serve as a good preamble to Douglas Hyatt's chapter on dispute resolution in workers' compensation, as they provide ample discussion of benefit features that could easily be disputed by the various parties. One of the initial motivations behind the passage of workers' compensation insurance statutes was to eliminate the need for tort as the sole remedy in determining whether and how much occupationally injured individuals would be compensated. For most cases, workers' compensation has succeeded in that goal, but for a significant minority, resorting to formal dispute resolution systems is necessary. In Chapter 5, Hyatt tells the story of two Canadian commissions charged with investigating and evaluating dispute resolution in workers' compensation to illustrate why cases end up in disputed status and what sort of research is needed to address those causes. His primary argument is that stakeholder discontent with the dispute resolution system cannot legitimately be seen as resulting solely from poor execution. Rather, he argues that difficulties with dispute resolution in workers' compensation and periodic increases in dispute activity arise from multiple sources: increasing complexity of work-related injuries, rising worker rights as evidenced by expanding appeal rights, the increasing awareness of inconsistencies in adjudicative decisions at the initial level, and growing use of experience rating that increases the sensitivity of employer costs to claims activity.

Hyatt describes a vicious circle at the appeals level: an efficient appeals system motivates those at the initial hearing level to pass off the more difficult cases to the appeals level, clogging that system and converting an efficient system into one that malfunctions. He suggests that more research is needed to better understand how many levels of dispute resolution is most efficient, and how alternative dispute resolution

or resorting to the court system might ameliorate current problems.

While interest in performance management and the development of good performance measures has increased in both the public and private sectors over the last several decades, workers' compensation administrative agencies have lagged behind in this area. The two chapters on benefit structure and the one on dispute resolution all highlight the need for good information with which to identify where the workers' compensation system is succeeding, needs adjustment, or is failing. Chapter 6, by Allan Hunt, provides an overview and description of the current state of performance measurement and management information systems in workers' compensation. Hunt begins with a description of the history of performance evaluation in workers' compensation, and while applauding past efforts, he notes several weaknesses, including inconsistent measures across states, the inclusion of some measures that are beyond control of the state agencies, and data that only permit comparison with a limited number of states.

Noting that performance measurement is more highly developed in the publicly administered jurisdictions in Canada and Australia, Hunt demonstrates how the combination of descriptive information can paint a telling picture of strengths and weaknesses of a claims system by combining basic descriptive statistics that make interjurisdictional comparisons. The chapter concludes with a discussion of state-of-the-art programs under way in both the United States and Canada. One such program, from the Nova Scotia Workers' Compensation Board, shows a well-conceived multistep system linking organizational goals to organizational outcomes.

Workers' compensation is primarily designed to compensate injured workers during their recuperation and pay for their medical care. However, it is also often described as providing safety incentives through its pricing structure. In Chapter 7, Karen Roberts examines how workers' compensation insurance is priced and what incentives are embedded in that price structure. The chapter begins with a description of how premium is determined. She contends that while the pricing structure is commonly presented as containing safety incentives to employers, because profit-maximizing insurers rather than welfare-maximizing government determines the pricing structure, there is reason to question the effectiveness of pricing as a safety-promotion tool. In the next two sections, Roberts examines the incentives this pricing structure is

intended to have on employers and the insurer perspective on pricing, respectively.

Although there is evidence that experience rating may have an effect on employer safety behavior, Roberts discusses several of the weaknesses in the relevant research, in particular, the use of proxy measures for experience rating and evidence that employers may not understand pricing sufficiently well to respond to its incentives. She uses the insurance literature to bolster her initial contention by showing that from the insurer's perspective, the objective of pricing is to adequately cover expected indemnity, rather than to change employer safety behavior. In the final section, Roberts reviews the literature on the effect of regulating workers' compensation insurance pricing on employer incentives, in particular, how those incentives are distorted. She concludes with the question of whether it is sound policy to rely on the private insurance sector to provide workplace safety incentives.

Chapter 8 examines a contributor to cost variation—health care. One of the benefits under workers' compensation is full health care coverage for the work-related injury or illness. The vast majority of workers' compensation claims are for medical care only, and in the United States, increases in the cost of health care are important drivers of overall workers' compensation cost growth. Two Canadian researchers, Cameron Mustard and Sandra Sinclair, explore an observed but poorly understood phenomenon, specifically, that workers' compensation health care costs are lower in Canada than in the United States both in terms of real dollars per claim and as a share of total premium costs. Mustard and Sinclair identify three factors that they argue explain the difference between Canadian and U.S. costs: 1) lower medical care prices in Canada, 2) lower rate of medical care inflation, and 3) higher intensity of health care service provision in the United States.

Mustard and Sinclair frame their discussion by contrasting the predominant privately financed system in the United States to the single-payer public system in Canada. They note that the private health care system in the United States has a substantially higher rate of overhead, indicating that this market-driven system has not led to more cost-efficient delivery of care; they then discuss in what ways the market in the United States has failed. The authors explore the possibility that the higher intensity leads to better health outcomes for U.S. workers, thus justifying the higher costs, but can find no evidence of better U.S.

outcomes. Their study provides lessons about how to structure health care delivery and financing in workers' compensation as well as in the general health care system.

Workers' compensation is a multidisciplinary subject, examined through multiple lenses: economic, legal, medical, psychological, and as a form of insurance. Most of the chapters in this book take a traditional economic approach. In Chapter 9, Seth Seabury, Robert Reville, Hilary Rhodes, and Leslie Boden examine the behavioral economics perspective and how it may contribute to a better understanding of workers' compensation. Standard economic theory frequently relies on the assumption that economic actors have perfect information and behave rationally. In the context of occupational health and injury, behavioral economics departs from this assumption and focuses on how individuals accumulate and process information about risk and uncertainty. After presenting and summarizing the research on compensating wage differentials, the standard economic approach, they present prospect theory, a behavioral economic framework.

Prospect theory postulates about the decision rules individuals use when faced with imperfect information and the systematic errors people appear to make in assessing risk. Specifically, Seabury and his coauthors examine three biases: 1) the availability bias, 2) the optimism bias, and 3) the accumulation bias, each of which distorts individual understanding of risk and subsequent behavior. Following this discussion, the authors detail the nature of irrationality as presented by prospect theory, where individuals fail to accurately match risk to potential gains and losses. They then discuss the implications for prospect theory for the use of the standard model. Their discussion generates a wealth of ideas for future research. Examples include incorporating how individuals perceive risk, as opposed to actual risk, in determining compensating wage differentials, examination of how worker learning about risk affects bias and decision making, and the use of risk perceptions in providing safety incentives and promoting safety.

Most workers' compensation programs are state-based, and although they all share certain basic features, there is considerable diversity across states. On occasion, the policy suggestion is made that workers' compensation could be more simply and fairly administered if it were a federal program. In Chapter 10, Peter Barth's description of the Black Lung Program, a federally administered program designed

to provide compensation to workers with occupational disease due to coal dust exposure, is a cautionary tale for advocates of federalization of workers' compensation. Barth's chapter chronicles the legislative history of several programs collectively referred to as the Black Lung Program.

Barth's description details policy formation based on insufficient understanding of the scope of the problem, inadequate understanding of the state programs with which the federal program was to eventually coordinate, and changes in federal government administrations that brought significant changes in ideological perspectives on how best to address problems of occupational disease. Barth notes that, despite the long history, the problems emanating from this program are relevant today: the Black Lung Trust Fund is currently in serious debt, and a new federal occupational disease program for energy employees has just been created. The chapter concludes with a set of lessons learned from the Black Lung Program, which is of great value to policymakers.

The final chapter in the book, Chapter 11, tells a political success story, one where contention in the workers' compensation system had brought the state to the brink of collapse, but where vision and courage by stakeholders who had been adversaries turned the situation around, making the state system a model of cooperative problem solving. Matthew Carey begins his chapter with a description of the Rhode Island system leading up to its 1990 crisis, when the dispute system had bogged down and the National Commission on Compensation Insurance had proposed a 132 percent increase in rates to cover expected benefit and claims costs. Carey then goes on to describe specific reforms in the critical areas of the Rhode Island workers' compensation system: implementation of a pretrial conference to streamline adjudication, use of nonprejudicial agreements for benefit payments and settlements, installation of penalties for fraud for both parties, a change in partial disability compensation, designation of Beacon Mutual as a competitive state fund, and the creation of a multistakeholder advisory council. Perhaps the most significant of these is the latter, as it has proved to be a forum for cooperative problem solving for nearly 15 years.

For a variety of reasons, workers' compensation has been declining as a share of the total wage bill for over a decade. Nevertheless, approximately \$50 billion worth of benefits are paid annually to injured workers. Real costs are higher than that because of the cost of program

administration, disputes, and profit. This volume provides an overview of most of the central features of workers' compensation and some of the research gaps that need to be filled for this type of social insurance to be more efficiently and equitably administered. Approximately 1 in 20 full-time equivalent workers becomes injured at work per year, so the need for effective disability insurance will continue. This volume is intended to contribute to the ongoing effort to improve workers' compensation.

2

Economic Incentives and Workplace Safety

Terry Thomason

The problem of work injuries is a substantial one. Recent estimates put the cost of workers' compensation benefits paid to injured Canadian workers and their families at more than \$6 billion annually, or nearly 1 percent of gross domestic product. In the United States, workers' compensation benefit payments amount to over \$40 billion annually. And workers' compensation benefit payments represent only a small portion of the economic costs of work injuries. Work injuries also entail losses due to lost production, damage to plant and equipment, and the uncompensated losses suffered by injured workers that are estimated to be as much as four times the cost of benefits (Heinrich et al. 1980).

The remainder of this chapter proceeds as follows. The next section discusses the economic theory of work injuries and illnesses. Specifically, this section examines employer and worker incentives for safety in the absence of government regulation. The chapter then discusses safety incentives created by different types of government regulation. Conclusions are drawn in the final section.

ECONOMIC THEORY OF WORK INJURIES AND ILLNESSES

Work injuries are an unwelcome by-product of economic activity. In part, they are random events, but they are also, to some extent, under the control of workers and employers. Employers can reduce the number of workplace injuries and illnesses by investing in safer technology, providing workers with personal protective equipment (such as hard hats and safety glasses), training workers and their supervisors, etc.;

workers can avoid accidents by following safe work practices and by taking greater care on the job.

Both parties incur costs when an accident occurs. Workers' costs include potential loss of income and medical expenses associated with treatment and rehabilitation as well as intangibles, such as pain and suffering and disability that reduces the ability to enjoy leisure activities. Employers' costs include interruptions in production and damage to capital equipment and physical plant.

Since accident prevention also entails costs to employers and employees, public policy should encourage employers and employees to minimize the combined costs of accidents and accident prevention that are incurred by both workers and employers.¹ It is possible to spend both too much and too little on accident prevention. Investment in accident prevention is *socially efficient* when total costs are minimized, that is, when an additional dollar spent on prevention reduces accident costs by exactly one dollar.

As indicated, both employers and workers affect workplace health and safety. We can expect that—if they are rational—both actors will make accident prevention decisions that are *privately efficient*. That is, we may expect that each will make decisions that minimize their own accident and accident costs individually; however, their decision making process may not consider costs that are incurred by the other party.

However, under some conditions, it is at least arguable that employers do consider the workers' accident costs when making investments in workplace health and safety and thus make socially efficient decisions as well. To understand this argument, let us consider a world where there are two types of employers, those with safe workplaces and those with hazardous ones. Assume that workers employed by safe firms do not risk having an accident or illness while at work—i.e., the probability of injury or illness is zero—while one of every ten workers employed by hazardous firms will have an occupational accident each year. Let us further assume that workers are aware of the probability of accidents at both types of firms and that they are free to choose the type of firm for whom they will work.

Under these assumptions, we may expect that if everything else were equal—i.e., the compensation package and other terms and conditions of employment—all workers would prefer employment at the safe firms. In order to attract workers, hazardous firms will be forced

to increase wages above the level paid by safe firms. In other words, we would expect to find that hazardous firms pay a compensating differential and that the magnitude of this differential will be related to the workers' expected accident costs, including the cost of lost income, medical expenses, pain and suffering, etc.

So, for example, let us assume that the average cost of accidents for workers is \$10,000 and that the average annual salary of workers in safe firms is \$40,000.² Since the probability of an accident at a hazardous workplace is 0.1, then expected accident costs at that workplace are \$1,000 ($= 0.1 \times \$10,000$). This means that hazardous employers must pay their employees an annual salary of \$41,000 for employment at a hazardous firm to be equally attractive as employment at a safe firm.³ Thus, the employer's accident costs include the expected accident costs borne by workers. Importantly, employers will be able to reduce the compensating differential and, consequently, their accident costs, by reducing the incidence of workplace accidents and illnesses.⁴

The economic model presented in the preceding paragraphs rests on a number of key assumptions, which many have questioned. In particular, the model requires that workers have complete and accurate information with respect to the risk of injury or death and an absence of barriers to worker mobility, i.e., that workers are free to move in and out of the labor market or between employers at relatively low cost. However, critics point out that it is likely that either workers do not have access to good information about injury risks or barriers to mobility prevent workers from moving to safer jobs. As a result, wage differentials due to the risk of injury either do not arise or they are inadequate, i.e., they do not fully compensate workers for the risk of injury.

Do employers, in fact, pay a compensating differential to workers exposed to greater risks of injury or illness? To answer this question the researcher must address a number of methodological issues that are not easy or simple to resolve, and existing statistical evidence is decidedly mixed. By and large, research investigating the relationship between the risk of fatal injury and wages has found a risk premium, while studies examining the relationship between wages and non-fatal risks have not (see Viscusi 1993, for a recent review of this literature). However, Dorman and Hagstrom (1998) demonstrate that even fatal-risk differentials are extremely sensitive to the regression specification.

Importantly, there is no evidence to demonstrate that the risk differential is fully compensating, even for fatal injuries. In addition, research suggests that, after controlling for the risk of injury and a variety of other factors affecting wages, the wage differential is substantially larger for unionized workers than for nonunion workers (Olson 1981; Dickens 1984; Fairris 1992; Siebert and Wei 1994; and Sandy and Elliott 1996). This result, which indicates that union workers get a greater premium for the same level of risk, is difficult to reconcile with the hypothesis that wage differentials compensate workers for the expected cost of accidents.⁵ Finally, psychological research suggests that people overestimate the likelihood of a low probability event and underestimate the likelihood of a high probability event (Viscusi 1993). This systematic bias implies that workers will generally demand a risk premium that is less than fully compensating.

Workers' Compensation

Workers' compensation provides cash benefits to workers who are unable to work as the result of an occupational injury or illness as well as medical benefits and rehabilitative services to all who are injured as the result of a workplace accident.

These benefits have the effect of reducing accident costs for workers and, consequently, the risk premium paid by hazardous employers. As a result, we may expect that the worker's incentive for avoiding workplace injuries will have been reduced because their accident costs have been reduced by the medical and cash benefits provided by the workers' compensation program, a problem known as risk-bearing moral hazard in the insurance literature. We might also expect that workers' compensation benefits would increase the workers' willingness to expose themselves to greater risks on the job, but that these benefits would also increase the likelihood that workers would report an injury that would have otherwise gone unreported or even falsely report a nonwork-related injury as occupational. This latter problem is known as reporting moral hazard. In either event, because workers' compensation reduces the cost of workplace accidents for workers, we would expect it would also reduce the compensating wage differential. In fact, there is some statistical evidence indicating that as compensation becomes more generous, the risk premium for hazardous work is reduced.

Do workers' compensation benefits affect employers' incentives to prevent workplace accidents? The answer depends on the way in which compensation benefits are funded. If the employer is liable for workers' compensation benefits paid to his or her firm's injured workers, then the employers' incentive structure will be unchanged by the introduction of workers' compensation. However, if there is no relationship between employer costs and worker benefits, then the employer's incentive to prevent accidents is reduced by workers' compensation benefits.

In Canada and the United States, workers' compensation benefits are funded through a payroll tax paid by employers. A two-step process determines tax (or assessment) rates in most provinces. In the first step, industrial classifications are used to group firms who share similar risks of workplace injury or illness, so that banks are grouped with other financial institutions, for example, food stores are grouped with similar retail establishments, etc. The recent historical accident record of each of these classifications, known as rate groups, is used to determine the base assessment rate for each group. The assessment rate is set so as to provide sufficient income to fund all workers' compensation benefits paid to workers and any expenses associated with workers' compensation program administration.

In the second step of the rate-making process, known as experience rating, the base assessment rate for some firms is adjusted to account for the firm's individual safety record.⁶ In other words, the assessment rate for firms with better than average safety records (lower injury rates) is reduced, and the rates of firms with worse than average safety records (higher injury rates) are increased.

Both steps of the rate-making process should reduce the injury rate relative to a regime where all employers are charged an identical assessment rate unrelated to the risk of injury. Variation in the base assessment rate means firms in hazardous industries pay a higher base assessment rate than firms in relatively safe ones, so that the cost of goods and services produced by firms in hazardous industries increases relative to a regime in which a flat assessment rate is charged to all employers. In turn, this reduces consumption of goods and services in hazardous industries relative to safe ones and subsequently employment; as the proportion of employment in safe industries rises, the overall accident rate will drop.

However, the base assessment rate is only marginally related to the firm's accident experience. If the firm is not experience-rated, the employer does not consider workers' compensation assessments to be part of the cost of accidents, since it cannot affect costs by preventing accidents. However, if the firm is experience-rated, then a reduction in the accident rate directly reduces its subsequent accident costs. Thus, if the firm is experience-rated, the employers' investment in workplace safety will remain unchanged following the introduction of workers' compensation insurance; however, if the firm is not experience-rated, the employer's safety investment will decline after workers' compensation is introduced.

Thus, workers' compensation unambiguously reduces workers' safety incentives and increases workers' incentives to report compensable claims. Furthermore, since not all employers are experience-rated, the overall impact of workers' compensation is to also reduce, on average, health and safety investments by employers.

Workers' Compensation and Occupational Injuries: The Evidence

Since the introduction of workers' compensation pre-dates the collection of injury rate data, there are only a handful of studies that have attempted to directly examine this issue and those that do have produced contradictory results. Chelius (1976) found that the introduction of workers' compensation programs led to a reduction in fatal accident rates relative to the tort regime that preceded them. However, Fishback (1987) reached the opposite conclusion, using a different (and arguably better) data set.

On the other hand, several studies have attempted to determine whether there is a relationship between the generosity of workers' compensation benefits and the work injury rate. As indicated, economic theory suggests that, where workers' compensation insurance is less than perfectly experience-rated, the accident rate should be positively related to workers' compensation benefit generosity.

A large number of studies using different methodologies and data sources have found the expected positive relationship between benefit levels and injury (or workers' compensation claim) rates. Studies of the U.S. workers' compensation include Butler and Worrall (1983) and Chelius (1982) who examined state-level claims and injury data and

Hirsch et al. (1997) who used longitudinal survey data to estimate the impact of benefit generosity on the probability that a worker would file a workers' compensation claim. Canadian studies include Thomason and Hyatt (1997), who examined provincial injury rates and Thomason and Pozzebon (1995), who used data on individual workers to estimate claim probability. Uniformly, these studies have found that higher levels of workers' compensation benefits are associated with higher injury or claims rates or a higher probability that a worker would initiate a compensation claim.

GOVERNMENT REGULATION AND WORKPLACE SAFETY

There are at least three approaches to the regulation of occupational health and safety, all of which have been adopted by policy makers in one form or another at one time or another. The first—and the one most commonly identified as occupational health and safety regulation—involves the promulgation of rules prescribing or proscribing specific policies and practices by employers, which are enforced through on-site inspections and monetary penalties for infractions. The second approach comprehends systems of general safety incentives that reward or punish employers on the basis of safety and health outcomes rather than behaviors that are thought to affect those outcomes. This second approach is embodied in the experience rating of workers' compensation assessments, whereby employers' compensation costs are tied to their accident experience. The third approach, termed internal responsibility, pervasive in Canada, is designed to improve safety and health conditions through workers' empowerment and involves three principal elements: 1) the worker's right to refuse to perform unsafe work; 2) the worker's right to information on the nature of workplace hazards; and 3) joint labor-management safety and health committees, which are given a mandate to oversee safety and health conditions in the workplace.

The Economics of Regulation

Occupational safety and health regulation seeks to change behavior of the employer by changing the cost-benefit calculus described in the previous section, through imposition of monetary penalties or other

sanctions.⁷ Specifically, regulatory sanctions lower accident prevention costs by the expected value of the sanction.⁸ In other words, firms considering adoption of a particular safety practice must now weigh expected costs of the sanction that will be imposed if they fail to do so. Sanction costs are characterized as “expected” because, under some—if not all—regulatory regimes, penalties are not imposed unless a violation is detected.

There are two costs that must be considered by efficient regulators: the administrative costs of regulation (the cost of staff involved in enforcement and adjudication), and the cost of regulatory effort (the imposition of sanctions whose expected costs are either too great or too small). Sanctions are too small (large) if the costs of accident prevention, including the expected savings from the avoidance of sanctions, are less (greater) than associated accident costs. The cost of error is equal to the difference between accident costs and the cost of accident prevention if the regulation in question is adopted and enforced. The goal of efficient regulation is to minimize the sum of these costs.

Direct Regulation of Workplace Hazards

As indicated, direct regulation attempts to change employer behavior by promulgating regulations that prescribe or prohibit specific employer or worker practices. Regulations are enforced through workplace inspections and penalties for noncompliance. Critics argue that direct regulation fails to recognize important variation across firms with respect to technology and other characteristics. In other words, a safety practice that is efficient for one employer may not be efficient for another, so that there are potentially substantial error costs. In addition, a system of direct regulation in which the regulator agency responsible for promulgating rules is one-step removed from the workplace and is, therefore, slow to respond to technological change. Once again, this could result in substantial error costs.

Furthermore, as Dorman (1996, p. 197) notes, “Most occupational risks are transitory . . . Safety features mandated by law may be unavailable or malfunctioning from time to time, but inspectors are not likely to know this.” In other words, the probability of detecting noncompliance is low so that the regulators must substantially increase the magnitude of the sanction imposed. Finally, direct regulation is costly to

administer. It requires an extensive bureaucracy to develop standards, inspect workplaces, and to resolve disputes with employers concerning the appropriateness of penalties.

Most research examining direct regulation is confined to an examination of the effects of the U.S. Occupational Safety and Health Act (OSHA) of 1970. At best, this research has produced mixed results with respect to OSHA's effectiveness, although more recent research—and, in some ways, methodologically superior—tends to find results that support the hypothesis that direct regulation reduces injury rates. (This question is also taken up by Mendeloff [1979, Chapter 11], with some comparative discussion on the United States and Canada.)

Much of this early research involved a time-series analysis or cross-sectional pre- and post-OSHA comparisons of aggregate injury rate data. By and large, these studies were unable to find the expected reduction in the incidence of workplace injuries (Smith 1973; Mendeloff 1979; Curington 1986). However, Smith (1992, p. 566) notes data problems render such comparisons problematic: "Because the Occupational Safety and Health Act fully covers the private sector, and because before-and-after comparisons are generally infeasible, a convincing study of the overall effects of the Act has not been—and may never be—done."

Another group of studies has evaluated the impact of OSHA enforcement activity—that is, the effect of inspections and fines—on the incidence and severity of workplace injuries. Following Smith (1992), these studies may be classified into two categories: those using aggregate industry injury rate data and those using plant level data.

Enforcement variables used in research examining industry aggregate accident rates include lagged measures of the probability of inspection and the expected penalty for an OSHA violation. In general, these studies found little or no effect for OSHA enforcement activity. For example, Viscusi (1979) was unable to detect a statistically significant relationship between injury rates and either inspection probability or the expected penalty. In a later study, Viscusi (1986) found that OSHA enforcement reduced the lost workday incidence rate by a modest 1.5 to 3.6 percent, although Smith (1992) argues that this result may have been a statistical artifact—the product of changes in employer reporting behavior resulting from a change in OSHA inspection strategies.

Arguing that these lagged penalty data were as much a measure of employer noncompliance as a proxy for a deterrent effect, Bartel and

Thomas (1985) estimated a system of structural equations in which the probability of inspection and penalties per inspection were treated as endogenous. They found that while OSHA significantly reduced employer noncompliance, there was little relationship between noncompliance and the lost-time injury rate. However, these authors conclude that OSHA *indirectly* reduced accident rates by placing a greater regulatory burden—in the form of increased inspection probability—on firms with higher injury rates.

A study of industry aggregate injury rates in Quebec by Lanoie (1992) found a statistically significant negative relationship between inspection probability and the lost-time injury rate. However, the likelihood of a workplace health and safety inspection by an officer of the Quebec government was positively associated with injury severity, measured as average number of workdays lost per injury. In addition, Lanoie failed to detect a statistically significant relationship between probability of penalty and either frequency or severity of work injuries.

Research using plant level data have generally reached more optimistic conclusions about OSHA's effectiveness, although these studies have also produced mixed results. Two types of studies have been conducted. Earlier research compared firms that had been inspected early in the year with firms that had been inspected late in the year, hypothesizing that inspection effects should be more evident for the former group of firms than for the latter group (Smith 1979; McCaffrey 1983). Using data from 1973 and 1974, Smith found that 1973 inspections reduced injury rates by about 16 percent while 1974 inspections induced a 5 percent reduction, although the latter relationship was not statistically different from zero at conventional levels. McCaffrey failed to find a statistically significant effect using data from 1976–77. As Scholz and Gray (1990, p. 299) note, taken together, these results suggest that “the easily accomplished reductions in risk that OSHA inspections could impose may have already been implemented in 1976, leaving more complex issues of risk reduction, less amenable to quick fixes.”

As Smith (1992, p. 569) points out, because these early studies lacked data on citations and fines resulting from inspections, they were only able to measure the abatement of injuries following an inspection; as a result, these studies were unable to measure OSHA's “deterrent” effect. Replicating this research, Ruser and Smith (1991) used a measure

of inspection probability based on the average inspection frequency for similar firms to estimate the deterrent effect. On the basis of this analysis, they concluded that: “there is virtually no evidence of a deterrence effect” (p. 231).

Interestingly, recent plant-level studies, which use explicit before-and-after comparisons of the same firms, provide evidence for a more sanguine assessment of direct regulation. Using a unique data set that allowed tracking of inspections and penalties for a large sample of individual firms over a seven year period, Scholz and Gray (1990) estimated both the deterrence and abatement effects of OSHA enforcement activity. They found that a 10 percent increase in enforcement resulted in a 1 percent reduction in the accident rate, a much larger effect than detected in prior research, although one that the authors describe as “modest” (p. 302). This reduction was primarily due to a “deterrence” effect and, specifically, an increase in the probability of inspection, as opposed to an increase in the average penalty.⁹

Importantly, Scholz and Gray argue that their results indicate that economic models of occupational safety and health regulation, which assume that firms optimize when making safety and health choices, fail to account for the limited information processing capacity of managers.¹⁰ Due to their limited capacity, managers do not optimize, but often engage in “fire-fighting,” responding to problems as they become more significant relative to other issues. As evidence, Scholz and Gray find that an unexpected increase in the accident rate in one year will lead to a reduction in injuries in the next, and vice versa. In addition, they find a lag between OSHA enforcement activity and a change in firm health and safety—a result that they claim is evidence of an organizational learning curve. Ruser (1985) obtained similar results.

Nonetheless, overall the extant evidence suggests that OSHA has, at best, resulted in a modest improvement in workplace health and safety in the U.S. However, advocates of direct regulation argue that these disappointing results are primarily due to diffident administration and a lack of funding than to a fundamental flaw in this type of regulatory regime. In particular, they point to two problems. First, the process of adopting permanent health and safety standards under OSHA is slow and cumbersome. Governed by the Federal Administrative Procedures Act, the law requires a Notice of Intended Rulemaking and a subsequent proposal, both of which must be published in the Federal Register. This

is followed by a Public Hearing and comment period where all interested parties are invited to submit comments, which the agency must consider before promulgating a standard.¹¹ After they are issued, standards are subject to judicial review, and the Supreme Court has ruled that the agency must provide substantial evidence that the standard is based on a “significant” risk. Second, agencies responsible for administering the Act are substantially underfunded, a problem exacerbated during the Reagan-Bush administrations. Dorman (1996, p. 193) notes that there are more fish and game wardens in the U.S. than occupational safety and health inspectors.

Critics have expressed greater apprehension over the impact of direct regulation on economic productivity (Burton and Chelius 1997). There is a public perception, shared by some economists, that the proliferation of industrial regulation in the 1960s, particularly with respect to occupational health and safety and environmental protection was responsible for anemic productivity growth since that time. Research is sparse, however. One study, estimating annual total factor productivity for 450 U.S. industries between 1958 and 1978, found that OSHA accounted for around 19 percent of the productivity slowdown of the 1970s (Gray 1987). Viscusi (1996) has estimated the cost and benefits of five OSHA regulations and found that for four of these, the costs of the regulation exceed the benefits in terms of lives saved. However, Stone (1997) challenged Viscusi’s estimates, claiming he ignored other benefits, such as the reduction in injuries and illnesses. His reanalysis of one of these regulations showed it was in fact efficient, when these other benefits were considered.

Nonetheless, if one assumes that the direct regulation of workplace safety is inefficient public policy, then it is possible that direct regulation could actually result in the deterioration of worker health. Keeney (1994) has argued that a reduction in disposable income due to these regulatory costs can lead to changes in spending on safety and health-care more generally, greater stress due to job loss, and risky behavior such as increased alcohol and tobacco consumption.

Internal Responsibility System

A principal criticism of direct regulation is that it fails to recognize firm heterogeneity, so that standards appropriate for one firm are likely

to be inappropriate for another. In contrast, the internal responsibility system is highly adaptable to the particular circumstances of the firm and is flexible so that it can respond relatively quickly to technological change. The design of safety “standards” is in the hands of the parties themselves—labor and management—who are intimately familiar with plant operation and who are therefore well placed to implement regulatory standards that are effective and efficient. In addition, administrative costs, which are principally borne by employers, at least initially, are relatively low. Enforcement is in the hands of the firm’s workforce so that the probability of detecting a violation will be high.

On the other hand, the success of the internal responsibility system is critically dependent on employee bargaining power. It is likely that internal responsibility is less effective in nonunion workplaces than in union ones. In addition, unions are political organizations that necessarily respond to the preferences of their memberships. And safety and health are often given a relatively low priority by a rank and file that sometimes appears to be more interested in wages and job security. Furthermore, the internal responsibility system can be used by employees to shirk legitimate work assignments or by labor unions as leverage in collective negotiations with employers. Finally, there are concerns that labor members may lack the expertise, particularly in the realm of occupational health, to either design effective standards or monitor firm compliance.

Unlike either direct regulation or general financial incentives, there is little direct evidence on the efficacy of the internal responsibility system. Most of this research has examined joint health and safety committees (JHSCs) and much of it uses data on Canadian workplaces.¹² By and large, however, the Canadian studies either examine process issues or factors determining the relative effectiveness of JHSCs rather than the question of whether or not they reduce injury rates or otherwise improve worker health compared to workplaces without such committees. In addition, these studies often rely on subjective reports by the participants rather than objective evidence. Nevertheless, some useful information relevant to the question of the effectiveness of the internal responsibility system may be gleaned from this research.

For example, Shannon et al. (1992) find that lower accident rates are found in firms where the JHSC includes a senior manager; where labor members had access to professional expertise; and where the JHSC

had a broad mandate rather than a narrow one. Furthermore, Tuohy and Simard (1993) find that JHSCs were more effective in reducing accident rates when the committee had an equal number of labor and management members and where there are well-established operating procedures. In other words, both studies indicate that JHSCs are more effective when employers give them greater resources and support.

Three studies directly examine the issue of whether JHSCs ameliorate workplace safety. Cooke and Gautschi (1981) combined OSHA administrative data with the results of a survey of 113 manufacturing firms in Maine to investigate, among other things, whether joint labor-management safety programs affected firm injury rates. They obtained mixed results, which depended on firm size. Large firms with joint safety programs had lower injury rates than large firms that did not have a joint program. However, this result was statistically significant only for firms with more than 300 employees and only at the 0.10 confidence level. For small firms, the opposite result was found; firms with joint programs had higher injury rates. Boden et al. (1984) surveyed 290 large (more than 500 employees) Massachusetts firms but failed to find a relationship between the presence of a joint safety committee and workplace injury or illness rates. Importantly, both of these studies—Cooke and Gautschi (1981) and Boden et al. (1984)—use cross-sectional, rather than longitudinal data, and are, therefore, limited in their ability to address the question of whether there is a causal relationship between JHSCs and workplace safety.

On the other hand, the most careful examination of internal responsibility found that the internal responsibility system generally and JHSCs in particular were associated with lower levels of workplace injuries and illness (Lewchuk et al. 1996). This study used administrative data from the Ontario Workers' Compensation Board supplemented with data from two surveys. The authors find that both enactment of internal responsibility legislation and the introduction of JHSCs were negatively and significantly related to the workplace injury rate. Specifically, they find that JHSCs may reduce lost-time claims by as much as 18 percent relative to similarly situated firms without JHSCs. Importantly, they also find that joint committees were more effective at reducing injury rates in unionized firms than in nonunion firms.

The latter results suggest that unions play an important role determining the effectiveness of JHSCs. Similarly, Weil (1991, 1992) has

argued that unions improve the effectiveness of direct regulation. Using 1985 OSHA data from the United States, he has shown that unions increase inspection probability; inspection intensity, as measured by the duration of inspections per employee; and the scope of the inspection, i.e., whether or not the inspection resulted in a physical examination of the workplace. Weil also found that unions increased the number of citations as well as the severity of the penalties. These results suggest that there may be a synergy between direct regulation and internal responsibility, at least for unionized workplaces.

On the other hand, critics cite anecdotal evidence that shows that unions use regulatory agencies and, in particular, occupational safety and health agencies to enhance their power in organizing campaigns and in collective bargaining (Northrup 1997). JHSCs would seem to offer similar opportunities for unions to enhance their organizing and collective bargaining outcomes. However, Schurman et al. (1998) note that complaint-based inspections in unionized firms result in a higher percentage of violations than similar inspections in nonunion firms and argue that this contradicts an interpretation that unions use safety regulation to gain organizing and bargaining advantage.

Hebdon and Hyatt (1998) present conflicting evidence with respect to this issue. They use Ontario data to examine factors influencing the probability of a refusal to do unsafe work or the probability of a health and safety complaint. In general, they found that while the probability of both events was higher where there is a contentious industrial relations environment, they found no evidence of concerted harassment of employers during collective negotiations.

More generally, we might expect that unionization could lead to more optimal health and safety conditions. Workplace health and safety has characteristics of a public good in that consumption is neither rival nor excludable.¹³ In addition, free rider problems may prevent unorganized workers from negotiating the optimal provision of safety conditions by the employer. That is, workers will be individually reluctant to reveal preferences because they fear that they will pay the full cost of safety. Employers must therefore rely on information gleaned from the labor market. However, such information necessarily reflects the preferences of workers who are very different than the average worker; these marginal workers are younger and are less likely to have family responsibilities. Among other things, marginal workers are likely to be

less concerned about workplace hazards and should be less willing to trade off wages for increased safety.

On the other hand, unions, which are democratic political organizations, are more likely to reflect the preferences of the average workers. In fact there is some evidence that unions in fact respond to the safety objectives of more senior workers while management is more likely to be influenced by the preferences of marginal workers (Kahn 1987; 1990).

General Financial Incentives

Both direct regulation and internal responsibility attempt to regulate the safety *process*, imposing sanctions on employer *behaviors* thought to affect the accident rate. In contrast, a regime using general financial incentives regulates safety *outcomes*, imposing sanctions based on employer performance with respect to results-based workplace safety measures. One proposal for general financial incentives is the injury tax, whereby the government imposes a monetary penalty for each work-related injury or illness (Smith 1974). A more prosaic form of general financial incentives is experience-rated workers' compensation insurance, as discussed in the previous section, whereby the firm's compensation assessment is based, wholly or partially on its accident experience.

Like the internal responsibility system, a system of general financial incentives imposes no specific requirement vis-à-vis firm health and safety practices, allowing firms to select the most appropriate means for attaining its safety goals. Furthermore, under a system of general financial incentives, administrative costs will be lower than those incurred under either direct regulation or the internal responsibility system. However, because experience-rating adjustments to workers' compensation assessments are based on the firm's *claim* experience rather than its *accident* experience, experience rating provides employers with incentives to engage in claims management as well as accident prevention. Claims management includes a number of less than desirable practices, including retaliation against workers who initiate compensation claims and legal challenges to legitimate claims by injured workers. In addition, for actuarial reasons, true experience rating is not feasible for small firms.

There is substantial research investigating the impact of experience rating on the frequency and severity of work accidents. In general, these studies have found considerable evidence that experience rating is associated with lower injury rates, although there are a few exceptions (Hyatt and Thomason 1998). However, research that fails to find the expected effect is, in general, methodologically weaker than studies that do (Hyatt and Thomason 1998). Studies investigating injury severity have generally produced mixed results. There are two possible explanations for the disappointing results with respect to injury severity: either employers have less ability to affect severity than the incidence of injuries or the effects of experience rating on incidence overwhelm the severity effect. That is, on the margin, experience rating induces employers to reduce the frequency of less severe injuries. In either event, severity studies are generally less informative and will not be reviewed here. However, a brief review of injury rate research follows.

Research examining the impact of experience rating on workplace safety, most of which uses U.S. data, falls into one of three categories. The earliest studies exploited the fact that U.S. experience-rating formulae are different for large and small firms, so that large firms are more likely to be experience rated and are more extensively experience rated than small firms. Since a difference in injury rates between large and small firms could be ascribed to firm size effects unrelated to experience rating—such as, scale economies in accident prevention efforts—these studies examined the relationship between benefit generosity and accident rate. As indicated previously, empirical research conclusively demonstrated work injuries are positively related to benefit levels. However, if experience-rating induces firms to improve workplace safety, then this relationship should be attenuated in large firms relative to small ones. That is, as benefit levels become more generous, experience rated firms will increase their safety investment, partially offsetting the increased level of injuries resulting from worker moral hazard. Several studies found this hypothesized relationship (Ruser 1985; Butler and Worrall 1988; Ruser 1991); only one failed to do so (Chelius and Smith 1983).

As indicated, the positive relationship between benefit levels and the work injury rate is primarily attributable to a reporting effect; workers are more likely to report an injury when benefit levels are high than when they are low. It is unlikely that fatal claims are subject to this

reporting phenomenon, so that the relationship between benefit levels and fatal injury probability should more accurately reflect the impact of benefits on employer behavior. Four studies have examined this relationship, and three found that the incidence of fatal injuries was negatively associated with higher benefit levels, as expected if experience rating has safety-enhancing effects (Moore and Viscusi 1989; Ruser 1991; and Durbin and Butler 1998). Only Butler (1983) failed to find the hypothesized negative relationship.

Several studies have taken advantages of “natural experiments” to compare injury rates before and after the implementation of an experience rating program. Chelius and Kavanaugh (1988) examined injury rates of two New Jersey colleges before and after they elected to self-insure and ceased to be covered by private compensation insurance.¹⁴ Chelius and Smith (1993) compared occupational injury rates for small firms in Washington, which gives experience-rated discounts to these firms, with injury rates for small firms in states that do not offer these workers’ compensation claim rates in Ontario and British Columbia, respectively, before and after the introduction of experience rating in those provinces. Shields et al. (1997) explored the effect of the implementation of “large-deductible” compensation insurance policies—where insured firms are responsible for the first several thousand dollars of compensation costs—in Texas. Finally, Durbin and Butler (1998) used state-level U.S. data to investigate the effects of both large and small deductible policies as well as a rule change that lowered eligibility criteria for experience rating.¹⁵ With the sole exception of Chelius and Smith (1993), these experiments found that experience rating was associated with lower injury rates.

Out of 14 studies reviewed here, 11 found evidence that experience rating results in an amelioration of workplace health and safety. This evidence was produced by research that is remarkably mixed with respect to both data sources and methodology. And, as indicated, a careful examination reveals that studies failing to detect this relationship were methodologically weaker than those that did. Taken as a whole the evidence is quite compelling: experience rating works.

However, as Hyatt and Thomason (1998) point out, the leap from the observation that experience rating is associated with lower injury or claims rates to the conclusion that experience rate enhances firm safety is short, but perilous. Experience rating may lead to increased claims

management by employers, who file claims, as well as pro-active staffing practices designed to screen job applicants likely to file a workers' compensation claim. This has the effect of reducing injury reporting, while leaving workplace hazards undisturbed. Two studies show experience rating increases employers claims management activity.

Examining a large set of administrative records from Ontario, Hyatt and Kralj (1995) found that experience-rated employers were significantly more likely to appeal claims than non-experience rated employers, and that the likelihood of an appeal for experience-rated employers increased as a function of the financial incentives that they faced. Kralj (1994) analyzed a small survey of Ontario employers in which managers were asked to report their impressions of the effects of experience rating on their behavior, i.e., changes in accident prevention and claims management practices resulting from experience rating. He found that while both prevention and claims management behaviors increased, experience rating had a greater impact on accident prevention efforts. Thus, while it is clear that experience rating leads to more intensive claims management efforts, this is not the only effect. Furthermore, claims management is not an unalloyed evil. The denial of fraudulent claims is both equitable and efficient, and there is evidence indicating that a prompt return to work leads to more successful rehabilitation.

Using a survey data set consisting of over 450 Quebec manufacturers, Thomason and Pozzebon (2002) examined the estimated relationship between experience rating and a wide range of firm health and safety and claims management practices. These practices included, for example, the amount of health and safety training provided to workers, the extent to which the firm disputed workers' compensation claims, the number of in-house personnel devoted to claims management or accident prevention activities, and firm expenditures on personal protective equipment. They found that experience-rated firms were both more likely to engage in more aggressive claims management and to make greater effort to increase workplace health and safety. Interestingly, however, the evidence also suggested that high wage firms are more likely to reduce workers' compensation claim costs by increasing their accident prevention efforts (relative to their claims management efforts) than low wage firms. This result implies that there may be a "high road" and a "low road" response to experience rating.

CONCLUSIONS

The past 20 years have seen a substantial accumulation of knowledge concerning the effects of various policy options, although much is left to be learned. It is by no means certain that policy makers have fully taken advantage of this knowledge or that they have developed a coherent policy with respect to occupational health and safety problems. Rather, policy has developed in a piecemeal fashion as jurisdictions have experimented with various approaches to these problems.

Until recently, these approaches tended to emphasize direct regulation and, more recently, internal responsibility; general financial incentives are little used. Workers' compensation programs have only recently introduced experience rating to the assessment process, and in most provinces in Canada, there are restrictions on its application, which substantially limit its effectiveness. For example, in British Columbia the experience rating adjustment is limited to 30 percent of the base assessment rate.

However, considerable evidence indicates that general financial incentives are effective in reducing accident rates. Moreover, experience-rating does not share many of the problems associated with the other two approaches. In addition, both the costs of direct regulation and its apparent limited effectiveness call into question whether a broad application of direct regulation is appropriate.

Nonetheless, general financial incentives, particularly in the form of experience-rated compensation assessments, are not a panacea. Two problems may be identified. First, because accidents are, by definition, random events, general financial incentives are not easily applied to small firms—the small firm's experience is not necessarily indicative of its underlying safety. Second, due to the long latency of many occupational diseases, it is difficult to assign responsibility to a particular employer. Finally, direct financial incentives assume that firms engage in an optimizing cost-benefit calculus, but the evidence suggests that limited information processing capacity may lead managers to satisfice. Under these circumstances, direct regulation could provide a needed shock to focus managerial attention on safety and health problems.

While this implies a continued role for direct regulation, it also suggests a more limited and targeted approach. More specifically, due to the high costs of direct regulation, the resources required by this

option should be directed at high-risk industries. This would include, in particular those in which there are numerous small firms, such as construction and those in which there is a relatively high probability of catastrophe—that is, an accident in which there is significant loss of life—such as underground mining. In addition, these resources should also be directed to the problem of long latency occupational disease, where it is unlikely that general financial incentives will be effective. This includes funding research that would investigate the relationship between occupational exposures and subsequent disease development as well as funding for monitoring workplace exposure.

Key Messages

- Much has been learned in the last two decades regarding effective policies to reduce disabling injury at work.
- Both direct regulation and internal responsibility have been widely used in Canada, whereas general financial incentives recently have become more pervasive as they are in the United States.
- Financial incentives do appear effective in reaching injury rates whereas the limited effectiveness of direct regulation raises questions about its value except where it may be targeted at high-risk individuals and longer-latency occupational disease exposures.
- General financial incentives are limited in their value for small firms.
- A stronger role for workplace exposure surveillance is necessary.

Notes

This chapter reprinted by permission. See Thomason (2003).

1. Accident prevention costs are manifested in higher production costs and lost productivity, which means that there are fewer goods and services including, for example, medical and rehabilitation services for those claimants who are injured or become ill due to a workplace accident or exposure.
2. The \$10,000 figure for accident costs subsumes an evaluation of the monetary value for intangibles such as pain and suffering.
3. This example assumes that workers are risk neutral, i.e., they are indifferent be-

tween income that will be paid with certainty (such as the wage income available from safe employers, where there is no risk of injury) and income that is uncertain (such as the wage income paid by hazardous employers, where there is a 10 percent chance that the worker will lose wage income due to a work accident). If the worker is risk averse, as is generally thought to be the case, then the worker would demand a salary higher than \$41,000 to compensate him or her for the additional risk incurred by working for a hazardous employer.

4. It is important to note that workers will continue to have an incentive to avoid workplace accidents and illnesses even if the wage is fully compensating, i.e., if it compensates workers for all of the expected cost of injury. This is because the worker will continue to incur costs if an accident occurs, unless he or she is able to purchase insurance that covers those costs.
5. Interestingly, one of the few studies that failed to find this relationship used a Canadian data set (Martinello and Meng 1992).
6. It is not feasible to experience rate small firms, i.e., firms with only a few employees. Because work accidents are random events and because their employment base is small, the number of accidents does not provide a reliable estimate of the underlying risk of injury.
7. It is also possible that Occupational Health and Safety regulations could attempt to influence the behavior of employees, although none of the existing regulatory models contemplates this.
8. Alternatively, sanctions raise the costs of not engaging in accident prevention.
9. Scholz and Gray also used their data set to replicate prior research in order to determine reasons for the discrepancy between their results and the results of these earlier analyses. They concluded that Smith (1979) and McCaffrey (1983) failed to find significant abatement effects because they had not accounted for long-term enforcement effects. Smaller deterrence effects found by Viscusi (1986) were attributed to sample differences. Specifically, the Scholz and Gray sample contained plants that were larger, more dangerous, and more heavily inspected than the average manufacturing plant examined by Viscusi. Scholz and Gray hypothesized that the plants in their sample were more amenable to the ameliorative effects of OSHA enforcement than the average plant.
10. The phrase “limited information processing capacity” is not meant to apply only to the abilities (or limitations) of managers. Rather it refers to limitations that constrain us all (including university professors).
11. For example, Meisenhelter (1991) notes that a period of six years elapsed between OSHA’s initial work on a Hazards Communication standard — similar to WHMIS — before it was finally issued in November 1983. Over 200 written comments were submitted totaling over 12,000 pages. There were 19 days of hearings, which produced 4,250 pages of transcripts.
12. A literature search uncovered only two studies examining the effect of an aspect of internal responsibility other than JHSCs on workplace safety. Lanoie (1992) estimated the impact of refusals to do unsafe work in Quebec, using industry aggregate data. He failed to find a relationship between the number of refusals per employee and the lost-time injury rate. However, Lanoie’s data show that

refusals are negatively related to injury severity, although this relationship is only marginally significant in two of his four specifications and statistically not different to zero in the other two. On the other hand, Cousineau et al. (1995), who also used Quebec data, found that refusals were positively related to one type of injury (“struck by or striking against”) thought to be particularly susceptible to safety regulation, while negatively related to two other types (“caught in or between” and “falls or slips”). However, the latter two relationships were not statistically significant.

13. A rival good is one that may be consumed by one and only one person. If it is possible to prevent the consumption of a good, it is excludable. A candy bar is a good that is both rival and excludable, while, clean air is both nonrival and non-excludable. These distinctions are important because it is generally thought that a private market is perfectly capable of efficiently providing rival and excludable goods, but not goods that are nonrival and nonexcludable.
14. Firms that self insure, an option available in most U.S. states for firms that meet certain fiscal requirements, are, by definition, perfectly experience-rated.
15. In most U.S. states, there is a minimum payroll requirement that a firm must satisfy in order to become experience rated.

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3

The Adequacy of Workers' Compensation Cash Benefits

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Workers' compensation is the primary form of financial support available to people who are injured or become ill as a result of their employment. In 2001, workers and their medical care providers received \$49.4 billion in workers' compensation payments, and employers paid out \$59.2 billion (NASI 2003). By covering medical costs and replacing lost earnings, workers' compensation can minimize the economic impact of workplace injuries and illnesses, although other impacts will remain.

The designers of workers' compensation programs did not intend for nonmonetary losses to be covered. Workers lost the right to receive payments for "pain and suffering" in the quid pro quo in which they were required to give up their ability to sue negligent employers in exchange for workers' compensation benefits that were provided on a no-fault basis. But, presumably, they did intend for lost earnings to be covered, although the question of how much of the lost earnings should be covered by workers' compensation benefits remains an unsettled issue. While benefit adequacy is a central goal of workers' compensation, other goals often come into conflict with adequacy. These include high workers' compensation costs to employers, concerns about worker fraud, and excessive time off work. Responses to these perceived prob-

lems include reducing cash benefits and limiting eligibility for workers' compensation benefits.

This pattern was particularly evident during the 1990s, when more than half the states modified their workers' compensation laws. During that period, many of the laws that were passed were designed to reduce employers' costs by either reducing benefits or limiting the number of claims filed (Burton and Spieler 2001; Boden and Ruser 2003).

Traditionally, workers' compensation systems have required employers to pay benefits to workers whose injuries or illnesses "arise out of and in the course of employment." Other contributing factors, like preexisting medical conditions, the aging process, and workers' lifestyles may have contributed to work-related disabilities, but this did not in principle prevent workers from receiving benefits. Laws passed in the 1990s limit the compensability of conditions that are not solely caused by workplace risks. They do so by creating a number of new requirements for receiving benefits. These include requiring that work be a major or predominant cause of the disability or eliminating compensation for the aggravation of a preexisting condition or for a condition related to the aging process. Other restrictive laws allow workers to demonstrate disability only by using objective medical evidence. These new laws can make it much more difficult to receive compensation for chronic musculoskeletal disorders, including carpal tunnel disease, noise-induced hearing loss, and most back injuries. Thomason and Burton (2001) estimate that such legislation enacted by Oregon in the late 1980s and early 1990s reduced benefits for workers and costs for employers by about 20 to 25 percent below what the amounts would have been if the laws had not been enacted. Finally, during the 1990s at least 22 states passed workers' compensation antifraud laws. Following passage, some states began aggressive public campaigns threatening criminal sanctions for workers who filed fraudulent claims. These campaigns sent the message that it was dangerous to file a claim, that the authorities would be checking up on you, and that perhaps it was safer, even for truly injured workers, not to file.

In addition to limiting access to benefits, several states reduced benefit payments in the 1990s. Some reduced the weekly benefit paid (for example Connecticut and Massachusetts), while others reduced the maximum number of weeks that could be paid, even for workers with permanent disabilities.

The issue of benefit adequacy was not addressed in any of these cases. Legislators did not even have access to data on benefit adequacy. In fact, virtually the only quantified policy parameters available to legislators were cost-related: incurred benefits per claim, claim frequency, changes in costs and frequency, overall costs, premium rates, insurer financial data, and so on. Weekly benefit payment parameters and benefit payment data were available, but nobody could relate them to the adequacy of benefits, since losses incurred by injured workers were unknown.

In the research presented in this paper, we describe the kind of data that would allow an informed discussion of benefit adequacy as a system goal and of the trade-offs between adequacy and cost. We first explain the measure of adequacy we use. This is followed by a brief review of empirical studies of adequacy from 1950 through the 1980s. Based on research completed in the last five years, we bring together what we currently know about the adequacy of workers' compensation cash benefits in the small number of states that have been studied. Finally, we discuss the implications of research to date for a workers' compensation research and policy agenda.

THE IMPORTANCE OF WORK-RELATED DISABILITY

For the year 2002, the U.S. Bureau of Labor Statistics reported about 5,500 deaths¹ and 5,000,000 occupational injuries and illnesses² in the private sector. These numbers are substantial, but a growing number of studies indicate that they greatly underestimate the true extent of the problem because many workplace injuries go unreported (Biddle et al. 1998; Morse et al. 1998; Morse et al. 2001; Azaroff, Levenstein, and Wegman 2002). Even in the face of substantial underreporting, the total economic costs of occupational illness and injury have been estimated to rival those of cancer and heart disease (Leigh et al. 1997, 2000). These illnesses and injuries also have important noneconomic effects on quality of life. Physical and psychological functioning in everyday activities can be affected, self-esteem and self-confidence reduced, family relationships stressed (Morse et al. 1998; Keogh et al. 2000; Pransky et al. 2000; Strunin and Boden 2004). Although we do not address these

nonmarket effects of workplace injuries, they may well be as important as the effects on earnings.

THE NATURE OF WORK-RELATED EARNINGS LOSSES

Many workplace injuries are minor and result in little or no time lost from work. For these injuries, no lost earnings result. Workers may lose a little time from the job to receive first aid, but this does not affect their wages. For other injuries, workers may need more substantial medical treatment and may incur functional limitations that do not allow them to return to their regular work immediately. These limitations may cause them to stay home or may require restrictions on the tasks that they can perform at work. The interaction of these functional limitations, workers' skills, and job demands can lead to time lost from work or to work limitations that result in reduced wages. These consequences of workplace injuries can last a few days, but they can also last a lifetime.

The factors that affect injury-related losses are not confined to the medical consequences of injuries. Labor market and other behavioral factors can affect the amount of earnings lost. Economists have focused on the incentive effects of workers' compensation benefits on how quickly workers return to employment (for example Meyer, Viscusi, and Durbin 1995), but these are not the only behavioral factors in operation. Friction between workers and employers over the amount of benefit payments, disputes about readiness to return to work, and employer concerns about fraudulent claims can result in the employer's refusal to offer a job or a worker's refusal to return to the at-injury workplace. Any of these can cause lost earnings to be considerably higher than necessitated by the physical consequences of the injury as a result of increased job search time and the loss of job-specific human capital.

When employees cannot work for a long time, their employers may find it too costly to continue to hold their jobs open and, as a result, may replace them. The resulting job loss also can substantially increase overall lost earnings. In addition, future potential employers may view a long period off work or a workers' compensation injury as a negative signal about the worker, thus reducing future job opportunities.

This combination of functional limitations and labor market behavior leads to lost earnings that may persist for many years. This is the

context in which workers' compensation systems provide benefits that replace part of workers' lost earnings.

DEFINING BENEFIT ADEQUACY

As a social insurance program, workers' compensation is supposed to cushion the financial impact of injuries on workers and their families. In principle, this means that cash benefits should cover much of the losses workers would otherwise incur. Benefit adequacy can thus be measured by the extent to which losses are replaced. The replacement rate—benefits received as a proportion of pretax losses—is thus the fundamental measure of benefit adequacy in this program.³

If we accept the replacement rate as a measure of adequacy, the question of what replacement rate is adequate immediately follows. There is no obvious answer to this question. One approach is to make the worker whole by covering all financial losses. Under this approach, adequate benefits would be 100 percent of after-tax losses net of job-related expenses plus any loss of fringe benefits and any earnings lost by other family members because of the injury. This would leave the worker financially as well off as if the injury had not occurred. In addition, high benefits would increase employer incentives to control workplace hazards. However, there are a number of reasons to consider lower replacement rates. First, providing full replacement reduces the incentive to return to work and thus may increase the overall costs of injuries. In addition, employers worry that the resulting high costs may affect their competitive position. Finally, although employers generally pay workers' compensation premiums, high premiums will reduce the demand for labor and may lead to lower wages. In this sense, workers pay for a part—possibly a large part—of the cost of workers' compensation insurance in the form of lower wages (Leigh et al. 2000, pp. 175–179). At a high enough benefit level, they might prefer to take higher wages rather than increased benefits. As in other forms of insurance, workers might be willing to trade incomplete coverage for a lower premium.

There is no theoretical justification for a specific adequacy benchmark, but we have chosen two-thirds of pretax earnings as our measure. We justify it largely for historical reasons. Most states pay temporary total disability (TTD) benefits at two-thirds of preinjury earnings up to

a maximum weekly amount, an indication of substantial agreement.⁴ This is also the standard used by the 1972 National Commission on State Workmen's Compensation Laws for temporary total and permanent total disability benefits. Although there is no similar explicit standard for permanent partial disability (PPD) benefits, Berkowitz and Burton (1987) and Hunt (2004) suggest using the two-thirds standard for these benefits as well. In addition, greater coverage of small losses than of large losses is not generally an efficient use of insurance. So if two-thirds replacement is the standard for temporary disability, it is difficult to justify a lower standard for PPD.

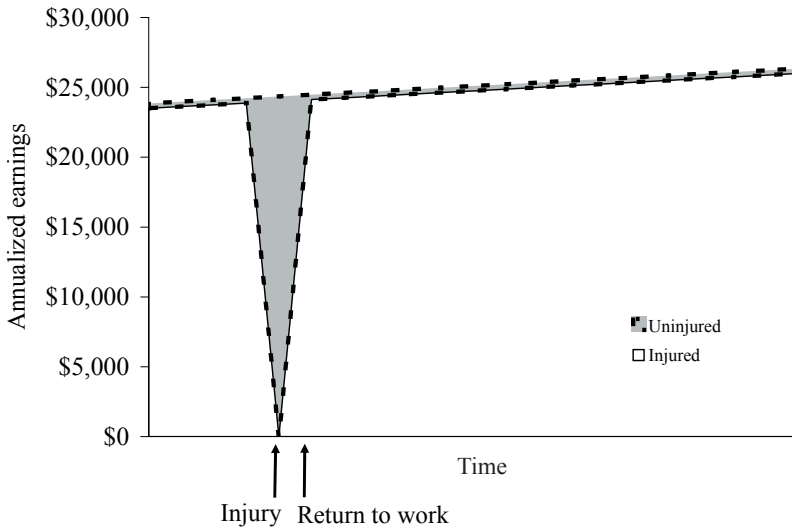
Given these considerations, we will use two-thirds of pretax lost earnings as a standard of adequacy. For ease and simplicity, we will not attempt to account for lost fringe benefits (which would reduce the measure of adequacy) and expenses related to employment (which would increase it).

MEASURING BENEFIT ADEQUACY

Measuring Losses

To measure the adequacy of cash benefits, we use the replacement rate, the present value of benefits paid divided by the present value of losses, both discounted to the date of injury.⁵ To measure wage replacement, we need to measure injury-related lost earnings and compare the losses to workers' compensation benefits received. Although there are some practical difficulties in determining the amount of income benefits paid, these difficulties pale in comparison to the effort required to measure lost earnings.

Lost earnings are actual earnings minus what would have been earned if the injury had not occurred. Figures 3.1 and 3.2 adapted from Reville (1999), display a conceptual model of lost earnings. Before the injury, the worker's earnings are observed. Figure 3.1 shows them at about \$19,000 annually and increasing slowly through time. After the injury, the worker recovers at home or in the hospital. Earnings are zero until the worker begins work again. At that point, wages may return to the uninjured earnings path (indicated by the dashed line). This figure displays a TTD. Upon return to work, some people continue to work

Figure 3.1 A Conceptual Model of Temporary Injury-Related Losses

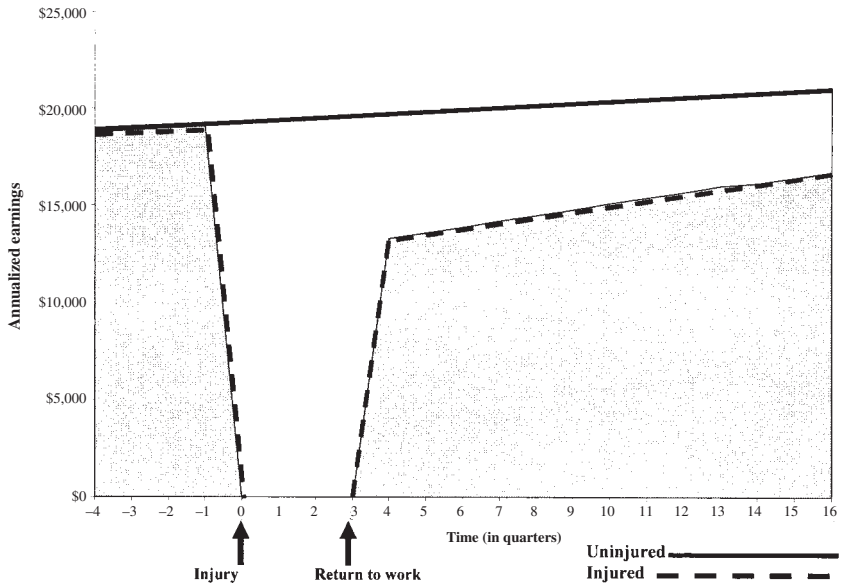
SOURCE: Adapted from Reville (1999).

fewer hours or at a lower rate of pay or experience more unemployment than would have been the case had the injury not occurred. Eventually, many recover to the preinjury earnings path, but others never do. In this case, workers have a permanent disability. This is shown in Figure 3.2, where injured earnings never reach the level of uninjured earnings.

If we could observe uninjured earnings, then we could simply subtract them from injured earnings to determine lost earnings. This is represented by the shaded areas in Figures 3.1 and 3.2. However, a worker is either injured or uninjured at a moment in time. If we observe somebody's injured earnings, we cannot observe their uninjured earnings. So we must find a way to estimate uninjured earnings from another source.

Traditionally, workers' compensation systems have used average preinjury earnings as the measure of uninjured earnings, assuming that the worker would have continued at the same level of earnings absent the injury. In the short run, this is probably a good assumption. But in the longer run, this assumption is less likely to hold. On average,

Figure 3.2 A Conceptual Model of Permanent Injury-Related Losses



SOURCE: Adapted from Reville (1999).

for example, most workers’ earnings rise as they get older, peaking at age 45–50, then declining, with a sharp decline at retirement, which, for many, is age 65. The age-earnings profile differs depending on a number of factors, including education. The earnings of more-educated people tend to be higher and peak later in life. One implication is that, for workers with permanent disabilities, using preinjury earnings might underestimate losses for young workers and overestimate them for workers over 50.

An alternative is to estimate uninjured earnings of injured workers by finding workers who are similar to the injured workers in all other respects but who were not injured. If we can identify uninjured workers who have the same personal, job, and employer characteristics, the same wage and job histories over the year before the injury, and so on, then it is reasonable to think that their average (uninjured) earnings will be close to the average uninjured earnings of their injured counterparts.

This can also be tested by examining whether the uninjured earnings of the two groups before the match period are the same.

Two approaches have been used to estimate uninjured earnings: matching and regression. The matching approach uses a comparison group of uninjured workers and matches each injured worker to one or more uninjured workers with similar relevant characteristics in the immediate preinjury period. In the research discussed below, up to five uninjured workers are matched to specific injured workers if they were employed in the same workplace at the time of injury and, in addition, had wages in each of the four preinjury quarters within 10 percent of the injured worker. Even though we wouldn't expect this to be true in every case, statisticians have shown that, under reasonable conditions, average uninjured earnings of the two groups should be identical. The most important of these is that comparison workers must be chosen so that all factors that affect both the probability of injury and earnings are accounted for.

Under these conditions, the average earnings of uninjured workers matched to a specific injured worker provide an estimate of what the injured worker's earnings would have been in the absence of injury. In each observed postinjury period, this estimate of uninjured earnings is subtracted from the actual wages of the injured worker. This difference produces an estimate of the injured worker's losses for each period.⁶ These estimated losses are then averaged for all injured workers over all observed postinjury periods to obtain an estimate of average losses.

The other currently used statistical approach to measuring losses, the regression approach, doesn't try to match individual injured and comparison workers. Instead, it uses statistical regression techniques to generate models of average earnings over time for uninjured workers with specific individual, job, and employer characteristics. It then applies these models to injured workers with the same characteristics, generating estimated uninjured earnings for those workers. This is similar to generating age-earnings profiles for workers with given characteristics. As with the matching method, the difference between the postinjury earnings of injured workers and their estimated uninjured earnings estimates their wage losses. These losses are then averaged for all workers to obtain a measure of average wage losses.

Measuring Benefits

Measuring benefits is generally easier than measuring losses, as in many states insurers and self-insured employers report benefit payments to state agencies. Benefit payments typically are reported by type of benefit (medical, temporary disability, PPD, and so on). However, cases involving disputed benefits often are resolved by settlements in which the parties agree to a specified amount as full and final payment of all benefits. As such, these settlements often include not only payments to cover lost wages but also to account for future medical costs and possibly other factors as well. Typically, settlements do not distinguish among types of benefits, so we cannot tell how much is being paid to cover lost earnings.

The approach in the research presented in this chapter allocates all settlements entirely to cash benefits. For this reason, it overestimates both cash benefits and the replacement rate. We believe that the bulk of settlement payments goes to cover lost earnings, but certainly not 100 percent.

THE PROBLEM OF UNDERREPORTING

To this point, the discussion of adequacy has been based on estimating adequacy for injuries reported as lost-time workers' compensation cases. However, there is growing evidence that many injured workers do not file workers' compensation claims. Recent studies of filing for physician-diagnosed upper-extremity musculoskeletal disorders suggest that only in a small minority of cases did workers' compensation cover these cases (Biddle et al. 1998; Morse et al. 1998; Morse et al. 2001). Part of the reason for the low coverage rates for these cases is that employers and insurers may not believe that all of them are work-related. However, even in the case of work-related finger amputations, an obviously work-related and reportable injury, Sorock, Smith, and Hall (1993) found that 12 of 134 patients entitled to workers' compensation benefits were not paid from that source.⁷

It could be argued that the amount of underreporting and the losses involved in unreported injuries should be taken into account in measuring adequacy, since workers with injury-related losses who do not

receive cash benefits have replacement rates of zero. So, for example, if a state's replacement rate was 50 percent but workers with 40 percent of the losses received no benefits, the true average replacement rate would be 30 percent. We do not have adequate information to know the proportion of losses that go uncompensated. As a consequence, we cannot estimate the extent to which underreporting affects average replacement rates.

Although the amount of underreporting is related to the generosity of benefits, from a policy perspective the question of how to design the benefit structure is distinct from that of how to insure that all eligible workers receive the benefits to which they are entitled. Thus, it might be better to view the estimates we calculate as measures of how well a workers' compensation system serves those who participate in it.

EARLIER STUDIES OF ADEQUACY

The study of workers' compensation benefit adequacy using claim-level data began with the publication of a study of California workplace injuries that occurred in the 1950s. In this study, Cheit (1961) derived hypothetical postinjury uninjured earnings by adjusting preinjury earnings by changes in the general level of wages and by changes in earnings related to age. He concluded that more than half these workers received permanent disability benefits without any permanent earnings losses.⁸ For workers who experienced permanent losses, however, PPD benefits typically replaced only a small fraction. For workers with ratings under 70 percent, he concluded that benefits typically replaced less than 10 percent of losses. Benefits covered 36 percent of losses for workers with the highest disability ratings.

Ginnold (1979) studied workers in Wisconsin who had an occupational injury in 1968 resulting in PPD benefit payments. He measured expected earnings by adjusting average earnings of injured workers in the two years before injury by average changes in wages and prices for the economy as a whole. He further adjusted this by an "age-education factor," capturing how earnings change over a person's working life. Five years after injury, Ginnold calculated that male workers in the group he studied still were losing an average of 16 percent of predicted earnings. Ginnold estimated that permanent disability benefits averaged

either 16.4 percent or 24.6 percent of pretax lifetime earnings losses, depending on whether he used a 5 percent or a 10 percent discount rate, respectively.

In a study of people injured at work during 1968 in Florida, California, or Wisconsin, Berkowitz and Burton (1987) calculated expected earnings using the preinjury average earnings of injured workers as a base. They adjusted these preinjury earnings by a growth ratio derived from the earnings growth of workers who were injured in California in 1968 and who received permanent disability ratings between 1 and 5 percent. This adjustment was based on the assumption that injured workers in the other states were similar to those in California and that workers in California with disability ratings less than 6 percent had no permanent loss of income after the healing period. Berkowitz and Burton measured income benefits net of legal fees for 1968 through 1973. Discounted earnings losses estimated by Berkowitz and Burton for permanently disabling injuries averaged 8 percent of potential earnings in Wisconsin, 15 percent in Florida, and 18 percent in California. In this study, pretax replacement rates in Wisconsin averaged 75 percent. In Florida they averaged 59 percent, while in California they were only 46 percent.

Replacement rates estimated by Berkowitz and Burton for permanently disabling injuries for 1968 in Wisconsin are much higher than those derived by Ginnold. Average benefits paid in the two studies are similar, but Ginnold calculated higher future earnings and thus higher earnings losses. The primary difference between the two estimates appears to be that Berkowitz and Burton focused only on the six years after the injury, while Ginnold projected earnings losses to the expected working life of the injured workers. The average age of injured workers is in the mid-30s, so the expected postinjury working life is about 30 years.

Johnson, Cullinan, and Curington (1979) measured income replacement among workers with permanent impairment ratings of at least 10 percent. These workers were injured between 1968 and 1970 in California, Florida, New York, Washington, or Wisconsin. The authors estimated expected earnings by adjusting preinjury earnings for inflation and for average productivity changes in the private sector. In 1975, five to seven years after injury, many of these workers still had substantial earnings losses. The authors then calculated after-tax replacement rates for the

year 1975, focusing on workers whose earnings losses were estimated to be at least \$500. For this group, workers' compensation replaced only 9 percent of after-tax losses. For about one-third of the injured workers, the study estimated earnings losses in 1975 at less than \$500, with losses averaging \$45. This group received mean benefits of \$163.

RECENT STUDIES OF ADEQUACY

Methods

Beginning in the late 1990s, researchers began a series of studies of lost earnings and benefit adequacy in California, New Mexico, Oregon, Washington, and Wisconsin. These studies are based on empirical estimates of injured workers' lost earnings (Biddle 1998; Peterson et al. 1998; Boden and Galizzi 1999; Reville 1999; Reville et al. 2001). Studies in all these states provide estimates of the losses of workers receiving permanent disability benefits or settlements. In addition, studies of Washington and Wisconsin also provide estimates of losses of workers who received cash benefits only for temporary disability benefits (Biddle 1998; Boden and Galizzi 1999).

All these recent studies use state workers' compensation claims data linked to quarterly earnings data from the state agency responsible for administering unemployment insurance. This provides data on earnings before and after the date of injury. Biddle (1998) and Boden and Galizzi (1999) use linear regression methods to estimate both injured and uninjured earnings. Their comparison groups are workers with minor injuries.⁹ To calculate uninjured earnings, Biddle uses workers with medical-only injuries (with either no lost time or less than 4 days lost time). Boden and Galizzi use injured workers who lost 8–10 days from work but who lacked permanent disability benefits.¹⁰ Both studies apply these methods to all lost-time injuries and, in addition, separate injuries into groups by whether permanent disability benefits were paid and, for claims involving only temporary disability, by the duration of disability.

Using data from California, Peterson et al. (1998) and Reville (1999) were the first to use matching methods to estimate injured workers' losses. Their comparison group consists of between one and five

uninjured workers at the same firm as the injured worker and with earnings in the year before the injury within about 10 percent of the injured worker's. A later study uses this matching method applied consistently to the five states for which there are now adequacy measures (Reville et al. 2001). In all these studies, the authors estimate losses only for cases involving permanent disability payments or settlements.

The researchers in these studies acquired data on postinjury earnings for periods ranging from 3½ to 9 years after injury. Even for the states with the longest period of postinjury earnings data, average losses continue to be substantial throughout the entire observed period. Figure 3.3 shows the average actual earnings of workers with permanent disability claims in Oregon relative to the earnings of matched uninjured workers. The difference between uninjured earnings (represented by the horizontal line labeled “100 percent”) and actual earnings is the estimate of losses. In this figure, we can see that these losses remain approximately 20 percent of uninjured earnings for at least five years after injury. The long-term nature of these losses presents researchers with a dilemma. Because the vast majority of cash benefits are paid within five years of injury, and losses continue long into the future, limiting estimated losses to the observed period would significantly underestimate

Figure 3.3 Earnings of PPD Recipients Relative to Uninjured Earnings



SOURCE: Authors' Calculations.

lifetime injury-related losses but not workers' compensation benefits. As a consequence, replacement rates would be overstated. On the other hand, many people would not be comfortable with the accuracy of losses projected 30 years into the future (the average age at injury is about 37). The results we report here are a compromise, with losses projected from the end of the observed period until 10 years after the injury.

Benefit Adequacy for All Lost-Time Cases

Studies of losses for all lost-time cases have been completed for only two states: Wisconsin and Washington. These two studies were done in the late 1990s and used regression methods. We have recalculated losses and benefits for the Wisconsin and Washington regression studies, using assumptions equivalent to those used in the matching studies below.¹¹

Boden and Galizzi (1999) used regression methods to estimate losses and adequacy for workers injured in Wisconsin in 1989–1990. As shown in Table 3.1, for cases with only temporary disability benefits paid, losses increase with duration of disability payments, with average losses reaching over \$53,000 for men receiving more than 16 weeks of temporary disability benefits. In fact, average losses for both men and women in this category exceeded losses in the permanent disability category.

Boden and Galizzi found that estimated quarterly losses for injuries less than 6 weeks in duration were not significantly different from zero after the first two postinjury quarters, so they set later losses to zero. For some groups estimated losses were small and positive, while for others they were small and negative. If we did cumulate these small positive (but statistically insignificant) losses over 10 years, we substantially increase estimates of total losses and reduce estimated replacement rates to about 10 percent for the groups with less than two months of TTD benefit payments. It is possible that small long-term losses are a consequence of averaging a very large proportion of cases with no losses with a small proportion of cases involving substantial long-term losses but for which benefits were stopped after a short period. Researchers have not yet been able to determine if this is the case.¹²

On the other hand, many workers in Wisconsin who lose at least two months of work and who do not receive permanent disability pay-

Table 3.1 Wisconsin Average Pretax Losses and Replacement Rates, by Benefit Category, 1989–1990 Injuries (2003 \$)

	Losses per injury (\$)		Replacement rate (%)	
	Men (<i>n</i> =36,283)	Women (<i>n</i> =18,026)	Men (<i>n</i> =36,283)	Women (<i>n</i> =18,026)
TTD benefits only				
8–10 days	704	483	67	68
11–14 days	1,098	888	60	51
2.1–4 weeks	1,541	991	69	74
4.1–8 weeks	2,899	1,935	74	75
8.1–16 weeks	24,118	16,372	16	17
16.1+ weeks	53,515	34,003	20	20
PPD benefits and settlements (including TTD benefits)				
PPD benefits	33,441	31,434	43	39
Compromise settlements	82,843	62,340	50	43
All claims	14,427	12,568	41	36

NOTE: Does not include lost fringe benefits. For groups with more than 8 weeks of TTD, PPD, or compromise benefits, losses are projected for 10 years. For other groups, loss calculations are limited to the quarter of injury and the next quarter. Real discount rate is 2.3%.

SOURCE: Authors' calculations, updated from Boden and Galizzi (1999).

ments clearly have large and continuing losses. The relatively low average temporary disability payment suggests that these injured workers have losses that continue long past the termination of these benefits. In terms of losses, they are in a similar position to workers who receive permanent disability benefits, except they do not receive these additional benefits. As a consequence, their benefits are much less adequate than for permanent disability cases.

Biddle (1998) carried out a similar study of workers in Washington State who had job-related injuries in 1993–1994. In this study, he

provided estimates for losses and replacement rates for 3½ years after injury for temporary disability cases divided into groups by duration, as well as for PPD cases and settlements. For this chapter, we project Biddle's initial results to 10 years postinjury, which are displayed in Table 3.2. As with our estimates for the Wisconsin data, we have cumulated only two quarters of losses for people with, at most, 60 days (8½ weeks) of TTD. As in Wisconsin, this method indicates generally adequate replacement rates for the group with at most 60 days of TTD (with only one replacement rate below 50 percent).¹³ For people with disabilities lasting longer than 60 days, losses are very large and replacement rates are 30 percent or less. For permanent disability and settlement cases, replacement rates are about 40 percent. Injured workers in Washington with at least 180 days of temporary disability benefits do somewhat better than those with a shorter duration of payments, but they still do not do as well as those receiving permanent disability ben-

Table 3.2 Washington Average Pretax Losses and Replacement Rates, by Benefit Category, 1993–1994 Injuries (2003 \$)

	Average pretax wage loss (\$)		Replacement rate (%)	
	Men	Women	Men	Women
TTD benefits only				
Less than 15 days	710	524	40	50
15–30 days 2–4 wk	1,765	1,179	56	76
31–60 days 4.1–8 wk	2,791	1,925	74	86
61–180 days 8.1 wk+	36,672	30,874	14	13
More than 180 days	84,741	73,557	30	27
PPD benefits and settlements	48,362	38,190	41	44

NOTE: Does not include lost fringe benefits. For groups with more than 8 weeks of TTD, PPD, or compromise benefits, losses are projected for 10 years. For other groups, loss calculations are limited to the quarter of injury and the next quarter. Real discount rate is 2.3%. Both wage losses and benefits are observed for 3.5 years following the injury or illness.

SOURCE: Authors' calculations, updated from Biddle (1998).

efits or settlements. Overall, these results are similar to the Wisconsin results in Table 3.1.

In both states, the data suggest that a substantial proportion of workers with very long-term losses do not receive permanent disability benefits. These losses may occur because of labor market effects that persist long after full medical recovery from the injury. For example, workers who take months to recover from their injuries may lose their at-injury jobs and thereby lose their investments in skills and seniority at those jobs. This may cause long-term losses despite full medical recovery. If permanent disability benefits are only paid for workers with incomplete recovery, these workers will not receive them. Another explanation for this finding is that some workers who are eligible for permanent disability benefits are not aware of their eligibility and that these benefits are not paid voluntarily by the responsible employer or insurer.

Benefit Adequacy for Permanent Disability Cases

The most ambitious attempt to date to estimate lost earnings and workers' compensation adequacy across several states has studied permanent disability cases in five states: California, New Mexico, Oregon, Washington, and Wisconsin. These estimates use matching methods as described above.¹⁴ Table 3.3 shows the characteristics of the samples used. Losses of 6,000–32,000 injured workers were analyzed, with an average of about four matched uninjured workers for each injured worker. Maximum follow-up time ranged from six years in New Mexico and Washington to nine years in Wisconsin (the beginning of 1989 through the end of 1997).

We studied these five states because they had collected the necessary data and were willing to share them with us. While there is no reason to think that these states are representative of all 50 states, there is substantial variation among the systems. Washington offers workers' compensation insurance through its exclusive state fund, while California and Oregon have competitive state funds, and New Mexico and Wisconsin have private insurers only. The states also have very different benefit payment levels, with California paying \$1.58 per \$100 of covered wages in 2001 compared with \$1.68 in Washington, \$0.88 in Oregon, \$1.12 in Wisconsin, and \$0.86 in New Mexico (NASI 2003).

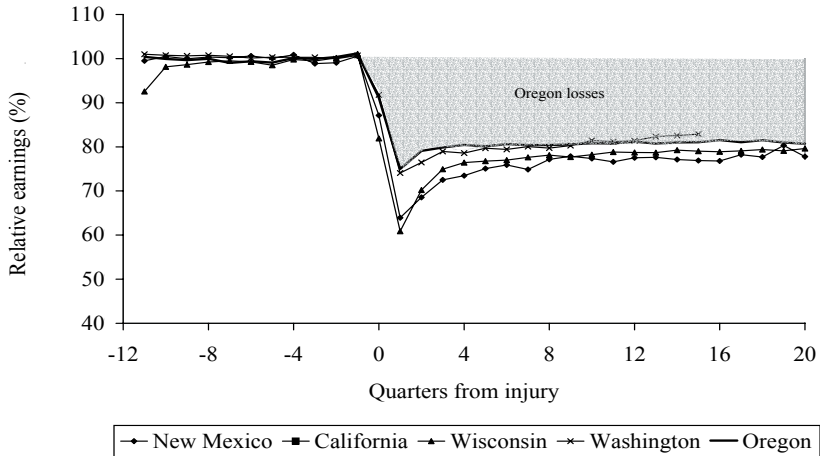
Table 3.3 Sample Characteristics from Five States, PPD Claims

State	Injury years	Earnings years	Number of injured workers	Number of comparison workers
New Mexico	1994–1998	1993–1999	5,996	25,128
California	1993–1995	1991–1999	32,358	128,722
Washington	1993–1994	1990–1998	13,317	47,371
Oregon	1992–1993	1988–1998	14,082	56,773
Wisconsin	1989–1990	1988–1997	16,186	69,480

SOURCE: Reville et al. (2001).

These workers' compensation systems also have different features that may affect the magnitude of lost earnings and, thereby, benefit adequacy. California's system is known as one of the most litigious, with attorney representation in 75 percent of PPD cases and 30 percent of lost-time cases (CWCI 2003), and Wisconsin's is recognized for its low rate of attorney involvement—only in 24 percent of PPD cases and 5 percent of lost-time cases (authors' calculation from 1989–1990 Wisconsin workers' compensation data). The other states' litigation rates fall somewhere in the middle. Litigation may increase tensions between workers who feel they are being treated poorly and employers who feel that they are being taken advantage of. This may well inhibit recovery of earnings losses by making workers less interested in returning to the at-injury employer and employers less interested in taking back injured workers.

In addition, several states have programs providing incentives to employers to hire disabled workers. Oregon offers its Employer-at-Injury Program, which assists time-of-injury employers with job modifications and other costs of reemployment. Both Washington and Oregon have also instituted Preferred Worker Programs that offer subsidies to other employers to hire occupationally disabled workers. Wisconsin and Oregon have two-tier permanent disability benefits that pay higher benefits to workers who do not return to work at or close to the preinjury wage. These provide incentives to the at-injury employer to offer

Figure 3.4 Earnings of PPD Recipients Relative to Uninjured Earnings: 5 States

SOURCE: Reville et al. (2001).

jobs to their injured employees. Finally, the Wisconsin law provides for penalties to employers who unreasonably refuse to hire injured workers.

Figure 3.4 shows the relative earnings of workers receiving permanent disability benefits in all five states over the five years after injury (with only four years of postinjury earnings available for Washington). In each of the five states, the general pattern is the same. There is a drop in earnings in quarters 1 and 2, and some recovery. However, the pattern differs across states. The initial drop in earnings is steepest in Wisconsin, California, and New Mexico. Wisconsin and New Mexico experience a larger recovery than those in California. Earnings drop the least in Oregon and Washington.

Table 3.4 reports 10-year earnings losses and replacement rates for the five states.¹⁵ The earnings losses results are also shown in Figure 3.4. Proportional earnings losses in California are the highest, followed by Wisconsin and then New Mexico. They are lowest in Washington and Oregon. In all five states, replacement rates are no more than 46 percent, varying from a low of 30 percent in Wisconsin to 46 percent in

Table 3.4 Ten-Year Earnings Losses and Replacement Rates PPD claims, (2003 \$)

	California 1994	Washington	New Mexico	Wisconsin	Oregon
Ten-year losses (\$)	68,139	47,925	40,172	55,404	44,691
Potential earnings (\$)	266,797	290,956	194,287	250,773	232,478
Total benefits (\$)	25,372	19,456	18,398	16,374	16,273
Proportional losses (%)	26	16	21	22	19
Pretax replacement (%)	37	41	46	30	36

SOURCE: Adapted from Reville et al. (2001).

New Mexico. California has both the highest losses in dollars and the highest proportional losses (losses as a fraction of potential earnings).

Differences across states in outcomes for injured workers may be driven by differences in their workers' compensation systems, but they may also be driven by differences in the characteristics of injured workers and their employers. For example, we can see from Table 3.4 that the potential earnings of injured workers in Washington are 50 percent higher than in New Mexico. In addition, industry composition and the proportion of employers who are self-insured (an indirect measure of employer size) differ among the five states. These factors may affect both losses and benefit adequacy. To control for them, we match the PPD claims in California with claims in each of the other four states on industry (one-digit SIC) and insurance status of the employer. We retain matches where the other state's claims are within 10 percent of the average wage of the matched California claim over the four quarters before injury. We then examine the losses and benefits of these California-matched claims in each state.

The question we seek to answer is, if workers with PPD claims in the other states have the same preinjury wage and are working in the same industry, in firms of similar employment size, and with the same insurance status as PPD claims in California, what will be their lost earnings and replacement rates? The answer is in Table 3.5. Except for New Mexico, whose estimated replacement rate decreases substantially, replacement rates change by three percentage points or less. In

Table 3.5 Ten-Year Earnings Losses and Replacement Rates PPD claims, Other States' Workers Matched to California's (2003 \$)

	California 1994	Washington	New Mexico	Wisconsin	Oregon
Ten-year losses (\$)	68,139	47,181	45,423	49,895	42,129
Potential earnings (\$)	266,797	255,695	237,431	248,121	258,743
Total benefits (\$)	25,372	19,127	17,077	15,964	16,627
Proportional losses (%)	26	18	19	20	16
Pretax replacement (%)	37	41	38	32	39

SOURCE: Authors' calculations.

none of the five states do replacement rates come close to the two-thirds standard for adequacy.

Table 3.5 compares losses and adequacy across the five states, but it does not account for one very important difference among the states: the fraction of workers with temporary disability benefits who also receive permanent disability benefits varies from 17 percent in Wisconsin to 41 percent in California (Table 3.6). If we assume that the distribution of injury severity is the same from state to state, then an additional 24 percent of injured workers in Wisconsin with TTD who lost more than 7 days off work would have received permanent disability benefits if they had been injured in California. Judging from the results of the studies in Wisconsin and Washington described above, workers with long temporary disability but no PPD benefits tend to have high and continuing losses. And because they have high losses and don't get PPD benefits, they have very low replacement rates. Averaging them in with other Washington workers who received PPD benefits would reduce the overall average benefits for the 41 percent who would have been eligible for benefits if they worked in California. For this reason, Wisconsin's workers' compensation system is even less generous compared with California's system than indicated in Table 3.5. The same is the case for the other three states.

Table 3.6 PPD Claims as a Proportion of all Claims with More than Seven Days of TTD Benefits (%)

California 1994	Washington	New Mexico	Wisconsin	Oregon
41	21	23	17	31

SOURCE: Authors' calculations.

To account for differences in the propensity to award permanent disability benefits, we attempt to create for each state a sample of 41 percent of the most severe injuries involving more than three days off work.¹⁶ Because we do not have an independent measure of severity, we use workers' compensation benefits as a proxy. We begin with all permanent disability cases. To make other states comparable to California, we randomly select additional people in each temporary disability duration group so that the proportion in that group that would have received permanent disability in California is included in the comparison.

For example, in California, 96 percent of workers in the top 10 percent of temporary disability durations are receiving permanent disability. In Washington, 64 percent of workers in the top 10 percent are receiving permanent disability. We calculate the replacement rate for the 64 percent who actually receive permanent disability in Washington, plus an additional randomly selected 32 percent of workers with temporary disability in the top decile (not including those receiving permanent disability) so that 96 percent of the top decile (including all actual permanent disability cases) are represented in the sample. We repeat this exercise for every decile so that the resulting sample is 41 percent of all lost-time claims in each of the states.¹⁷

Table 3.7 displays the results of this exercise. It provides a picture of losses and replacement for people who would have received permanent disability benefits if they had been injured in California. By definition, California's losses and replacement rates are the same as in Table 3.5. The other three states' losses are lower than when only their permanent disability cases are included, but their benefits are lower yet. The result is a decline in replacement rates for all three. The four states have replacement rates between 23 percent and 37 percent—well below the two-thirds standard of benefit adequacy.

Table 3.7 Ten-Year Earnings Losses and Replacement Rates, Four States, Matched PPD Claims Augmented with Long-Term TTD (2003 \$)

	California 1994	Washington	Wisconsin	Oregon
10-year losses (\$)	68,139	50,044	36,214	40,144
Potential earnings (\$)	266,797	253,242	249,714	260,387
Total benefits (\$)	25,372	14,502	8,347	13,739
Proportional losses (%)	26	20	15	15
Pretax replacement (%)	37	29	23	34

SOURCE: Authors' calculations.

It is also notable in Table 3.7 that the proportional losses experienced by California's PPD recipients are substantially higher than for equivalent workers in the next highest state, Washington. Indeed, they are 76 percent higher than the average losses of equivalent workers in Wisconsin.

CONCLUSION

Benefit adequacy is a central goal of workers' compensation. Yet, in most states we know little about whether cash benefits are indeed adequate. Our initial studies in five states have shown that, for many groups of injured workers, replacement rates do not approach the two-thirds benchmark for adequacy. This gives us cause for concern, as there is no reason to believe that other states' replacement rates will be much higher than the five states we have studied to date. It also underlines the importance of conducting studies of adequacy in additional states.

To the extent that benefits are inadequate, it would be helpful to understand the effects of policies available to increase replacement rates. Potential policy choices include increasing weekly benefit payment levels, increasing the level of benefits paid for each percentage point of permanent disability, changing permanent disability guidelines to increase the likelihood that people with a given level of lost earnings will receive permanent disability benefits, and eliminating roadblocks

that prevent injured workers from receiving workers' compensation benefits. Each of these policies would directly increase overall benefit payments to workers and therefore increase costs to employers. Additionally, each would buck the recent trend toward reducing benefits and eligibility.

Alternate approaches focusing on benefits would try to improve the distribution of benefits by targeting benefits more toward groups with particularly low replacement rates or toward groups with particularly large losses. These steps would improve the equity of benefit distribution. However, unless they worked hand-in-hand with benefit increases, they would imply substantial reductions in benefits for untargeted groups.

Another approach is to try, *ex post*, to target benefits at people whose compensation turns out to be incommensurate with their losses. Most permanent disability systems provide benefits in expectation of losses. Naturally, sometimes people's actual losses differ substantially from what was predicted. To address this, Texas has a supplemental benefit program that identifies people with large and continuing losses and pays additional benefits to them.

Other avenues to improve benefit adequacy would focus on reducing lost earnings of injured workers or on reducing injury rates. Both of these approaches have the potential to increase replacement rates without increasing employer costs. One area that may have great potential is private or public policies directed at return-to-work at the at-injury employer. Studies also have shown that, when the preinjury employer rehires the injured or disabled worker, time lost from work is reduced substantially and the employment trajectory is improved (Burkhauser, Butler, and Kim 1995; Galizzi and Boden 2003). The Oregon Employer-at-Injury Program is an example of such an approach. As described earlier, it provides subsidies to employers who offer modified or light-duty jobs to allow injured workers to return to work before they have fully recovered from their workplace injuries. The primary goal is to maintain employment at the at-injury employer and thus to improve the trajectory of postinjury employment and earnings.

To fully understand the implications of these and other policy alternatives for improving benefit adequacy, much additional research would be required. Our understanding of the adequacy of workers' compensation benefits is in its infancy. The list of important unanswered ques-

tions is long and could form the basis of a valuable research agenda. Still, this does not absolve us from attempting to respond to the challenge of inadequate benefits.

We end this chapter with a partial list of important questions that we would like to see addressed in future research.¹⁸ Answers to these questions would provide an empirical basis for policymakers to decide among alternatives for improving the adequacy of workers' compensation benefits.

- 1) How do replacement rates differ among states? For example, do states with high maximum weekly benefits tend to have high replacement rates? Do states with a high propensity to provide PPD benefits have high replacement rates? Does unionization affect replacement rates?
- 2) To what extent could replacement rates from workers' compensation be increased through more effective assistance with return to work or job accommodations? How effective are current state programs designed to encourage the at-injury employer or other employers to offer jobs to injured workers? How effective are vocational rehabilitation programs?
- 3) Are losses reduced and adequacy improved by two-tier PPD systems that pay higher benefits if employers do not rehire injured workers in comparable jobs?
- 4) How effective is the supplemental benefit program in Texas in increasing benefit adequacy for workers with large losses?
- 5) To what extent do workers receive benefits from other wage-replacement programs, such as Social Security disability or retirement benefits, unemployment insurance, state temporary disability benefits, employer sponsored pensions, sick leave or private long-term disability insurance? How different would total replacement rates be if they included payments from other programs?
- 6) Do injured workers also lose nonwage (fringe) benefits? Which benefits are lost, and what is the value of these losses to the worker? If we include lost fringe benefits, how would this affect our measure of the adequacy of benefits?

- 7) How much are the increased costs to families because they must care for injured workers or replace household work formerly done by them? How much are the offsetting savings to workers from reduced work expenses, such as commuting, child care, food, and clothing? And how do these impact benefit adequacy?
- 8) Does absence from work, from any cause, lead to reduced future earnings? If so, how long an absence must occur before the future loss becomes significant? Does an absence as a result of work-related injury or disease exhibit the same or a different pattern of future wage loss than an absence due to some other reason?
- 9) What impact do the costs of obtaining benefits have on the adequacy of the benefits actually received by workers (e.g., what are the effects of delays and the reduction in claimants' net recoveries after payment of attorney fees and litigation expenses)?
- 10) What is the relationship between pretax and after-tax wage replacement rates in different states?
- 11) To what extent can losses be predicted by medical information about the injury, such as the information used in the American Medical Association Guides?
- 12) Are there worker, employer, or labor market characteristics that affect losses and replacement rates? Examples include gender, race, age, preinjury earnings, and union status; employer size and industry; and state unemployment rates.
- 13) In states where this issue has not yet been studied, are replacement rates relatively low for workers with long-duration temporary disability but no permanent disability benefits? If this disparity exists, can we determine its causes?
- 14) To what extent do states with high rates of litigation have higher or lower replacement rates (net of attorney fees paid by workers)? If any differences exist, what are the underlying reasons for them?
- 15) To what extent are large losses of injured workers caused by the functional limitations caused by their injuries?

- 16) To what extent are these losses caused by labor market impacts of time lost from work, injury-related job loss, or stigma attached to workers with long-term injuries and illnesses?
- 17) What is the magnitude of losses related to workplace injuries that do not receive workers' compensation income benefit payments? How do these uncompensated cases affect overall replacement rates? To what extent do changes in workers' compensation laws affect the proportion of injuries that go unreported?
- 18) Can the methodology used in the recent studies of adequacy be simplified and/or explained so that state agencies can conduct adequacy studies?
- 19) What are the advantages and disadvantages of the various methods used to estimate earnings losses in the earlier and recent studies of adequacy? For example, Ginnold (1979) relied on state income tax records, and Berkowitz and Burton (1987) relied on Social Security earnings records, while the recent studies have relied on state unemployment insurance records.

Notes

1. See <http://www.bls.gov/news.release/cfoi.nr0.htm>.
2. See <http://www.bls.gov/news.release/osh.t02.htm>.
3. Adequacy can also be measured by whether family income is restored to a socially acceptable level, such as the poverty level. This concept of adequacy is not typically applied to the workers' compensation program. However, limitations on weekly temporary disability benefits (typically to 100 percent of the state average weekly wage) do reflect this notion of adequacy to some extent. For a more complete discussion of alternate measures of workers' compensation adequacy, see Hunt (2004).
4. Some states pay at a somewhat different rate, and others pay based on a measure of after-tax earnings, but this is the predominant rate. For short-term injuries, replacement is lower because of the impact of the waiting period.
5. Because benefits and losses occur over time, and benefits and losses years from now are worth less than if they occurred today, we discount them, using an annual real discount rate of 2.3 percent. This is drawn from Social Security Administration studies. We also convert benefits and wages to 2003 dollars to take inflation into account.

6. There is no reason to expect that individual workers' losses will be captured by this method, but only that the average difference between estimated uninjured earnings and actual earnings will be an unbiased measure of average losses.
7. Fraudulent reporting of injuries would be the converse of underreporting. However, there are no studies that indicate that overreporting is nearly of the same magnitude as underreporting.
8. Cheit drew this conclusion from looking at predicted and actual postinjury earnings of individual workers. This finding suggests that a substantial number of workers had little or no work-related lost earnings. However, findings for individual workers are subject to substantial uncertainty. See note 12.
9. Uninjured workers could not be used in the regression context because personal characteristics controlled for in this setting (for example, age and gender) are unavailable for the uninjured workers.
10. To account for the losses of workers out for 8–10 days, they added 9 days' wages to each worker's estimated losses.
11. This includes a 2.3 percent discount rate. Also, in the 1999 Wisconsin study, Boden and Galizzi imputed changes in the employment rates of uninjured workers over time as they might affect losses. The other studies did not do this, so, for sake of comparison, we omitted this step.
12. Determining the true losses of individual workers is virtually impossible because, at the individual level, we cannot know what factors caused changes in earnings. Only by estimating losses of large groups of workers can we apply statistical techniques that "average out" the noninjury causes of changes in earnings.
13. The relatively low replacement for the group under 15 days is caused by the fact that this group is not paid benefits for the first 3 days off work. Once 15 days is reached, the first 3 days' benefits are paid.
14. Initial match quality was judged by how well earnings of injured and matched uninjured workers tracked each other in the prematch period. Match quality was excellent in New Mexico and insured firms, but less so in the other three states and self-insured firms in California. To improve match quality in these cases, uninjured workers were matched by employee tenure in addition to employer and preinjury wages.
15. In Washington, on the basis of the average over the last 4 quarters observed (quarters 11–15), we project a 1.9 percent quarterly decline in wage losses after the last quarter observed. In California, we project a 1 percent decline after the last quarter observed, which is also based on the last quarters observed. In Wisconsin, almost 10 years of postinjury earnings are directly observable. In Oregon, the data suggest that no decline in wage losses is occurring at the end of the observed period.
16. Because New Mexico has a seven-day waiting period and the other states have three-day waiting periods, we do not include it in this comparison.
17. California permanent disability recipients have the longest temporary disability durations. Using deciles instead of actual durations controls for differences across workers' compensation systems that might extend or reduce the durations of temporary disability, such as the level of benefits or control over medical

care or levels of litigation. If true severity were the only determining factor of temporary disability durations across states, because California has the highest durations, this approach (using deciles instead of durations) would overstate the fraction that would receive permanent disability benefits if they had been injured in California. On the other hand, California may not award permanent disability randomly within long-duration temporary disability groups. Rather, permanent disability may be awarded to workers within these groups likely to have the largest lost earnings. In this case, our method would underestimate the losses among workers in other states who would have received permanent disability benefits in California because we randomly chose workers within temporary disability groups.

18. Several of these questions are adapted from another agenda for research on workers' compensation adequacy published in an appendix to Hunt (2004).

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4

Permanent Partial Disability Benefits

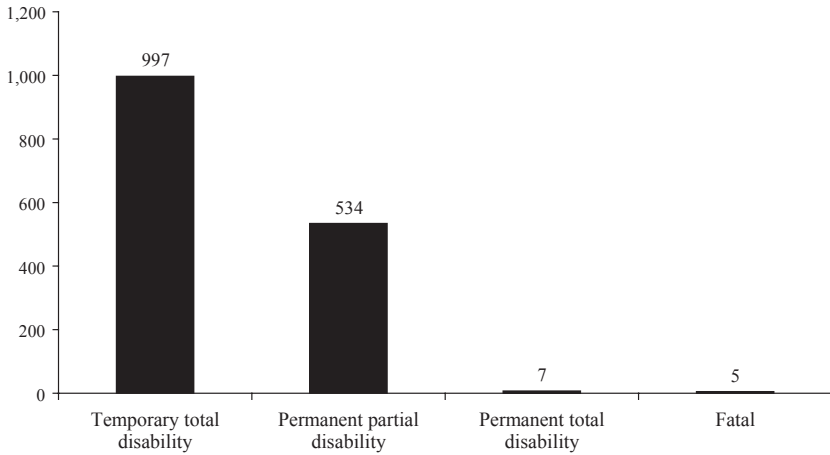
John F. Burton, Jr.
Rutgers University

Permanent partial disability (PPD) cash benefits constitute the most expensive and complex type of benefit provided by workers' compensation programs.¹ PPD benefits are paid to workers whose workplace injuries have consequences that are permanent but not totally disabling.² This chapter provides an overview of the previous research on PPD benefits, with particular emphasis on the contributions of Terry Thomason, and indicates the topics for which additional research is needed.

INTRODUCTION TO PPD BENEFITS

The importance of PPD benefits in the U.S. workers' compensation program and the variability among states in the relative importance of PPD benefits are shown in 1999 data on incurred cash benefits (Blum and Burton 2003). Nationally, temporary total disability (TTD) benefits are more common than PPD benefits (Figure 4.1), and permanent total disability (PTD) benefits and fatal benefits are much more expensive per case than PPD benefits (Figure 4.2). However, the total expenditures on PPD benefits per 100,000 workers account for over 70 percent of all cash benefits nationally (Figure 4.3). Blum and Burton (2003) also report that nationally PPD cash benefits increased from \$14.4 million per 100,000 workers in 1996 to \$17.2 million in 1999.

There are significant differences among states in these measures of incurred PPD benefits, as shown in the lowest, first quartile, mean, median, third quartile, and highest values for the 46 jurisdictions with data. The frequency of PPD claims per 100,000 workers varies from

Figure 4.1 Frequency per 100,000 Workers in 1999, National Averages

1,221 in California to 128 in the District of Columbia, almost a tenfold difference (Figure 4.4). The average cost of cash benefits per PPD case varies from \$86,872 in Michigan to \$13,909 in Indiana, a more than sixfold difference (Figure 4.5). As measured by total expenditures on PPD cash benefits per 100,000 workers, the \$43.3 million in California is more than 10 times the \$4.1 million in Utah (Figure 4.6).

One research task is to explain the interstate and intertemporal differences in these measures of incurred PPD benefits. One logical determinant of the amount of incurred cash benefits in a state is the generosity of the benefits prescribed by the state's workers' compensation statute. Another obvious candidate for a variable that would explain interstate differences in incurred benefits is the state's injury rate.³

A CONCEPTUAL FRAMEWORK FOR EXAMINING PPD BENEFITS

Permanent Consequences of Workplace Injuries and Diseases: Terminology and Concepts

There are significant differences among the states and provinces in their approaches to compensating permanent disabilities. Furthermore,

Figure 4.2 Average Cash Benefits per Case in 1999, National Averages (\$)

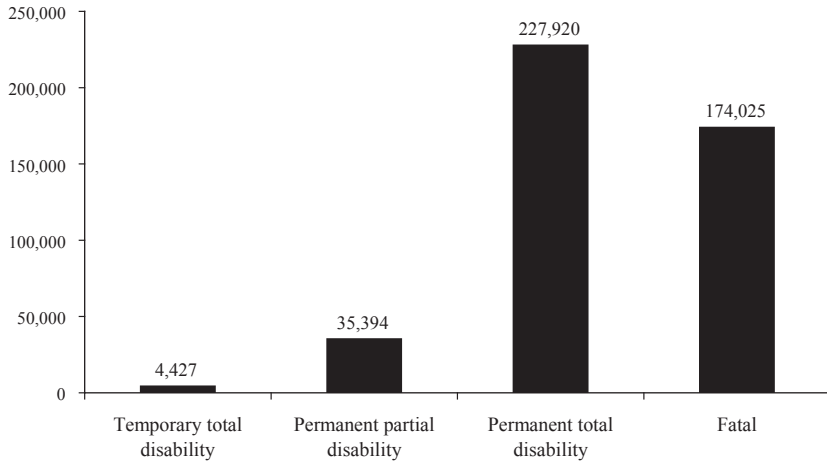


Figure 4.3 Cash Benefits per 100,000 Workers in 1999, National Averages (in Millions \$)

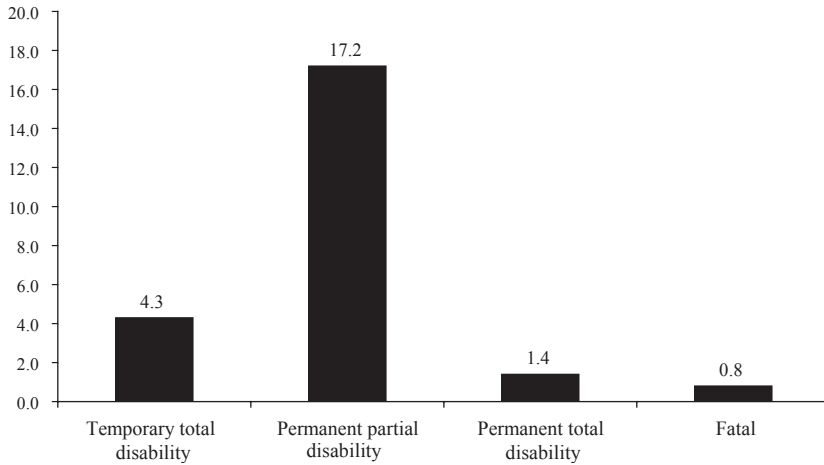
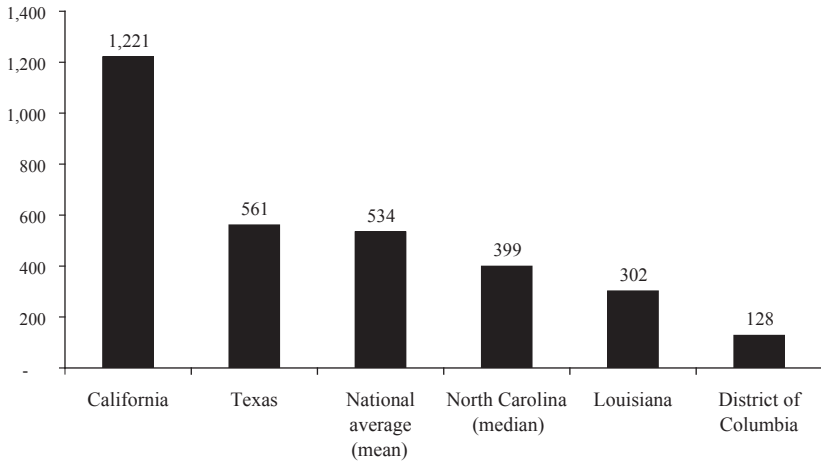


Figure 4.4 Permanent Partial Disability Benefits Frequency per 100,000 Workers in 1999, Variations among States



among jurisdictions using the same approach, the terminology used to describe the same approach may differ. Thus, a common set of terms is a practical necessity for effective interjurisdictional comparisons regarding PPD benefits.

Three time periods

As shown in Figure 4.7, three time periods are pertinent in compensating a worker with an injury serious enough to result in PPD benefits. The *preinjury period* is relevant because *inter alia* the employee's average wage is used in calculating the cash benefits after the worker is injured. The *temporary disability period* refers to the time from the onset of the injury or disease until the date of maximum medical improvement (MMI) has been reached; the *permanent disability period* refers to the period following MMI. The distinction between the temporary and permanent disability periods is important because workers' compensation programs provide different types of cash benefits in the two periods.

What are the permanent consequences?

Most workers injured on the job fully recover by the date of MMI and thus sustain no permanent consequences from the injury. For those

Figure 4.5 Permanent Partial Disability Benefits, Average Cash Benefits per Case in 1999, Variations among States

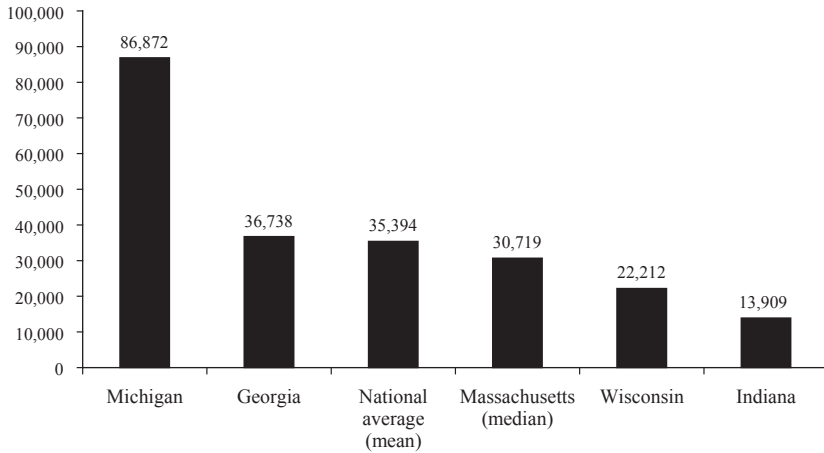


Figure 4.6 Permanent Partial Disability Benefits, Cash Benefits per 100,000 Workers in 1999, Variations among States

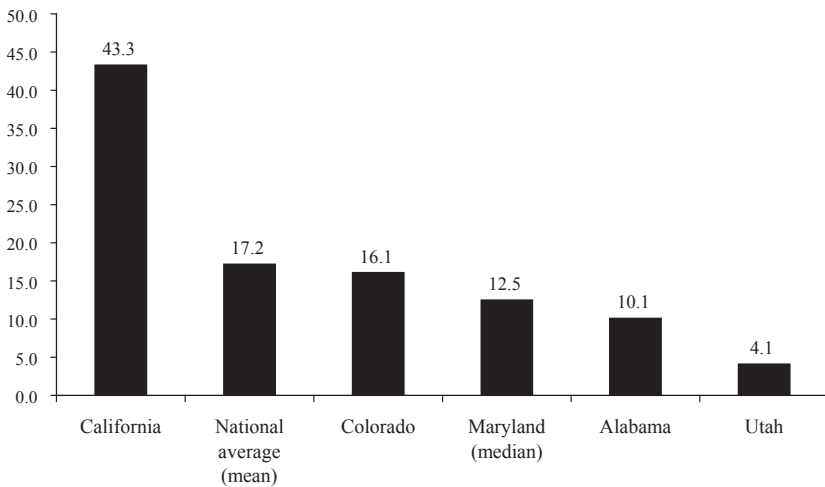
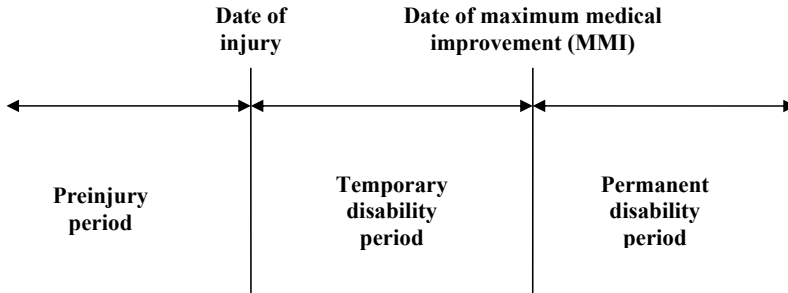


Figure 4.7 Three Time Periods in a Workers' Compensation Case Where the Injury Has Permanent Consequences

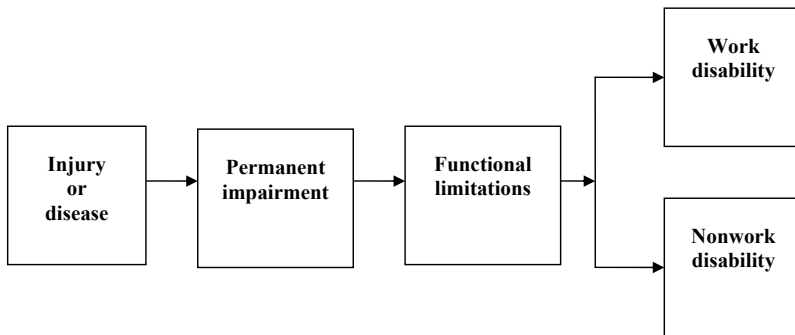


workers with relatively serious injuries, several permanent consequences are possible. There may be a persistence of pain and suffering and a continuing need for medical care and rehabilitation. Of particular interest are the other permanent consequences (shown in Figure 4.8) because they are the focus of most of the debate concerning the optimal design of PPD benefits.⁴

A *permanent impairment* is any anatomic or functional abnormality or loss that remains after MMI has been achieved. Amputated limbs or enervated muscles are examples of permanent impairments. The impairment probably causes the worker to experience *functional limitations*. Physical performance may be limited in such activities as walking, climbing, reaching, and hearing; furthermore, the worker's emotional and mental performance may be adversely affected or limited.

Functional limitations, in turn, are likely to result in a disability, of which there are two types: work disability and nonwork disability. *Work disability* can be conceptualized as having two phases: the *loss of earning capacity*, which results in *actual wage loss*. In a strict sense, these two aspects of work disability must accompany one another. An actual loss of earnings only occurs if there is loss of earning capacity. Nevertheless, the distinction is important because (as discussed later) some types of workers' compensation benefits are based solely on a determination of a presumed loss of earning capacity, while other types of benefits require demonstration of actual wage loss.

Nonwork disability includes the loss of the capacities for other aspects of life, such as recreation and the performance of household tasks,

Figure 4.8 Permanent Consequences of an Injury or Disease

and can be conceptualized as having two phases: the *loss of capacity for nonwork activities* which results in *actual noneconomic loss*. Again, in a strict sense, these two aspects of nonwork disability must accompany one another, but at least conceptually they can be measured separately.

Factors that affect the magnitudes of the permanent consequences

The relationships shown in Figure 4.8 indicate chains of causation that begin with the worker's injury, which in turn results in permanent impairment, functional limitations, work disability, and nonwork disability. However, the chains of causation are neither automatic nor are they immutable because they are the result of factors that are uncontrollable after the date of injury. Rather, as shown in Table 4.1, in each stage in the chains of causation there are also factors controllable by the worker, or by participants in the delivery system for workers' compensation benefits, or by public policy.⁵

Stage 1—the movement from the injury or disease to the permanent impairment—will be affected by such controllable factors as the quality of the medical care received by the worker and by such uncontrollable factors as the worker's previous health status. Stage 2—the movement from the permanent impairment to the functional limitations—is also affected by controllable factors (such as the quality of medical rehabilitation) and uncontrollable factors (such as the worker's prior physical condition). Likewise, stage 3A—the progression from functional limitations to loss of earning capacity—will be influenced by control-

Table 4.1 Factors That Affect the Extent of the Permanent Consequences

Stage 1	Injury to Permanent Impairment	
	Controllable factors include	Medical care
	Uncontrollable factors include	Prior health status
Stage 2	Permanent Impairment to Functional Limitations	
	Controllable factors include	Medical rehabilitation
	Uncontrollable factors include	Prior physical condition
Stage 3A	Functional Limitations to Loss of Earning Capacity	
	Controllable factors include	Vocational rehabilitation
	Uncontrollable factors include	Age, prior education, prior work experience
Stage 4A	Loss of Earning Capacity to Actual Wage Loss	
	Controllable factors include	Employer return-to-work policies, reasonable accommodations at work site; design of benefits (affecting incentive to return to work)
	Uncontrollable factors include	General state of the labor market
Stage 3B	Functional Limitations to Loss of Capacity for Nonwork Activities	
	Controllable factors include	Rehabilitation (such as training to operate modified automobile)
	Uncontrollable factors include	Age, prior experience
Stage 4B	Loss of Capacity for Nonwork Activities to Actual Noneconomic Loss	
	Controllable factors include	Redesigned facilities or equipment (such as modified automobile)
	Uncontrollable factors include	None, perhaps

lable factors (the quality of vocational rehabilitation, for example) and uncontrollable factors (such as the worker's age and prior work experience). Finally, in stage 4A—the actual wage loss resulting from the loss of earning capacity—other factors will influence the outcome, such as the employer's return-to-work policies (controllable) and the general state of the labor market (uncontrollable for a particular employer or worker). Table 4.1 also catalogues several controllable and uncontrollable factors that affect the extent of loss of capacity for nonwork activity resulting from functional limitations (stage 3B) and the amount of actual noneconomic loss resulting from the loss of capacity for nonwork activity (stage 4B).

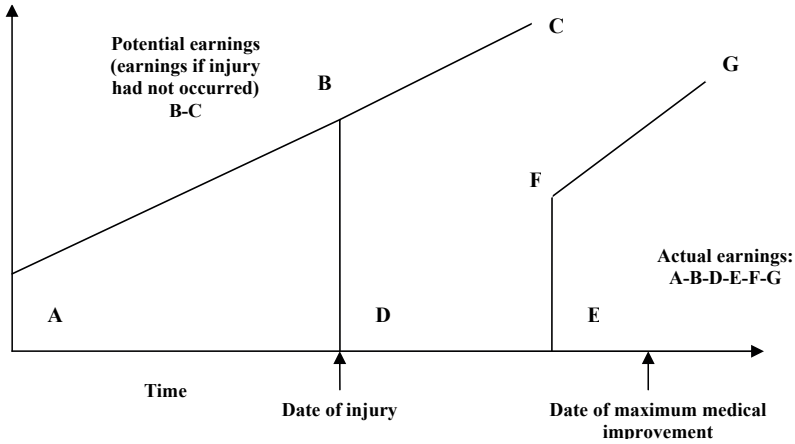
The distinction between controllable and uncontrollable factors in Table 4.1 is not meant to provide a rigid classification scheme, nor is the list of factors meant to be exhaustive. One purpose of the table is to suggest that some factors that affect the chains of causation between the initial injury or disease and the ultimate work or nonwork disability can be influenced by workers, employers, physicians, rehabilitation providers, and others in the workers' compensation delivery system, or by policymakers who design the workers' compensation PPD benefits system; however, other factors can not be influenced.

Another purpose of Table 4.1 is to emphasize that there are numerous factors that affect all of the stages in the chains of causation. As a result, knowing the extent of a worker's loss for any of the intermediary consequences shown in Figure 4.8 may not provide a good prediction of the extent of the loss for a subsequent consequence. The accuracy of predictions of actual wage losses from the ratings of loss of earning capacity, and other such purported relationships among the various permanent consequences of work-related injuries or diseases, including the efficacy of intervention at various stages of the disability determination process, are empirical issues that deserve further research.

The Effect of Work Injuries on Earnings

The loss of earnings resulting from a work-related injury or disease that has permanent consequences is illustrated by Figure 4.9. Prior to the injury, the wages increased through time from A to B, reflecting the worker's increasing productivity as well as general inflation. At point B, the worker experienced a work-related injury that permanently re-

Figure 4.9 Actual Loss of Earnings for a Worker with a Permanent Disability



duced his earnings. Had he not been injured, his earnings would have continued to grow along the line BC. Although these *potential earnings* cannot be observed for the injured worker, they can be estimated from information on what happened after point B to earnings of similar workers who were not injured.

The injured worker's *actual earnings* in this example dropped from B to D and continued at this zero earnings level until point E, when the worker returned to work at wage level F. Thereafter, actual earnings grew along the line FG. This example assumes that the worker's actual earnings never return to the potential earnings (line BC) that he would have earned if he had never been injured. The worker's "*true*" wage loss due to the injury is equal to the worker's potential earnings after the date of injury (BC) minus the worker's actual earnings after the date of injury (BDEFG).⁶

Of course, not all workers with permanent impairments resulting from their work injuries have wage histories that correspond to the example in Figure 4.9. Some may return to their old jobs at the wage they would have earned if they had never been injured; others may experience a total loss of earnings from their injuries. The example shown illustrates an intermediate case, in which the worker has a partial but not total loss of earnings.

There are a myriad of issues that must be resolved in order to measure the actual loss of earnings resulting from work-related injuries and the workers' compensation benefits actually received by workers as a result of those injuries. These issues and a catalogue of research topics are presented in Boden, Reville, and Biddle (2005).⁷

WHICH PERMANENT CONSEQUENCES SHOULD BE COMPENSABLE?

The taxonomy of the permanent consequences of workplace injuries provided in the previous section serves as a basis for the design of a PPD benefits system. One policy issue that implicitly or explicitly has to be resolved in any jurisdiction in order to design this system pertains to the purpose of the PPD benefits.⁸

The obligation of the workers' compensation program to provide medical care and rehabilitation services is generally accepted (although in some jurisdictions, there is disagreement about the extent of vocational rehabilitation services to which the worker is entitled). Conversely, in most jurisdictions there is general agreement that the worker is not entitled to benefits because of pain and suffering.⁹ The rationale often given is that the original design of workers' compensation involved a trade-off, in which the employee is eligible for benefits without demonstrating employer fault and the employer's liability is limited to certain consequences of the injury, which not did encompass pain and suffering.

Most of the recent controversy over which of the permanent consequences of a work-related injury deserve compensation involves arguments concerning the four permanent consequences shown in Figure 4.8. Because the four consequences are sequential and interdependent, a particular consequence may be endorsed as a basis for compensation because it serves as a convenient proxy for other consequences of primary concern.

Thus, one may argue that the amount of the PPD benefits should operationally be based on the extent of the worker's impairment when the real concern is for the work disability caused by the impairment. This indirect route to compensating work disability may be chosen because impairment may be easier to measure than work disability. Unfortunately, those who favor payment when the worker suffers an impairment do not

always make clear whether this payment is meant to compensate for the existence of the impairment by itself or is meant to compensate for the work disability (or some other consequence) that is expected to result from the impairment.

To the extent that the rationale for benefits is discernable, however, two schools of thought can be identified. One view considers lost wages due to the injury (work disability) as the sole justification for workers' compensation benefits. Supporters of this position recognize that some jurisdictions pay benefits on the basis of an evaluation of the extent of impairment or of some of the other permanent consequences in Figure 4.8 prior to actual wage loss, but argue that when such evaluations are made, wage loss is conclusively presumed. The jurisdiction, in short, compensates on the basis of one of these intermediate consequences because it serves as a proxy for wage loss.

An alternative view of the rationale for benefits for workers with permanent consequences of their injuries accepts work disability as the primary basis for benefits, but argues that there is a secondary role for benefits paid for nonwork disability. Arguments for these "impairment benefits" indicate that the purpose is not only to compensate impairment *per se* but to also use permanent impairment as a convenient proxy for the functional limitations and nonwork disability that result from the impairment. A variant on this alternative view is to argue that nonwork disability merits compensation, and that the degree of permanent impairment serves as a proxy for the extent of nonwork disability.¹⁰

The dominant view probably is that the only permanent consequences that warrant benefits in a workers' compensation program are medical care, rehabilitation, and work disability. There are, however, several jurisdictions that explicitly adopted benefits for nonwork disability, including Florida (which paid what were termed "permanent impairment" benefits from 1979 to 1993) and most Canadian provinces, such as Ontario (which pays noneconomic loss benefits). One provocative research question is why Canadian provinces are much more receptive to paying noneconomic loss benefits than U.S. states?

THE THREE BASIC OPERATIONAL APPROACHES TO PPD BENEFITS

Among those states in which work disability is the sole reason why PPD benefits are paid, most jurisdictions use another of the permanent consequences shown in Figure 4.8 as a proxy or predictor of the extent of work disability. This section provides an overview of the basic operational approaches for PPD benefits found in U.S. and Canadian jurisdictions.¹¹

Three Basic Operational Approaches for Work Disability Benefits

Three basic operational approaches for work disability benefits, plus variants of each of the three basic approaches, are shown in Table 4.2.¹² The operational approaches represent the building blocks for PPD benefits systems. The difference among the three basic operational approaches depends on which of the permanent consequences shown in Figure 4.8 is used as a proxy for or measurement of work disability.

Operational Approach I: The permanent impairment approach

The first basic operational approach, the permanent impairment approach, evaluates the seriousness of the worker's permanent impairment and/or functional limitations resulting from the work-related injury.¹³ An impairment rating is made, which is used to determine the amount of the PPD benefits.

The first variant of the permanent impairment approach is the "pure" permanent impairment approach (Operational Approach I.A). As indicated in Table 4.2, the only worker-specific factor that affects the amount of PPD benefits in this approach is the size of the permanent impairment rating. This presumably provides a very rough proxy for the worker's actual loss of wages, but a few jurisdictions nonetheless rely on this approach for work disability benefits.

The second variant of the permanent impairment approach is the permanent impairment and preinjury wage approach (Operational Approach I.B). This approach multiplies the permanent impairment rating by a weekly benefit that is largely determined by the worker's weekly

Table 4.2 Operational Approaches for Permanent Disability Benefits

Operational Approach I: The Permanent Impairment Approach

Operational Approach IA: The “Pure” Permanent Impairment Approach

1. The worker is given a permanent impairment rating based on the extent of the workers’ permanent impairment/functional limitations.
2. The worker’s permanent partial disability (PPD) benefits are determined by multiplying the rating by a dollar amount per point that does not vary among individuals on the basis of their preinjury wages.

Operational Approach IB: The Permanent Impairment and Preinjury Wage Approach

1. The worker is given a permanent impairment rating based on the extent of the workers’ permanent impairment/functional limitations.
2. The duration of the PPD benefit is determined by multiplying the rating times a duration specified in the statute or workers’ compensation agency rule.
3. The weekly PPD benefit is determined by multiplying the worker’s preinjury wage by a percentage (e.g., 66 $\frac{2}{3}$ percent); the weekly benefit is subject to minimum and/or maximum weekly benefits.^a

Operational Approach II: The Loss of Earning Capacity (LEC) Approach

Operational Approach IIA: The Ad Hoc Loss of Earning Capacity Approach

1. The worker is given an LEC rating based on the facts of the particular case, which includes the worker’s permanent impairment rating and other factors, such as the worker’s age, occupation, education, and prior work experience.
2. The duration of the PPD benefit is determined by multiplying the LEC rating times a duration specified in the statute or workers’ compensation agency rule.
3. The weekly PPD benefit is determined by multiplying the worker’s preinjury wage by a percentage (e.g., 66 $\frac{2}{3}$ percent); the weekly benefit is subject to minimum and/or maximum weekly benefits.^b

Operational Approach IIB: The Loss of Earning Capacity by Formula Approach

1. The worker is given a loss of earning capacity rating based on a formula, which considers the worker’s permanent impairment rating and other factors, such as the worker’s age, occupation, and education.
2. The duration of the PPD benefit is determined by multiplying the rating times a duration specified in the statute or workers’ compensation agency rule.

3. The weekly PPD benefit is determined by multiplying the worker's preinjury wage by a percentage (e.g., 66⅔ percent); the weekly benefit is subject to minimum and/or maximum weekly benefits.

Operational Approach IIC: The “Pure” Loss of Earning Capacity Approach

1. The worker is given a loss of earning capacity rating based on the facts of the case or based on a formula.
2. The rating is used to determine the amount of PPD benefits using a formula that does not vary among workers on the basis of their preinjury wages.

III. Operational Approach III: The Actual Wage Loss Approach

Operational Approach IIIA: The “Pure” Actual Wage Loss Approach

1. The worker's actual wage loss is (a) the worker's projected wages in the permanent disability period^d and (b) the worker's actual earnings in the permanent disability period.
2. The worker must demonstrate that the actual wage loss was due to the effects of the permanent impairment and was not because of other factors, such as the worker's voluntarily retiring or withdrawing from the labor force, or refusing a legitimate job offer, or general economic conditions.
3. If the worker's actual wage loss is zero (or a negative number), there are no PPD benefits.
4. The duration of the PPD benefit depends on the duration of the worker's actual wage loss (subject to a statutory maximum on duration).
5. The weekly PPD is determined by multiplying the actual wage loss by a percentage (e.g., 66⅔ percent); the weekly benefit is subject to minimum and/or maximum weekly benefits.

Operational Approach IIIB: The Limited Actual Wage Loss Approach

1. The worker's actual wage loss is (a) the worker's projected wages in the permanent disability period^d and (b) the worker's actual earnings in the permanent disability period.
2. The worker must demonstrate that the actual wage loss was due to the effects of the permanent impairment and was not because of other factors, such as the worker's voluntarily retiring or withdrawing from the labor force, or refusing a legitimate job offer, or general economic conditions.
3. The worker's maximum compensable wage loss is the workers' projected wages in the permanent disability period times either (c) the worker's loss of earning capacity rating or (d) the worker's permanent impairment rating; and/or the worker's maximum compensable wage loss is the actual wage loss in excess of a threshold that is a percent of the worker's preinjury wage.^e

4. The worker's compensable wage loss is the lesser of the worker's actual wage loss or the worker's maximum compensable wage loss.
 5. If the worker's compensable wage is zero (or a negative number), there are no PPD benefits.
 6. The duration of the PPD benefit depends on the duration of the worker's compensable wage loss (subject to a statutory maximum on duration).
 7. The weekly PPD is determined by multiplying the compensable wage loss by a percentage (e.g., 66 $\frac{2}{3}$ percent); the weekly benefit is subject to minimum and/or maximum weekly benefits.
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^a In a few jurisdictions, the duration of the PPD benefits is fixed and the rating is used to help determine the weekly PPD benefit.

^b In a few jurisdictions, the duration of the PPD benefits is fixed and the rating is used to help determine the weekly PPD benefit.

^c In most workers' compensation programs, the worker's projected wages in the permanent disability period are the same as the worker's preinjury wages.

^d In most workers' compensation programs, the worker's projected wages in the permanent disability period are the same as the worker's preinjury wages.

^e The choice among the worker's loss of earning capacity rating or the worker's permanent impairment rating or the threshold linked to preinjury wages varies among jurisdictions.

wage prior to the workplace injury. This variant is more closely aligned with the idea that the purpose of PPD benefits is to compensate for work disability.

Operational Approach II: The loss of earning capacity approach

The loss of earning capacity approach considers the seriousness of the worker's permanent impairment and functional limitations, as well as other factors that may affect the loss of the worker's earning capacity resulting from the injury. These factors may include the worker's age, prior education, and prior work experience. In addition, factors such as the job opportunities in a given location may be considered. After all the factors relied on in the particular jurisdiction are considered, a rating of the worker's loss of earning capacity due to the work-related injury or disease is produced. In turn, that rating is used to determine the duration (or, in some jurisdictions, the weekly amount) of the PPD benefits. Loss of earning capacity is presumably used as a proxy for the actual wage loss that is expected to result.

The first variant of the loss of earning capacity approach is the ad hoc loss of earning capacity approach (Operational Approach II.A in Table 4.2). The extent of the loss of earning capacity is decided on the facts of the case, which may vary from case to case in the same jurisdiction depending on the predilections of the parties (including the administrative law judge) involved in the case. This approach multiplies the loss of earning capacity rating by a maximum duration specified in the statute to determine the duration of the worker's PPD benefits. The weekly benefit is largely determined by the worker's weekly wage prior to the workplace injury.

The second variant of the loss of earning capacity approach is the loss of earning capacity by formula approach (Operational Approach II.B in Table 4.2). The worker's permanent impairment rating is modified by a formula that considers factors such as the worker's age or occupation in order to determine the loss of earning capacity. The third variant of the loss of earning capacity approach is the "pure" loss of earning capacity approach (Operational Approach II.C in Table 4.2). The worker's loss of earning capacity is determined based either on the facts of the particular case or on a formula. The loss of earning capacity rating is then used to determine the amount of PPD benefits based

on factors such as the extent of the loss of earning capacity. However, the benefit does not vary among workers on the basis of their preinjury wages.¹⁴

Operational Approach III: The actual wage loss approach

The actual wage loss approach determines the actual wage loss due to the work-related injury by comparing the worker's earnings in the period after the date of maximum medical improvement (MMI) with the worker's earnings before the date of injury. The duration and amount of PPD benefits are then related to the duration and amount of actual wage loss.

The first variant of the actual wage loss approach is the "pure" actual wage loss approach (Operational Approach III.A). As explicated in Table 4.2, this approach defines actual wage loss as the difference between the worker's projected earnings in the permanent disability period and the worker's actual earnings in that period. If the worker can demonstrate that the actual wage loss was due to the workplace injury or disease, the weekly PPD benefit is calculated as a percent of the actual wage and is paid for the duration of the wage loss (subject to statutory limits on the duration).

The second variant of the actual wage loss approach is the limited actual wage loss approach. The details of the approach are shown in Table 4.2. The distinguishing feature of this approach is that the worker's compensable wage loss is limited by the extent of the worker's loss of earning capacity, or by the extent of the worker's permanent impairment, or by the amount of actual wage loss above a threshold that is a percent of the worker's preinjury wage, or by a combination of the limiting factors. For example, if the worker's actual earnings in the permanent disability period are 75 percent below the projected earnings, but the worker is considered to have only lost 25 percent of preinjury earning capacity, then the PPD benefits will be based on the 25 percent figure. Another example is that if the worker had preinjury wages of \$500 per week and has actual wage loss of \$100 per week in the permanent disability period, but the state limits compensable wage loss to the amount in excess of 15 percent of the worker's preinjury wages, then the compensable wage loss is only \$25 per week.

The essential attributes of the actual wage loss approach

There is a critical distinction between the first two operational approaches—the permanent impairment operational approach and the loss of earning capacity approach—and the actual wage loss approach. The states that rely on the actual wage loss approach require the worker 1) to demonstrate that a work-related injury has produced a permanent impairment and/or loss of earning capacity¹⁵ and 2) to demonstrate that he or she has experienced an actual loss of earnings because of the work-related injury or disease. In contrast, the impairment and loss of earning capacity approaches will pay PPD benefits even if there is no actual loss of earnings so long as the worker can demonstrate that the work injury caused a diminution in one of the proxies for actual wage loss.

The elusive nature of the actual wage loss approach

As discussed in more detail later, the actual wage loss approach—which requires that cases be kept open for extended periods—can easily be transformed in practice into the loss of earning capacity approach through the use of compromise and release agreements.

The Operational Approach for Nonwork Disability Benefits

As previously indicated, a few jurisdictions, in addition to compensating for work disability, also provide injured workers with an additional benefit that is designed to compensate for noneconomic loss (or nonwork disability). For example, permanent impairment benefits were available in Florida from 1979 to 1993, while noneconomic loss benefits have been paid in Ontario since 1990. The operational basis for the noneconomic loss benefits in both Florida and Ontario corresponds to the “pure” permanent impairment approach (Operational Approach I.A) shown in Table 4.2.¹⁶

HOW STATES DESIGN SYSTEMS OF PPD BENEFITS

Common Distinctions within States for PPD Benefits

All jurisdictions have different PPD benefits (measured by weekly amount or potential duration) for different categories of injuries and diseases, and some jurisdictions use different operational approaches for different categories of injuries. The most common distinctions involve three factors.

1) *Distinctions between diseases and injuries.* Several states provide more restrictive PPD benefits for diseases than for injuries.¹⁷ Montana, for example, does not provide compensation for partial disability resulting from a disease.

2) *Distinctions between different types of injuries.* Most states treat scheduled injuries differently than nonscheduled injuries. Unfortunately, these terms are not used in a uniform and unambiguous fashion. The workers' compensation statutes in most states contain a schedule that lists the number of weeks or the dollar amounts of compensation benefits to be paid for the physical loss or (in most jurisdictions) the loss of use of specified parts of the body. A *scheduled injury* is any injury that is specifically enumerated in the workers' compensation statute and typically involves injuries to the upper and lower extremities (arms, legs, hands, feet, fingers, and toes).¹⁸ Injuries to the trunk, back, internal organs (such as heart or lungs), nervous system, and other body systems usually are not included in the list of injuries found in the statutes; these are *nonscheduled injuries* (or *unscheduled injuries*). I describe these states as the "scheduled/nonscheduled distinction states."

A significant minority of states do not distinguish between scheduled injuries and nonscheduled injuries in the sense I use those terms: the former are specifically listed in the workers' compensation statute and the latter are not. These unitary rating system states treat all injuries the same way in the workers' compensation statute, either by specifying that a particular rating system should be used for all injuries or by authorizing the workers' compensation agency to adopt a comprehensive rating system.¹⁹

3) *Distinctions between injuries with different degrees of severity.* Within the category of PPD benefits, many jurisdictions provide more generous benefits (in terms of weekly amount and/or potential duration)

for more serious injuries than for less serious injuries. Some states also distinguish between injuries that result in amputations of a body member and injuries that involve permanent loss of use of the body member. The former may be entitled to PPD benefits, while the latter may not.

A Taxonomy of State Systems of PPD Benefits

I am aware of three attempts to systematically classify states in terms of their approaches to PPD benefits relying on the three basic operational approaches discussed in the previous section and the distinctions among injuries just discussed. Berkowitz and Burton (1987) examined 10 states based on fieldwork and a literature review. The National Council on Compensation Insurance (NCCI 1995) classified all 50 states plus the District of Columbia based on a questionnaire. The latest taxonomy of the 51 U.S. jurisdictions, on which the balance of this section is largely based, was prepared by Barth and Niss (1999).

The states and provinces in North America utilize the three operational approaches to work disability benefits and the one operational approach to nonwork disability benefits in a variety of systems of PPD benefits. Each jurisdiction has a system of PPD benefits because without exception each jurisdiction makes some distinction among the types of injuries or diseases that affects either the operational approach for the benefits or the amount or duration of those benefits. This section briefly describes six systems of PPD benefits, each used in at least one North American jurisdiction. A more extended discussion, with examples of specific states, is included in Reville et al. (2005, Appendix A1). Some states do not neatly fit into the six systems, but I believe the taxonomy provides a good representation of the most important or interesting systems of PPD benefits.²⁰ I begin with three systems of PPD benefits used in scheduled/nonscheduled distinction states.

System I PPD benefits: Scheduled/nonscheduled distinction states that rely on the permanent impairment approach for nonscheduled injuries

Most states have PPD benefit systems that distinguish between scheduled and nonscheduled injuries. In about a dozen states that rely on this distinction, including New Jersey, both scheduled and nonsched-

uled injuries receive PPD benefits based on the extent of permanent impairment.

System II PPD benefits: Scheduled/nonscheduled distinction states that rely on the loss of earning capacity approach for nonscheduled injuries

The System II design for PPD benefits draws a distinction between scheduled and nonscheduled injuries similar to that found in System I. Also, similar to System I, the scheduled injuries in System II are compensated on the basis of the permanent impairment. The distinctive feature of System II is that the nonscheduled benefits are based on the loss of earning capacity approach (Operational Approach II).

An interesting variant of System II is Wisconsin, which relies on Operational Approach I.B (the permanent impairment and preinjury wage approach) for scheduled injuries.²¹ For nonscheduled injuries, there are two possibilities. If the worker has returned to work and is earning at least 85 percent of the worker's preinjury wage, the workers' permanent impairment is rated. The duration of PPD benefits for such a worker is determined by multiplying the PI rating times 1,000 weeks. Thus, the Wisconsin PPD benefits for the worker who has returned to work and is earning at least 85 percent of preinjury wages are based on Operational Approach I.B (the permanent impairment and preinjury wage approach).

If the worker with the nonscheduled injury has not returned to work and is earning at least 85 percent of the preinjury wage, the worker's loss of earning capacity is determined. The evaluation of the LEC takes into account the seriousness of the worker's permanent impairment, plus such factors as the worker's age, education, and prior work experience. The evaluation produces a rating indicating the percentage loss in earning capacity due to the injury, and the rating is multiplied by 1,000 weeks to determine the duration of the PPD benefits. Thus, the nonscheduled PPD benefits for Wisconsin workers who are not back to work earning at least 85 percent of preinjury wages is based on Operational Approach II.A (the ad hoc loss of earning capacity approach).

System III PPD benefits: Scheduled/nonscheduled distinction states that rely on the actual wage loss approach for nonscheduled injuries

The System III design for PPD benefits draws a distinction between scheduled and nonscheduled injuries similar to that found in Systems I and II. Also, similar to Systems I and II, the scheduled injuries in System III are compensated on the basis of the permanent impairment. The distinctive feature of System III is that the nonscheduled benefits are based on the actual wage loss approach (Operational Approach III).

New York is an example of a state relying on System III. The first step in New York in determining the applicable benefits for an injury with permanent consequences is to determine whether the injury is scheduled or unscheduled. The distinction is similar to that used in New Jersey and Wisconsin, where injuries to arms, legs, and other bodily extremities are classified as scheduled, and injuries to internal organs and the back are defined as unscheduled.²² In New York, the operational basis for scheduled PPD benefits is the permanent impairment and pre-injury wage approach (Operational Approach I.B).

New York's system relies on the actual wage loss approach for nonscheduled benefits, which has several traits. One trait is that, unless the worker has actual earnings after the date of MMI that are less than the worker's preinjury earnings, no benefits are paid even if the work injury has resulted in a permanent impairment or loss of earning capacity.²³ Another characteristic of the wage loss approach is that the total duration of the PPD benefits is *not* determined shortly after the date of MMI, as in the permanent impairment or loss of earning capacity approaches. Instead, the duration of benefits depends on the length of time the worker experiences actual losses of earnings due to the work injury. In New York, this duration can range from zero weeks (for those cases closed with no present wage loss) to the balance of the worker's life.

There are three outcomes possible for nonscheduled injuries in New York. First, if, at the time the case is initially classified as a nonscheduled PPD, the worker has returned to work and is experiencing no wage loss, the worker receives no PPD benefits and the case is closed.²⁴

Second, if, at the time the case is initially classified as a nonscheduled PPD, the worker experiences a wage loss, benefits commence. The duration these benefits will continue is unknown because the duration of subsequent wage loss is unknown.²⁵

In New York, there is a third outcome for a nonscheduled PPD case, namely a lump-sum settlement. The lump-sum settlement in New York is essentially a compromise and release agreement, in which the parties reach a compromise concerning the amount of benefits to be paid, the worker receives a lump-sum payment, and the employer is released from any further liability for the particular injury.²⁶

System IV PPD benefits: Unitary rating system states with a single operational approach for PPD benefits

California is an example of a jurisdiction providing System IV PPD benefits in which all injuries are rated using the same approach. California relies on a formula to combine the impairment ratings with the age and occupational factors in order to produce a disability rating, which is Operational Approach II.B, the loss of earning capacity approach by formula approach. The California PPD system uses the disability rating to determine the duration of PPD benefits, using a formula that provides more weeks per percent rating for more serious injuries than for less serious injuries.²⁷

System V PPD Benefits: Unitary rating system states with multiple operational approaches for PPD benefits (the hybrid approach)

The fifth system of PPD benefits is the hybrid approach, which potentially pays two types of PPD benefits on a sequential basis. The approach is used in Connecticut and Texas, and was used in Florida between 1994 and 2003.²⁸

In Texas, the initial phase of PPD benefits is based on Operational Approach I.B (the permanent impairment and preinjury wage approach). Once the worker reached the date of MMI, the extent of permanent impairment for all injuries with permanent consequences is rated using the American Medical Association's *Guides to the Evaluation of Permanent Impairment*. Three weeks of impairment benefits are then paid for each 1 percent impairment rating. The weekly benefit is 70 percent of the worker's preinjury wage, subject to a maximum benefit that is 70 percent of the state's average weekly wage.

Those workers who have a permanent impairment rating of at least 15 percent have an opportunity to qualify for wage loss benefits (known

as “supplemental income benefits” in Texas) after the impairment benefits expire (i.e., at least 45 weeks after the initial eligibility date for impairment benefits). The wage loss benefits are paid to workers who experienced at least a 20 percent drop in wages between the preinjury period and the period of permanent disability; 80 percent of the wage loss in excess of the 20 percent threshold is compensated (again subject to a maximum week benefit that is 70 percent of the state’s average weekly wage). The wage loss benefits in Texas are an example of the Operational Approach III.B (the limited actual wage loss approach).

**System VI PPD benefits: The dual benefits approach
(nonwork disability benefits and/or work disability benefits),
depending on the type of injury**

A few jurisdictions have explicitly paid nonwork disability (or noneconomic loss) benefits in addition to work disability benefits. The System VI variant of dual PPD benefits was used in Florida from 1979 until 1993, although some significant modifications were made in 1990 prior to the total abandonment of the approach in 1993.

The Florida program had two types of benefits—impairment benefits and wage loss benefits—and an injured worker with permanent consequences of his or her injury could qualify for either, both,²⁹ or neither of the benefits, depending on the facts in the case.

Impairment benefits were paid to workers with certain types of permanent impairments, including amputations, loss of 80 percent or more of vision, or serious head or facial disfigurements. Other types of permanent impairments, such as total or partial loss of use of a body member without amputation, did not qualify for the benefits. The purpose of these “impairment benefits” was to compensate the worker for nonwork disability. The impairment benefits were paid using Operational Approach I.A (the “pure” permanent impairment approach).

The wage loss benefits contained in the 1979 Florida legislation required the worker to have at least a 1 percent permanent impairment rating. In addition, the worker had to experience at least a 15 percent decline between the wages in the preinjury period and the wages in the permanent disability period. The wage loss benefits then replaced 85 percent of the actual wage loss in excess of the 15 percent threshold.

This description of the dual benefits approach in Florida is simplistic and does not capture the initial acclaim and eventual disillusionment

with the approach, especially the wage loss component, which ultimately led to the abandonment of the dual benefits approach in Florida after 1993. This overview of North American systems of PPD benefits would be remiss, however, if we did not mention that the dual benefits approach is still alive and apparently operating well in several Canadian provinces, including Ontario and Saskatchewan.

Observations

This section has identified six different systems of PPD benefits, and others are possible. Several observations seem warranted, drawing in part on the survey of state PPD programs by Barth and Niss (1999).

First, the most common type appears to be System I, in which both scheduled and nonscheduled benefits are based on the permanent impairment approach. Barth and Niss (1999) reported that about 13 jurisdictions use this approach.³⁰

Second, Systems III and VI, which contain elements of the actual wage loss approach that begin for some types of injuries at the date of MMI, appear to be under threat, at least in the United States. Florida has abandoned the dual benefits system (System VI), and Pennsylvania, which has used a variant of System III (in which scheduled benefits are based on the impairment approach and the nonscheduled benefits based on the actual wage loss approach)³¹ has recently added a qualification that benefits can be reduced even if the worker does not have actual earnings in the permanent disability period so long as the employer can establish that light-duty work is available within commuting distance.³²

Third, use of System V, the hybrid approach, has received some recent interest. Florida used this approach between 1994 and 2003, and the current Connecticut and Texas statutes provide impairment benefits followed by wage loss benefits.

Fourth, I again want to emphasize the critical distinction between 1) the permanent impairment operational approach and the loss of earning capacity approach, and 2) the actual wage loss approach. The permanent impairment and loss of earning capacity approaches will pay PPD benefits even if there is no actual loss of earnings so long as the worker can demonstrate that the work injury caused a diminution in one of the proxies for actual wage loss. In contrast, there must be actual losses of

earnings in the permanent disability period in order for benefits to be paid in the actual wage loss approach.

Fifth, compromise and release agreements, in which workers release their claim to future benefits in exchange for a lump-sum settlement, can turn the actual wage loss approach into the loss of earning capacity approach. That is, the compromise and release agreement transforms a case from one relying on the wage loss approach (where the amount of PPD benefits is unknown until the end of the period of permanent disability or the worker reaches the statutory maximum for such benefits) into a loss of earning capacity approach (where the amount of PPD benefits is determined near the beginning of the period of permanent disability based on an assessment of the extent of loss of earning capacity).

CRITERIA FOR EVALUATION OF PPD BENEFITS

Each North American workers' compensation program provides PPD benefits. As previous sections indicate, there are three basic operational approaches for PPD benefits, which have been used to design a variety of systems of PPD benefits. What are the advantages and disadvantages of the different operational approaches and PPD benefit systems? This section provides five criteria that can be used to answer these questions and attempts some answers. There are several caveats to this exercise: the criteria are not universally endorsed, there are only a limited number of studies that use the criteria in the evaluation of PPD benefits, the application of different criteria sometimes leads to conflicting assessments of the same program, and the existing literature generally does not compare the performance of the different basic operational approaches or PPD benefit systems. These caveats mean there are virtually endless opportunities for research in this area.

Adequate Benefits

Definition of the adequacy criterion

The meaning of the adequacy criterion will only be briefly examined here because the topic is extensively examined in Hunt (2004), which is the result of a multiyear study by the National Academy of

Social Insurance (NASI).³³ The primary test for adequacy adopted by NASI can be explained by reference to Figure 4.9. The NASI standard is that after the date of MMI, PPD benefits should replace two-thirds of the difference between the worker's potential earnings (along line BC) and the worker's actual earnings (along line FG). Alternatively stated, benefits are adequate if the replacement rate—the PPD benefits divided by “true” wage loss—is at least 66⅔ percent.³⁴

Application of the adequacy criterion

The application of the adequacy criterion will also only be briefly examined here because the topic is examined by Boden, Reville, and Biddle in Chapter 3 of this volume. The essence of their findings is that in the five jurisdictions they examined (California, New Mexico, Oregon, Washington, and Wisconsin), PPD benefits replaced between 16 and 26 percent of earnings losses in the 10 years after workers were injured, which meant the “replacement rates do not approach the two-thirds benchmark for adequacy.”

Boden, Reville, and Biddle (2005) include a useful list of research topics concerning the adequacy of PPD benefits. What also needs to be examined is whether choices among the different operational approaches or PPD benefit systems identified in this chapter make any difference in the quest for adequacy? There is no obvious reason why the choices should make a difference, and there is no obvious pattern between the extent of adequacy and the design of the PPD benefit systems in the five jurisdictions studied by Boden, Reville, and Biddle. However, to the best of my knowledge, no one has studied this important question.

Another matter concerning adequacy discussed in Hunt (2004) is worth repeating. The best way to determine whether a state has adequate benefits is to conduct a wage loss study, which examines the actual earnings losses of and benefits received by a large sample of injured workers. But such studies are expensive and time consuming, and not all states have the requisite data. The issue is whether there is a measure of a state's PPD benefits that is relatively easy to calculate (such as the actuarial assessments of the state's workers' compensation statutory provisions reported by Thomason and Burton [2001]) that provides a satisfactory proxy for the results of a wage loss study.

Equitable Benefits

Definition of the equity criterion

The equity criterion for permanent disability benefits has two dimensions: horizontal equity and vertical equity. Horizontal equity requires that workers who are equivalent should be treated equally.³⁵ Thus workers with equal losses of earnings should receive equal benefits.³⁶ A narrow test of vertical equity requires that workers with different losses of income should receive benefits proportional to their losses.³⁷ A more general test for vertical equity only requires that there be a consistent relationship between losses and benefits. A state may decide, for example, that the proportion of benefits to losses should increase (or decrease) as losses increase.³⁸

The previous paragraph applied the horizontal and vertical equity tests to the relationships between losses of earnings and benefits (the replacement rates). However, the equity tests can be applied to other aspects of PPD cases. For example, do workers with the same PPD rating have the same replacement rates?³⁹ Other aspects of cases to which the equity tests could be applied include the workers' characteristics, such as age, occupation, and sex, the types of injuries experienced by workers, and workers' compensation system characteristics, such as whether the case was litigated or not.

Application of the equity criterion

Berkowitz and Burton (1987, pp. 341–353) compared earnings losses, benefits, and replacement rates for California workers injured in 1968 for workers of different ages, injury types, severity of injuries, and three types of cases: 1) formal, in which a formal PPD rating was received from the Disability Evaluation Unit; 2) informal, in which an informal PPD rating was received; and 3) other. They found significant equity problems with the California PPD benefits as of that time, such as the lower replacement rates for contested cases with trunk injuries compared to injuries to other parts of the body. Similar equity problems were found for the PPD benefits in Wisconsin and Florida.

Reville et al. (forthcoming) examined the equity of the PPD rating system in the California workers' compensation program and found large differences among types of injuries in the relationship between

average disability ratings and average earnings losses. For example, PPD cases involving injuries to the elbow had a 1.86 ratio between the disability ratings and average earnings losses, while cases involving the shoulder had a 0.90 ratio between ratings and losses.

The 2004 amendments to the California workers' compensation program will allow the program to adjust the ratings and benefits for different types of injuries based on empirical evidence of the sort developed by Reville et al. (forthcoming), which should make a major contribution to improving the equity of the California PPD benefit system. But are there other operational approaches or benefit systems that could do even a better job of providing PPD benefits that are equitable? One of the rationales for the adoption of the wage loss approach in Florida in 1979 was a better ability to provide benefits to workers in proportion to their earnings losses. But we lack evidence about whether the Florida wage loss approach (while it lasted) or the variants of wage loss approach used in other states achieved greater equity.⁴⁰

Delivery System Efficiency

Definition of the delivery system efficiency criterion

The benefits and services in workers' compensation are provided by a delivery system comprised of employers, carriers, state agencies, attorneys, doctors, and other participants. Berkowitz and Burton (1987, pp. 26–28) evaluated the efficiency of this delivery system by examining the relationship between two variables. One variable measures the administrative costs of providing benefits incurred by the participants in the workers' compensation delivery system. The other variable measures the quality of the workers' compensation benefits, where quality is assessed on the basis of one or more of the other criteria used to evaluate a PPD benefits system, such as adequacy and equity.

Berkowitz and Burton (1987, pp. 27–28) suggest that one meaning of delivery system efficiency, panoramic efficiency, is that benefits of a particular quality are provided at the least possible administrative costs. Another meaning of delivery system efficiency, myopic efficiency, is only concerned with reducing administrative costs without concern for the quality of the program.

Application of the delivery system efficiency criterion

Evaluation using the delivery system efficiency criterion is especially difficult.⁴¹ For one thing, data on the expenses of administering the program that are borne by employers and others in the private sector, plus the amount of attorneys' fees for both workers and employers, as well as other types of data relevant to the assessment of the efficiency of the delivery system are scarce. Another reason the delivery system efficiency criterion is hard to apply is that the quality of the benefits and the administrative costs must be simultaneously considered in order to evaluate the panoramic efficiency of a state's workers' compensation program.

An important aspect of the delivery system efficiency test concerns the delivery system model used to provide workers' compensation benefits. One model relies on an active state agency that makes many decisions itself, closely supervises the operation of employers and private carriers, and limits the role for attorneys.⁴² A considerably different model relies on the private parties, particularly attorneys, to make most of the decisions about benefits payments.⁴³ The agency is essentially passive, although it will resolve disputes brought to it by the private parties. An intermediate model involves a state agency that conducts a minimal review of decisions made by the private parties and that resolves disputes in a relatively high proportion of the cases, but that nonetheless relies on extensive attorney involvement to make the delivery system operate.⁴⁴

How attorneys are used is an important feature differentiating these three delivery system models. As recounted by many commentators on the history of workers' compensation, the original notion was that the elimination of the fault concept and the prescription of benefits by statute would enable employees to protect their interests without external assistance. From that standpoint, the substantial reliance on lawyers suggests at the minimum a lack of myopic efficiency. And yet the involvement of attorneys can also be viewed as a *prima facie* indictment of the idea that workers' compensation laws can be self-administering; attorneys may be in the system because they help achieve the criteria of adequate and equitable benefits. In other words, the involvement of attorneys may represent a lack of myopic efficiency but not necessarily a lack of panoramic efficiency.

Whether, in fact, attorneys help achieve the equity and adequacy of benefits is not clear *a priori*. On one hand, they receive fees that generally are subtracted from the workers' awards, which, in a nominal sense, reduces the adequacy of the benefits. On the other hand, attorneys may increase the awards in some cases in which they are involved and possibly have an indirect impact on the amount of benefits in other cases in which they are not involved. Thus on *a priori* grounds, the impact of attorneys on the adequacy of benefits is unclear. Likewise, the impact of attorneys on the equity of benefits is unclear. They may take cases in which benefits would otherwise be inappropriately low, or, alternatively, their involvement may be on a basis unrelated to the relative under compensation of the case, such as the worker's membership in a union.

Thomason and Burton (1993) studied the effect of attorney involvement on the outcome of cases paying nonscheduled PPD benefits in New York, and found that attorneys increase the probability of lump-sum settlements, reduce the amounts of those settlements, and have no statistically significant effect on the size of litigated awards. While this study is confined to one state, it suggests that assuming the use of attorneys improves the adequacy or equity of PPD benefits is inappropriate without supporting evidence.

Berkowitz and Burton (1987) compared Florida, California, and Wisconsin and concluded that Wisconsin had the best record of delivery system efficiency at the time. The Wisconsin benefits were more adequate and equitable than those in California and Florida, while the costs of the Wisconsin delivery system—including the expenses of operating the state agency as well as the cost of attorneys' fees for claimants, employers, and carriers—were lower than those in the other two states.⁴⁵

I am unaware of any research that systematically considers the possible relationship of delivery system efficiency to different operational approaches to benefits and PPD benefit systems. PPD benefit systems that rely on the permanent impairment or loss of earnings capacity approaches to benefits are likely to require fewer resources to operate than benefit systems that incorporate elements of the actual wage loss approach (because the latter approach requires cases to remain open for extended periods and to be periodically monitored), which means the wage loss approach is probably less efficient using the myopic meaning

of efficiency. But is the wage loss approach less or more efficient using the panoramic meaning of efficiency?

Prevention, Compensation, and Rehabilitation (PCR) Efficiency

Definition of PCR system efficiency

PCR system efficiency is concerned with avoiding adverse effects of the PPD benefits on the fundamental objectives of the workers' disability system, namely to prevent injuries and diseases; to compensate disabled workers adequately and equitably; and to rehabilitate workers and return them to work.⁴⁶

Applying the PCR system efficiency criterion to the prevention objective

One of the objectives of the PCR system is the prevention of injuries and diseases among workers. Increasing the level of PPD benefits can have a number of effects on the behavior of employers and employees.⁴⁷ Because the premiums for the employers of most workers are experience rated, the higher PPD benefits cause the potential costs of the workers' compensation program to increase for employers. These higher potential workers' compensation costs should lead to behavioral changes by employers, which have been labeled the "safety effect." The safety effect includes all those safety improvements (including not only changes in the physical plant, but changes in training, safety monitoring, etc.) that are cost-effective. Although the theory that experience rating provides safety incentives has been postulated since the first state workers' compensation program was enacted in Wisconsin in 1911, there is still a controversy about whether that theory is valid. Thomason (2003) indicates that most recent studies show that experience rating does matter for safety, and to the extent this is true, then increasing PPD benefits has an indirect effect that is desirable.

There are, however, other effects of increasing the level of PPD benefits. A number of studies during the last 15 years have shown that, as statutory workers' compensation benefits rise, both claims frequency and the reported severity of injuries increase. For example, Butler (1994, I-85) indicates that claims frequency rises from 3 to 8 percent in response to a 10 percent increase in the real level of benefits.

Whether the increased frequency and severity are adverse consequences of the higher PPD benefits depends on the nature of the changes in employee behavior that result in these increases. The “true injury effect” postulates that workers will take less care on the job (and thus incur more work injuries) because the higher benefits mean they will have increased income security if they are injured. The “reporting effect” postulates that workers will report claims for injuries that would not have been reported in the absence of the greater monetary incentives resulting from the higher potential benefits. The “duration effect” postulates that workers will extend their period of reported disability (and thus increase the apparent severity) because of the higher benefits.⁴⁸

If the evidence demonstrating that higher benefits result in increased frequency and severity of injuries were due to the true injury effect, this would be considered an unintended and adverse consequence of the higher benefits. Fortunately, Durbin and Butler (1998) report that most recent studies argue that the true injury effect is not the major reason for the positive relationship between benefits and the measures of workplace safety. Instead, the relationships appear to primarily be due to the reporting effect and the duration effect.

Applying the PCR system efficiency test to the rehabilitation objective

There are circumstances in which workers' compensation benefits can be so high as to induce the reporting effect or the duration effect, and in which greater utilization is an undesirable outcome. The most egregious example of PPD benefits that were inadvertently designed to have a serious disincentive for reemployment is the wage loss benefits enacted by the Florida legislature in 1979.⁴⁹ The law provided that, once a worker experienced at least a 15 percent drop in income after the date of MMI due to the work injury, the PPD benefits would replace 95 percent of the wage loss above that 15 percent threshold. This benefit formula meant that, for a worker who had begun the rehabilitation process and had already returned to work one-third time, a decision to increase work to two-thirds time would lead to a reduction in PPD benefits that would be 103 percent of the increase in net earnings (gross wages minus taxes) resulting from the additional hours worked. Surely this disincentive was an unintended and adverse consequence of the 1979 Florida PPD benefits scheme. Disincentives to this extent are not

inevitable in a wage loss system, but the poor design of these benefits was one reason why the wage loss approach in Florida has subsequently been virtually vitiated. In short, the 1979 PPD benefits in Florida failed to meet the PCR system efficiency test because the benefits undermined the rehabilitation and return-to-work objective.

The wage loss approach appears to be more likely to undermine PCR efficiency than the impairment approach and the loss of earning capacity approach, since workers' compensation benefits are reduced if the worker has increased earnings, while the PPD benefits are not affected by greater employment after the date of MMI in the other approaches. However, there has been little if any evidence on the magnitudes of the differences between the approaches in their ability to promote or hinder PCR efficiency.

Affordability

Affordability is concerned with designing a system of PPD benefits that employers, workers, and the public can afford without serious adverse consequences, such as loss of jobs.

A historical perspective on affordability

Affordability generally has not been explicitly recognized as a criterion for evaluating workers' compensation programs in general and a system of PPD benefits in particular. However, the importance of affordability was recognized in the *National Commission Report* (National Commission on State Workmen's Compensation Laws 1972, p. 125):

While the facts dictate that no State should hesitate to improve its workmen's compensation program for fear of losing employers, unfortunately this appears to be an area where emotion too often triumphs over fact . . . whenever a State legislature contemplates an improvement in workmen's compensation which will increase insurance costs, the legislators will hear claims from some employers that the increase in costs will force a business exodus. It will be virtually impossible for the legislators to know how genuine are these claims . . .

When the sum of these inhibiting factors is considered, it seems likely that many States have been dissuaded from reform of their workmen's compensation statute because of the specter

of the vanishing employer, even if that apparition is a product of fancy not fact. A few States have achieved genuine reform, but most suffer with inadequate laws because of the drag of laws of competing States.

The National Commission on State Workmen's Compensation Laws offered a solution to the inhibitions to reform caused by potential employer departures. That solution was federal standards for 19 essential attributes of state workers' compensation programs pertaining to extent of coverage and levels of benefits.

While the affordability issue was obviously important 30 years ago—it likely was the major reason why the commission recommended federal standards—it has become even more important in recent decades. One ironical reason is the legacy of the commission. While federal standards were never enacted, for a period in the 1970s the threat of standards was taken seriously and many states improved the levels of cash benefits in their workers' compensation programs. One consequence of the higher benefits was higher costs: the average costs nationally peaked at about 2.2 percent of payroll in the early 1990s, almost double the percentage in the early 1970s. Employers' costs relative to payroll have since dropped in response to various factors, including a declining injury rate and more stringent eligibility rules for workers' compensation programs (Spieler and Burton 1998). Moreover, the differences in costs of workers' compensation insurance have probably widened since 1972,⁵⁰ which means the specter of the vanishing employer is more credible now than it was when the National Commission characterized the threat as “a product of fancy not fact.” Compounding the runaway employer concern in recent years is the substantial loss of manufacturing jobs in many states and the widely publicized bout with high workers' compensation costs in California.

Affordability for whom?

The definition of the affordability criterion indicated that the purpose is to design a system of PPD benefits that employers, workers, and the public can afford without serious adverse consequences, such as loss of jobs. The primary focus in the affordability discussion is usually on the costs of workers' compensation to employers in the form of insurance premiums or the equivalent expenditures by self-insuring employers. However, the affordability criteria must be formulated in terms

of the three possible bearers of the costs of workers' compensation.⁵¹

Employers are likely to bear much of the cost of higher workers' compensation premiums in the short run in the form of lower profits, and in the long run are also likely to experience some reduction in profits. Consumers also bear part of the cost of higher workers' compensation benefits and premiums in the long run in the form of higher prices and reduced consumption. Workers also bear part of the cost of higher workers' compensation benefits and premiums in the long run in the form of lower wages and less employment. The empirical evidence suggests that workers bear most of the costs of higher benefits in the form of lower wages. To be sure, workers are also the primary beneficiaries of the higher benefits, but those benefits are largely paid for by the workers in the form of lower wages.

This point is worth emphasizing because the debates over workers' compensation reform in general, and PPD reform in particular, are generally cast as a trade-off between adequacy of benefits (which presumably is primarily of interest to workers) and affordability (which presumably is primarily of interest to employers). In fact, there are positive aspects for employers of more adequate benefits (including higher morale and greater productivity among workers who feel they are being treated fairly, as well as the lower wages that eventually will result from the higher benefits),⁵² and there are negative aspects for workers from higher benefits (including loss of jobs and lower wages).

Observations on the Criteria

There is a danger expanding the evaluation criterion from the traditional trinity (adequacy, equity, and efficiency) to the five criteria presented in this chapter. This is particularly true because the criteria often come into conflict in evaluating PPD benefit systems, and the more criteria we use, the greater the number of conflicts and trade-offs that must be considered in the evaluation process.

I am persuaded, however, that the use of all five criteria serves a useful purpose. *Efficiency* is a term that has been used by some economists to include both what I term *delivery system efficiency* and *prevention compensation, and rehabilitation system efficiency*, and the explicit separation should help distinguish between the two meanings of efficiency. *Affordability* has seldom been explicitly mentioned as a crite-

tion, but has always been an implicit factor lurking in the background. Indeed, in recent years, affordability may have de facto become the dominant criterion in the reform of PPD benefits in many states, and explicit recognition of affordability as a criterion may improve the policy debates associated with efforts to reform PPD benefits.

Researchers and policymakers may find my list of five evaluation criteria too cumbersome, and I encourage efforts to develop a more parsimonious set of evaluations standards. Yet there is also the possibility that the list of factors that govern the design of PPD benefit systems is incomplete. Perhaps a missing criterion that would help explain the evolution of PPD benefit systems is risk minimization or risk shifting: how can the system be designed to reduce the overall uncertainty associated with the payment of PPD benefits, or how can the system be designed to reduce the risks of long-term disability borne by the participants in the workers' compensation system with the greatest political influence?

CONCLUSIONS

I have tried to provide an organized approach to examining PPD benefits, to summarize some of the research literature, and to pose some areas where additional research is needed. I conclude by posing a few more questions I hope a new generation of scholars will examine.

One question that warrants contemplation is whether the conceptual framework presented in the second section is the most useful organizational structure for research and operational purposes? For example, perhaps the number of consequences can be reduced: the *Guides to the Evaluation of Permanent Impairment* published by the American Medical Association (2000) do not distinguish between permanent impairments and functional limitations.

The fifth section provides an overview of how the states design their systems of PPD benefits. Are the six systems the best way to categorize the many varieties of state laws? And what explains why different states have adopted similar or different PPD benefit systems? Moreover, how do we explain why some states (such as New Jersey) have PPD benefit systems that have basically been unchanged since the early years of workers' compensation in the United States, while other states have

made major changes in their systems? The most notable example of a state that has tried a variety of approaches in the last 40 years is Florida. Is this due to a commendable willingness to learn from weaknesses of prior approaches, or to impatience, or to unrealistic expectations?

The final section offers several criteria for the evaluation of PPD benefit systems. In addition to the questions I raise about whether the list of criteria is too long or too short (or just right!), more attention needs to be devoted to the trade-offs among the criteria. Thomason, Schmidle, and Burton (2001) present evidence that one of the major determinants of the employers' costs of workers' compensation insurance is the percentage of cases paying PPD benefits. They also devote a chapter to benefit adequacy versus affordability, and conclude that if states were to adopt adequate benefits (as prescribed by the Model Act issued by the Council of State Governments [1974]), the result would be substantially higher workers' costs nationally, as well as greater dispersion of costs among states. Whether this trade-off between adequacy and affordability is accurate deserves scrutiny. The more fundamental point is that research and policy making would benefit from explicit consideration of trade-offs among criteria, rather than reforms based on a single goal, such as reducing employers' costs.

Notes

1. Workers' compensation programs provide cash, medical, and rehabilitation benefits to workers disabled by work-related injuries and diseases. This chapter focuses solely on cash benefits.
2. For this chapter, unless otherwise indicated, the term *injuries* includes both injuries and diseases.
3. Steve Guo, a Rutgers University graduate student, is examining the determinants of interstate differences in incurred benefits for his Master's thesis.
4. A more extended discussion of the consequences of injuries is included in Berkowitz and Burton (1987, pp. 5–13).
5. The distinction between controllable and uncontrollable is not as clear as the text suggests. For example, the quality of vocational rehabilitation is identified as a controllable factor in the progression from functional limitations to loss of earning capacity. However, for a particular worker in a state that does not require employers to provide vocational rehabilitation, vocational rehabilitation is effectively uncontrollable.
6. Although this definition of "true" wage loss is appropriate for many purposes, it is not the measure of wage loss typically encompassed in a workers' compensa-

tion statute, which usually measures restricted wage loss. That is, the worker's earnings as of the date of injury are projected into the future at that level. Then the "restricted" wage loss is measured as the difference between the worker's preinjury wages and the worker's actual earnings after the date of injury. In general, "restricted" wage loss is smaller than "true" wage loss.

7. The issues of measuring wage losses and benefits are also examined in Berkowitz and Burton (1987, pp. 365–389).
8. An extended discussion of which consequences should be compensable is provided in Berkowitz and Burton (1987, pp. 20–22).
9. Some jurisdictions do not compensate for pain and suffering per se, but do consider pain and suffering in determining the extent of the loss of earning capacity resulting from the injury. Thus in the California workers' compensation program, Swezey (2003, § 5.40) indicates, "It is important to note that pain and suffering as such are not ratable. Pain is ratable only to the extent it causes disability."
10. The National Commission on State Workmen's Compensation Laws (1972, p. 38) justified the payment of impairment benefits in terms of a broad set of consequences: "The argument for impairment benefits is that many workers with work-related injuries or diseases experience losses which are not reflected in lost remuneration. Permanent impairment involves lifetime effects on the personality and on normal activity."
11. This chapter uses the terms *states*, *provinces*, and *jurisdictions* interchangeably.
12. This three-category scheme is adapted from the taxonomy in Berkowitz and Burton (1987).
13. The rating systems for this approach typically contain a mixture of impairment ratings (amputations are given a specified rating without any requirement to measure the resulting loss of function) and functional limitations ratings (loss of use of a limb typically is rated by examining the loss of function caused by the injury).
14. Idaho uses the "pure" loss of earning capacity approach for nonscheduled PPD benefits. The degree of loss of earning capacity is multiplied by 500 weeks to determine the duration of the benefits. The weekly benefit is 55 percent of the state average weekly wage for all workers.
15. States differ on which of the permanent consequences (permanent impairment, functional limitations, or loss of earning capacity) must be demonstrated, and differ as well on the extent of these consequences that are required for wage loss benefits to be paid.
16. In both Florida and Ontario, the primary basis for assessment has been the *AMA Guides*. Research by Sinclair and Burton (1995) on noneconomic loss benefits in Ontario raises serious doubts about the appropriateness of using the *AMA Guides* permanent impairment ratings as a proxy for the extent of noneconomic loss.
17. Additional examples of programs that distinguish between injuries and diseases are included in Reville et al. (2005, Appendix A1). The examples are from U.S. Chamber of Commerce (2003, Chart IV).
18. In addition, states commonly schedule benefits for the enucleation of an eye and for hearing and vision loss.

19. Examples of the “unitary rating system” are the System IV and System V PPD Benefits discussed in the next subsection.
20. The six systems of PPD benefits are based in part on Burton (1996). In the current study, the states were assigned to the categories largely based on the descriptions of the PPD benefits included in Barth and Niss (1999), who may not agree with the systems used in this chapter. Some states, e.g., Arizona and New York, are classified differently by Barth and Niss than in my taxonomy.
21. The distinction between scheduled and nonscheduled injuries in Wisconsin is similar to that in New Jersey, with injuries to arms, legs, hands, etc., listed in the statutory schedule, while injuries to backs and internal organs are nonscheduled injuries. The scheduled durations in the two jurisdictions differ, however. An arm, for example, is worth 500 weeks in Wisconsin compared to 330 weeks in New Jersey.
22. The scheduled durations are, to be sure, different among the states, with the New York arm worth only 312 weeks.
23. This is a crucial difference between the true wage loss approach and the loss of earning capacity approach; a worker who experiences a loss of earning capacity but has no actual loss of earnings is precluded from benefits in the wage loss approach but is not precluded in the loss of earning capacity approach.
24. The worker’s eligibility for nonscheduled benefits, as well as the weekly amount of those benefits, can change through time in jurisdictions using the wage loss approach. For example, in New York a worker whose case is initially closed with no benefits because of no present wage loss can reopen the case for up to 18 years after the date of injury or 8 years after the last benefit payments. PPD benefits can commence after the reopening if the work injury is then causing lost earnings.
25. As discussed by Berkowitz and Burton (1987, pp. 244–248) the exact variant of the actual wage loss approach used for New York workers with at least some actual wage loss depends on whether the worker has any earnings during the permanent disability period. If the worker has some earnings, then the “pure” actual wage loss approach (Operational Approach III.A) is used. Thus, if a worker had preinjury wages of \$500 per week and returns to employment at \$200 per week, the nonscheduled benefits is two-thirds of the wage loss, which means the weekly benefit is \$200. (The weekly PPD benefit is subject to a maximum amount, which as of 2004 is \$400 per week.) If the worker does not have any earnings in the permanent disability period, then the limited actual wage loss approach (Operational Approach III.B) is used. The worker’s loss of earning capacity is evaluated and serves as a limit on the worker’s wage loss. Thus, if a worker had preinjury wages of \$500, does not return to work and is rated as having a 50 percent loss of earning capacity, the weekly PPD benefit is \$166.67.
26. The use of compromise and release agreements in the New York workers’ compensation program was examined in Thomason and Burton (1993).
27. The life pension is a weekly benefit that is 1.5 percent of the worker’s preinjury wage for each 1 percent of disability over 60 percent (subject to a maximum weekly benefit) Swezey (2003, Sec. 5.9). The California PPD benefits system draws another distinction among workers depending on the magnitude of the disability

rating. A disability rating of 100 percent qualifies the worker for permanent total disability benefits for life. A disability rating between 1 and 69.75 percent qualifies a worker for PPD benefits. For workers with a disability rating between 70 and 99.75, the worker qualifies for PPD benefits using the formula summarized above, and when those PPD benefits expire, the worker qualifies for a life pension.

28. Texas and Florida use Operational Approach I.B (the permanent impairment and preinjury approach) for the initial phase of their PPD benefits and Operational Approach III.B (the limited actual wage loss approach) for the second phase of their PPD benefits. Connecticut uses Operational Approach I.B (the permanent impairment and preinjury approach) for the initial phase of the PPD benefits and Operational Approach III.A (the “pure” actual wage loss approach) for the second phase of the PPD benefits.
29. The possibility that a worker with a single injury could receive both impairment and wage loss benefits is different than the System I, II, and III PPD benefits, where a worker with a single injury qualifies for either scheduled or nonscheduled benefits. (There are occasional exceptions to this pronouncement regarding System I and System II benefits, such as a scheduled injury that has psychological overlays that are nonscheduled.)
30. The National Council on Compensation Insurance (NCCI) (1995) indicated that of the 42 states in which some permanent partial injuries are compensated on a nonscheduled basis, eight states use the actual wage loss approach, 26 states use the impairment approach, and 14 states use some other approach (in most cases, probably the loss of earning capacity approach). As indicated in my review of the NCCI Inventory (Burton 1995), I think that Arizona is actually a loss of earning capacity state (not a wage loss state) and that New York is actually a wage loss state (not an “other” state). However, these misclassifications should not affect the textual conclusion that the System I version of PPD benefits, in which the impairment approach is used for nonscheduled benefits, is the most common system.
31. Pennsylvania’s PPD benefits are described in Berkowitz and Burton (1987, Chapter 8).
32. A brief report on the recent “reforms” of the Pennsylvania workers’ compensation law is provided at 7 *BNA’s Workers’ Compensation Report* 319 (June 14, 1996).
33. Examinations of the adequacy criterion are also found in Berkowitz and Burton (1987, pp. 365–373) and Boden, Reville, and Biddle (2005).
34. This formulation of the adequacy test assumes that the sole purpose of PPD cash benefits is to compensate for work disability.
35. The equity tests can be applied to workers within a state (e.g., do workers in Idaho with equal losses of earnings receive equal benefits, thus satisfying the horizontal equity test for that jurisdiction?) as well as to workers in different states (e.g., do workers in Indiana and Massachusetts with similar losses of wages receive similar benefits, thus satisfying an interstate horizontal equity test?).

36. If workers A and B both have \$1,000 of earnings losses, and worker A receives \$700 of benefits (and thus has a 70 percent replacement rate) and worker B receives \$300 of benefits (a 30 percent replacement rate), then the horizontal equity test has been violated.
37. If worker C has \$5,000 of earnings losses and received \$3,000 of benefits, while worker D has \$10,000 of earnings losses, then the narrow test of vertical equity requires that worker D receive \$6,000 of benefits (so that the replacement rate for both workers is 60 percent).
38. Although the general formulation of vertical equity is more difficult to translate into empirical tests than the narrow test, reasonable requirements appear to be 1) that the ratio of benefits to earnings consistently increase (or decrease) as earnings losses increase, and not fluctuate as losses increase, and 2) that there should be no abrupt changes in the ratio of benefits to earnings losses as those losses increase. The more general test of vertical equity would be violated if worker E had \$1,000 of earning losses and received \$700 of benefits (for a 70 percent replacement rate), worker F had \$2,000 of earnings losses and received \$1,000 of benefits (for a 50 percent replacement rate), and worker G had \$3,000 of earnings losses and received \$2,700 of benefits (for a 90 percent replacement rate).
39. If worker H has a 10 percent PPD rating and a 40 percent replacement rate, while worker I has a 10 percent PPD rating and a 70 percent replacement rate, there is a lack of horizontal equity among PPD ratings.
40. It appears likely that the widespread use of compromise and release agreements in Florida undercut the potential for greater equity from benefits based on the wage loss approach, but that is mere speculation.
41. Roberts (2003) is one of the few studies that have examined the efficiency of workers' compensation delivery systems, including the effects of workers' compensation agency activism on outcomes for employers, employees, and insurance carriers.
42. Berkowitz and Burton (1987) used Wisconsin as an example of this approach.
43. Berkowitz and Burton (1987) used the federally operated Longshore and Harbor Workers' Compensate Act as an example of this approach.
44. Berkowitz and Burton (1987) used Florida and California as examples of this approach when they conducted their study of workers injured in 1968.
45. The positive assessment of the efficiency of the Wisconsin workers' compensation program is based on a study involving injuries that occurred in 1968. Based on inconsistent and fragmentary information, I am not certain that the current Wisconsin workers' compensation program would receive an equally positive assessment. Boden, Reville, and Biddle (2005) found that the PPD benefits in Wisconsin were less adequate than the PPD benefits in the other four jurisdictions examined in their study. In addition, Berkowitz and Pascale (1995) graded the annual reports of state workers' compensation agencies, and Wisconsin was one of the six jurisdictions that received an F because it had not issued an annual report. However, in a more recent evaluation of workers' compensation agency websites, Berkowitz (2001) assigned Wisconsin (and 12 other jurisdictions) an A grade.

46. The prevention, compensation, and rehabilitation system includes an array of programs. The prevention components of the workers' compensation program and the Occupational Safety and Health Act; the cash benefits provided by public programs (such as workers' compensation and the disability insurance component of the Social Security system), and by employers (such as long-term disability benefits); the health care provided by public programs (such as workers' compensation and Medicaid) and by employers (such as group health plans); and the rehabilitation provided by workers' compensation programs and by state vocational rehabilitation agencies are examples of these programs.
47. These behavioral effects are discussed in Butler (1994) and Burton and Chelius (1997).
48. The threefold distinction among the true injury effect, the reporting effect, and the duration effect is an extension of the twofold distinction used by Butler (1994).
49. This provision of the Florida law is examined in more detail in Burton (1983, pp. 40–49).
50. Burton and Schmidle (1992, Table 8, pp. 1–15) indicate that the means and standard deviations (in parentheses) for average insurance rates for 44 insurance classes for weighted observations from 42 states were 0.772 (0.273) in 1972 and 0.996 (0.339) in 1975. Thomason, Schmidle, and Burton (2001, Table C.18, p. 376) report that the means and standard deviations (in parentheses) for the average insurance rates for 71 insurance classes for weighted observations for 42 states were 0.910 (0.377) in 1975 and 2.929 (0.823) in 1995. The standard deviation is a statistical measure of the dispersion among the observations (in this case, states) and thus the data indicate the dispersion among states in the costs of workers' compensation insurance roughly tripled between 1972 and 1995. Although more recent data using a consistent measure of workers' compensation insurance rates are not available, it seems unlikely that the interstate differences in the costs of workers' compensation insurance have narrowed appreciably since 1995.
51. This discussion of the incidence of the costs of the workers' compensation program is based on Chelius and Burton (1992, 1994), which are reprinted in Burton and Schmidle (1995). Their approach is summarized in Leigh et al. (2000, p. 178) who assert "Chelius and Burton (1994) conclude that all premiums are passed down to workers in the form of lower wages. They acknowledge that their conclusion is 'radical' (25)." More precisely, Chelius and Burton (1994, pp. 24–25) summarized the research of Moore and Viscusi (1990) as "radical" in this passage: "The conclusion that may be inferred from the finding of this study—that higher workers' compensation benefits, from the employer's perspective, more than pay for themselves in the form of lower wages—is a radical one that undoubtedly will be sharply contested by many members of the workers' compensation community." Chelius and Burton's own views were more modest (1994, p. 26): "We have a reasonable degree of confidence that social science research has indeed provided an answer to our question of who actually pays for workers' compensation: *a substantial proportion of workers' compensation costs*

(and even, according to some estimates, all of the costs) are shifted onto workers.” (Italics in the original.)

52. If the costs of higher workers’ compensation benefits are largely paid for by employees in the form of lower wages and reduced employment, then why do employers place so much emphasis on the affordability criterion when reforms of PPD benefits are undertaken? First, many employers are unaware of the economic analysis that suggests that workers bear much of the costs of improved benefits in the form of lower wages. Or, if they are aware of the argument, they are not persuaded by the logic or supporting evidence. Second, in the short run, the costs of higher workers’ compensation benefits are largely borne by employers in the form of lower profits until prices and wages can be adjusted to reflect these higher costs.

Third, the affordability issue does not just involve employers and workers in the U.S. workers’ compensation programs, but also involves private carriers. Much of the zeal for reform of PPD benefits in the early 1990s can be traced to the significant underwriting losses that workers’ compensation carriers experienced in the late 1980s and early 1990s. Whatever advantages may accrue to employers from more adequate benefits, much of the cost of the workers’ compensation program was being borne by carriers for whom higher workers’ compensation insurance rates were harder to obtain from employers and regulators than were lower insurance rates resulting from legislative reforms that reduced benefits.

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5

Issues in Workers' Compensation Appeals System Reform

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The workers' compensation system in North America is a result of discontent with tort litigation, an earlier mechanism used to resolve disputes between workers and their employers over workplace injuries and diseases. Legislators and other policymakers in the United States and Canada concluded that tort suits favored the "propertied class" by placing a number of legal barriers in front of workers who sought restitution for workplace injuries. While legislative interventions began to erode traditional common law defenses of employers, it was still a widely held belief that, in the interests of societal peace, a more automatic approach to compensating injured workers needed to evolve outside of the courts.¹

Workers' compensation statutes sought to create a set of rules that would be applied to the assessment of work injury claims for cash and medical benefits. The result was a program that determined eligibility and benefit amounts based not on fault but on whether the injury was related to work, and on an assignment of cash benefits based on a schedule. This statutory approach was designed to reduce the cost, time, uncertainty, and adversarial proceedings that were hallmarks of tort compensation. One goal was to effectively remove litigation from the process.

Over time, however, litigation has been reintroduced into workers' compensation, which, to some observers, has resulted in a replication of the woes of the tort system that workers' compensation replaced. Discontent with the processes and, especially in Canada, with the outcomes of workers' compensation appeals—which I will argue are often the result of other upheavals in the primary adjudication rather than prob-

lems with the appeals process itself—have resulted in calls for reform to which policymakers have responded.

This chapter is written at a time when discontent with appeals systems in workers' compensation is at an ebb. This is partially due to the slow pace in Canada of fundamental reforms in the way injured workers' are compensated, and therefore confusion and uncertainty are reduced. It is also the case that there are fewer injuries, or at least workers' compensation claims, than there were in the past. However, there are always new compensation issues brewing, and if history is any guide, the current calm is unlikely to last.

When discontent does flare in Canadian provinces, a common response is the formation of a commission to investigate the problems and make recommendations for improvement. I have been involved in several such commissions, including directing the research for two, and benefited from the good counsel of my friend and colleague Terry Thomason in both instances. Often, the membership of the commission consists of people who have not been directly involved in workers' compensation. There are two results: First, the commissioners quickly begin to appreciate the complexity of workers' compensation, especially the interrelatedness of policies and procedures in various aspects of the program. It becomes evident very quickly that decisions taken to resolve one problem may very well undermine the foundation under other policies and procedures. The second reaction is that, given the obvious and serious failings in the jurisdiction's program, every other workers' compensation system "*must* be dealing with the vexatious issues better than we are!" The commissioners soon discover, however, that there are very few twenty dollar bills lying on the sidewalk of workers' compensation.

This chapter draws together the experiences of two commissions of inquiry into workers' compensation in Canada—one in Ontario in 1995 and the other in British Columbia in 1998. There are two main goals for the chapter: 1) to review what I believe emerged as the central drivers of the reintroduction of litigation into the workers' compensation system, and 2) to set out some central policy issues in workers' compensation appeals for which there has been little research. These policy issues were common to both inquiries and, as we discovered through our research, common to those confronted by workers' compensation authorities around the globe.²

REINTRODUCING LITIGATION TO WORK INJURY COMPENSATION

At its essence, a good workers' compensation system delivers 1) a reasonably fair method of collecting funds for the purpose of providing medical and financial support to injured workers, and 2) a reasonably fair method of distributing those funds. Discontent with the workers' compensation system arises when the "fairness" in either of these elements is breached. An initial expectation for the workers' compensation system was that it would deliver fairness to workers and employers in a way that the courts could not—on a timely, cost-effective basis. Workers' compensation claims adjudicators, armed with legislation, regulation, and operational policy, would make decisions based on the merits of each claim, without undue regard to precedence and with no regard to fault.

However, as the nature of work evolved over the last 100 years, and the nature and relative importance of various work injuries and diseases were transformed, the workers' compensation system was slow to adapt. Discontent among the stakeholders with adjudication decisions grew with the perceptions that some decisions were being made with little consultation between the adjudicators and the stakeholders, and that accountability for explaining the basis of decisions was absent. In this section, I argue that the increasing complexity of work-related injuries, the stakeholder demands for due process that have resulted in the introduction and expansion of appeal rights, and the inconsistencies in the claims adjudication process brought to light by worker and employer appeals that give "economic value" to appeals, are intimately related to the growth of litigation involving work injury compensation.

The Growing Complexity of Workplace Injuries

As has been well-documented, the definitions of a *worker*, the *workplace* and an *injury* or a *disease*, as well as the guidelines that workers' compensation claims adjudicators have at their disposal to guide them in determining whether an injury or disease arose out of, or in the course of, employment have become more ambiguous as the nature of work and employment relationships have evolved. Thomason, Hyatt, and Roberts (1998, pp. 269–270) summarized these developments:

. . . workers' compensation programs have become increasingly litigious, adding substantially to costs. In part, these perceptions have been fueled by an expansion of the definition of disability. The scope of compensable conditions has broadened to include soft tissue injuries, repetitive strain syndromes, psychological disorders, and a variety of occupational diseases. Accurate diagnosis of these conditions is problematic so that it is difficult to establish the extent of disability. For soft tissue injuries, repetitive trauma syndromes, and psychological ailments, diagnosis is primarily based on subjective symptoms. For all these conditions, it is also difficult to determine whether or not and to what extent the condition is work-related.

The traditional model of a worker employed in a manufacturing facility or on a construction site has represented fewer workers in each decade dating back to the advent of workers' compensation. Workers are now more likely to suffer disabilities that did not have an immediate onset, such as repetitive strain and other soft-tissue injuries. Increasingly, injuries and disease occur for which work may have been only one of many contributing factors. And, workers are now more likely to work outside of a traditional workplace, such as in their homes or out of their vehicles. Indeed, it may even be the case that some of the changes in the workplace (for example, hiring independent contractors for whom the employer may not be responsible for providing workers' compensation coverage) have been driven to a degree by the costs to the employer of workers' compensation.

Workers' compensation legislation and policy have lagged behind the evolution of work and work-related injuries. To a large extent, the statutory language and legal doctrines used to determine which workers are covered and which injuries and diseases are work-related are remnants of the early twentieth century.

Policy vacuums in workers' compensation often result in denials of claims that are unfamiliar, which then draws appeals from the injured workers, or by the acceptance of unfamiliar claims, which then draws appeals by employers (particularly experience-rated employers). Until the 1970s, access to appeals bodies was largely missing from Canadian workers' compensation programs.

The “Due Process Revolution”

Appeals bodies are relatively recent additions to Canadian workers' compensation systems. While formal appeals processes had been sought by injured workers and employers almost since the inception of workers' compensation, such demands were resisted and rejected by workers' compensation administrators, commissions of inquiry, and legislators. This changed most dramatically in the 1970s during what Law (2000) has termed the “due process revolution” in workers' compensation.

It seems odd that workers' compensation was largely without serious appeals mechanisms, given that the system has now become so used to them, and in fact come to rely upon them. The central reason for the absence of an appeals structure during the pre-1970s period was that it ran contrary to what workers' compensation was supposed to be—a purely administrative decision-making process in which the facts are collected, eligibility determined, and compensation paid based on legislations, policies, and procedures. As the Sloan Commission (1942) in British Columbia, Canada, concluded, opening up avenues for appeal would impair the system's delivery of “quick, summary and final decisions.”³

When workers' compensation authorities began to consider the structure of the appeals process, they were confronted with the same questions that are faced by policymakers today. How many levels of appeals should there be? Should higher levels of appeal be restricted to reviewing previous decisions and evidence, or should they be *de novo* hearings? In addition to the increasing complexity of claims resulting from changes in the workplace, the appeals structure brought a new level of procedural complexity, which required specialized knowledge in order to process claims.

Many Canadian workers' compensation authorities responded in part to the need for specialized knowledge by introducing representation into the workers' compensation system. The innovation this time (compared to the use of attorneys in tort suits prior to the introduction of workers' compensation) was that the representation was largely free of charge. “Worker advisors” and “employer advisors” became common forms of representation provided by workers' compensation systems to assist with the claims process and to provide representation at appeals

proceedings. Hyatt and Kralj (2000) found empirical support for what many participants in the Ontario workers' compensation system conjectured to be the case—that worker advisors were good at what they did. Hyatt and Kralj found that representation from the worker advisors not only increased the likelihood that workers' appeals were granted, but worker advisors also achieved better results for injured workers than lawyers, union representatives, or any other form of representation.

The influence of worker and employer representation is not felt just at the stage of appealing an adjudicator's decision. Indeed, advocacy can start from square one, the filing of a claim. Anecdotal evidence from claims adjudicators in Canada suggests that both worker and employer advocates have become more active in trying to influence decisions at the primary adjudication level. This can take the form of calling adjudicators to follow up on claims, and ensuring that adjudicators have all relevant information to adjudicate the claim.

To the extent that this more aggressive form of advocacy puts useful information in the hands of the adjudicator, it can be enormously helpful, and may even further the timeliness of the process, if the adjudicator is not required to gather the information on his or her own. However, it was common in the commissions of inquiries in which I have participated to hear concerns that in many cases an advocate puts pressure on an adjudicator to expedite the decision process. Furthermore, an advocate may suggest that a decision contrary to the result he or she is advancing will result in complaints to the adjudicator's supervisor or an appeal of the decision, and that these pressures and suggestions may cause the adjudicator to pay the claim (or not), and leave it to the appeals structure to mop up the mess left by a misadjudicated claim.

The due process revolution gave employers and workers recourse for adjudicative decisions that were either faulty or perceived as faulty. Further, the outcomes of the appeals process illuminated shortcomings in policy and adjudication processes that needed to be addressed by workers' compensation authorities, including the need for remedial action on previously mishandled claims. The availability of advocates well-versed in workers' compensation matters gave the parties the necessary expertise to realize the "economic value" of uncertainty that had been growing in the workers' compensation system.

The Impact of Inconsistencies in Adjudication and Appeals Outcomes

The due process revolution resulted in appeals bodies, which, like most other administrative law tribunals in Canada, are independent in the sense that panels of the tribunal are not bound by precedence and are mandated to decide appeals based on the merits of the case. Coupled with the changing nature of workers' compensation claims (the uncertainty with respect to benefit entitlement—"no" does not necessarily mean "no" and "yes" does not necessarily mean "yes" when initial decisions can be appealed) the stakes to the parties of disputing adjudicators' decisions were raised.

The absence of policy and legislation in the face of a changing compensation environment means that primary claims adjudicators are often on their own in the claims decision process when claims involving unfamiliar fact patterns are filed. A consequence is that different adjudicators may reach very different results on whether similar claims should be accepted for payment, as well as the type and duration of the awards. This variability in claims adjudication and appeals outcomes creates an "economic value" to contesting decisions. Variations in the outcomes of otherwise similar claims are rapidly disseminated in the worker and employer communities, and encourage appeals, in contrast to the absence of economic value of appealing a decision that is consistent with legislation, policy, and previous decisions so that an appeal is certain to be denied. Empirical evidence of the influence of uncertainty on appeals has been advanced by Thomason (1991), Roberts (1992), and Thomason and Burton (1993). These studies demonstrated that measures of award variability and the time between the date of the injury and receipt of payment (a proxy for uncertainty) were associated with an increased likelihood of a dispute (or a decrease in the likelihood of a settlement).

Uncertainty that encourages claims and appeals from initial decisions can also arise from attention, or lack of attention, to cost considerations. As described by Spieler and Burton (1998), recent decades have been characterized by a pendulum of workers' compensation reform efforts in North America which have swung between an emphasis on adequacy of benefits at one end and affordability at the other. From the perspective of the incentive to appeal, the issue is not whether it is inappropriate to make adjustments in the relative importance of adequacy

and affordability, but rather that these types of pendulum swings simply cannot help but encourage appeals.

Spieler and Burton (1998, p. 236) describe the focus on workers' compensation costs and affordability that emerged in the 1990s.

The combination of rapidly increasing costs to employers and unprofitability for carriers beginning in the mid-1980s resulted in a backlash: affordability became the dominating criterion for reform during the 1990s. Employers and insurers mounted successful political campaigns to reduce costs. We have documented the consequences in terms of cutbacks in benefits, tougher eligibility standards, and new approaches to medical care and disability management.

Spieler and Burton (1998, p. 238) put the 1990s into a broader historical context that highlights the pendulum swings in workers' compensation legislation and policy, as follows:⁴

The history of the workers' compensation program since 1960, in terms of achieving the compensation goal, has shown variation through time in the relative importance of the adequacy and affordability criteria. Adequacy received the most attention in the 1970s, and concerns for adequacy and affordability were roughly in balance during most of the 1980s. The 1990s have been dominated by efforts to achieve affordability.

In recent times, the ability of workers' compensation administrators to respond quickly to changes in financial performance of the system was furthered with technology. The use of broadcast voicemail and electronic mail has made it very easy to transmit subtle changes to policy that may be induced by financial considerations. Electronic monitoring of adjudicator decisions, and the ability to produce up-to-the-minute financial reporting, means that pressure to more carefully consider certain types of claims at some times, or ease up at other times, is more easily implemented within shorter time frames than in the past.⁵

Experience Rating and the Economic Value of Employer Appeals

A factor that has encouraged increased appeals volumes in Canadian workers' compensation has been the broader application of experience rating, which increases or decreases the workers' compensation premiums paid by employers on the basis of the benefits paid to injured work-

ers.⁶ Canadian workers' compensation jurisdictions were much slower to embrace experience rating than were their American counterparts. While experience rating furthers the role of the workers' compensation system as a reasonably fair method of collecting funds from employers to be distributed among injured workers by ensuring that employers responsible for the highest benefit payments pay the highest rates, it focuses employer attention on claims costs, especially relative to those of industry competitors.

Experience rating raises the economic value (or marginal costs) of workers' compensation claims outcomes to individual employers. Costs can be controlled by reducing the incidence and severity of workplace injuries and diseases, but also by claims management practices, which includes efforts to limit the number of claims that are approved by adjudicators and appeals bodies. This is not to suggest that employer monitoring of workers' compensation claims induced by experience rating is necessarily inappropriate. In fact, experience rating may induce vigilance on the part of employers that improve the long-run viability of the workers' compensation system. Hyatt and Kralj (1995) show, using data from the province of Ontario, Canada, that experience-rated employers are more likely to appeal workers' compensation claims, and that the likelihood of employer appeals increases with the size of the experience rating incentive. A recent study by Thomason and Pozzebon (2002) also found that high-wage firms were also more likely than low-wage firms to respond to experience rating by increasing their accident prevention efforts relative to their claims management efforts.

The Importance of an Efficient Appeals Structure

As the appeals apparatus has grown and become more widely used, and while those in workers' compensation advocacy roles have reportedly become more aggressive at intervening at the primary adjudication level, the stakes to adjudicators of making faulty decisions have diminished. An efficient appeals structure will fix any errors. This reliance on the appeals structure allows busy claims adjudicators the opportunity to pass along difficult files to the appeals system, especially those requiring time-consuming investigation.⁷ The Royal Commission on Workers' Compensation in British Columbia (1999, p. 20) observed

The commission is deeply concerned that the current appeal system appears to have become a substitute for quality decision making at the claims adjudication level. Rather than ensuring that all the relevant information is gathered and that the resulting claims adjudication decision is correct, accurate and fair, the current appeal system appears to provide the board with an opportunity to make insufficiently informed, inaccurate or incorrect decisions in the expectation that eventually the right decision will be made.

This observation highlights an important reality—what seems to be a problem with the appeals system may be reflecting a fundamental problem upstream in the adjudication process.

Summary

Law (2000, p. 304) provides a summary of the factors that have contributed to the litigiousness of work injury compensation.

Yet any observer of North American workers' compensation today knows that the non-litigious adjudicative model is at best a 'first step' in the life of a workers' compensation claim. What has happened? In short, the following: workers enter a host of claims never envisioned at the outset of the twentieth century; employers vigorously defend the insurance funds against claims; insurers, public and private, have developed elaborate multi-stage decision-making systems that include formal hearings. The result is a litigation-laden web of adjudicative and tribunal-based decision-making, with radically reduced degrees of certainty and predictability in conjunction with increasing administration and party costs.

Uncertainty is a key factor that drives appeals. The causes of uncertainty in the workers' compensation system are legion but are frequently driven by inconsistencies in the adjudication process, the absence of policy with respect to "nontraditional" injuries or diseases, and major legislative or policy reforms that are not well understood by the parties or the adjudicators. The result is inconsistent adjudicator decisions. The potential to exploit this inconsistency gives economic value to appeals, and the use of representation by the parties—lawyers, advisors, and consultants (some of which may be paid for by the workers' compensation system itself)—give the parties an informed advocate to capture this economic value. The result is an overwhelmed appeals system and the appearance that the problem is with the appeals structure.

However, the problems with the appeals structure may often be more appropriately cast as reflecting problems throughout the adjudication process. Looking at the kinds of appeals and the issues raised therein provides a snapshot of the problems the system is facing as a whole, and the volume of appeals at a point in time is a good indicator of the magnitude of the problems in the system. Neither of these, however, is a particularly instructive indicator of the health of the appeals process itself. Indeed, paradoxically, an efficient appeals structure may well reduce the incentives provided by the adjudicative process to reform in the basic design of the workers' compensation program if mistakes or gaps in policy are efficiently handled through the appeals process.

CENTRAL ISSUES STILL FACING POLICYMAKERS: A RESEARCH AGENDA

Even though my view is that problems in primary adjudication caused by faults in the basic design of the workers' compensation program are the key source of deficiencies in the appeals system, nonetheless there are many direct changes that can be made to improve the appeals process. Of course, answers to what constitutes "improving" the appeals process, like so many issues in workers' compensation, depend on whom one asks the questions.

One starting point is to offer a model of what a workers' compensation appeals system should deliver. After extensive consultation with stakeholders, literature reviews, and deliberations, the Royal Commission on Workers' Compensation in British Columbia concluded that an independent appeals structure should have five "intimately connected" features. The appeals process must

- 1) apply legislation, rules and policy in a fair and equitable fashion;
- 2) make decisions based on all the relevant information, including new information only recently discovered or determined to be important;
- 3) be an active participant in making inquiries and not the passive recipient of information;

- 4) have the capacity to revoke or vary an adjudication decision and substitute a new decision; and
- 5) be able to monitor the implementation of its decisions and not be limited to simply referring the matter back with instructions.

The question that faced the Royal Commission, and which faces all workers' compensation policymakers, is what design features should be built into the appeals process that would best ensure that these features will be present? While there has been considerable research on many aspects of the workers' compensation appeals, there remain a number of gaps in the research. Some of the key questions necessary to address include: How many steps should there be in the appeals structure? What is the role of appeals jurisprudence in decision making? What is the role of alternative dispute resolution in workers' compensation? And, is there a role for the courts?

How Many Steps Are Required in the Appeals Process?

Workers' compensation must, as it has always done, balance the costs and the benefits of providing due process. A central question is, how many levels of appeal are necessary to deliver due process but still be timely and cost efficient?

To many of the policymakers who designed the first of workers' compensation programs, an elaborate appeals structure was believed not to be warranted. While some adjudication decisions, and the communication of the decisions and their justifications, were considered necessary, the prescribed "minimalist" solution involved a two-pronged response: require that written decisions be given to the parties that adequately delineate how the decisions were reached, and provide a means by which files could be reviewed by someone whose only responsibility was to conduct such reviews (preferably by someone who was not involved in the original decision).

On its face, there is no obvious reason why this relatively simple approach to appeals could not deliver the "intimately connected" elements of an effective appeals system as outlined by the British Columbia Royal Commission. Lind et al. (1993) showed that workers who perceive the process as fair are less likely to pursue appeals, independent of the outcome of the process. Roberts (1996) found that when injured

workers felt that the information decision makers had about their claims was accurate, they are also less likely to appeal. Clearly, however, this relatively simple approach failed to satisfy the perceptions of workers' compensation system stakeholders of the procedural rules needed to assure fairness and justice, and has given way to more elaborate multi-tiered appeals apparatus. It merits emphasis that, with all that researchers have learned about procedural justice, what has yet to flow from that research is any specificity on the optimal number of steps in an appeals process, and the degree of separation from the original decision makers necessary to achieve independence.

The Royal Commission on Workers' Compensation in British Columbia recommended a two-step appeals structure. The first step, the "internal review process," would consist of a readjudication of the workers' compensation claim to take into account any new information. The term *internal* means that the review would be conducted by workers' compensation board staff. The decision arising from the internal review could then be appealed to an independent appeals tribunal. In recommending a two-step appeals process, the Royal Commission on Workers' Compensation in British Columbia (1999, p. 27) concluded that ". . . fewer appeals levels could reduce jurisdictional disputes (between the various appeals bodies), enhance the speed and consistency of decision making, and eliminate administrative duplication."

An ancillary issue that arises as the number of levels of appeal grows is the relationship between the levels of appeal themselves. To what extent should lower levels of appeal be bound to the decisions of higher levels of appeal? This is part of a broader issue, which is the extent to which appeals systems should have the latitude to set policy where it is absent, and in so doing open or close access to benefits, or to find workers' compensation legislation or policy to be illegal.

What Is the Role of Appeals Jurisprudence in Decision Making?

A common feature of Canadian legal systems involving administrative agencies, like workers' compensation, is that decision makers are not bound by precedence, but rather should consider each case on its merits. While this approach asserts the independence of the decision maker, it can be a source of frustration to workers' compensation system stakeholders when this freedom from precedence causes deci-

sions to look less like they were independent and more like they are inconsistent.

That workers' compensation appeals structures should not be bound by precedence has led to problems, not only between levels of the appeals structure, but also back to the primary adjudication process. If, at the appeals level, an adjudicator's decision was found to be, for example, a faulty interpretation of policy, it has frequently been the case that while the adjudicator's decision might be overturned in that specific instance, the adjudicator may feel free to make the same faulty (in the eyes of the appellate structure) decision again. In other words, the jurisprudence that arises from appeals may have no impact on the adjudication of future claims with similar fact situations. What is left, then, is for the worker or employer to appeal in every instance of the same type of claim.

The Royal Commission on Workers' Compensation (1999, p. 41) expressed a concern they frequently heard from stakeholders: "(t)his freedom from precedent has tended to promote inconsistent decisions throughout the claims adjudication and appeal process with the result that it is difficult, if not impossible, to predict how decisions will be made in the future or to use prior decisions to assert that subsequent decisions are unfair."

Workers' compensation systems in Canada have struggled to find some sort of middle ground on the issue of precedence. An influential decision of the Supreme Court of Canada, *Consolidated-Bathurst Packaging Ltd. v. International Woodworkers of America, Local 2-69*, [1990] 1 S.C.R. 282, concluded that while administrative bodies may not be bound to slavishly follow precedence and should therefore remain independent, they must find acceptable ways of achieving consistency. To balance independence and consistency, the court proposed a three-pronged model for administrative law bodies in which 1) the decision-making panel must be free of outside interference; 2) while legal and policy issues can be discussed within the tribunal, the decision in a specific case must be entirely in the hands of the panel that heard the evidence and can assess the facts; and 3) a clear distinction must be made between discussions on legal and policy matters within a tribunal and discussions of factual matters in a particular case. Discussions within the tribunal on legal and policy matters are not to be used to decide the appeals, but rather to delineate and assess standards which

could be adopted by the panel members hearing the matter. While reasonable on the face of it, the approach suggested by the Supreme Court of Canada has not been followed by all workers' compensation appeals bodies. One reason for this is the practical problem that consultative meetings between members of different panels of an appeals tribunal proposed by the Supreme Court are difficult to schedule, especially in an environment of growing case loads.

As a consequence, alternative approaches have been adopted or proposed to deal with the issue of precedence. These include requiring panels to give reasons for decisions that depart from earlier decisions involving similar matters; having leading cases decided by panels made up of neutral members (that is, none of the members is a worker or employer representative) whose decision would set out the key considerations for subsequent decisions to follow; and having a member of the appeals tribunal who did not hear the matter review a panel's preliminary decision, and if appropriate, outline in writing where the panel has diverged from previous decisions (the panel would still ultimately make the final decision). Another approach encouraging the reliance on precedence is to require that all decisions be published and/or all appeals hearings are open to the public. This latter approach adds transparency, but at the potential cost of compromising the privacy of injured workers and employers. Many of these approaches are being employed, providing useful variation necessary for fertile research on which approach achieves more consistent decision making, while maintaining independence.

The issue of the independence of workers' compensation appeals bodies extends further. A question with which policymakers constantly grapple is the role of the appeals body in refining, or redefining, workers' compensation policy. It is usually the case that legislation gives the provincial workers' compensation agency the authority to determine policy for which it is, in turn, accountable. Appeals bodies are supposed to interpret policy and determine whether it has been applied properly. However, appeals bodies may also determine that a policy adopted by the agency is illegal because it is inconsistent with the provincial workers' compensation statute. The central issue is whether the appeals bodies should be able to reject and replace workers' compensation board policies that may be legal under the provincial statute but considered

inappropriate by the appeals board, or to create new policy where none exists?

This issue exposes an important paradox in workers' compensation. Appeals bodies frequently assert that their decisions should be binding, not only on lower level appeals bodies, but also on primary adjudication process. Yet, because the decisions of the appeals bodies, which are supposed to be based on the merits of individual cases and are not supposed to be overly burdened by precedence, are by definition case specific, workers' compensation authorities rarely wish to be bound by the decisions of appeals bodies. Moreover, workers' compensation administrators believe their authority is enshrined in legislation, and it is to the legislature that they are accountable, not to appeals bodies.

The tensions that arise as appeals bodies breach the border between policy interpretation and policy making have caused policymakers to try to more clearly define the roles of the workers' compensation authority and the appeals bodies. Approaches that have been followed include altering workers' compensation legislation to reinforce the primacy of the workers' compensation authority to develop policy (and the role of the appeals bodies to interpret policy and assess its application in specific instances); where an appeals body has determined that a policy is illegal, the policy must be reviewed by the workers' compensation board on a timely basis in consultation with stakeholders, and a revised policy substituted (or the initial policy reissued); and referring questions of law to the court.

What Is the Role of Alternative Dispute Resolution in a Purely Adjudicative System?

It is hard to argue there is no room in workers' compensation for processes, such as alternative dispute resolution (ADR), that seek to help parties understand the nature of their disputes and resolve them. Surely in workers' compensation, where there are many opportunities for disputes, particularly after periods of significant reform, when the actors are uncertain about the new rules and how they apply to their matter, ADR techniques have a natural home.

ADR has become more popular, both because the primary adjudication has become more complicated and the appeals process has become more accessible (and complicated). As a consequence, dealing with dis-

putes takes a probably increasing share of real resources (though this is difficult to measure). To the extent that ADR can reduce dispute costs and satisfy the parties, its attractiveness is obvious.

However, the proper place of ADR in workers' compensation is not so straightforward. ADR evolved from situations where adversarial parties owned a dispute and had conflicting interests in how the dispute was ultimately resolved. As Law (1998, p. 4) points out, this was not the situation envisioned for workers' compensation, in which, "(t)he object of workers' compensation was to lift the matter of injury compensation out of the lives of master and servant, converting what was a private dispute (before the advent of workers' compensation) into a public service." Canadian law contends that workers and employers are not "parties" to workers' compensation disputes at all, and have no ownership of the adjudicative decision (although clearly they are not disinterested parties in the outcome). That is, workers' compensation did not envision empowering employers and workers to substitute even a mutually agreed upon alternative outcome to the adjudicators' decision, which was arrived upon by an application of legislation and established policy to the facts of the case.

Law (1998) identifies four classes of alternative dispute resolution approaches within workers' compensation. The first class, case management, characterizes ADR as a way of expediting the collection of information to ensure timely decision making based on all of the information relevant for the matter at hand. Law (pp. 24–25) describes this approach as, ". . . at once a 'customer service' initiative (the case moves faster through the system) and an 'administrative benefit' (if it reduces the number of transactions and or resources required to be applied to the matter)."

The second class of ADR procedures is the "flexibility for the decision maker" approach, in which the limited discretion an adjudicator normally has is supplemented by other remedies that are consistent with the facts. Law gives the example of an injured worker who is receiving temporary total disability benefits, but for whom the weight of the evidence suggests that the worker is not mitigating his or her losses through sufficient participation in vocational rehabilitation initiatives. In this instance, the prescribed outcome of adjudication would be to discontinue benefits. However, the worker is likely to disagree with the adjudicator's assessment of the mitigation efforts. An alternative ap-

proach might be to set out the evidence for the parties, and instead offer a solution which is to reduce the benefit over the period where the extent of mitigation was in question. In such an instance, the solution arrived at by the parties is consistent with the evidence (and gives the worker the benefit of the doubt) and may be preferable to the “normal” decision of terminating benefits, if that decision would have only have dragged the parties into extended costly proceedings.

A third ADR approach, decision endorsement, allows the parties (worker and employer) to make a decision within a range of specified outcomes, but the agreement reached by the parties must be approved by the adjudicator. The fourth approach goes one step further, empowering the parties to make decisions themselves on eligibility for and the quantum of benefits, with no supervisory review.

If ADR procedures offer the opportunity to achieve outcomes that more closely reflect the needs and wishes of the parties, then they merit consideration. If they instead weaken the parties’ ability to obtain the results promised by statute, then ADR serves only to undue one of the advantages, relative to tort proceedings, that workers’ compensation promised—predictable benefits for workers and predictable costs for employers.

Canadian and American workers’ compensation programs have come to different conclusions about which of the alternative dispute resolution approaches are appropriate in workers’ compensation. In reviewing ADR procedures in Washington State (which, like all Canadian workers’ compensation provinces, operates a monopoly fund), Law (1998, p. 21) aptly captures a flavor of the contrasting approaches and philosophies.

This is the fundamental distinction between the Washington State and Canadian systems—in Canada the statutorily prescribed benefit is technically the only benefit payable to the worker, and waivers or adjustments to that are prohibited. In the United States (and Washington specifically) the parties treat the insurance system as more of a menu, with a maximum number of choices.

The implication of this distinction is that ADR has a greater potential role in the U.S. because there are more opportunities to fashion solutions that do not precisely adhere to statutory prescriptions. This is a little studied point of departure in U.S. and Canadian workers’ compensation programs, and one that merits additional comparative research.

Is There a Role for the Courts?

As the nature of workplace injuries evolved and attribution to work or the workplace became, in some instance, much more difficult, some policymakers chose to simply exclude certain injuries and diseases from coverage,⁸ rather than to modify legal rules to accept such claims into workers' compensation or apportion benefits based on the degree to which work contributed to the workers' condition. In some instances, excluding injuries and diseases from coverage was at least partially motivated by the cost implications of doing otherwise (Spieler and Burton 1998; Hyatt 2001). However, precluding coverage for certain conditions under workers' compensation threw open the question of whether workers could now sue their employers if they could establish that their excluded condition was linked to the workplace. Hyatt (2001) found that the courts in both Canada and the United States have generally been loath to disrupt the exclusive remedy doctrine of workers' compensation, and have not granted workers and employers broad rights to sue. One exception is Oregon, where the Supreme Court held in *Smothers v. Gresham Transfer, Inc.*, 23 P.3d 333 (Or. 2001) that an effort by the Oregon legislature to preclude a worker from obtaining workers' compensation benefits because the workplace injury was not the major contributing cause of the worker's disability while also denying the worker the right to sue the employer in a tort suit was unconstitutional.⁹

The "historical compromise" that workers' compensation represents, in which workers gave up the right to sue their employer in return for benefits paid with certainty and on a timely basis, came after ruinous tort litigation. Over time, employers, workers, and legislators were able to fashion some considerable degree of consensus for a major change in the legal remedies available for workplace injuries because the failure to compromise put at risk the sustainability of the industrial revolution (Hyatt and Law 2000).

The benefits of the workers' compensation system compared to the tort approach are many. Those frequently cited among the most valued include timeliness of the adjudication process; reduced costs, due fundamentally to the elimination of the burden of adjudication in the regular court system to determine fault and to the reduction in legal and other related costs of pursuing a claim; relatively nonadversarial procedures, again due to the no-fault nature of workers' compensation;

and decision making that, because it is based on legislation and policy and administered by professional adjudicators who specialize in work injuries and diseases, generates predictable compensation and costs.

In the instances where workers are denied access to the workers' compensation for certain injuries/diseases/conditions, and are also denied access to the courts, potentially work-related injury claims are simply suppressed. This is not a situation that can persist in the long run, as the emergence of workers' compensation some 100 years ago demonstrated.

While the virtues of the tort system are sometimes overlooked as a way of resolving some workplace disputes, such as charges that employers are discriminating against workers on the basis of race or gender, a return to the tort system to provide the remedy for workplace injuries and diseases is rarely seriously considered. However, the court may be a useful forum to adjudicate matters for which policy moves too slowly.

Although frequently maligned because of cost, lack of timeliness, and adversarial nature, the courts and the process of tort litigation remain good mechanisms for eliciting the best evidence available and making decisions on that evidence. This is partly because resources are devoted to providing evidence, and the process is adversarial and is not rushed. It should be emphasized that legislators have also been slow to react to an evolving workplace environment for workplace safety and health. While the workers' compensation system is likely faster and cheaper for dealing with routine work injury matters, it cannot be said that legislators are necessarily faster than the courts for addressing emerging issues, such as the proliferating evidence on the relationships between workplace exposures to toxic substances and the diseases affecting workers.

It would appear, however, that given the general reluctance of courts to loosen the bar on tort suits for workplace injuries and diseases, legislators would have to enact legislation allowing workers to sue their employers in instances where their conditions have been excluded from workers' compensation coverage. Litigation raises the stakes to all of the parties. Perhaps even the "threat" of loosening the tort bar may be enough to encourage modern workers and employers to update the historical compromise to better reflect modern conditions.

CONCLUSION

The due process revolution that introduced litigation into Canadian workers' compensation programs reflects recognition that there can be legitimate differences of interpretation of the facts before a claims adjudicator and that mistakes can be made. Principles of natural justice require that a forum be available, even within an administrative law regime, to address these situations. Perhaps more importantly, attention to due process is an acknowledgment that some flexibility needed to be built into the workers' compensation system to allow more timely reaction to constantly evolving environment of work and work injuries than is afforded by legislative and policy reform processes.

However, to the extent that workers' compensation appeals increasingly becomes a substitute for quality decision making at the claims adjudication level, then the faith of injured workers and employers in the primary adjudication process will be compromised. Claims adjudicators and administrators reported to the provincial commissions of inquiry, referred to earlier, of instances in which employers and workers file the documentation to initiate an appeal of the adjudicator's decision at the same time that the claim is filed (and before the adjudicator had made any decisions). If workers and employers believe in sufficient numbers that the only way to get the "right" decision is to appeal, then the advantages of workers' compensation over tort are clearly diminished.

Policymakers, then, must continue to ensure that primary adjudication is maintained at a level such that the economic value of appeals is diminished, while still allowing an effective forum for legitimate difference to be considered and mistakes to be corrected.

Notes

1. Burton and Mitchell (2003, pp. 178–180) provide a brief history of the origins of workers' compensation in the United States. Chaykowski and Thomason (1995, pp. 2–6) provide a similar introduction to the historical development of workers' compensation in Canada.
2. This chapter does not provide a systematic review of past research on workers compensation appeals. Such reviews can be found in Thomason, Hyatt, and Roberts (1998), Law (2000), and Hyatt (2001).

3. For an excellent review of the history of appeals system, with particular reference to British Columbia, see Workers' Compensation Board of British Columbia (1997).
4. Law (2000) provides a description of a similar pattern in the Canadian context.
5. Even more worrisome is that economic considerations may affect the claims of some workers differently from others. Thomason (1994, p.76) found that, "... decisions concerning both liability and compensation are partially based on economic considerations," and that "insurers are more likely to adjust the claims of those most vulnerable to financial pressure: non-English speakers and claimants who are not represented by legal counsel."
6. Thomason (2003) provides a recent survey of studies of the effects of experience rating.
7. The problems associated with decisions based on inadequate investigation of the claims at the primary adjudication level are compounded when those decisions are not appealed.
8. Workers' compensation policymakers have not warmed to trying to assess the relative contributions of work and nonwork factors, and provide partial benefits based on the work contribution. Shainblum, Sullivan, and Frank (2000) provide a review of the issues involved, the feasibility of instituting such an approach, as well as alternatives.
9. The issue of whether a state can preclude a worker from having any remedy against an employer for a workplace injury or disease is examined in Willborn, Schwab, and Burton (2002, pp. 978–985).

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6

Performance Measurement in Workers' Compensation Systems

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Interest in performance measurement and performance management has expanded remarkably in the past 25 years. This interest has spawned many initiatives, both private and public. One of the most ubiquitous has been the “balanced scorecard.” This initiative developed out of the work of two professors at the Harvard Business School in the early 1990s (Kaplan and Norton 1992), and was based on the fundamental concept that there are (or should be) multiple objectives and thus multiple dimensions for performance measurement. Kaplan and Norton urged that the financial perspective should be complemented by a customer perspective, an internal process perspective, and an organizational learning and growth perspective. Only then could performance measurement fully serve the strategic objectives of the modern enterprise (Kaplan and Norton 2001).

While the balanced scorecard was finding application in private business, nonprofits, and local government entities, the federal government was conducting a National Performance Review, under the leadership of Vice President Al Gore (1993). This gave a boost to a pending piece of legislation that was enacted under the title of the Government Performance and Results Act of 1993, or GPRA. This act is the latest in a series of government attempts at “performance budgeting,” including the Planning-Programming-Budgeting System of 1965, Management by Objectives of 1973, and Zero-Base Budgeting of 1977 (U.S. General Accounting Office 1997).

However, GPRA differs from those earlier efforts in that it also imposes a planning and evaluation process designed to influence program effectiveness and budgeting decisions. Five-year strategic plans

are required from all federal agencies (with revision every three years) together with an annual performance plan that has credible outcome-based goals. Further, these “good intentions” are enforced by the Office of Management and Budget (OMB) Program Assessment Rating Tool (PART), which is being applied across all federal government agencies and programs on a five-year cycle. In fact, OMB conducted PART evaluations on 234 federal programs during fiscal year 2002–2003 and plans to complete 411 during fiscal year 2003–2004.

PART rates programs as “effective, moderately effective, adequate, results not demonstrated, or ineffective” based on four criteria. Twenty percent of the evaluation is based on management, 20 percent on program purpose and design, 10 percent on planning, and 50 percent on program results (U.S. General Accounting Office 2004). While it is too early to judge the success of PART and GPRA, these efforts certainly represent a manifestation of the growing interest in program effectiveness and program evaluation in the federal government and elsewhere. (See U.S. General Accounting Office 2004 for a critical view.)

There are many other illustrations of the interest in performance measurement in public programs. The International City/County Management Association was an early advocate for more effective performance measurement and management (see Morley, Bryant, and Hatry 2001). Today the CPM Consortium project includes well over 100 participating cities and counties who are seeking to improve their own performance, partly through benchmarking to other similar entities.¹ The Organisation for Economic Co-operation and Development (OECD) published an occasional paper on performance measurement in 1994, which combined a “how-to” manual with specific examples of efforts in various countries. Paralleling the balanced scorecard approach, OECD listed the following “dimensions” of functional performance measurement: economy measures, efficiency measures, effectiveness measures, service quality measures, and financial performance measures (OECD 1994).

HISTORY OF PERFORMANCE MEASUREMENT IN WORKERS' COMPENSATION

Workers' compensation systems have not historically been leaders in the adoption of performance measurement or performance management techniques. In fact, one could argue that these programs have been somewhat of a backwater for performance measurement. Workers' compensation systems tend to be iconoclastic, with relatively little comparability across jurisdictions (see U.S. Department of Labor 2002 for what can be easily compared). This is because such systems are the result of a complex interplay of statutory language, legal interpretation, and administrative practice, all of which are specific to each jurisdiction. It is little wonder that the situation can be characterized as "a tower of babel."

The lack of comparable performance measures among workers' compensation systems also meant that it was difficult to tell which policy initiatives worked across jurisdictions. Workers' compensation reform was characterized by veering to one side or the other, depending upon whether the friends of labor or the friends of employers were in political control. It was frustration with this situation that led to the establishment of the Workers Compensation Research Institute (WCRI) in 1983.

The Workers Compensation Research Institute is an independent, not-for-profit research organization providing high-quality, objective information about public policy issues involving workers' compensation systems. It is funded by memberships with annual dues set according to the size and type of organization. Membership includes workers' compensation insurers, large employers, and employer associations. Associate members include many state and provincial workers' compensation administrative agencies in the United States, Australia, and Canada as well as a handful of labor organizations.

One of the earliest research programs at WCRI was the "administrative inventory" series. According to the first of these, "This is the first of a series of Administrative Inventories of state workers' compensation systems. The purpose of the series is to describe and offer convenient data on how the different systems function, to allow interstate comparison" (Barth 1987, p. 3).

Administrative inventories have now been performed in some 24 U.S. jurisdictions, several of them more than once (see WCRI 2003). While they may not have been as effective in allowing interstate comparisons as originally thought, they have gone a long way toward facilitating communication across systems and increasing general understanding of different workers' compensation systems.

Another objective of WCRI was to determine "best practice" among workers' compensation systems, which of necessity implies a comparative perspective. The motivation for this is to provide guidance for reform; one has to know what works if one is to improve the performance of a workers' compensation system. "Our past research has shown that public officials and stakeholders in a particular state generally understand how their own system performs, but their ability to make meaningful and credible comparisons between their system and those of other states is severely limited" (Telles, Wang, and Tanabe 2004, p. 3).

The earliest work that included explicit interstate comparisons at WCRI involved a review of medical cost trends in 43 jurisdictions (Boden and Fleischman 1989). This was followed by a study of cost drivers in six state systems (Victor et al. 1992). The development of a multistate database for the express purpose of making comparisons among state systems followed logically from these efforts and the first CompScope™ multistate comparison study appeared in 2000 (Fox, Casteris, and Telles 2000).

Recently the fourth edition of this reference work was released (Telles et al. 2004). It provides detail on nearly 60 performance measures for 12 states over the period 1996–2001. Comparable definitions have been used and the data have been standardized for wage levels, industry employment, injury mix, and benefit waiting period. Thus, the emphasis of this effort is on comparing "apples to apples" even if that causes some tension with unadjusted system statistics that may be published elsewhere. As the fourth edition puts it, "The annual benchmarks of system performance collected here enable policymakers and stakeholders to better manage and continuously improve their systems and avoid the historic cycles of crisis-reform-crisis that have frequently characterized workers' compensation systems" (Telles et al. 2004, p. 3).

Most recently, WCRI has initiated a new series of comparative studies of self-reported outcomes for injured workers (Victor, Barth, and

Liu 2003). These telephone surveys of injured workers in four states compare critical outcome dimensions, including physical recovery; satisfaction with, access to, and quality of medical care; and durability of return-to-work results. We look forward to the expansion of this series to additional states in the future.

Predating WCRI was the series of workers' compensation employer cost studies conducted by John F. Burton, Jr. and various collaborators over the years. These studies began with Burton's Ph.D. dissertation at the University of Michigan in 1965, partly sponsored by the W.E. Upjohn Institute for Employment Research. The most thorough description of the methods used in this research is in Thomason, Schmidle, and Burton (2001). Burton and his coauthors have replicated and refined this study over the years to provide a more or less continuous record of employers' cost of workers' compensation coverage over several decades.

Burton's measures are developed from National Council on Compensation Insurance data that are used for rate-making for workers' compensation insurance policies written by private insurers in approximately 40 states, and supplemented by comparable data in other states with available information. An expanded version that includes data from public funds, self-insured employers, federal workers' compensation programs, and including adjustments for additional technical problems (like large deductibles) is published annually by the National Academy of Social Insurance (NASI); the most recent version is *Workers' Compensation: Benefits, Coverage, and Costs, 2001* (NASI 2003).

Another workers' compensation cost study, the *Oregon Workers' Compensation Premium Rate Ranking* study, is performed biannually by the Oregon Department of Consumer & Business Services. It provides explicit comparisons of premium levels for the 50 largest workers' compensation classifications in Oregon across all 51 states. This study was developed to track Oregon premium rates relative to other states, and therefore qualifies as an aggregate performance measure.

Finally, there is a "workers' compensation report card" developed and promoted by the Work Loss Data Institute.² It is composed of data elements from Occupational Safety and Health Administration log reports, and awards letter grades to state workers' compensation systems depending upon the state's performance on the aggregate injury incidence rate, the percentage of injuries that involve lost workdays,

the median duration of disability, the proportion that are long duration cases, and state experience with low back strain and carpal tunnel injuries.

So there is the beginning of a performance measurement movement in workers' compensation. While not all these workers' compensation measures were developed with performance *management* in mind, they do constitute performance measurement for some purpose. The distinction is between measures that are or may be under the control of some entity, as opposed to those that seem to simply express the outcome of some process without a specific controlling entity. For instance, it would be difficult to hold some particular individual or organization responsible for the level of workers' compensation costs in a jurisdiction. But it would be reasonable to hold a claims administration agent responsible for the timely payment of wage replacement benefits. Let us turn our attention now to collective efforts at measuring the performance of workers' compensation systems that are presumably designed to improve that performance.

BENCHMARKING WORKERS' COMPENSATION SYSTEMS

Canadian Benchmarking

The Canadian workers' compensation boards have led the way in developing system benchmarks and making them available to the general public. The Association of Workers' Compensation Boards of Canada (AWCBC) maintains a Web site where anyone can view some 24 performance measures and 6 "indicator ratios" for each of the 12 Canadian provincial systems.³ The chief financial officers of the Canadian boards have developed a common set of definitions for key statistical measures (KSMs) and indicator ratios which can be used to describe the workers' compensation insurance systems in Canada, and to provide comparisons across jurisdictions. This effort dates to the mid-1990s and has been gradually refined over the past decade.

The KSMs are published in both tabular and graphical format, with extensive explanatory detail. The AWCBC data also include self-insured employers, which are reported separately. While the measures reported may have a financial bias, there are also measures of incidence, time-

liness of payment, duration, and severity. Furthermore, the consistent reporting of these measures across jurisdictions and across time means that judgments can rather easily be made about relative performance.

This is demonstrated in Figure 6.1, which shows the injury frequency rate by province. It shows that injury frequency is relatively high in Manitoba and low in New Brunswick and Ontario. Further, the three years of trend data demonstrate that the overall Canadian injury frequency was declining from 2000 through 2002. This was also true for most, but not all, provincial systems.

Figure 6.2, however, indicates that the severity of injury was relatively high in New Brunswick, with more than 10 percent of claims receiving impairment benefits, compared to Manitoba, where less than 2 percent of all claims did. So it seems that Manitoba has many minor injuries, which accounts for its higher overall injury frequency. This observation might lead one to look at the differences in benefits from a policy perspective. Are these two provincial systems trying to do the same thing, or something different?

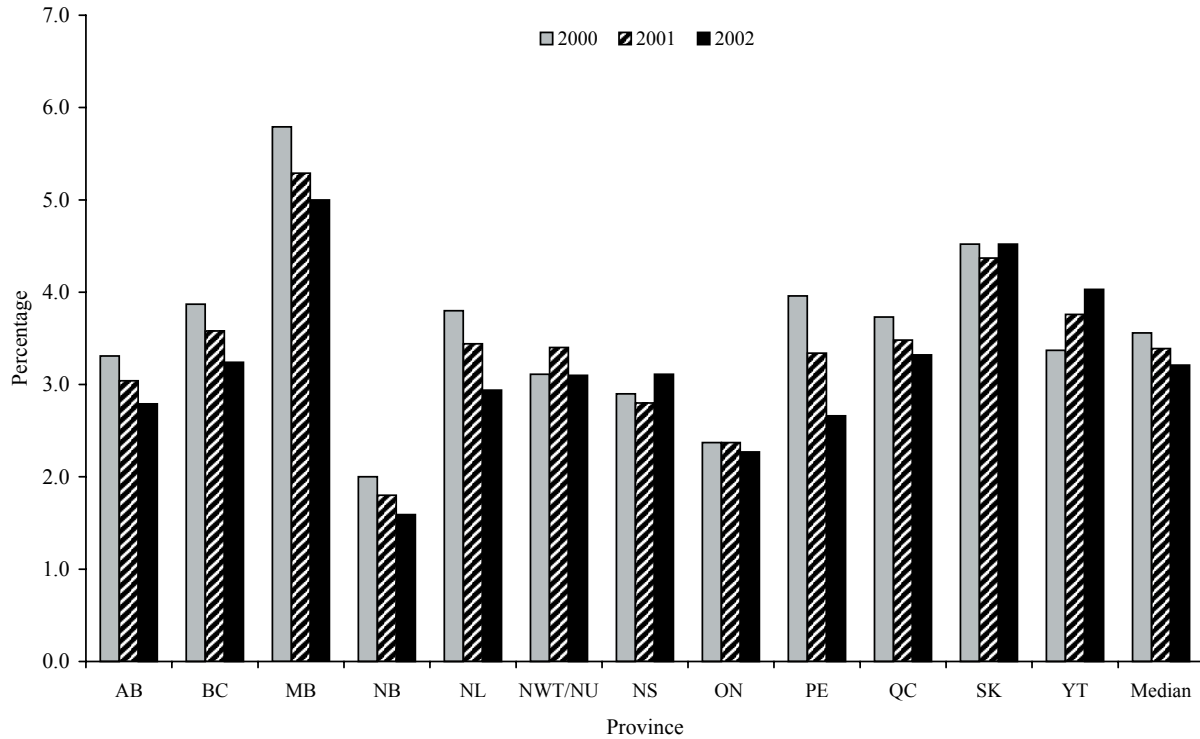
Figure 6.2 shows that the percentage of claims receiving impairment benefits was also relatively high in Quebec and Nova Scotia. Furthermore, the proportion of claims that received impairment benefits was rising for the median province, i.e., injuries appear to be growing more severe, even as their number is being reduced.

Figure 6.3 indicates that the cost of workers' compensation coverage for Canadian employers hovered around C\$2 for the period from 2000 to 2002, ending at C\$1.95 in 2002. Costs were higher than average in the Maritime provinces and lower than average in Alberta, Manitoba, Northwest Territory, Saskatchewan, and Yukon Territory. In the population centers of British Columbia, Ontario, and Quebec, workers' compensation costs were close to the weighted average.

Figure 6.4 refers to the timeliness of payment by the workers' compensation board in Canadian workers' compensation systems. It shows the average calendar days from the date of injury to the date of the first payment for all jurisdictions except Quebec. There are clear differences among the systems, with Alberta and British Columbia being on the quicker side with performance in the 20- to 25-day range; Ontario and Prince Edward Island are on the slower side at about 40 to 45 days.

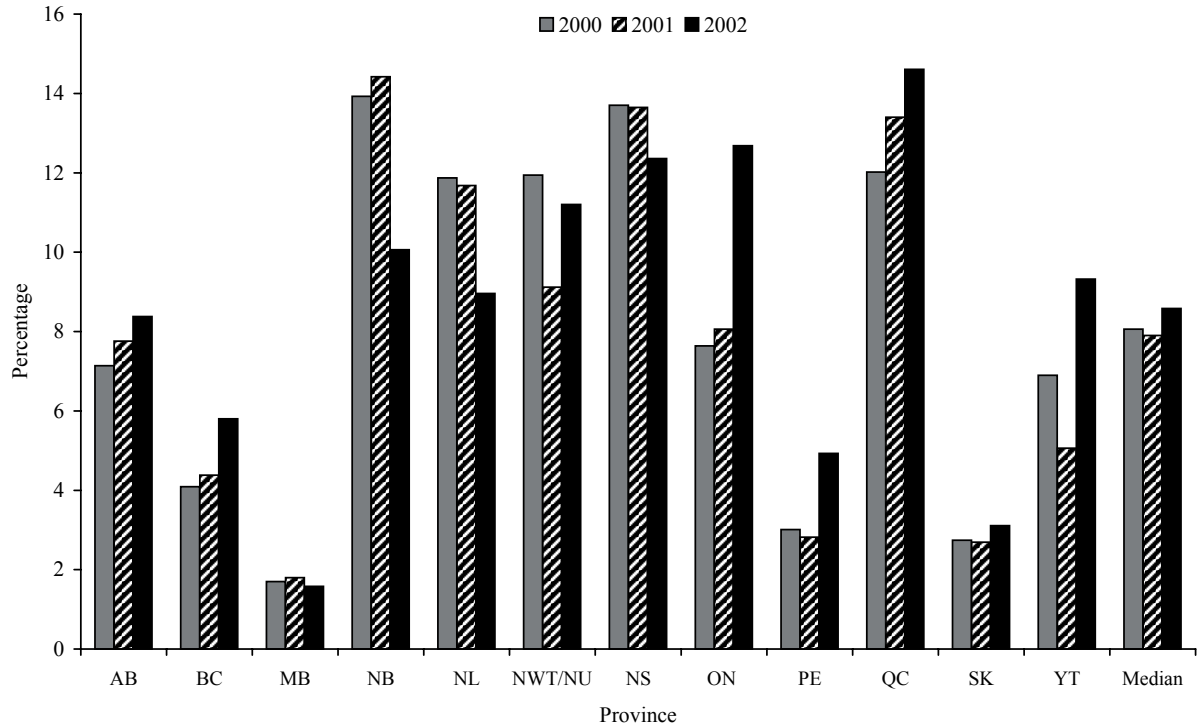
There are obviously many more performance measures available from this source. Taken together, they convey a fairly detailed picture of

Figure 6.1 Injury Frequency (per 100 workers of assessable payrolls)



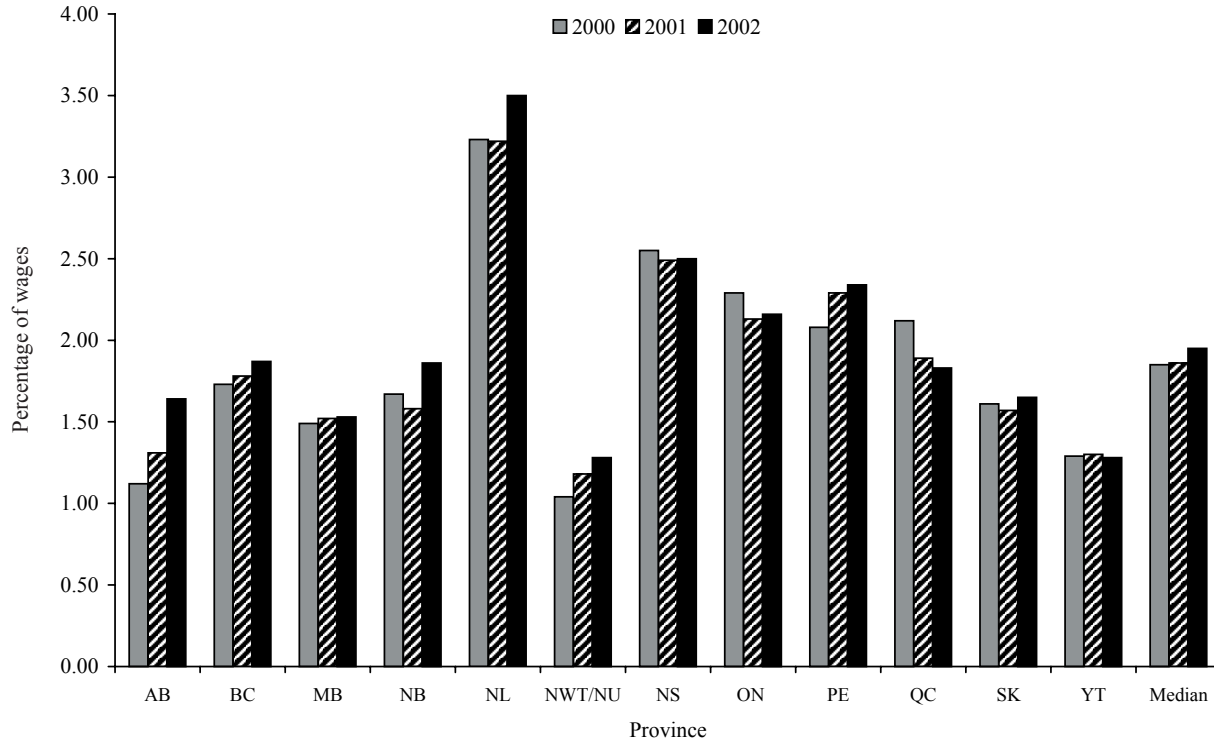
SOURCE: AWCBC (2003).

Figure 6.2 Percentage of Claims Awarded Impairment Benefits, 2000–2002



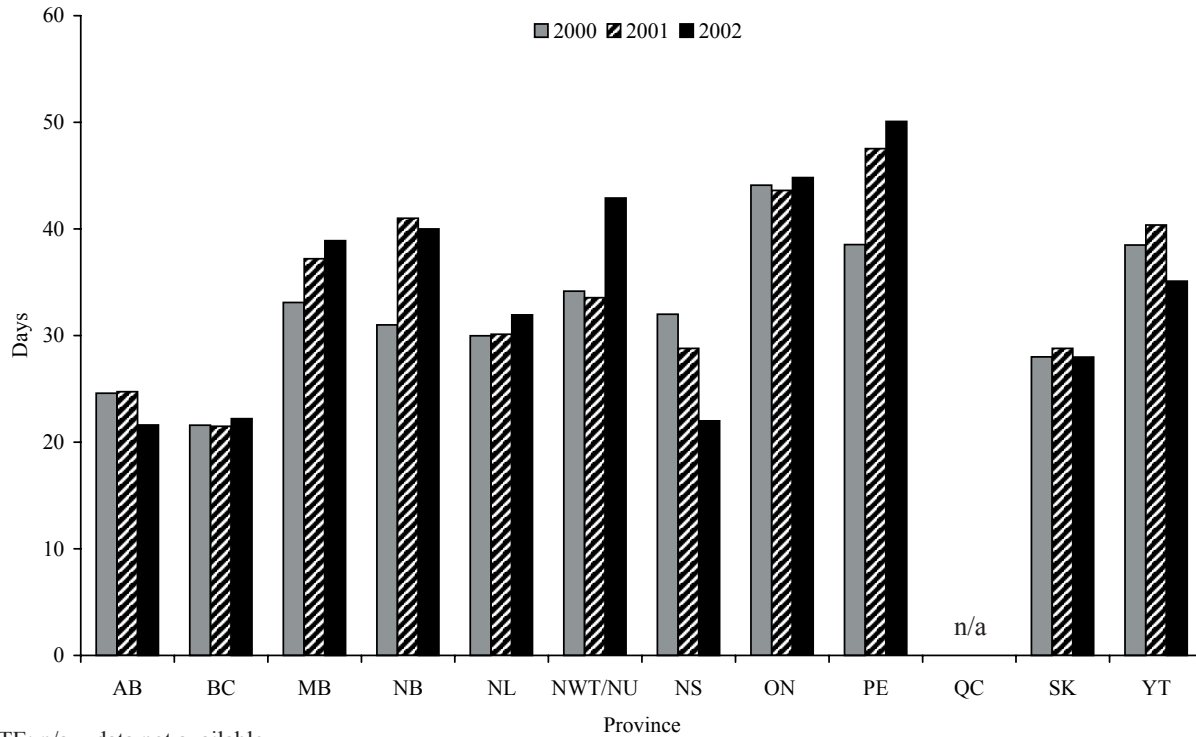
SOURCE: AWCBC (2003).

Figure 6.3 Actual Average Assessment Rate for Assessable Employers, 2000–2002



SOURCE: AWCBC (2003).

Figure 6.4 Average Calendar Days from Injury to First Payment Issued, 2000–2002



NOTE: n/a = data not available.

SOURCE: AWCBC (2003).

the performance of Canadian workers' compensation systems. Because the definitions have been developed jointly, we can also be relatively confident that they are comparable, although there are always qualifications that reflect unique system aspects.

AUSTRALIAN BENCHMARKING

In Australia, the Workplace Relations Ministers' Council (representing Workplace Relations Ministers from each state) publishes a Comparative Performance Monitoring report for the occupational health and safety and workers' compensation schemes in Australia and New Zealand. See Workplace Relations Ministers' Council (2003) for the fifth such report.

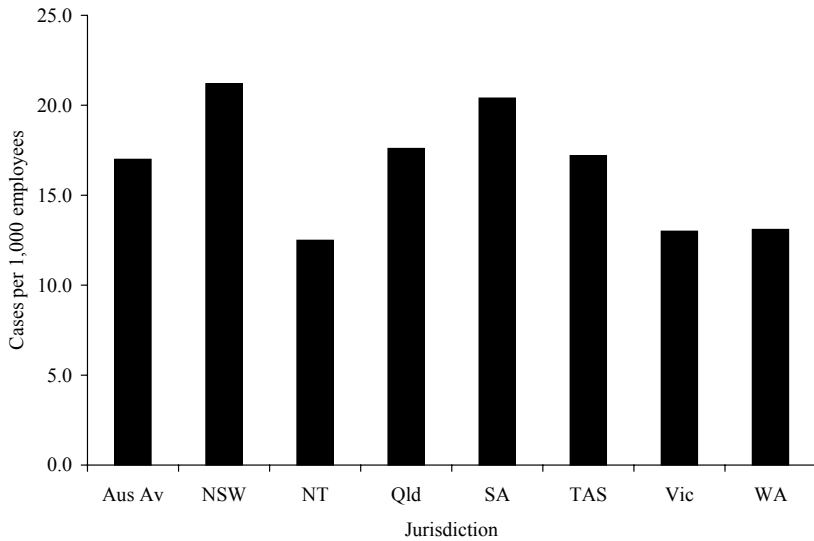
There are 103 figures presented and classified under the categories of occupational health and safety (25 figures), workers' compensation (21 figures), return to work (9 figures), and industry-specific indicators (48 figures). The presentation is particularly thorough, with multiple views of the same or similar information displayed in several different ways.

Australia has exclusive fund states (Queensland), traditional private insurance jurisdictions (Western Australia, Tasmania, and Northern Territory), and three states (New South Wales, South Australia, and Victoria) have mixed systems of public-sector underwriting and private-sector claims administration that have been dubbed "the third way" (see Barth et al. 2000). Because of this institutional variety, there has been a great deal of national interest in comparing the performance of the different jurisdictions.

Figure 6.5 shows the unadjusted incidence of compensated injuries and diseases that resulted in at least one week off work for seven Australian jurisdictions.⁴ It appears that the Northern Territory, Victoria, and Western Australia had relatively low workers' compensation claims incidence in 2001–2002. New South Wales and South Australia had higher claims incidence than the Australian average.

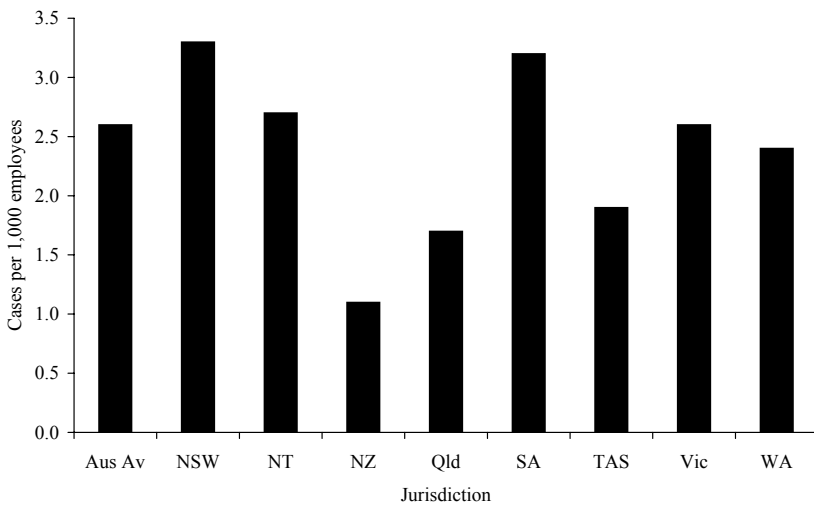
Australian jurisdictions do not report severity in a comparable way to Canadian systems, but Figure 6.6 shows the incidence of claims involving at least 26 weeks off work. These would be serious injuries, and certainly a much more restrictive definition than used for Canadian

Figure 6.5 Incidence Rate of Compensated Injuries and Diseases, by Jurisdiction, 2000–2002



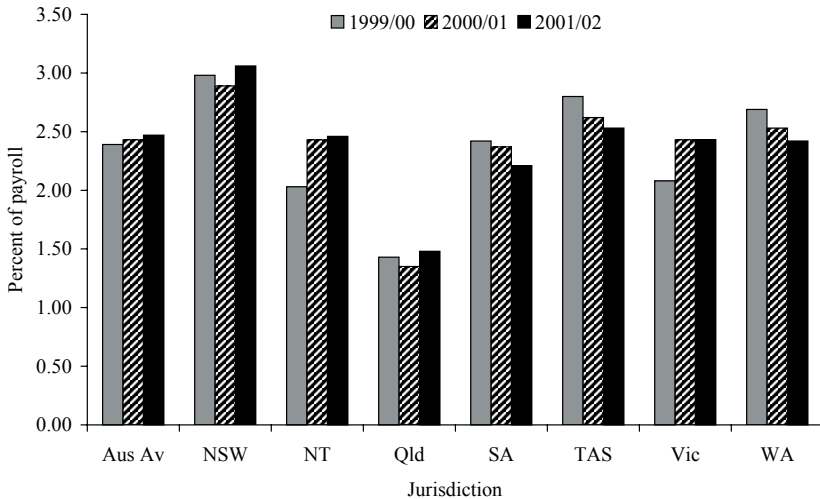
SOURCE: Workplace Relations Ministers' Council (2003).

Figure 6.6 Incidence of Claims with 26 Weeks or More off Work, by Jurisdiction, 2000–2001



SOURCE: Workplace Relations Ministers' Council (2003).

Figure 6.7 Average Standardized Premium Rates, by Jurisdiction, 2000–2002



SOURCE: Workplace Relations Ministers' Council (2003).

jurisdictions in Figure 6.2. Figure 6.6 shows a twofold variation in the incidence of claims with 26 weeks or more of wage loss. Queensland and Tasmania are low, while New South Wales reports 3.3 claims per 1,000 employees. The Australian average was 2.6 claims per 1,000 employees in 2000–2001.

The cost of workers' compensation coverage in Australia is presented in Figure 6.7. It shows the average premium rate for the latest three years, standardized for variation in industry mix, pension coverage, employer excess, and coverage of self-insurers in some jurisdictions. Costs demonstrate a twofold variation between the lowest in Queensland and the highest in New South Wales. The Australian average premium level rose from A\$2.39 per 100 in 1999–2000 to A\$2.47 per 100 in 2001–2002.

U.S. BENCHMARKING

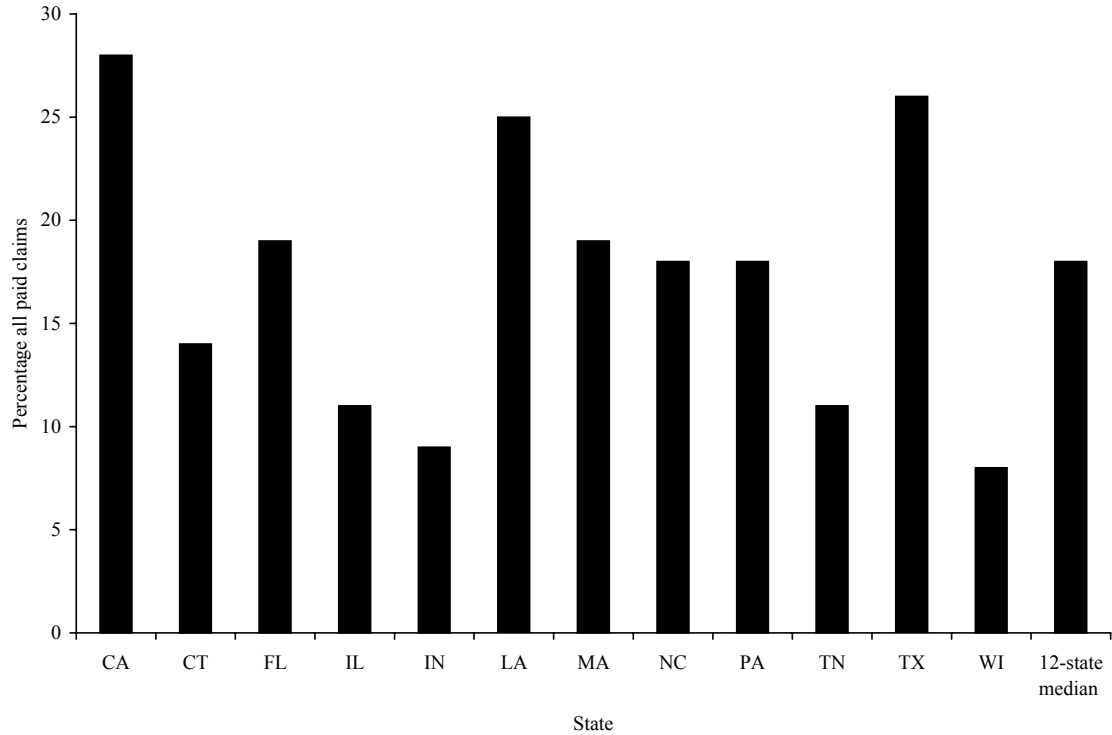
As discussed earlier, in the United States there has not been the same degree of national interest in benchmarking workers' compensation systems as in Australia or Canada. However, the Workers Compensation Research Institute (WCRI) has developed a series of detailed benchmark measures for a subset of 12 large U.S. states that represent more than 50 percent of the nation's workers' compensation benefit payments.

The major reason for this lack of interest may be that in most U.S. jurisdictions, the majority of workers' compensation policies are written by private insurance companies. These companies compete vigorously with each other and do not welcome the opportunity to "tell their secrets" to the competition, or even to admit that they are doing well or poorly, since this could affect marketing results. Given the competitive atmosphere, even the public funds that compete with private insurers are loath to reveal their operating results. Yet, historically the workers' compensation insurance industry has been regulated by public entities. The net effect of this environment was a data reporting system that was narrowly construed to enable public regulation without conveying much information.

The CompScope™ effort of WCRI is a welcome break from this tradition. However, the CompScope™ measures themselves reveal a different bias. They are designed to compare the operation of workers' compensation systems, but tend to focus on claims administration issues rather than overview measures. For instance, CompScope™ includes measures of average medical cost containment expenses per claim, but does not include the incidence of claims for the system as a whole.

Figure 6.8 shows the proportion of all claims with more than seven days of lost time that involve 26 weeks of disability or more. This measure is presented to maximize comparability with the Australian figures reported earlier. Among these 12 states, Wisconsin and Indiana have the lowest proportion of extended duration claims, closely followed by Tennessee and Illinois. California, Texas, and Louisiana have the highest proportion of extended duration claims, each at 25 percent or more of all wage-loss claims. For the 12 states, the median is 18 percent of wage-loss claims that extend for 26 weeks or more. Although the numbers were presented as incidence rates for Australian jurisdictions,

Figure 6.8 Proportion of Claims with More Than 26 Weeks Paid Duration for Selected U.S. Jurisdictions



SOURCE: Telles, Wang, and Tanabe (2004).

an average of 14 percent of claims involved extended wage loss. So, American injuries appear to be comparable at least for this sample of 12 states.

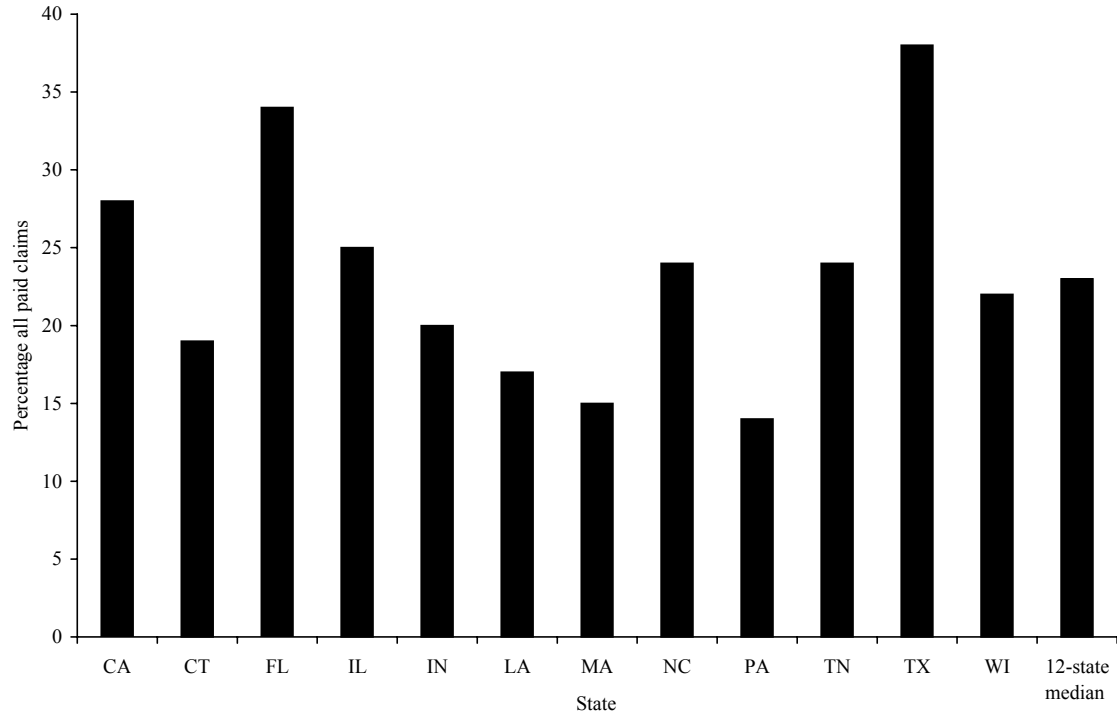
Analogous to the data presented on Canadian systems in Figure 6.2 would be the proportion of wage-loss claims that receive permanent partial disability (PPD) payments in U.S. jurisdictions. These numbers are presented in Figure 6.9. It shows that 14 to 38 percent of wage-loss claims receive PPD payments, with a 12-state median of 23 percent. States with a low proportion of PPD payments include Pennsylvania, Massachusetts, Louisiana, Connecticut, and Indiana. High PPD proportions are found in Texas, California, and Florida. Thus, the proportion of claims receiving PPD payments in U.S. jurisdictions appears to substantially exceed the proportion receiving impairment benefits in Canadian provinces.

Unfortunately, there is not a source of state workers' compensation cost data that compares directly to the Canadian and Australian figures presented earlier. Figure 6.10 shows the average workers' compensation benefits paid per \$100 in covered wages for 2001 reported by the National Academy of Social Insurance. High benefit-cost states were California, Pennsylvania, and Florida. Low benefit-cost states were Massachusetts and Indiana. The median benefit-cost for the 12 states listed was \$0.91 per \$100 of covered payroll.

Finally, Figure 6.11 shows the timeliness of first indemnity payment for the selected U.S. jurisdictions. These data from the CompScope™ database indicate that the median state needs 63 days from the date of injury to the first indemnity payment. This is significantly slower than the Canadian average at 35 days from injury to first payment in 2002. Massachusetts was the quickest at 50 days, and North Carolina was the slowest at 77 days.

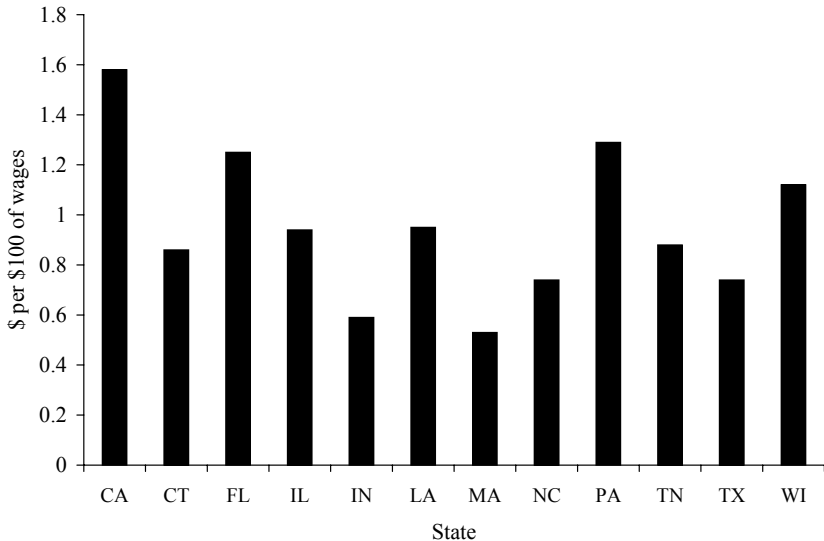
Benchmarking of workers' compensation systems has come a long way in the past decade. None of these measures was available 10 years ago. And some very preliminary judgments can be made about comparative system performance. However, there is still a great deal of haze surrounding system performance assessment as represented in the benchmarking efforts. Let us turn now to the state of the art in performance measurement in individual workers' compensation systems.

Figure 6.9 Proportion of Wage-Loss Claims that Receive PPD Payments for Selected U.S. Jurisdictions



SOURCE: Telles, Wang, and Tanabe (2004).

Figure 6.10 Workers' Compensation Benefits Paid Per \$100 of Covered Wages for Selected U.S. Jurisdictions



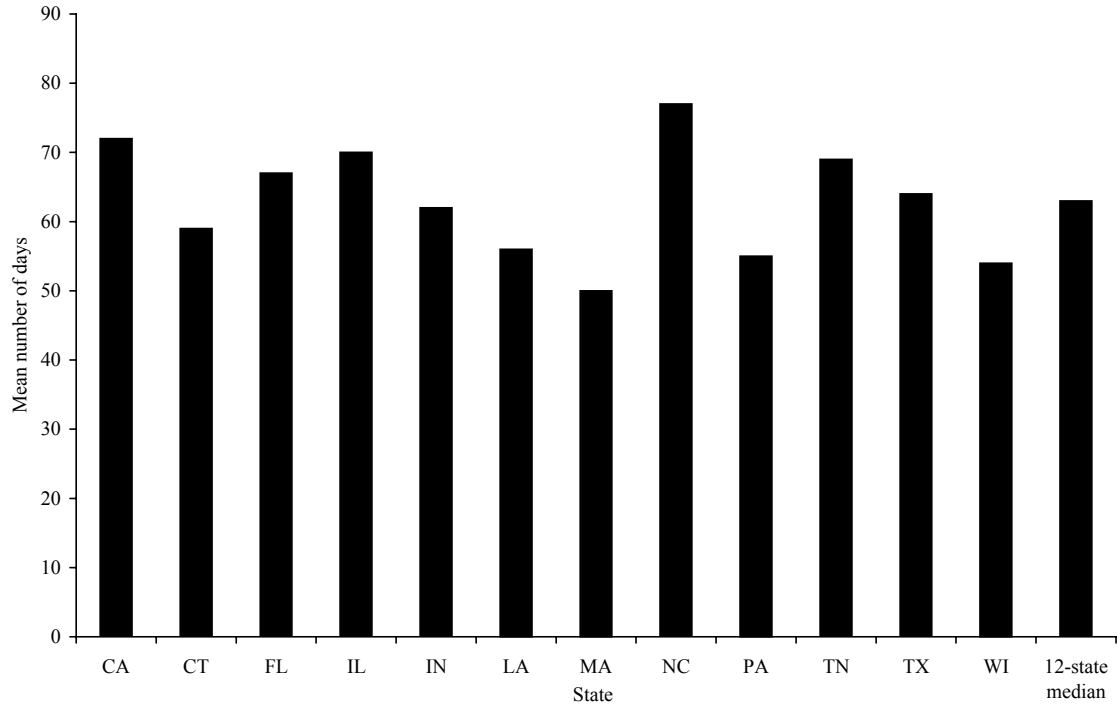
SOURCE: NASI (2003).

STATE-OF-THE-ART PERFORMANCE MEASUREMENT IN WORKERS' COMPENSATION SYSTEMS

As discussed earlier, workers' compensation systems have not been among the leaders in developing performance measurement tools. However, many jurisdictions now appear to be catching up and are able to take advantage of the experience that has accumulated in other types of organizations. Workers' compensation is a "data rich" environment, and that has been the source of many problems. In the old paper processing systems, the sheer volume of paper documents was simply overwhelming. But with modern scanning and character recognition technologies, it has become possible to compile data more expediently and more economically.

The International Association of Industrial Accident Boards and Commissions (IAIABC), the professional association for administrators of workers' compensation systems, began encouraging consistency in electronic data collection in the early 1980s. As many workers' com-

Figure 6.11 Time from Date of Injury to First Indemnity Payment, Selected U.S. Jurisdictions



SOURCE: Telles, Wang, and Tanabe (2004).

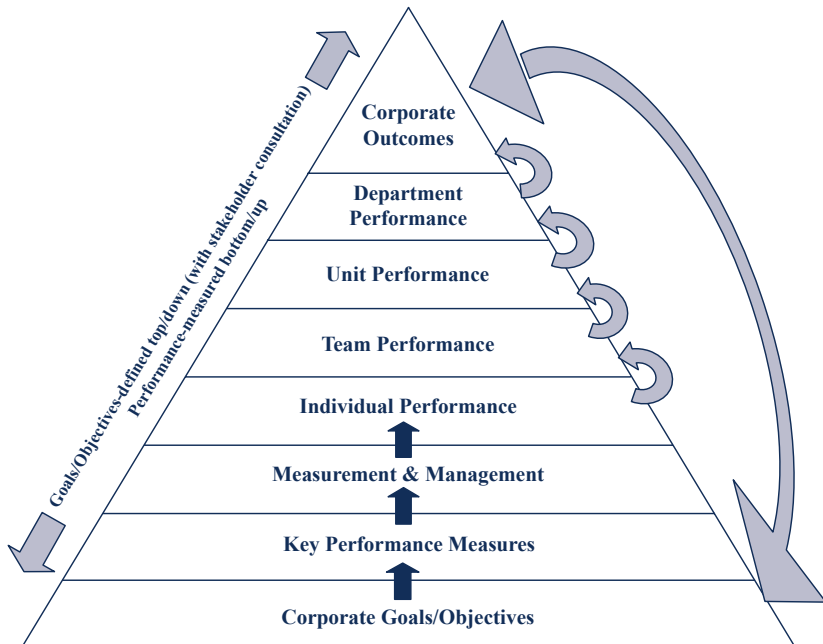
pensation systems began investigating the possibility of migration from paper to electronic record keeping, the electronic data interchange standards of IAIABC provided guidance and reassurance. However, as of September 2002 (latest available statistics), only 24 states were using the claims reporting standards (since revised twice) and 5 more were planning to use them. That left 21 states that were not yet using the standard format after nearly two decades of experience.

There are, however, a number of impressive performance measurement systems currently in place throughout the workers' compensation world. These performance measurement systems are specifically designed to support the management of the workers' compensation function. They include targets or goals, with an accountability standard that defines acceptable levels of performance. They also are measured with greater frequency, to support operational requirements. Let's begin with the IAIABC Information Product Award winner in 2003 for "program improvement."

NOVA SCOTIA WCB

The Nova Scotia WCB Performance Measurement and Management System (PMMS) emphasizes empowering WCB employees by giving them the necessary information to align their personal work goals with organizational objectives. This is illustrated by Figure 6.12, which shows the performance model underlying the PMMS. It indicates that the goals of the organization are defined from the top down, but performance is measured from the bottom up. Individual performances add up to team performance, which in turn cumulates to unit and then department performance. All departments taken together constitute corporate outcomes.

The PMMS system uses performance bands to define expected performance norms based on past experience. These "dashboard indicators" define adequate (green), marginal (yellow), and unacceptable (red) performance for each performance measure and at each organizational level. In this way, individuals or teams with performance problems can be identified and targeted for additional training or assistance as determined by management.

Figure 6.12 Performance Model for Nova Scotia PMMS

SOURCE: IAIABC (2004).

The primary performance indicators are

- timeliness,
- return-to-work outcomes,
- claim durations,
- claim costs,
- staff availability, and
- stakeholder satisfaction.

The system is a proprietary, Web-based application designed so that each user is assigned an appropriate level of access as well as the necessary performance level indicators. Thus, individual caseworkers may access their own monthly performance results, as well as their team, unit, and department performance results, but they cannot access another

er individual's results. Similarly, a team manager has access to results for her/his department, unit, and team, plus the individuals in the team, but not for other teams or individuals. There are seven distinct levels of security access built into this system.

For each performance area, the software permits "drill-thru" to more refined or specific measures. For example, the corporate timeliness of payment measure allows drill-thru to the five different client service units, which are organized geographically. Data (and dashboard indicators) are displayed for the current month and the previous month, as well as the threshold levels for green, yellow, and red indicators. A human contact for more information is also listed. Additional drill-thru to teams and individuals on this measure is also available. When you get to the individual worker level, data are displayed for the last eight measurements (typically months). This permits easy identification of performance problems and enables quick intervention for remedial efforts or workload rebalancing.

The PMMS system also delivers management information reporting that supports day-to-day operational management. For instance, there is a "Medium High Caseload Report," which identifies units, teams, or individuals with relatively high caseloads. The report assigns each claim a status and weight, based on specific activities happening with the claim. The system is designed to represent the amount of effort that would typically be required for a case of that status. Management can then work with this list to maintain more equitable file distribution and resultant work effort.

The WCB of Nova Scotia reports that users indicate that the software tool is "intuitive and relevant to their work." Eighty-five percent of staff surveyed in 2002 indicated that they understood how they could meet their personal performance targets. The board of directors has also expressed a high level of satisfaction with the information they receive monthly from the PMMS. The bottom line is that timeliness for first payment improved from 60.5 percent in May 2002 to 81.5 percent in May 2003.

WCB OF BRITISH COLUMBIA

Another state-of-the-art performance measurement system is that of the WCB of British Columbia. Their Web-based system is called “Decision NET,” which was developed as a balanced scorecard system operating through ordinary Web browsers. The Decision NET system reports at the corporate level (complete with dashboard indicators) and the divisional level, which in British Columbia includes assessments, compensation, and prevention. This performance measurement system follows more of a “top down” approach than that in Nova Scotia. In fact, it was developed partly from an earlier key performance indicator (KPI) system used by management at the WCB of British Columbia.

There are 15 performance measures included at the corporate executive view, with dashboard indicators for financial, human resources, operations, and customer perspectives. There are three indicators to represent the financial perspective, five indicators for the human resources perspective, four indicators for the operational perspective, and three indicators for the customer perspective. Of course, one can drill down for more detail within each broad area.

For example, in the financial perspectives domain there are three performance measures: 1) the unfinalled claims liability index, 2) administration expenses, and 3) surplus (deficit) from operations. In late 2003, two of these dashboard indicators were at acceptable levels (green) and one was unacceptable (red). Against a budgeted deficit of \$405.5 million year to date, actual performance was a deficit of only \$13.9 million, resulting in a green dashboard indicator. A caption explains that if either the operating surplus (deficit) or actual fund balance are below budget for the year to date, the entire indicator is negative.

The fund balance showed an actual deficit of \$420.6 million against a budgeted level of \$812.2 million, so both measures were better than budgeted and the dashboard indicator is green. The figure for last period (previous year to date in this instance) is also reported for comparison purposes. This provides a sense of the trend in the performance measure which may be important in interpreting the indicator.

An unfavorable (red) dashboard indicator was shown for unfinalled claims liability. As explained in a caption, claims costs were unfavorable due to higher incidence and older long-term disability claims than planned. Older claims generally result in larger “catch-up” payments

and, hence, higher average current costs for LTD claims. This unfavorable trend was not sufficiently offset by favorable trends in short-term disability, health care, and vocational rehabilitation costs.

There are similar displays for the other performance measures in the Decision NET system. Most indicators are reset monthly, but on different schedules according to the reporting cycle of the underlying data. Thus, the entire reporting system is renewed monthly, but is not held hostage to one late reporting number or one data verification problem.

There are other performance measurement systems in the workers' compensation universe that have very good reputations. These include those of the New York WCB and the State Accident Insurance Fund of Oregon. No doubt, private sector insurers have some sophisticated performance measurement systems as well. However, these two Canadian systems illustrate the state of the art of performance measurement that is possible today.

OFFICE OF WORKERS' COMPENSATION PROGRAMS, U.S. DEPARTMENT OF LABOR

There is one additional measure that should be cited. The Office of Workers' Compensation Programs (OWCP) in the U.S. Department of Labor has developed what may be the ultimate single outcome measure for a workers' compensation agency. In response to the pressures generated by the Government Performance and Results Act discussed earlier, OWCP decided to measure production days lost due to workers' compensation claims in the federal employing agencies, and to evaluate OWCP performance in terms of reduction in average lost production days.⁵

Lost production days may be the ultimate performance measure for a workers' compensation agency, because it represents both the incidence of claims and their duration. A reduction in lost production days is clearly a good thing for both workers and employers.

This system was implemented originally as a way to track performance under the Quality Case Management program, a nurse case management system designed to return long-term Federal Employees' Compensation Act (FECA) claimants to employment. The average reduction in lost production days has been nearly 20 percent from 1997

to 2004. Using this measurement to manage performance over time appears to have been very productive for those involved in the program. This is demonstrated in the fact that the lost production day (LPD) measure was extended to the entire FECA program in fiscal year 2001. It has subsequently been adopted under the President's Safety, Health and Return-to-Employment initiative for all federal employees for 2004–2006. OWCP reports results on this and other performance measures by agency on their Web site (<http://www.dol-esa.gov/share/>).

CONCLUSIONS

Performance measurement has clearly gained at least a tenuous foothold within some workers' compensation systems in North America. One gets the impression that the "state of the art" is better in Canada than in the United States. But that impression could be mistaken; perhaps it results from the more competitive workers' compensation environment in the United States, which leads insurers to think of performance measurement systems as a part of their competitive advantage. This could lead in turn to a more secretive approach to these issues.

The performance measurement systems in Nova Scotia and British Columbia are impressive. They incorporate multiple dimensions and show considerable innovation in measuring very complex outcomes. Nova Scotia's PMMS seems particularly well suited to their objective of bringing corporate goals into play at each worker's desk. We look forward to seeing how performance measurement might translate into performance management over the next several years.

The benchmarking efforts in Australia, Canada, and the United States also seem promising. The measures are generally appropriate and cover many of the most important dimensions of workers' compensation system performance. Benchmarking may represent an approach that is closer to "the least common denominator" than to "state of the art." But one can certainly see how the knowledge that a system is lagging in performance behind its peers could be politically embarrassing. It remains to be seen whether laggard performers will mount an effective effort to improve. This may depend more upon stakeholders' attitudes than on the benchmarking results, but at least the benchmarking can provide some impetus for change.

On the other hand, there are also limits to the role of performance measurement in workers' compensation systems. First must come the dictum that "what gets measured gets done." To a large degree this is true, especially if compensation or other personal benefits are tied to achievement of measured results. However, another question is, "what is not measured?" It seems clear that concentration on achieving one goal of complex systems like these will likely come at the expense of other goals. It may not be evident immediately, but the time and energy that goes into achieving the stated goal will be diverted from some activity with an unstated goal. This may or may not be a problem, but the issue should be carefully examined to make sure that the net result is not unintended.

Recent accounting scandals in private industry (Enron, Global Crossing, etc.) show another danger of performance measurement. Sometimes people cheat to make sure they achieve the goals. Measurement systems are only as good as the underlying data, and if anyone has the incentive and the opportunity to inflate performance data for personal advantage, it is a serious threat. The surprising aspect of recent scandals is how few people it apparently takes to successfully corrupt a performance measurement system.

The other question is, "what happens when things go bad?" The savvy executive knows that is the time to change the performance measurement system. On the other hand, corporate and public governance systems should be capable of dealing with this issue. Performance goals must be realistic and achievable, or they will not motivate performance. But this means they must reflect the underlying reality, and that reality may change rapidly. So performance goals must also be flexible.

Since forces like economic conditions, demographic trends, policy changes, etc., are outside the control of workers' compensation administrators, it is unfair to expect that their influence should be controlled by management. Thus, it seems critical that some agreed upon process for setting and modifying system goals be established. Otherwise, the performance measurement system may come to be seen as simply an apologist for management.

Finally, observers ask whether performance measurement is just "the flavor of the month?" This seems unlikely, since it is part of a much broader trend in government, education, and private enterprise. But ultimately, performance measurement must be adopted by stakeholders

as an important part of system management and governance if it is to truly reach its promising potential. It is still early in the history of performance measurement in workers' compensation; it remains to be seen how much performance management it will lead to. We look forward to watching this process unfold over the next several years.

Notes

Many thanks to Tim Schmidle, Karen Roberts, and Terry Bogyo for reading and critiquing an earlier draft of this paper. All errors remaining are the responsibility of the author.

1. See <http://www2.icma.org/CPMParticipants/> for current list.
2. See <http://www.worklossdata.com>.
3. See http://www.awcbc.org/english/board_data.asp.
4. The published version of the report also includes New Zealand, the Australian Capital Territory (ACT) system, the Seacare system, and the Comcare system for Australian government employees.
5. It should be noted that OWCP maintains a number of other performance measures that are not covered here. See U.S. Department of Labor (2004).

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7

The Structure of and Incentives from Workers' Compensation Pricing

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Workers' compensation was originally designed to deal with an aspect of the employment relationship, that of work-related illness and injury. As such, it is viewed as a transaction between two primary stakeholders, the employer and the employee. Examination of the pricing of workers' compensation requires a shift in orientation. In addition to the employee–employer interaction, the transaction in pricing is also between the employer and the insurer. As is the case in the employee–employer relationship, the two parties have somewhat different interests with respect to the purchase of insurance. Unlike the literature that examines the injury, benefit, and return to work, where the interests of the employer and insurer are treated as coinciding, examination of workers' compensation pricing is often modeled as a principal–agent problem where information imperfections distort behavioral incentives (Dionne and Harrington 1992).¹ Principal–agent refers to conditions when one party, the principal, either because of a lack of skills or for reasons of cost, contracts with another party, the agent, to perform a particular function. The principal–agent problem arises because the principal is unable, due to costs or other factors, to perfectly monitor the agent. The problem facing the principal is how to structure incentives for the agent to perform the function in the absence of complete monitoring (Sappington 1991).

The purpose of this chapter is to examine how workers' compensation prices are determined, the incentives embedded in that pricing process, in what ways the employer and insurer perspectives coincide

and where they diverge, and the policy implications of the different perspectives.

Much of the literature about workers' compensation pricing is framed in terms of its effect on workplace safety. The theoretical framework is based on commonly made economic assumptions about rationality and utility maximization (Thomason 2003). As is the case with most positive economic models, actor behavior can be understood in terms of a response to benefits and costs (Ehrenberg and Smith 2003). Workers' compensation is sometimes described as a payroll tax. Employers are seen as trading off between the cost of providing safety and the cost of insurance in the form of workers' compensation premium. Similar to unemployment insurance, the cost of workers' compensation insurance is designed to vary with the employer's use of the insurance, and can thus be seen as lowering the relative cost of safety and providing an incentive to maintain a safer workplace. Employers are therefore seen as engaging in a cost-minimization strategy.

In contrast to unemployment insurance, however, the actor that generates the safety incentive is a profit-maximizing insurer rather than a welfare-maximizing government. Examination of the incentives to insurers shows that the loss-minimizing strategy insurers use is designed to minimize uncertainty around losses rather than minimizing the losses themselves. Economic theory suggests that the workers' compensation bargain is voluntarily entered into and results in a mutually welfare enhancing arrangement (McCluskey 1998). One question raised in this chapter is whether that is true given the nature of the objective functions of employers and insurers.

The next section of this chapter includes a brief description of how workers' compensation prices are determined. Subsequent sections discuss the incentives embedded in the price determination process and the research that examines the effectiveness of those behavioral incentives.

PREMIUM DETERMINATION IN WORKERS' COMPENSATION

Premium determination in workers' compensation is a several-step process, and states vary in the degree to which they regulate the various

steps. Up until the early 1980s, most states used what is called administered pricing to determine workers' compensation rates. Under administered pricing, states fully regulate prices by issuing basic rates and allowable adjustments that all carriers in the state must use, including the state fund if there is one. Over the past 20 years, many states have deregulated the pricing process to varying degrees (Thomason, Schmidle, and Burton 2001, pp. 39–41). Some states permit carriers to deviate from the basic rates, although these deviations must be applied uniformly across policyholders, and some states permit carriers to set their basic rates independently rather than as a deviation from the state issued rates. Additionally, various states permit carriers to use schedule credits (or debits), which are percentage adjustments to premium that can be applied to individual insurance purchasers and do not have to be offered to all customers. At a minimum, all states require that carriers file their rating plans with the state insurance bureau, but some differ in their policies on whether a carrier must wait for state approval before using their filed rates. For example, file-and-use states permit carriers to use rates as soon as they have been filed with the state bureau, whereas use-and-file states permit carriers to use rates prior to filing. Others require a waiting period to permit the bureau to review the rating plan.

All production activity in the workplace is divided into rating classifications (McGavin 2001). Most states use the classification system devised by the National Council on Compensation Insurance (NCCI), which includes over 600 categories. These categories or class codes are a mix of industry and occupation that are intended to be homogenous with respect to risk. Employers are assigned to these class codes based on their payroll. Class assignment is proportional to payroll distribution.

In each state, a base rate is associated with each of these class codes, expressed in terms of dollars per hundred dollars of payroll. These base rates are developed by rating organizations that collect loss and expense data from insurers, incorporate trend estimates (possibly including a claim adjustment expense factor) and generate rates that are meant to equal expected losses across the state in each of these rating categories (Parry and Math 1993). Workers' compensation is unique among insurance lines in that all insurers in a state are required to be members of the rating organization (Carroll and Kaestner 1995). There is variation across states in what is included in these base rates. These rates

are referred to as pure premium if they reflect only expected losses. In some states, factors to include loss adjustment expenses are added in to generate what are called loss cost rates. In other states, a profit loading is applied that includes underwriting expenses, commissions and profits, creating what are termed advisory rates (Thomason, Schmidle, and Burton 2001, p. 61). These can be thought of as fully developed manual rates.

In regulated states, the rating organization submits these rates to an insurance bureau or other state agency responsible for insurance industry regulation for approval. This can be a politically charged process as the insurance bureaus are responsible for assuring both statewide insurance industry solvency and employer access to insurance, and may fail to approve rates which the rating organization views as adequate on behalf of its members (Danzon and Harrington 1998). In administered pricing states, once these base rates are approved they become the manual rates all carriers in the state are required to use, with the exception of some states where carriers may apply for approval of an across-the-board deviation. In open competition states, the rating organization is responsible for generating pure premium, loss cost, or advisory rates for insurance commissioner approval. Once approved, these rates become the basis for carriers to independently develop their own manual rates. In open competition states, manual rates are an aspect of price on which carriers can compete for business. Each employer's manual premium is equal to the manual rate for the class code multiplied by employer payroll in that class code divided by 100.

The next step in the pricing process is experience rating. There are two prevailing descriptions of the purpose of experience rating. One that comes primarily from the insurer perspective is that it is "a procedure that utilizes the individual risk's past loss experience to forecast future losses. It is an effort to modify the ratemaking process by recognizing an individual risk's potential for incurring claims" (Parry and Math 1993, p. 658). The other description is framed in terms of providing safety incentives to employers where employers are viewed as responding to an economic incentive to operate a safe workplace: "To the extent that a firm's own injury experience is reflected in its premium, there is an induced incentive for it to consider investing in safety. If its injuries fall, so will its workers' compensation premium" (Smith 1993, p. I-152). The distinction between the two descriptions

is that one emphasizes accurate prediction of future losses in order to collect sufficient premium, while the other emphasizes safety-related behavior incentives.

Most states use a standard formula developed by NCCI, although some states permit carriers to develop their own. The basic formula for the experience modification factor is (Chelius and Smith 1993):

$$X_j = (Ap_j + W_j Ae_j + (1 - W_j) Ee_j + B_j) / (E_i + B_j),$$

where Ap_j = firm j 's actual primary losses; Ae_j = firm j 's actual excess losses; Ee_j = expected excess losses for a firm of j 's payroll size in industry i ; E_i = the total expected losses for a firm of j 's payroll size in industry i (is equal to the sum of expected primary losses and expected excess losses); and W_j = is a weighting factor theoretically ranging between 0 and 1 that determines how much weight to give to a firm's own losses (Gillam 1995). The smaller the firm, the smaller W_j is. B_j = ballast factor that moves inversely with W_j .

Actual and expected losses are calculated over a three-year period. It is frequently noted that the experience modification formula gives more weight to frequency than severity of injury and that the smaller the firm, the less self-rated it is. The weighting of frequency above severity is accomplished by the separation of losses into actual primary and excess losses. Actual primary losses are equal to actual losses but capped at \$5,000. Losses over that amount are included but weighted by firm size. The addition of a ballast factor in both the numerator and denominator reduces the effect of experience rating for smaller firms such that they tend to pay as though they had experienced losses equal to the industry average. Larger firms, on the other hand, face a premium that is adjusted to more closely reflect their true loss experience. The W factor is termed firm credibility and refers to the degree to which a firm's loss history can be relied upon to predict future losses. Loss histories of larger firms have greater predictive value than smaller firms so W varies with payroll (Parry and Math 1993). There have been several revisions to the experience rating formula that truncated the true range for W . For example, in Michigan, the possible range for W is between 0.04 to 0.8 (Compensation Advisory Organization of Michigan 2004). The experience modification factor, X_j , is multiplied by the manual pre-

mium to calculate the firm's modified, or standard earned, premium (McGavin 2001).

There are several other adjustments that can be made to premium. The most common include premium discounts, schedule credits (or debits), and allowance for deductibles. Actual premium may also be adjusted by dividend payments after the close of the policy period; however, in states that permit *ex ante* adjustments, evidence suggests that the use of dividends is declining (Yates and Burton 2003, p. 3). Premium discounts are essentially volume discounts and depend on the level of premium generated. In most states, carriers that offer premium discounts are required to apply them uniformly across policyholders.

Schedule credits (debits) are percentage reductions (increases) applied to modified premium. These are considered an underwriting tool in that they allow carriers to adjust premium based on information about expected losses that they do not believe is captured by modified premium. In particular, schedule credits or debits give insurers a mechanism for rewarding employers for improved safety or penalizing for deteriorating safety conditions more rapidly than experience rating permits. Their use also acts as a mechanism for carriers to compete for business on the basis of price.

There are two types of deductible programs, small and large deductible policies. Their use varies by state but nearly all states allow for the use of one or both types of policy. Both types of deductible policy can be seen as a form of "co-insurance" in that they involve explicit sharing of the risk of injury between the insurer and employer (Arrow 1971). Under small deductible policies, employers pay an initial \$500 to \$2,500 per claim. States vary as to whether they include the deductible amounts in a firm's loss history. Large deductibles range from between \$100,000 to \$5 million per accident (Shields, Lu, and Oswald 1999).

INCENTIVES TO EMPLOYERS

The basic framework for understanding incentives to employers begins with the production cost-minimization framework. Injuries impose production costs in the form of lost productivity and perhaps lost human capital investment. Injury costs can be reduced by employer investment in safety, and employers use the efficiency condition such that they

invest in safety up to the point where the marginal benefit equals the marginal cost. The benefit of safety is foregone injury and the cost is an investment cost in equipment, training, or other safety measures. Workers' compensation benefits are seen as increasing the costs of injuries to employers and thus decreasing the relative cost of safety (Boden 1995). To the extent that employers bear the costs of those workers' compensation benefits, they will be motivated to invest in safety. The next section discusses the incentives to employers embedded in the various components of workers' compensation premium determination.

Manual Rates

Arguably there are safety incentives for employers embedded in the determination of manual rates (Burton and Chelius 1997). Those rates are determined by the losses experienced by the state's employers. Better statewide loss histories result in lower manual rates. The use of manual rates as a safety incentive is diluted, however, by free-rider effects, where safer employers subsidize more risky ones who enjoy the lower manual rates without incurring safety costs (Burton and Chelius 1997). Further, it is unlikely that employers understand the possible link between their individual safety records and statewide manual rates (Roberts 2003). There is little research on the effect of manual rates on employer safety behavior. Durbin and Butler (1998) perform national and state-level analyses that separate the effects of manual rates, experience rating, small and large deductibles and OSHA on fatality rates. Using national data, they report that a 10 percent increase in manual rates would lead to a 0.6 percent decrease in fatalities, suggesting that poor understanding and/or issues of cross subsidies undermine potential manual rate safety incentives.

Firm-Level Experience Rating

There is a considerable research literature on the effects of experience rating on employer behavior. Existing studies fall into two broad categories: 1) those that use firm size as a proxy for degree of experience rating, and 2) those that examine the effect of experience rating on fatalities.

Firm size–benefit interaction studies

The theory underlying the firm-size studies is based on moral hazard that arises due to information asymmetries in workers' compensation. Two sorts are considered in the literature: 1) *ex ante* "risk-bearing" moral hazard, where employees reduce their safety efforts because the cost of injury has decreased due to workers' compensation benefits; and 2) *ex post* "reporting" moral hazard, where employees know the true nature of their injuries, such as whether the injury is truly work-related, how serious it is, and/or whether it genuinely is preventing return to work, but employers do not (Bolduc et al. 2001; Durbin and Butler 1998). As a result, as benefit levels increase, workers' compensation claims and/or duration will rise due to both types of moral hazard (Krueger 1990). For the firm, therefore, benefit increases raise the marginal savings from injury prevention efforts as long as costs are passed back to firms in a form such as experience rating (Chelius and Smith 1983). The firm size–benefit studies make use of the feature of the experience rating formula that increases the degree of sensitivity to the firm's own loss experience directly with payroll. Therefore, firm size is treated as a proxy measure for the level of experience rating.

Other than one of the earliest studies by Chelius and Smith (1983) that failed to find support for an experience-rating effect using the benefit–firm size interaction, most studies using this approach do find support for experience rating as a mechanism for reducing claims rates. Ruser (1985) uses data from 25 three-digit manufacturing industries over the 1972–1979 period to test for the benefit–firm size interaction on both frequency and severity of injury. His evidence supports the experience rating effect on the frequency of injury but not for severity. In a later study using establishment data, Ruser (1991) finds strong statistical support for the firm-size effect on injury rates that is robust to several different estimation approaches.

Worrall and Butler (1988) also examine the effect of benefit increases framed as result of two countervailing forces: 1) the employee effect, where higher benefits raise claims costs; and 2) the employer effect, where employers invest in safety to reduce claim costs. They note that if firms were perfectly experience rated, workers would be indifferent between buying their own insurance and a wage adjustment that reflects the compensating wage differential but that reality is plagued with in-

formation failures. Using two-stage least-squares estimation, they estimate the effects wages (result of stage one regression), expected benefit levels, firm size, benefits and firm size squared and the interaction of the two on permanent partial, temporary total, and all indemnity claims.² The sign on the firm size–benefit interaction is negative as they expected, but is not statistically significant in the temporary total benefit claim regression. In a separate study (Butler and Worrall 1988), they examine the effect of experience rating on claim duration using firm size as their indicator of experience rating. Estimating hazard rates, they find that the firm size coefficient is statistically significant, but when used to calculate elasticity, they find that the elasticity of duration with respect to experience rating is substantively small.

Chelius and Smith (1993) take advantage of a unique feature of the Washington State workers' compensation system, which in addition to conventional experience rating also offers small firms a supplemental experience-rating credit if there are no compensable losses during the rating period. Their prediction is that if experience rating is providing safety behavior incentives, small firms in Washington will have lower injury rates than small firms in other states. The experience rating credit was measured using a dummy variable for the state of Washington. Their results did not support their hypothesis. Arguably, their measure of small firm credit was too imprecise and captured countervailing effects.

Fatality Rate Studies

As noted above, one of the difficulties in measuring the effect of experience rating on employer safety behavior is the countervailing effect of benefits on employee claim propensities. The use of fatality rates as an indicator of safety efforts is thought to be free of the effect of both types of moral hazard (Moore and Viscusi 1989). For the most part, studies using this approach find support for a safety effect from experience rating. Moore and Viscusi (1989) use data from the Panel Study of Income Dynamics and the National Institute for Occupational Safety and Health to estimate the effect of workers' compensation benefits on fatality rates. They use the firm size–benefit generosity measure of experience rating described in the studies above. They find a large negative and statistically significant effect of their measure of experi-

ence rating on fatality rates. Using the same data, they also investigate the extent to which premium costs are passed back to employees in the form of lower wages. They find evidence of positive compensating wage differentials but also that higher wage workers are somewhat more likely to pay for the costs of their benefits. These results indicate that employers enjoy a substantial savings in labor costs by improving safety because much of the cost of safety improvement is financed by employees in the form of lower wages.

Taking advantage of natural experiment presented by the introduction of experience rating in Ontario, Bruce and Atkins (1993) examine the effect of experience rating on fatality rates over a 10-year period. Experience rating is measured by a dummy variable, and industry was the unit of observation. Their results suggest that experience rating in the forestry and construction industries (those subject to experience rating under the Ontario system) led to a permanent (that is, long-run equilibrium) decrease in fatalities in those industries. Further, they found that the magnitude reduced the fatality rate by 20–40 percent.

After providing descriptive evidence that workplace safety was improving despite increases in workers' compensation costs, Durbin and Butler (1998) examine the effect of several features of insurance pricing on fatalities. They find a large and significant effect of experience rating on the national fatality rate: a 10 percent increase in the cost of experience rating will lead to a 12.3 percent reduction in the number of fatalities.

Potential Weaknesses of the Experience-Rating Studies

There are several potential difficulties with the firm size–benefit interaction approach. One is that the countervailing effect of increased employee claiming may overwhelm empirical evidence of experience-rating effects (Lanoie 1992). The strength of the empirical results suggests that employee efforts may reduce estimates of experience-rating effects, but they do not eliminate them, thus complicating efforts to estimate the magnitude of the effect of experience rating on safety.

A related difficulty is the application of the prevailing assumption about the functioning of reporting moral hazard—that is, that workers' claiming rates increase with benefit levels. More recent evidence suggests that there is significant underclaiming on the part of injured

workers and that the replacement rate is weakly related to claim behavior (Biddle and Roberts 2003; Shannon and Lowe 2002). This research suggests that there may be countervailing effects other than safety that mitigate against reporting moral hazard.

A third difficulty is determining the true employer safety behaviors in response to experience rating. While the evidence suggests that claims rates do decrease with experience rating, claims rates may decrease due to increased safety investments by employers or by claims management (Thomason 2003). While claims management may entail positive strategies for keeping an injured worker able to work, such as accommodation or rehabilitation, there is also potential for less positive behaviors, such as retaliation for claiming or disputing legitimate claims (Thomason 2003). There is some evidence that experience-rated employers are more likely to dispute claims, though without the ability to measure claim legitimacy, it is not clear that employers are engaging in that behavior (Hyatt and Kralj 1995). In a study of employer response to experience rating, Thomason and Pozzebbon (2002) investigate the extent to which employers engage in safety investment and/or positive claims management (accommodation, rehabilitation, and monitoring worker recovery). They find that experience rating leads to more of both safety investment and claims management but that larger firms are more likely to use safety over claims management.

A fourth difficulty arises out of the complexity of the experience-rating formula itself. Arguably, it is sufficiently complex that few employers truly understand the incentives embedded within it (Kralj 1994; Roberts 2003; Spieler 1994). Evidence suggests that the better the firm understands the experience-rating formula, the more likely there will be a safety response, and that understanding increases with firm size (Kralj 1994). This suggests that understanding may be a mediator between experience rating and safety.

Another difficulty is specific to the fatality approach. While the evidence from the fatality rate studies is compelling, the question remains as to whether those results can be safely generalized to the ability of experience rating to reduce the likelihood of nonfatal injuries. These studies appear to implicitly assume that the probability distribution underlying fatal injuries is the same as that for nonfatal. While this may be true in some workplaces, 46.1 percent of lost-time claims in 1999 were sprains, strains, or repetitive motion injuries (U.S. Bureau of La-

bor Statistics 2001), injury types that are unlikely to ever result in death in the extreme. This suggests that results from the fatality studies might be generalizable to prevention of traumatic injuries such as cuts and lacerations but not to injury rates in general.

Finally, none of these studies actually include a direct measure of the experience-rating modification factor and have to rely on proxies for it, either a firm-size measure or a dummy variable. It is quite possible that those measures are capturing other, unobserved factors that affect injury rates and severity.

Other Adjustments

The preponderance of the research on incentives to employers has revolved around experience rating, however; two studies examine the role of deductibles. After a period of rapid growth in workers' compensation costs during the 1980s, use of large deductible policies increased beginning in the early 1990s (Danzon and Harrington 1998). One study examined the question of whether the use of large deductibles generated incentives for employers to prevent injuries. Taking advantage of a unique research opportunity in Texas, where the use of large deductibles was permitted a year before self-insurance legislation was enacted, Shields et al. (1999) used firm-level data to examine whether permitting deductibles lowered claims rates and claim costs. Their results showed an immediate effect on claim costs, which dropped by 12 percent during the first year after the introduction of large deductible policies. Decreases in claims rates did not appear until the third year. One possible weakness in their study, which they mention but do not address, is that there is likely selection bias due to more risky firms electing to purchase large deductible policies. They also do not discuss what effect the availability of self-insurance a year after the start of their observation period might have had on their sample. However, their results are consistent with those found by Durbin and Butler (1998), who find that small and large deductibles decrease fatality rates by 3.2 percent and 10 percent, respectively.

INSURER PERSPECTIVE

The insurer perspective is commonly modeled as a resource allocation problem, where insurers need to determine the optimal insurance contract. Under the assumption of insurer risk neutrality, the optimal contract is adequate to covering a risk if the policy price is set equal to the expected indemnity plus a loading factor. There are several obstacles to setting this contract, specifically, moral hazard, adverse selection, and regulation (Dionne and Harrington 1992).

Moral hazard, as is the case in its application to claiming behavior, is an artifact of information asymmetry. Again, there are two types of moral hazard, *ex ante* and *ex post*. In this context, opportunities for *ex ante* moral hazard arises because although the insurer can observe that an accident occurred, it can not observe what safety efforts were made to avoid it. The two possible solutions to this are to either provide incomplete coverage against loss or for the insurer to perfectly observe whether the risk is taking care. Only if the latter condition holds is full coverage optimal (Shavell 1979).

Ex post moral hazard refers to understanding of the true nature of the accident once it occurs. In most insurance contracts, it is assumed that the insured fully understands the extent of the damage but the insurer does not, and, again, it is costly for the insurer to collect that information. In the context of workers' compensation, this sort of moral hazard is complicated by the employee's ability to incompletely disclose the extent of the injury. Adverse selection is also a problem of imperfect information. Resources are misallocated because the insured has no incentive to reveal the true extent of risk and it is expensive for the insurer to observe it (Dionne 1983).

These difficulties with setting the optimal insurance contract provide the logic for three structural features of insurance premium: 1) the creation of risk classes, 2) the use of experience rating, and 3) partial coverage (or deductibles) (Dionne 1983). Because workers' compensation insurance pricing is regulated, another aspect of the discussion of the optimal insurance contract is how regulation prevents optimality and the unwanted consequences of regulation.

Features of Premium Adjustment

As noted in the description of how premium is determined, manual premium is calculated based on how the firm's payroll is distributed across rating classes, that is, categories of work activities. The use of rate classifications is one mechanism insurers can use to prevent *ex ante* moral hazard: although the insurer may not be able to perfectly observe safety efforts on the part of the insured, it can approximate risk by classifying the firm's activities and use market average risk levels for each category to estimate expected losses for the future. Using the argument that to the extent that firms are less able to engage in *ex ante* moral hazard, workplaces will be safer, Lanoie (1992) examined the effect of the number of risk classes on the frequency and severity of injury. The coefficients for the number of rating classes were negative but not statistically significant in the frequency models, and positive and significant in the severity model. These results failed to support his expectation that greater insurer *ex ante* ability to observe true risk, as implied by the ability to assign payroll to detailed rate classes, should reduce the frequency and severity of claims because it is harder for insureds to engage in moral hazard.

Experience rating is used to deal with adverse selection, where firms know how risky their workplace is but insurers do not (Gal and Landsberger 1988). From the insurer perspective, experience rating is functioning well when standard loss ratios (ratio of losses to standard premium) are the same across a recognized risk group (Harrington 1988). In practical terms, this refers to best predicting a risk's loss for the coming policy period (Sherman 1990). This could be accomplished by manual rates if the risk class were truly homogeneous such that all employers with payroll within each class code maintained equally safe workplaces, but in reality firms are heterogeneous even within rating classes, necessitating additional adjustments.

This perspective on experience rating puts its emphasis on collecting sufficient premium, not on the provision of safety incentives to employers. From the insurer's perspective, one of the problems with full coverage is that the insured has no motivation to avoid loss and thus will shift all costs of risk to the insurer. For the employer, avoiding loss translates into implementing safety measures, thus incurring costs of safety. Assuming that employers want to minimize costs, they will want

to minimize accidents to the extent that the cost of the losses are passed back to them. However, for the insurer, the key problem is knowing in advance (*ex ante*) how large the loss will be so they can price accordingly. The size of the prospective loss is not the issue for the insurer, but rather *ex ante* information about the size of the expected loss. In other words, employers are motivated to minimize loss in order to minimize operating costs, whereas insurers want to minimize uncertainty about the size of the prospective loss.

There are two broad threads in the insurer perspective literature on experience rating: 1) the development of theoretical models that examine the assumptions and conditions under which experience rating generates an optimal contract, and 2) empirical examination of the ways in which the application of experience rating is distorted either by features of the formula itself or through regulation.

The theoretical discussion notes that the way experience rating is incorporated into insurance contracts is based on the Law of the Iterated Logarithm. When applied to the insurance contract, this law provides an understanding of insurance as a set of multi-period contracts. Repeated observation over the length of the relationship approximates perfect observation, thus eliminating the opportunity for moral hazard (Dionne 1983; Dionne and Harrington 1992).

One model suggests that repeated contracts are not necessary for optimality. According to this model, at the end of each period, the insurer offers a contract where premium paid at the end of the period depends on the number of claims submitted until then (Gal and Landsberger 1988). Insureds know that the premium will depend on the number of claims submitted by the end of the period and so recognize there is some uncertainty about the premium since they do not know in advance what their claims rate will be. Thus, uncertainty is shared; but, by paying premium that reflects actual claims made in the last period at the start of the next period, the contract allows for the eventual coverage of losses. The model requires the insured to renew the contract and that losses be accurately reported. The former requirement is probably reasonably accurate for workers' compensation where insurance is compulsory, but problems with injury underreporting in workers' compensation suggest that the latter assumption cannot be made safely.

The less theoretical work examining the effect of experience rating examines the accuracy of the formula in adjusting premium so that poli-

cyholders with equal risk produce equal expected loss ratios (Parry and Math 1993). Several criticisms have been leveled against the standard (NCCI) experience rating formula, including 1) a lack of precision in incorporating the tendency for larger firms to have lower loss ratios that result in insufficient manual rates, potentially resulting in availability problems for small firms (Harrington 1988); 2) a tendency to obscure commonality within a risk class (the argument here seems to be that experience rating permits overly heterogeneous risks to be included in one rating class through the process of off-balancing); and 3) an inability to adequately handle shifts in firm ownership that change the underlying riskiness (Parry and Math 1993). Revisions of the standard experience-rating formula in 1993 and again in 1997–1998 along with the use of additional adjustments such as schedule credits, were designed to ameliorate these problems (Compensation Advisory Organization of Michigan 2004; Gillam 1995). In addition, the most recent revision of the formula reduced the effect of medical-only claims on the experience modification factor (Compensation Advisory Organization of Michigan 1998). Again, the reason for this change can be interpreted in two ways. For the employer, this revision arguably provides an incentive to either keep injured workers at work or return them before the waiting period expires. However, for the carrier, a medical-only claim has more predictable future losses, that is, less uncertainty.

THE EFFECTS OF REGULATION

Pricing in the insurance industry is heavily regulated, and because coverage is required for nearly all employers, workers' compensation pricing is more regulated than most other lines (Carroll 1993). Over the past 20 years, however, pricing in workers' compensation has undergone significant reform so that 37 states have enacted some form of open competition since the early 1980s (Thomason, Schmidle, and Burton 2001 p. 42). However, even under open competition, some regulation in the form of rate approval is often required (Hunt, Krueger, and Burton 1988; Thomason, Schmidle, and Burton 2001). The mandate of the state insurance bureaus is to assure insurer solvency, rate affordability, rate fairness, and universal access (Carroll and Kaestner 1995). Typically, workplace safety is not part of the insurance bureau portfo-

lio unless the claims portion of the state regulatory structure is housed there. One of the questions investigated with respect to the effects of regulation in workers' compensation is the extent to which it creates cross-subsidies that damage both employer and insurer incentives.

One reason that regulation can be thought of as a barrier to the optimal insurance contract is due to the regulatory objectives, which include both a healthy insurance market and affordable rates consistent with a positive economic development climate, and thus require a balancing of competing interests. If, through regulation, insurance bureaus set rates and permit adjustments that are actuarially fair, then the optimal contract will be possible (Schmidle 1995). However, political pressures from employers to lower rates or from insurers to raise them can distort contract incentives and threaten either of the core regulatory objectives.

Typically, there are two primary forms of rate regulation: 1) limit the percentage experience modification factors applied to class rates; and 2) restrict the class rates themselves (Harrington and Danzon 2000). As described earlier, in every state, the rating organization issues basic manual rates (e.g., pure premium, loss cost, or advisory rates). In theory, the rating organization is submitting rates that reflect state average expected losses in each rating class and are actuarially fair. In regulated states, these rates go to the insurance commissioner for approval before being issued for carrier use. In open competition states, carriers use these as guidelines but file their own rates. In principle, each carrier's rates reflect its own underwriting experience, cost structure, and marketing strategy.

That regulation is beneficial rests on two arguments. One is that government may possess information either not available to the parties or that would be inefficiently costly for each party to uncover for itself, such as insurer solvency or workplace safety. Because of the cost of acquiring that information, data collection and distribution in the form of rates is treated as a public good. The second is a welfare argument that insurance access is important, even if its guarantee involves some inefficiencies (Carroll and Kaestner 1995).

There are several reasons, however, why regulation may be undesirable. Because rate regulation is partially a political process, there may be pressure to suppress overall rates in the name of economic competitiveness. Further, some employers may be more able to influence

the regulatory process leading to the suppression of some rates and a possible compensating inflation of others (Carroll and Kaestner 1995). In addition, it is sometimes argued that the insurance bureau becomes “captive” of the insurance industry and excessively raises rates (Harrington 1984).

A primary criticism of regulation is its potential for generating inequitable and welfare reducing cross-subsidies (Danzon and Harrington 1998). The research on possible cross-subsidies argues that regulation results in subsidies from safer to more risky employers, often in the form of cost shifting from the residual to the voluntary market. The central premise to the cross-subsidy discussion is that if rate regulation results in rates that are insufficient relative to claims costs, distortions will occur that will in fact lead to even greater cost growth (Danzon and Harrington 1998).

Noting that the insurance market is segmented into two portions, the voluntary market and the residual market, one premise that underpins this discussion is that the larger the residual market share, the more troubled the state’s insurance market. All states except those that are exclusive state funds have a residual, or assigned risk, market. Risks that fail to meet the underwriting standards of the voluntary market, are uniquely dangerous, have no loss experience, have had a recent significant loss, or have a loss experience that lacks credibility are typically insured in the residual market. To some extent, the boundary between the two markets is fluid. To the extent that rates are suppressed below actual expected losses in the voluntary market, insurers will be unwilling to insure some of the less safe firms at the margin, forcing them into the residual market. In most states, a cohort of servicing carriers writes the policies and pays the claim but does not bear the underwriting risk in the residual market. Rather, losses incurred in the residual market are shared out among the voluntary market carriers according to each carrier’s share of the state’s premium.

It is this sharing out process that creates the most common form of cross-subsidy (Danzon and Harrington 1998). To the extent that regulation suppresses rates in the residual market in order to assure access to coverage for those firms in the assigned risk pool, aggregate residual market premium will not cover the actual losses along with expenses and fees, generating an excess loss that needs to be capitalized into

premium for those insured in the voluntary market (Kwon and Grace 1996).

Regulators have several different tools for manipulating rates in the residual market, including price differential programs (employers charged a fixed percentage higher than comparable risks in the voluntary market); risk-adjustment programs (ARAP, or Assigned Risk Adjustment Programs, where employers in the residual market are surcharged up to 49 percent of base premiums); restrict residual market access (where employers are denied residual market coverage if they have refused any voluntary market carrier's legitimate rating plan); removal of premium discount plans (employers in the residual market cannot receive premium discounts even if they would qualify in the voluntary market); and take-out credit programs (where voluntary insurers receive credits for offering residual market firms the same coverage for at least one policy period). Each of these tools acts as a ceiling on residual market rates (Kwon and Grace 1996). Additional variations in the structures of residual market prices include the use of loss-sensitive rating plans that enhance the effect of the individual employer's loss history, and additional surcharges on employers in the pool (Thomason, Schmidle, and Burton 2001, p. 338).

As residual market losses are passed back to the voluntary market, costs in the voluntary market are expected to increase, and safety in the workplace is expected to deteriorate for several reasons. One is that as premium in the voluntary market increases due to the residual market losses, the larger and safer firms in the voluntary market will self-insure, leaving the less safe in the voluntary market where costs will increase (Danzon and Harrington 1998). This can become a vicious circle if regulation of voluntary market rates does not adjust to take this into account, leading to the more marginal employers in the voluntary market being forced into the residual market. During the 1980s, the markets in several states, notably Maine, Rhode Island, and Louisiana, were caught in this cycle that ended with an inordinately large share of the workers' compensation market in the assigned risk pool, creating true crises for workers' compensation in their states (Thomason, Schmidle, and Burton 2001). According to this view of market dynamics, both the size of the gap between premium and expected losses and uncertainty about what that will be lead to a reduction in supply of insurance in the voluntary market, leading to an availability problem and higher rates.

This cycle not only creates availability problems but also dilutes safety incentives. Because regulated premium in the residual market does not correspond to expected losses, those in the residual market will lose the incentive to invest in safety, increasing their loss rates. Again, because these costs are passed to the voluntary market, the cycle described above will be triggered.

Several forms of cross-subsidies are possible, but in all cases, safer employers are subsidizing riskier ones. If all rate class prices are suppressed, those employers in the residual market will be subsidized by those in the same rate class in the voluntary market, as described above. This subsidy will worsen as the higher risk employers are forced into the residual market and the lowest risk employers go to self-insurance, leaving the middle risk employers to subsidize the riskiest. If regulation varies across rate classes, those with payroll in the suppressed rate classes will be subsidized by those in the other classes, whose rates will have increased so that total premium will, on average, cover total losses (Danzon and Harrington 1998).

Because cross-subsidization is difficult to observe, the empirical work examines the broader predictions of these models. Danzon and Harrington (1988) examine the effect of rate regulation on total and indemnity loss growth using three measures of regulation: 1) lagged residual market share, 2) lagged filed to approved rate ratio, and 3) lagged underwriting margin for the filed to approved rate ratio. Their results show a positive and statistically significant relationship between residual market share and loss growth but do not support such a relationship for the other, more direct, measures of regulation. However, using a different specification, they do find significant effects of the lagged filed to approved rate ratio on total loss growth (Harrington and Danzon 2000).

While these results do suggest that regulation adversely affects loss growth, they do not necessarily indicate the presence of cross-subsidies. As an alternative test for cross-subsidies, Danzon and Harrington (1998) develop a model of political influence, which predicts that if regulation of rates is the outgrowth of political influence, patterns of rate suppression should persist over time. Using data from 150 class codes in seven states, the null hypothesis that they test empirically is that fluctuation of manual rates should be random over time. Rejection of the null hypothesis would be viewed as evidence of political influ-

ence in the regulatory process. They examine several potential sources of political influence. They find support for persistent cross-subsidies along three dimensions: 1) between rating classes (larger classes are subsidized), 2) between low- and high-risk employers (high-risk, low-wage employers are subsidized), and 3) between policyholders and insurers (policyholders are subsidized).

Kwon and Grace (1996) examine the magnitude of the cross-subsidy of low risk to high risk employers by examining the share of residual market assessments carriers can pass on to voluntary market policyholders. They find that operating losses in the residual market do raise premium in the voluntary market, but that only about 27 percent of the residual market assessment on carriers is passed on in voluntary premium. They also find that few of the policy measures designed to reduce the size of the residual market are effective. Thomason, Schmidle, and Burton (2001) cite the importance of the Danzon–Harrington perspective in that it examines the distributional consequences of regulation and not just the effect on price levels. However, they also cite the weaknesses of the measures of regulation, in particular, the lack of differentiation among the different regulatory regimes. In addition, their empirical test finds weak support for increased injury rates under administered pricing (the most regulated scheme) and a lack of support for a relationship between deregulation and injury (p. 264). Both the Kwon and Grace study and those by Danzon and Harrington cite the health of the insurance market as the policy focus, but only Danzon and Harrington also mention safety implications.

In their study of the effect of differing insurance arrangements on various workers' compensation outcomes, Thomason, Schmidle, and Burton (2001, p. 245) find support for full deregulation as being more efficient at reducing employer costs. However, they qualify for this conclusion because of the difficulty of accurately characterizing prederegulation conditions and with evaluating the sustainability of the effects of deregulation.

CONCLUSION

This chapter provided a description of how workers' compensation premium is determined and then examined the research literature on pric-

ing from two perspectives, that of the employer and that of the insurer. There are some differences between these two perspectives that may have welfare implications. What becomes evident in the research is that the focus in the employer-based literature is on safety incentives embedded in workers' compensation premium, whereas the emphasis in the insurer-based literature is on generating sufficient premium to cover losses. The significance of this difference is that while the purpose of the premium setting mechanism may be seen as to promote safety from one point of view, from the other it is not to minimize injury but rather to estimate it accurately.

In an unfettered market, this difference in objective functions might not matter: the invisible hand would keep costs low, promote safety, and protect insurer solvency. But the evidence on the safety effects of experience rating (the feature of pricing that has received the most empirical attention) is mixed and potentially quite flawed by the absence of a direct measure of experience rating. Further, the only research that directly examines whether employers understand the incentives workers' compensation is designed to promote suggests that the formula is not universally well understood (Kralj 1994).

The weaknesses in the experience-rating literature best frame the directions for future research. One particularly weak aspect of this research is the lack of studies that actually include the experience-rating modification factor as the measure of experience rating. Because the experience modification is observable, this seems a feasible research direction. A second research area that would benefit from further investigation is the role that employer understanding of the structure of their insurance premiums plays in safety behavior. With the exception of the few studies cited above, little survey research of employer understanding of or response to safety incentives in workers' compensation has been done.

The important question that this raises is whether it is sound policy to rely on market forces to the extent that we do to promote safety at work. It appears that U.S. workplaces are becoming safer (Durbin and Butler 1998), with the number of nonfatal illnesses and injuries per 10,000 full-time workers dropping from 304.7 in 1992 to 169.1 in 2001 (U.S. Bureau of Labor Statistics 2004). However, the extent to which improved safety can be attributed to employers responding to the economic incentives from prices has not been established. It may be more

plausible that employers provide a safe workplace for other reasons, such as a belief that it is a good investment (Spieler 1994). Failure to understand the underlying motivational mechanisms will limit effective policy development should the trend toward lower injury rates change.

Notes

1. The discussion in this chapter describes what is referred to as the voluntary market, where employers purchase workers' compensation insurance from insurance carriers. Depending on the year, approximately 20–25 percent of workers' compensation insurance benefits are paid by self-insured, that is, employers who choose to pay workers' compensation benefits directly (Mont et al. 2001, p. 9). The principal-agent framework would not apply to the self-insured portion of the workers' compensation market.
2. Two-stage least-square estimation is an econometric method used to address possible problems with endogeneity—where what is being treated as an independent variable is correlated with the residual and thus is not truly exogenous.

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8

Health Care and Workers' Compensation

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Terry Thomason's career was marked by his interest in the economic consequences of workers' compensation policies across North America, including both the observed variations within U.S. states, as well as the differences that emerged over time between the Canadian and the U.S. policy contexts. One important difference between these two jurisdictions has been the divergent trends in health care expenditures. Gross domestic product (GDP) expenditure shares for health care in Canada and the United States began a long-term trend of divergence in the 1970s. This story is now well known to scholars and policymakers who maintain a weather-eye on comparative trends in national health care expenditure. In the period 1970–1975, expenditures on medical care were equivalent in Canada and the United States, at about 7.5 percent of GDP in both countries. By 1995–2000, GDP share allocated to health care in Canada had increased to 9.5–10.0 percent. In the United States, by contrast, total health spending as a share of GDP was 13.0 percent. These divergent developments occurred in a period in which average economic growth was stronger in the United States than Canada. Over the period 1990–2000, GDP per capita grew by 1.7 percent in Canada and health care spending increased in parallel, with an annual average growth in health care spending of 1.8 percent. In contrast, over this period U.S. health care spending increased at an annual rate of 3.2 per-

cent, a rate of increase more rapid than the 2.3 percent average growth in GDP (Anderson et al. 2003).

The divergent Canadian and U.S. trends in health care expenditure growth is but one area of policy research interest arising from the natural experiment of the very different principles underlying the design of the two systems. The consequences arising from the differences in the financing and organization of health care services in Canada and the United States has been the subject of longstanding research attention (Anderson et al. 2003; Detsky et al. 1990; Evans 1984; Evans, Barber, and Hertzman 1991; Fuchs and Hahn 1990; Redelmeir and Fuchs 1993; Woolhandler, Campbell, and Himmelstein 2003). A comparison of health care systems in Canada and the United States invites observations of the relative efficiency of the two systems, one based on markets and one based on public governance and insurance monopolies. (This same policy contrast describes the finance and administration of workers' compensation insurance in the two countries.) This research tells an important story about the potential limits of private markets in efficiently providing goods of value to the health of populations. Although less thoroughly studied, the comparison of workers' compensation systems in Canada and the United States is an important opportunity to understand the relative performance of private markets versus public administration in achieving outcomes that are efficient, equitable, and of the highest possible quality.

Aside from the very substantial differences between the two countries in the financing of health care, there are otherwise broad similarities in the organization and delivery of health care services to general populations. Within this broad similarity of the two health care systems, there are some useful distinctions to note in the provision of health care services to injured workers receiving compensation from workers' compensation programs. In most U.S. states, the employer or insurer chooses the treating physician and other health care providers for the treatment of workplace injury or disease compensated by workers' compensation. Provider reimbursement is provided directly by the employer or the compensation insurance carrier. In Canada, the injured worker has the right to choose his or her treating physician (who is typically the regular provider of health care). In most Canadian provinces, the treating physician is reimbursed by the provincial single-payer health care insurance plan, which in turn bills the workers' compensation author-

ity for the reimbursement of the costs of care. Care provided by allied health professionals, hospital care, and pharmaceuticals are reimbursed directly by workers' compensation agencies.

A SUMMARY OF THE THOMASON/BURTON STUDY

Terry Thomason and John Burton collaborated on a study of the employers' costs of workers' compensation insurance in two Canadian provinces, Ontario and British Columbia, relative to costs in several jurisdictions in the United States over the period 1975–1995 (Thomason and Burton 2000). The key finding from this study suggested that the costs of workers' compensation insurance are lower in jurisdictions with single payer, publicly owned insurance providers (“monopolistic public funds” in the language of Thomason and Burton). However, the authors noted very real challenges in accurately adjusting for differences in the design and administration of the Canadian and U.S. programs and argued for the importance of a more refined study methodology.

Thomason and Burton subsequently revised their methodology to address some of the limitations they identified in their earlier study (Thomason and Burton 2001). Among the more important revisions included 1) the addition of three U.S. states with exclusive state fund insurance provision, 2) adjustments to inter-jurisdictional differences in rate group classification and in payroll calculations, 3) adjustments to more accurately account for unfunded liabilities in the Canadian jurisdictions, and 4) examining in more detail the possibility that health care costs may be shifted from the workers' compensation program to the universal single payer health care insurance programs in Canadian jurisdictions.

Consistent with the results of their earlier study, the revised Thomason and Burton study reported that Ontario workers' compensation insurance costs were equal to or lower than the costs in the median cost jurisdiction in the United States over the time series, and that in recent years, actual Ontario costs were in the lowest quartile of workers' compensation jurisdictions included in the study sample. While performing as one of the four lowest cost jurisdictions in North America, the Workplace Safety and Insurance Board in Ontario also achieved a higher wage replacement rate than most U.S. jurisdictions, experienced

a lower rate of permanent partial disability awards, and incurred lower medical care expenditures as a proportion of premium revenue.

Building from the observation that the Ontario workers' compensation system incurs lower medical care expenditures, the objective of this chapter is to examine factors that may account for this important difference in resource allocation between Canadian and U.S. workers' compensation programs. Among the factors that appear to be responsible for these differences are 1) lower medical care prices in Canada, 2) lower medical care price inflation in Canada, and 3) higher intensity of health care services in the United States. We argue three central points in this chapter. First, contrasting the U.S. model of market-based health insurance provision with the universal tax-financed single-payer model in Canada suggests the latter is substantially more efficient (both in general health services and in services purchased to treat compensable work-related injury and disease). Second, the greater intensity of health care treatment typically provided in the United States does not appear to result in substantially better health outcomes for U.S. patients relative to Canadian patients. Third, both the Canadian and U.S. health care systems have struggled to align incentives to consistently improve the efficiency and the quality of health care.

WHAT WE HAVE LEARNED

After 30 years of North American policy experiment and reform in the finance and delivery of health services, we have learned a number of lessons about the efficiency of different insurance funding models and the effectiveness of different health care financing models in purchasing quality.

Efficiency in the Financing and Funding of Health Care

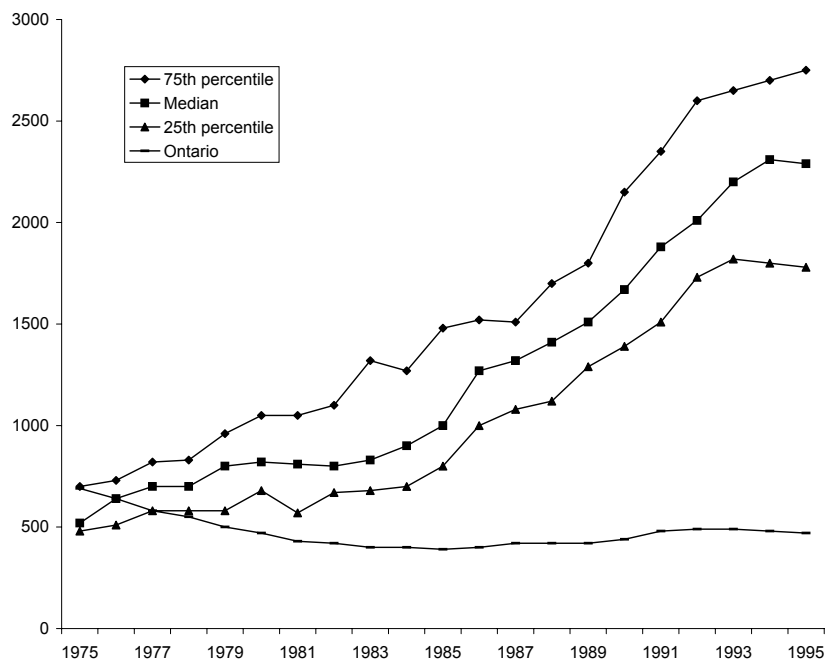
In their study of workers' compensation program cost differences between Canada and the United States, Thomason and Burton (2001) directly compared prices for 10 common medical procedures used in 39 U.S. state compensation programs and the province of Ontario. In this comparison, after adjusting for differences in the values of the Canadian and U.S. dollars, they found that the price for medical procedures

in the United States is substantially greater than the price for similar procedures in Ontario, with the ratio of the median fee in the United States to the fee in Ontario ranging from 1.6 to 7.1. Taking a simple average of fees across the 10 procedures, the average median fee in the United States was found to be 4.6 times greater than the average fee in Ontario.

The observation that health care prices are generally higher in the United States relative to Canada has been extensively reported in the health services research literature (Detsky et al. 1990; Fuchs and Hahn 1990; Redelmeir and Fuchs 1993). Anderson et al. (2003), for example, have recently reported findings from a cross-national comparison of Organisation for Economic Co-operation and Development (OECD) economies, examining evidence for the proposition that the higher U.S. spending on health care (as a percent of GDP) is primarily due to higher relative prices for health care goods and services in the United States, rather than a greater intensity of use of equivalently priced health care resources. In 2000, the United States spent 13 percent of GDP on health care, Switzerland 10.7 percent, and Canada 9.1 percent. The OECD median was 8.0 percent. Paradoxically, however, the United States had fewer of each of the following than the median OECD country: physicians per 1,000 population, physician visits per capita, acute beds per capita, hospital admissions per 1,000 population, and acute care days per capita. Anderson et al. (2003) conclude that higher average prices is the likely explanation for the paradoxical pattern observed in the United States of lower aggregate utilization of health care services and higher per capita expenditures on health care.

Thomason and Burton's observation of very substantial medical care price differentials between Ontario and the sample of 44 U.S. states for a selection of 10 common procedures is based on fee information at the end of the 20-year observation period of their study. It is important to note that this differential in the price of medical care in the two countries has emerged over the 20-year period 1975–1995. As shown in Figure 8.1, in the period 1975–1979, prices for medical care purchased by workers' compensation insurance providers were essentially identical in Canada and the United States.

Medical care price inflation has been a persistent policy challenge in the United States. In addition, there is good evidence that medical care expenditures for the treatment of occupational conditions in the United

Figure 8.1 Real Medical Benefit Costs, 1975–1995 (\$)

States exceed those for the treatment of similar conditions insured under general health insurance plans (Baker and Krueger 1995; Baldwin, Johnson, and Marcus 2002; Durbin, Corro, and Helvacian 1996; Johnson et al. 1993; Johnson, Baldwin, and Burton 1996). In contrast, medical care price changes in Canada have been more tightly aligned to the macroeconomic growth profile of the country. There are a number of explanations for the difference in medical care price growth between the two countries. The most prominent explanation is the price-setting power of the monopoly universal health insurance programs in Canadian provinces relative to the fragmented and competitive structure of private market health care insurance in the United States (Evans 2000; Evans, Barer, and Hertzman 1991).

The Ontario Workplace Safety and Insurance Board (WSIB) has legislated authority to function as a health insurance provider and to purchase health care services for the treatment of work-related injury

and disease. This authority predates the establishment of the single-payer universal health insurance programs in Canada in the period 1960–1970. The federal legislation creating public single-payer health care insurance agencies in Canadian provinces created insurance monopolies by explicitly prohibiting private insurance carriers from providing health plans that covered services insured by the single payer plans. Provincial workers' compensation programs in Canada function as a parallel health insurance provider. They are, however, a minor purchaser. In the province of Ontario, the WSIB purchases approximately \$350 million of health care services annually in a publicly funded health care system of \$10 billion. The health care costs of work-related injuries range between 2 and 5 percent of total health care costs, although this proportion is larger when total public health care expenditures are restricted to working age populations (Association of Workers' Compensation Boards of Canada 2001). With limited exceptions, workers' compensation authorities purchase care for injured workers within the structure of the publicly funded system (Association of Workers' Compensation Boards of Canada 2001). The workers' compensation authorities in Canada, by buying within the publicly funded health care system, have been able to benefit (free-ride) from the price-setting power of the large universal single-payer health insurance plans.

There appear to be very substantial administration costs associated with the provision of health care insurance through multiple insurers in private markets. Woolhandler and colleagues have documented a durable pattern of higher administrative expenditures in the U.S. health care system relative to Canada (Himmelstein and Woolhandler 1986; Woolhandler, Campbell, and Himmelstein 2003; Woolhandler and Himmelstein 1991, 1997). They have estimated that 31 percent of U.S. health care expenditures in 1999 were allocated to administration functions (\$US1,059 per capita) compared to 16.7 percent of Canadian health care expenditures (\$US307 per capita). Between 1969 and 1999, the share of the U.S. health care labor force engaged in administrative tasks increased from 18.2 percent to 27.3 percent. During the same period in Canada, the health care labor force engaged in administration grew from 16.0 percent to 19.1 percent. Insurance overheads in Canada are estimated to be 1.9 percent of health care system expenditures. In the United States, private insurance provider overheads are estimated to be 11.9 percent, Medicare overheads to be 3.6 percent and Medicaid over-

heads to be 6.8 percent. Clearly, the challenges of technical and allocative efficiency decisions within the complexity of contemporary health care systems require a commitment to intensive and sophisticated management. What remains uncertain is the optimal level of administration expenditure in a health care system.

Greater medical care price inflation and higher administrative costs in the United States will account for an important fraction of the higher average U.S. expenditure on health care services in the treatment of injuries and disease compensated by workers' compensation insurance. A number of researchers have noted, in addition, that medical care expenditures for the treatment of occupational conditions exceed those for the treatment of similar conditions insured under general health insurance plans (Baker and Krueger 1995; Baldwin, Johnson, and Marcus 2002; Durbin, Corro, and Helvacian 1996; Johnson et al. 1993; Johnson, Baldwin, and Burton 1996). By way of explanation, Himmelstein et al. (1999) note that the coverage of both medical care and wage-loss benefits distinguishes workers' compensation insurance from typical health insurance plans. The dual responsibility for medical care costs and wage-loss costs creates stronger incentives for insurance providers to select therapeutic options that may expedite earlier recovery and earlier return to work. As Himmelstein et al. (1999, p. 430) observe, "Where a traditional insurer or HMO might seek costs savings by delaying or denying medical tests or treatments, workers' compensation insurers might seek to accelerate appropriate medical care," or be receptive to the promise of more intensive medical care. In general, these incentives can be understood to influence to a similar degree both single payer Canadian insurers and U.S. private market insurers. However, as noted earlier, the Canadian single-payer compensation insurers in general have purchased health care services within the fee schedules of the publicly funded health care system. There is some evidence that workers' compensation insurers in the United States have offered more lucrative provider fees in the interests of purchasing expedited care (Baker and Krueger 1995; Baldwin, Johnson, and Marcus 2002; Durbin, Corro, and Helvacian 1996; Johnson et al. 1993; Johnson, Baldwin, and Burton 1996).

The theory of neoclassical economics predicts that the private health care insurance market will be a more efficient instrument than a public monopoly insurance provider. Market competition will dis-

discipline insurance prices and the efficiency of the insurance function. However, as suggested by the Thomason and Burton comparison of Canadian and U.S. workers' compensation health care expenditures, the empirical evidence appears to indicate that public single-payer health insurance may be more efficient than private markets. Robert Evans, who authored an important early treatise on economic behavior in the health care industry, has provided a thoughtful analysis of some of the trade-offs in the design of health insurance (Evans 1984). In particular, he has emphasized the risks of market failure in private health insurance markets. These risks arise from economies of scale, adverse selection, and moral hazard.

The provision of health insurance is subject to economies of scale, rendering economic advantage to large insurers. In addition, there are diseconomies arising from private health insurance markets. Health care providers face compliance costs in dealing with many different insurance providers. Insurance providers face marketing and commission expenses associated with market competition. A "public utility" insurance model, relying on a monopoly provider, captures the economies of scale and avoids the costs of compliance, marketing, and profit-making associated with private markets. There are a number of examples of insurance market failure in the United States (the numbers of uninsured citizens and the withdrawal of providers from workers' compensation insurance markets in some states), which may be related to the inability of markets to capture economies of scale.

Adverse selection is a clearly understood phenomena in private insurance markets, where people of different risk statuses are more or less likely to buy insurance. Segmenting health insurance products by benefit coverage, copayment conditions, and risk status will result in insurance coverage costs for high-risk groups being more expensive than insurance provided under a community-rating model. Insurance market failure occurs when groups or individuals wish to purchase coverage but are priced out of the market. The moral hazard risk of insurance has received a great deal of attention from health economists. Moral hazard in the context of health insurance refers to a risk that the existence of insurance coverage will increase the probability or intensity of health care use. Moral hazard appears to be an equivalent risk for health insurance provided by private markets or by public monopolies.

Efficiency in the Organization and Delivery of Health Services

A number of features of the organization and delivery of health services are frequently contrasted in comparisons of the Canadian and U.S. health care systems. The Canadian system is often characterized, for example, as having a more constrained supply of some medical care services than the United States. One perspective views supply constraints as having large potentially negative effects, arising from unmet medical care needs or in delays in the receipt of effective care. An alternate perspective notes that a supply-constrained system will more likely be more efficient in each treatment encounter than a system with substantial surplus human and physical capital. In this section we consider some of the evidence for efficiency differences in the organization and delivery of health services in the two countries.

The health effects of delays in the provision of care or barriers to access to care have been a focus of health services research attention in both the United States and Canada. In the United States, concern focuses on the health effects arising from barriers to accessing medical care among persons without health care insurance. In the Canadian system, with universal insurance coverage, concern has focused on the health effects of delays in the provision of care arising from a less generous supply of health care providers and health care services relative to the United States.

Research studies designed to compare the structure, process, and outcome of health care in Canada and the United States can be informative. One example is a study comparing the clinical management of acute myocardial infarction in a sample of 2,600 U.S. patients and a group of 400 Canadian patients with very similar clinical and demographic profiles (Mark et al. 1994). Patients in both countries were interviewed by telephone 30 days, six months, and one year after myocardial infarction to determine their use of medical care and quality of life. The clinical management of Canadian patients was less intensive than provided to U.S. patients. Canadian patients had a lower rate of cardiac catheterization (25 percent versus 72 percent), coronary angioplasty (11 percent versus 29 percent) and coronary bypass surgery (3 percent versus 14 percent). At one year, 24 percent of the Canadian patients and 53 percent of the U.S. patients had undergone angioplasty or bypass surgery at least once. Despite these differences in the intensity

of invasive procedures, unadjusted survival rates for the U.S. cohort at 30 days (93.2 percent) and one year (90.7 percent) were equivalent to survival rates in the Canadian cohort (92.4 percent at 30 days and 90.3 percent at one year). While there were no important differences in functional status at 30 days between two patient cohorts, the study did report marginally better average quality of life among U.S. patients at one year compared to Canadian patients. Although this study did not report the precise measures of the economic value of the differences in health care utilization between the two cohorts, these expenditure differences must be substantial. The large differences in resource utilization observed in this study were not associated with strong differences in clinical outcome.

The provision of health care services in the treatment of acute low-back pain is a second example of a dissonant pattern, where the intensity of health care service use is not directly related to the duration of disability. Disabling back pain is common and, whether caused by work-related exposures or non-work-related exposures, is one of the most frequent reasons that patients visit primary care physicians. Patients with acute low-back pain may seek care from among several types of health care providers: primary care physicians, specialty-qualified physicians (particularly orthopedic specialists), or chiropractors. A number of studies in both Canada (Côté et al. 2001) and the United States (Carey et al. 1995; Deyo et al. 1991; Deyo and Tsui-Wu 1987) have documented wide variation in the intensity of treatment for low-back pain, both within clinical professions and between clinical professions. For example, Carey et al. (1995) followed a group of 1,500 adults in North Carolina who presented symptoms of low-back pain to one of six types of practitioners: 1) urban primary care physicians, 2) rural primary care physicians, 3) urban chiropractors, 4) rural chiropractors, 5) orthopedic surgeons, and 6) primary care physicians in a group-model health maintenance organization. At the six-month follow-up, the times to functional recovery, return to work, and complete recovery from low-back pain were similar among patients seen by all six groups of providers. Despite the similarities in clinical and functional outcomes, there were marked differences in the intensity of health service utilization. Mean total direct outpatient costs per episode of low-back pain ranged from \$435 for patients seeing an HMO provider to \$783 for patients seeing an urban chiropractor. Given the high prevalence of acute back pain in

working-age populations, these differences in health care resource use will be substantial. The absence of evidence of clinical benefit associated with more intensive clinical resource use suggests that intensive treatment of acute low-back pain is inefficient.

As a final example, we summarize a study that used an identical study protocol to measure the prevalence of mental health disorder in representative samples of U.S. residents and residents of the Canadian province of Ontario (Katz, Kessler, Frank, Leaf, and Lin 1997; Katz, Kessler, Frank, Leaf, Lin, and Edmund 1997). This study has produced a fascinating series of findings. Among the findings salient for the purposes of this chapter was the observation that the use of mental health services by persons without detectable mental health morbidity or disability in the U.S. sample was 75 percent higher than observed among well-functioning Ontario respondents in the sample. This finding suggests that the probability of inappropriate use of mental health services (treatment where no treatment was indicated) may be more likely in a health care system with generous service supply. The study finding also suggests that the moral hazard potential of a universal single-payer first-dollar insurance program (also known as Canadian health care) may be overstated. In an important parallel finding, the study reported that persons with detectable mental health disorder were more likely to be provided mental health treatment services if resident in Ontario than in the United States.

Effectiveness in Purchasing Quality Care

Contemporary health care systems face persistent deficits in delivering health care of the highest quality. For example, one of the most consistent findings in health services research is the gap between evidence and practice (Grol and Grimshaw 2003). Studies of health care systems in the developed economies typically find that about 30–40 percent of patients do not receive care according to current scientific evidence, and that about 20–25 percent of care provided is not needed or is potentially harmful (Schuster, McGlynn, and Brook 1998). In the United States, only one-half of the population receive needed preventive care; 70 percent receive recommended care for acute problems, such as colds or stomach pain; and just 60 percent of those with a chronic illness such as diabetes or hypertension get the care they need. In addition, about one-

fifth of the care given to persons with chronic conditions is unnecessary and possibly harmful (McGlynn and Brook 2001).

Evidence of uneven quality performance in health care systems is frequently suspected when different treatment rates or variations in treatment intensity are observed between similar geographic populations. As one example of high variation in treatment across populations, Lavis et al. (1998) described trends in hospital use for neck and back problems (common conditions in workers' compensation claims) in Ontario and the United States. Between 1982 and 1992, the hospital admission rate for medically treated cases (without surgery) decreased by 52 percent in Ontario and by 75 percent in the United States. Over the same period, the admission rate for surgically treated cases increased by 14 percent and by 35 percent respectively. By 1992, the admission rate for medically treated cases in the United States was 23 percent higher than in Ontario, whereas the rate for surgically treated cases was 164 percent higher. In this study, the reduction in hospital admission for medically treated cases would appear to be consistent with evidence that bed rest and traction, two common forms of inpatient medical treatment, were not effective. In contrast, the relatively strong increase in the frequency of surgical treatment for neck and spine disorders in the United States would appear to be more related to the more ample supply of surgical specialist and diagnostic imaging facilities in the United States than to clear evidence of the effectiveness of surgical intervention.

Over the past two decades, there has been more experimentation in alternate approaches to the purchasing, organization, and delivery of health services in the United States than in Canada. Most of these organizational reforms have been motivated by the twin goals of improving efficiency and improving effectiveness of health care services. Baldwin, Johnson, and Marcus (2002) have recently reported on health care costs and service differentials between preferred provider networks and nonnetwork providers in the treatment of work-related injuries in the United States. A sample of approximately 38,000 workers' compensation claims with work absences of less than seven days that were provided care by network providers were compared with a matched sample of 64,000 workers' compensation claims provided care by nonnetwork providers (claims were matched on type of injury, age, and gender). The motivation of this study was to clarify *how* networks succeed in reducing costs, by examining evidence for cost reductions arising from three

alternate strategies: 1) reducing the quantities of services provided to injured workers, 2) shifting to more economical services, or 3) simply reducing per unit prices.

In this sample of injured workers, the study found that average health care costs are lower for network claims than for matched nonnetwork claims. Price discounts explain the largest part of the cost differential, with reductions in service utilization also being important for understanding resource use differentials in the treatment of acute back injuries and the treatment of cumulative stress injuries. Given that network savings primarily reflect price discounts for the same services provided by nonnetwork providers, network strategies result in an increase in the efficiency and, therefore, the cost-effectiveness of care.

McGlynn and Brook (2001, p. 84) document the persistent failure of public and private policymakers in the United States and elsewhere to identify and solve the factors underlying the inconsistent quality performance of contemporary healthcare.

Serious deficits are also manifest in how skilfully care is delivered. Coronary angiography is an invasive test used to diagnose cardiac disease and determine what treatment is appropriate for a patient. Analysis of a random sample of angiographies performed in one state showed that only half of the tests were done competently enough to be accurately interpreted. When the tests were reread by a group of expert cardiologists, one-quarter of patients determined by the original reading to have the most severe disease did not have it. Six percent of persons who were told that their test results were not severely abnormal actually had severely abnormal results. One third of persons whose bypass surgery was considered necessary or appropriate based on the original interpretation of the angiography results underwent surgery that was of uncertain benefit or inappropriate based on the gold-standard review. Nearly 1.3 million coronary angiographies were performed in 1998 nationally. If the results of this study held nationally, nearly 650,000 tests would be difficult to interpret accurately; at \$12,450 per test, that is more than \$8 billion in wasted expense.

Suboptimal health care quality is both inefficient and ineffective. McGlynn identifies the following factors which, in their view, account for the absence of a strong policy commitment to quality improvement in contemporary health care. First, *the responsibility for quality is diffuse*, distributed among professional regulatory bodies, health protec-

tion agencies, accreditation bodies, regulators, health care purchasers, (and lawyers who bring malpractice suits alleging substandard care). An unfortunate consequence of this diffusion of responsibility is a persistent policy failure to respond to substandard care practices. Second, health care is characterized by *outmoded system design*, where quality performance protocols well-established in other fields have either been resisted or not adopted in much of contemporary health care. Finally, there are very *large information voids*. There is, for example, no regular, ongoing surveillance of the quality of health care encounters, and no monitoring of the progress across the system in adopting practices with demonstrated effectiveness to improve quality. These problems are as prevalent in the organization and delivery of health care services to workers' compensation beneficiaries as they are in the general health care system. McGlynn and Brook argue that improvements will come from policy initiatives which 1) create quality champions (presumably with some authority to set financial rewards and penalties); 2) create functional information systems, and 3) routinely monitor and report on the quality performance of the health care system.

LESSONS LEARNED

Thomason and Burton's study of the economic performance of workers' compensation programs in Canada and the United States is an excellent example of the potential of comparative cross-national studies to inform our understanding of the implications of different policy choices. A comparison of the efficiency and effectiveness of health care services purchased by workers' compensation insurance providers in Canada and the United States is an important case study of the more global question of the relative benefits and limitations of private markets and public monopolies in the provision of health care insurance.

Canadian workers' compensation agencies purchase health services within the publicly funded, single-payer health care insurance programs in each province. In the United States, workers' compensation insurance is provided through private markets in a substantial number of state jurisdictions, and health services for injured workers are purchased in competitive provider markets.

In comparing the experience of the two systems over the past 30 years, it is clear that the publicly funded, single-payer health care insurance programs have been more successful in limiting medical care price inflation. In addition to less success in disciplining medical care prices, the U.S. reliance on private insurance markets appears to result in a substantially higher proportion of health care resources allocated to administrative functions. This higher expenditure on administrative functions does not appear to increase the relative efficiency of the U.S. health care system.

There is evidence that the more constrained supply of human and physical capital in the Canadian health care system is associated with less intensive medical care treatment compared to the United States. There also is some evidence, however, that more intensive medical care treatment does not result in significant health benefits for many classes of morbidity.

Finally, both the Canadian and U.S. health care systems have struggled to align incentives to consistently improve the efficiency and the quality of health care. Brook (1998) has argued that a systemic commitment to quality improvement in health care will require a stronger commitment to ensuring that effective medical care is appropriately delivered to patients with need for care, and that care is provided to a high standard of technical excellence. Aligning incentives to improve quality is a challenge shared by health care purchasers in both Canada and the United States.

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9

How Can Behavioral Economics Inform Research on Workplace Injuries?

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Over the last 30 years a number of theoretical and empirical advances have emerged in the study of how the risk of injury in the workplace influences labor market transactions. Economists have focused particular attention on mechanisms that compensate individuals for risk, primarily higher wages or workers' compensation benefits, and how these compensation mechanisms influence the level of workplace safety. These issues have not only been the focus of considerable attention by academics, but have also been applied to important public policy issues such as evaluating the benefits of safety programs and determining the optimal levels of workers' compensation benefits.

As with most applications of economic theory, however, a number of these results have relied on very specific assumptions about the ways in which individuals obtain and use information about risk. Information plays a critical role in economic theory. While economists have studied the role of information asymmetries in great detail, they have

paid less attention to how individual agents accumulate information and implement it in decision making. The standard economic model is one in which people process information perfectly, fully comprehending (and using) all information available to them. Gradually, however, economists have become increasingly interested in deviations from the perfect rationality model, particularly with regard to the processing of information about risk and uncertainty. We refer to the study of this issue broadly as *behavioral economics*.

For obvious reasons, the ability of individuals to accumulate and process information about risk is particularly important for economists studying occupational safety and health. If we fail to properly model the ways in which individuals perceive, value, and respond to risk, it is unlikely that we will be able to accurately predict behavioral responses to changes in the risk of workplace injuries. This has important implications not only for economic research, but also for policies designed to promote workplace safety.

The objective of this chapter is to both explore how past research in the economics of occupational safety has dealt with deviations from the perfect rationality model, and to ask how the standard predictions change when we incorporate some of the key results of behavioral economics. Economists since Adam Smith have recognized that deviations from the perfect rationality model would influence the way individuals respond to occupational risk. However, most recent studies use the basic framework from the standard perfect rationality model and study the effect of introducing a relatively small perturbation to the model, almost always by adding a subjective probability function that underestimates the true risk of occupational injuries. We attempt to incorporate some of the richer and more complex elements of behavioral economics into the analysis in the hopes of isolating some areas where current research might provide either misleading or incomplete conclusions about the role of occupational risk in employment and safety decisions.

Before proceeding we would like to note that this chapter is intended to be suggestive, and we do not presume to provide a comprehensive integration of behavioral economics with the economic analysis of workplace safety. Both fields are vast and complex, and we focus our attention on just a small sample of the possible set of issues. Nevertheless, we believe that the issues we focus on are important and illustrate both that occupational safety is a natural place to apply (at least some

of) the principles of behavioral economics, and that these principles can have a profound impact on our predictions.

We proceed as follows. In the next section we outline the standard model of occupational risk in an expected utility framework. We focus on two key issues from the economics literature: the existence of compensating wage differentials for job risk, and the relationship between workers' compensation benefits and workplace safety. Our discussion focuses on the derivation of the main results in the perfect rationality model and some of the empirical evidence. In the third section, we then review some basic principles of behavioral economics. Our goal with this section is to summarize some of the evidence on how individuals perceive, value, and respond to risk differently than in the standard economic model. In the fourth section we discuss the extent to which the behavioral model alters the predictions of the standard model. In the fifth section we discuss the possibility that employers might be subject to some of the same behavioral phenomena that affect workers, and we discuss how this could influence the predictions of the model. The sixth section then draws out some of the policy implications from our integrated model, and the final section concludes with recommendations for future research.

THE CLASSICAL APPROACH TO WORKERS' COMPENSATION

In this section we outline some of the basic results that have been obtained from applying economic analysis to workplace safety. We focus our analysis on two central topics that have been studied in the literature: the existence of compensating wage differentials for job risk, and the relationship between the insurance for occupational injuries and the level of workplace safety. These topics are particularly useful for our purposes because they comprise many of the most important results in the field and, as we demonstrate later on, because they are sensitive to assumptions about how individuals perceive, value, and respond to risk.

Compensating Wage Differentials for Job Risk

Adam Smith first introduced the concept of compensating differentials for job risks in *An Inquiry Into the Nature and Causes of the Wealth of Nations*. Smith (1937) argued that individuals faced with two identical jobs would, all other things equal, require more compensation to accept the job that involved a higher risk of personal injury or illness. Nearly 200 years later, Rosen (1974) formalized this intuitive notion and provided an empirical methodology to estimate the implicit “price” that workers charge for bearing the risk of injury on the job. Rosen’s work spawned a large literature dedicated to estimating this price using labor market data.

The intuition behind the empirical methodology is straightforward. Consider the empirical model relating individual wages to job characteristics:

$$(9.1) \quad w_i = \delta + X_i\beta + Z_i\zeta + \alpha q_i + \varepsilon_i,$$

where w_i represents the wage offer w for worker i , X represents a vector of individual characteristics such as age, gender or education, Z represents a vector of characteristics of individual i ’s job, q represents the probability of injury on the job and ε is a random, mean zero error term. Note that for simplicity we consider a single injury type here, but in practice the model has been extended to include vectors of both fatal and nonfatal risks.

For our purposes the chief parameter of interest in this regression equation is α , which represents the compensating wage differential. Assuming that the parameter estimate of α is well identified (generally that α is uncorrelated with ε), then we can literally interpret it as the marginal increase in wages an individual would require to make him or her indifferent to a marginal increase in job risk. This parameter is important, because in theory the price individuals charge to bear risk should be synonymous with their willingness to pay to reduce risk. The ability to estimate the willingness to pay to reduce risks is of critical importance for public policy, because this information is necessary if we wish to monetize the benefits of policies designed to increase safety. With the wealth of available data on individual wages, the estimation of compensating wage differentials for job risks has played a key role in

cost–benefit analysis for many environmental and health policies.

Numerous empirical studies have used Rosen’s approach to estimate α , beginning with Thaler and Rosen (1976). In general, the empirical results have shown evidence of a compensating wage differential for fatal injury risk, but only mixed evidence of a wage differential for nonfatal injury risk (Viscusi 1993). A number of explanations have been posited for why the estimated differentials for nonfatal risks are difficult to estimate. From an empirical standpoint, the general problem is that the parameter of interest α might be negatively correlated with the error term ϵ , which causes a negative bias in estimates of α . The primary reasons for this suspected correlation presented in the literature are a confounding effect of workers’ compensation benefits, selection bias, and measurement error.

A failure to include workers’ compensation benefits in the vector Z could bias α toward zero because these benefits reduce the expected cost of injuries, so workers with higher benefits demand a lower compensating wage differential. To eliminate this bias, a number of studies have included a measure of workers’ compensation benefits and have increased the size of the estimated compensating wage differential (Viscusi 1993).

Selection bias can result because the level of job risk may be a choice variable for the worker. Individuals with a greater tolerance for risk might be more willing to accept employment at a risky job, a tendency that would bias the compensating differential downward. Brown (1980) used a fixed-effects estimator to control for this selection and found little evidence of compensating differentials for job risk. Garen (1988) used an instrumental variables approach and found evidence of relatively large compensating differentials. Measurement error is one possible explanation for why Brown (1980) found no evidence of compensating differentials. Black and Kniesner (2003) found evidence of significant, nontrivial measurement error in published job-risk variables that was correlated with other observable variables, making it impossible to consistently estimate compensating differentials with ordinary least squares.

These are all plausible explanations as to why it is difficult to estimate compensating wage differentials for nonfatal, or even fatal, job risks. However, each of these can be overcome given the appropriate econometric technique and the availability of instrumental variables.

Later, when we discuss compensating wage differentials in the context of behavioral economics, we will see how certain elements of the behavioral model will call into question our ability to obtain estimates that are meaningful for policy analysis.

Optimal Workers' Compensation Benefits and Safety Incentives

In the United States, the primary relief for workers injured on the job comes from workers' compensation. One of the key features of workers' compensation is that it offers only partial compensation for workplace injuries. Whereas an individual with a valid cause of action suing for damages in the tort system would be eligible to recover full economic losses as well as noneconomic losses (pain and suffering), workers' compensation provides only partial replacement for lost income and no compensation for noneconomic losses. On the other hand, because individuals can recover damages regardless of whether or not there was negligence, compensation occurs with much greater frequency than it would in the tort system.

A common justification for the use of partial coverage in workers' compensation is the potential impact of benefits on safety incentives. One facet of this argument supposes that individual workers have the ability to take precautions that reduce the risk of injury but are unobservable (or unverifiable) to employers. If workers can control the level of risk they face, and if safety precautions involve some cost, then no-fault insurance will give workers the incentives to take fewer precautions and thereby reduce the overall level of safety. By only providing partial income replacement, workers' compensation benefits reduce any disincentive by workers to take care.¹ It may also reduce employer efforts to oppose reporting of legitimate claims, because such efforts would yield greater savings (Chelius and Kavanaugh 1988; Azaroff, Levenstein, and Wegman 2002). Note that there are other dimensions of this problem that may be mitigated by partial insurance coverage that might have little or no direct impact on actual safety levels, such as fraudulent claiming or extending injury duration past the true recovery period. In addition, workers' compensation may lead employers to reduce safety precautions if they are imperfectly experience rated or if workers do not demand the "optimal" level of precautions (Rea 1981; Smith 1992).

Worker safety precautions are not the only mechanism through which workers' compensation can influence the risk of occupational illnesses or injuries. A natural argument against removing occupational injuries from the tort system and restricting compensation is that it will reduce the incentives of employers to invest in safety precautions that reduce the frequency and/or severity of occupational injuries. Workers' compensation provides incentives for employers to improve safety, as fewer and less severe injuries will result in lower benefit payments (and correspondingly, lower workers' compensation insurance premiums).

The effect of workers' compensation benefits on workplace safety is the subject of debate in the literature. Studies such as Krueger (1990) and Ruser (1993) generally find evidence in support of the notion that higher workers' compensation benefits lead to higher injury rates (for a review of the literature see Butler 1994). Less evidence has been found to support the claim that firms respond to incentives to improve workplace safety (see Roberts 2005). Later in this chapter, we explore how behavioral economics changes our predictions about the relationship between workers' compensation and workplace safety, and ask if it offers any guidelines for public policy.

THE BEHAVIORAL APPROACH TO RISK AND UNCERTAINTY

In this section we briefly review how behavioral scientists have thought about decision making under uncertainty, with a particular eye for the decision elements relevant for the study of occupational safety. We focus much of our discussion, at least in a broad sense, on the work of Kahneman and Tversky, which has exposed some critical assumptions that have led economists traditionally to mischaracterize human behavior (Rabin 2003). Specifically, we utilize the framework of *prospect theory*, introduced in Kahneman and Tversky (1979).

One of the most important contributions of behavioral economics is to demonstrate that people make *predictable* judgment errors when faced with uncertainty (Rabin 2003).² Individuals frequently employ rule-based, decision making techniques when they cannot calculate the costs and benefits of a choice. People may lack the time or the analytic skills necessary for the evaluation. For some, the dearth of cru-

cial information regarding the choice, such as objective probabilities and outcome values, hinders the rational decision-making process. For others, the dizzying array of information simply overwhelms. The frequent practice of substituting heuristics, or cognitive rules of thumb, for structured analysis helps to explain why normative theory tends to fall short of reality. It also demonstrates the importance of considering the bounds to human rational decision making.

Prospect theory provides a systematic methodology for reconciling individual decision making with some of these errors. As a descriptive theory of choice, prospect theory illustrates decision making under risk as a selection among particular gambles or prospects. It distinguishes between two stages of the decision making process: an editing phase in which an individual organizes the problem into a choice between changes in wealth (or utility), and a choice phase in which the individual chooses whichever outcome has the highest value. In this section we discuss how individuals might “edit” the problems associated with job risk. In particular, we focus on three aspects of the problem where this editing is of key importance: the perception of risk, the valuation of risk, and the response to risk. In the next section we then consider how these edited problems produce results that are different from the classical model.

Before moving on, we identify some subtle differences in what we mean by “risk” in these three aspects of individual behavior. When we discuss how individuals perceive risks we are generally referring to their perception of the probability of an injury or illness occurring. When discussing how individuals value risk we are talking more about the magnitude of the loss in utility individuals face if an injury or illness occurs. Finally, when we discuss how individuals respond to risk we refer to the behavior of individuals in response to the probability of an injury, the size of the loss, or, most often, the expected value of the loss.

How Do Individuals Perceive Risks?

In this section we are interested in the ways in which individuals perceive risks to health. Perhaps the most important question is whether or not individuals perceive risks accurately, i.e., does an individual’s subjective assessment about the likelihood of some adverse event oc-

curing equal the “true” likelihood on average. Evidence supports the notion that individuals do not perceive risk accurately, and has led behaviorists to identify a number of cognitive biases that disturb an individual’s information processing about risk. Below we discuss three of these biases that we feel are most relevant to the study of occupational risk: the availability bias, the optimism bias and the accumulation bias. We review the empirical evidence on each of these biases as they pertain to the workplace if such evidence is sufficiently available, and to health risks more generally if it is not.

The availability bias

Biased predictive judgments and subjective probabilities frequently result from the common use of the *availability bias*. Humans tend to judge the likelihood of an event by its ease of recall: we tend to disproportionately weigh *salient* and *memorable* events even when better sources of information exist (Rabin 2003). To illustrate, consider the fact that a substantial number of people have avoided flying since the 9-11 terrorism attacks but continue to drive at high speeds on the nation’s highways, where physical injury is far more likely to occur. Additionally, we observe that people tend to be overly influenced by friends’ remarkable mishaps with certain car brands, ignoring the empirical evidence readily available from publications such as *Consumer Reports* (Rabin 2003). Tversky and Kahneman (1974) further illustrate this phenomenon as follows:

The subjective assessment of probability resembles the subjective assessment of physical quantities such as distance or size. These judgments are all based on data of limited validity, which are processed according to heuristic rules. For example, the apparent distance of an object is determined in part by its clarity. The more sharply the object is seen, the closer it appears to be. This rule has some validity, because in any given scene the more distant objects are seen less sharply than nearer objects. However, the reliance on this rule leads to systematic errors in the estimation of distance. Specifically, distances are often overestimated when visibility is poor because the contours of objects are blurred. On the other hand, distances are underestimated when visibility is good because the objects are seen sharply. Thus, the reliance on clarity as an indication of distance leads to common biases. Such biases are also found in the intuitive judgment of probability.

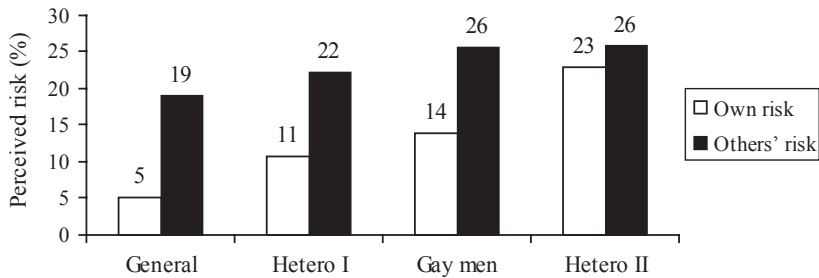
While some workers demonstrate a fairly accurate perception of risk (for example, see Ostberg 1980; Singleton, Hicks, and Hirsch 1981), empirical studies provide some evidence of workers' reliance on availability for occupational risk perceptions. For instance, in his survey of 915 workers on eight Norwegian oil rig platforms, Rundmo (1992) found that people most frequently perceived risk in connection with disasters and major accidents rather than with their routine tasks. This result also indicates the "flipside" of the availability bias—that workers may grow accustomed to their frequent and routine occupational dangers. In so doing, these risks may lose their "remarkableness" and are then underestimated as being "normal."

Organizational behavior scholars have provided us with substantial evidence of workers in familiar, highly risky work situations who underestimate their risk levels in comparison to workers in unknown situations with comparable risk profiles (Mearns and Flin 1996). For example, Zimolong (1985) found that workers in the construction industry typically overestimate the risks involved in tasks that they perform infrequently or do not understand fully, while commonly underestimating the risks involved in performing their routine tasks. In a subsequent study, Zimolong (1991) found that railway shunters, who are responsible for coupling and uncoupling train cars, overestimate the risks for tasks that have a reputation for being dangerous and underestimate the risks involved with routine activities. Rundmo (1992) found similar results in his work concerning Norwegian oil rig personnel; workers frequently perceived risk in connection with disasters and major accidents rather than in their common work responsibilities.

The optimism bias

Another form of bias that has commonly been demonstrated in perception of risk is the *optimism bias*. The optimism bias simply states that people tend to underestimate their own injury risk compared to the average risk. Health behavior researchers have found that people generally think that they are less vulnerable to adverse health outcomes than the rest of the population. Specific examples appear frequently in the AIDS risk perception literature.

One such study focused on people's comparative AIDS risk assessments (van der Velde, van der Pligt, and Hooykaas 1994). The researchers surveyed four groups in Amsterdam, listed roughly in the order of

Figure 9.1 Mean Scores of AIDS Risk Perceptions, Own versus Others

SOURCE: van der Velde, van der Pligt and Hooykaas (1994).

their increasing risk of contracting AIDS: a nationally representative sample ($n = 437$), heterosexuals with multiple private sex partners ($n = 241$), homosexual men with multiple sex partners ($n = 147$), and heterosexuals with multiple prostitution partners ($n = 493$). They asked the participants to assess their personal risk (i.e., the likelihood that the subject himself or herself becomes infected) and average risk (i.e., the likelihood that a random person in their age group becomes infected). They found that people with more objective risk factors perceive themselves to be at greater risk. However, the subjects rated their personal risk substantially lower than that of others and were extremely optimistic about their own chances of avoiding the virus (see Figure 9.1).

A similar form of the optimism bias appears in workplace-related health risks. The more direct experience workers have with occupational hazards without adverse outcomes, the more confident they are in their ability to control the risk (Weyman, Clarke, and Cox 2003). For instance, a study of mine bunker operations reported that there was a “widespread faith in their ability to respond to dangerous incidents” (Rushworth et al. 1986). It thus appears that there is a kind of “Lake Woebegon” effect: when it comes to evaluating one’s own ability to avoid adverse health outcomes, everyone feels above average.

The accumulation bias

Other inaccurate risk perceptions result from the tendency of humans to form incomplete problem representations. Researchers have

observed that people do tend to learn about risks in ways that change their original assessments of risk. In a study concerning 130 manufacturing workers, Cree and Kelloway (1997) found that accident history as well as perceptions of others' commitment to health and safety were predictive of workers' risk assessments. They also found these risk perceptions related to the workers' willingness to participate and turnover intentions. However, their risk perceptions may still fall short of the real level of exposure occurring in their workplace because of the *accumulation bias*.

People have the tendency to perceive risks "in isolation" rather than as a sequence of similar decisions or one that accumulates over a lifetime (Linville, Fischer, and Fischhoff 1993). Researchers have found that people typically do not perceive a difference between the likelihood of injury occurring when a risky action is taken once versus the likelihood that ensues through multiple exposures. For example, people may understand that the chance of being injured in a car accident is about 1 in 10,000 each time they drive. However, they typically fail to realize that this statement is equivalent to a 33 percent probability of being in an injurious accident at least once during their lifetime (Slovic, Fischhoff, and Lichtenstein 1978).

Researchers have observed this tendency in a variety of psychology experiments related to health behaviors. Doyle (1997) found that people underestimate the cumulative risk of contraception use by failing to use the binomial probability model, where the probability of an unintended pregnancy is equal to 1 minus the probability of an intended pregnancy in one encounter raised to the number of sexual encounters. Likewise, Linville, Fischer, and Fischhoff (1993) found that peoples' risk estimates for being infected with AIDS in more than 10 encounters were far too small when considering the risk they perceived in one encounter. Their subjects' median risk perception of transmitting AIDS from a male to female when using a condom was 5 percent in one encounter, 10 percent in 10 encounters, and 20 percent in 100 encounters. If the subjects had appropriately applied the binomial probability model, they would have argued that the risk was 40.1 percent in 10 encounters and 99.4 percent in 100; these values differ with statistical significance.

Summary

Here we have discussed three important biases about the ways in which people perceive risks. It is important to note that the biases are not mutually exclusive, and often work together. For instance, in the AIDS perception study by Linville, Fischer, and Fischhoff (1993) it was found that individuals underestimate lifetime risk given their own estimates of the risk from a single exposure. However, they found that individuals substantially *overestimated* both the single exposure risk and lifetime risk. This is easily explained by the availability bias; the risk of HIV infection is highly publicized and easy to recall, thus individuals tend to overestimate it. When taken in concert with the results of van der Velde, van der Pligt, and Hooykaas (1994), we can see how all three biases can be present with an individual's perception of a single risk to health.

These misperceptions can influence individual behavior and potentially lead to poor health decisions, including those precautions taken and protective equipment used to ensure occupational safety. For example, workers may neglect to wear a mask in a dusty warehouse because the risk of developing asthma from a single day of inhaling pollutants is relatively low. On the other hand, Linville, Fischer, and Fischhoff (1993) found that individuals overestimate the ability of condoms to protect them from a sexually transmitted disease. This suggests that in some cases individuals may place too much faith in protective technologies, and may avoid other kinds of precautions that are necessary to minimize the risk of injury.

How Do Individuals Value Risks?

Prospect theory suggests that it is important not only to consider how individuals perceive risks, but also the ways individuals value risks. More precisely, it suggests that we should pay attention to the relative weights that individuals place on the gains and losses that are at stake. Standard economic theory predicts that people should value gains and losses symmetrically. In general, prospect theory suggests that this symmetry does not hold, particularly when the gains and losses are uncertain. If true, this might cause us to not only change our predictions about behavior, but to change the way we interpret observed behavior.

More specifically, individuals frequently display signs of *loss aversion*, suggesting that they dislike losses more than they like gains of equal magnitude (Kahneman and Tversky 1979; Tversky and Kahneman 1991). While there are many implications of loss aversion, for our purposes we can illustrate the key concepts with the following hypothetical scenario. Consider a risk averse individual who receives utility from some good y according to the function $U(y)$, where U is increasing and concave. Now suppose the individual faces two lotteries: one (which we call A) in which she begins with $y = 2,000$ and faces a gain of 1,000 with probability 0.25, and the other (called B) in which she begins with $y = 3,000$ and faces a loss of 1,000 with probability 0.25. In this example the expected utility for the lottery A is equal to $0.75U(2,000) + 0.25U(3,000)$ and the expected utility for lottery B is equal to $0.75U(3,000) + 0.25U(2,000)$. It is a simple enough matter to show that the gain in expected utility from beginning with 2,000 and participating in lottery A is equal to the loss in expected utility from participating in lottery B.³ This is an important point, because expected utility theory implies that *the amount individuals would be willing to pay to participate in lottery A should be equal to the amount they would pay to avoid lottery B*.

As we have stated, we would not expect this symmetry to hold under prospect theory. Prospect theory generally supposes that individuals evaluate changes based on gains and losses. Moreover, individuals evaluate these changes in welfare using a value function, which we denote $V(\cdot)$, that assigns a subjective value to a given gain or loss. Suppose we ignore the problems discussed in the previous section and assume that individuals perceive the probability of gain and loss accurately. If we let $a = [U(3,000) - U(2,000)]$ and $b = [U(2,000) - U(3,000)]$, we can define the value of lottery A as $V(a)$ and the value of lottery B as $V(b)$. Under expected utility theory, we would have $V(a) = -V(b)$, but under prospect theory we expect that $V(a) < -V(b)$. The subjective value that individuals place on a loss is greater than the value placed on an equivalent gain. Thus, we can say that *if individuals are loss averse, then the amount they would be willing to pay to participate in lottery A will be less than the amount they would pay to avoid lottery B*.

We should note that the concept of loss aversion is distinct from the concept of risk aversion, which is fundamental to the neoclassical theory of insurance demand. Risk aversion essentially states that

individuals dislike risk, and will require a premium to accept a lottery with an uncertain outcome but the same expected value as one with a certain outcome. Mathematically, risk aversion is incorporated under the standard model through the assumption that the utility function, represented by $U(y)$ is concave (so the marginal utility of income increases at a decreasing rate). Although the two concepts sound similar, they refer to two very different behavioral phenomena. Simply put, an individual who is risk averse dislikes uncertainty, even uncertainty between two positive outcomes. Someone who is loss averse dislikes a shortfall, whether it occurs with certainty or not. In general, an individual can be loss averse and risk averse at the same time. However, an interesting implication of loss aversion pointed out by Kahneman and Tversky (1979) is that loss averse individuals will be risk loving with respect to avoiding losses (in other words, they will prefer an uncertain loss to a certain one with identical expected value).

There is a great deal of experimental evidence to support the existence of loss aversion in individuals (e.g., see Knetsch 1989; Kahneman, Knetsch, and Thaler 1990; and Bateman et al. 1997). Most of the studies we are aware of focus on actual consumption goods, and have not established whether or not individuals are averse to losses of health. Nevertheless, the evidence supporting loss aversion in empirical studies is certainly strong enough to suggest that it is a phenomenon worthy of further study in the context of job-related health risks. As we shall see later on, the possibility that individuals are averse to health losses will have substantial implications for the economic analysis of workplace safety.

How Do Individuals Respond to Risk?

While the ways individuals perceive and value risks are important considerations for studying human behavior with regards to workplace injuries, in some sense they are both merely elements in the decision process that drives individual choices. McFadden (1999) defines a *cognitive process* as “the mental mechanism that defines the cognitive task and the role of perceptions, beliefs, attitudes preferences and motives in performing this task, to produce a *choice*.” Therefore, we can think of risk perception and the value placed on risky options as specific components in the larger problem of individual decision making.

Economists generally rely on the principle of utility maximization as the cognitive process that drives behavior. Taking preferences as given, the economic model predicts that individual behavior can be well explained by a process by which individuals choose whatever allocation of resources provides them with the highest overall benefit. While there can be no question that the utility maximization model has proved extremely useful and provided countless valuable insights into human behavior over the years, it has been criticized by behaviorists as ignoring many other important principles that influence behavior. This criticism is an important one for our purposes, because even if we make the right assumptions about subjective probability and subjective value we may still find it difficult to predict behavior if individuals do not respond to risk as assumed in the standard economic model.

If individuals fail to (always) act as rational utility-maximizing agents, then what principles do we expect to govern the choices that they make? Prelec (1991) argues that individuals create decision rules to guide choices in cases where ordinary cost–benefit analysis is problematic. It is important to distinguish between these rules and the more common bounded rationality model. Prelec explicitly distinguishes rules that override cost–benefit analysis even when the analysis is relatively straightforward from the rules associated with bounded rationality, which are used exclusively when cost–benefit analysis is difficult and costly. For our purposes, bounded rationality would lead to similar results if the cost–benefit analyses associated with workplace safety decisions are sufficiently complicated.

Prelec suggests three cases in which cost–benefit analysis might fail. The first case is that of a *temporal mismatch*, whereby individuals have difficulty assessing the net gain or loss of a particular action when its cost(s) and benefit(s) are separated by a substantial period of time. The second refers to a *saliency mismatch*, in which one of the pair (i.e., either the costs or the benefits) is vivid and easy to understand or imagine while the other is vague or uncertain. The final case is that of a *scale mismatch*, in which either there is a large disparity between the costs and benefits or if one of them is only realized if the action is repeated many times. Prelec argues that cost–benefit analysis fails under each of these because it leads to an asymmetry in the weight assigned to either the cost or benefits associated with the action.⁴

Risks to health resulting from workplace injuries may be subject to any of the three mismatches that confound cost–benefit analysis. For example, determining the level of care to exert when using certain machinery that may pose a risk of loss of limb potentially suffers from the scale mismatch. The scale effect could arise because the cost of using a machine carefully is relatively small while the benefit of not suffering a loss of limb is large. Faced with the similar decision of whether or not to wear a seat belt, Prelec (1991) argues that individuals may develop a simple rule that governs use regardless of small permutations of the problem (such as whenever it rains or whenever driving on the highway).

The scale mismatch is only one example of how behavior related to workplace risks might be subject to these cost–benefit asymmetries. Repetitive stress disorders represent a set of common occupational injuries that may suffer from the temporal mismatch, given that they only develop over long periods of time. The saliency mismatch could arise in cases where workers felt financial pressure to take risk. Faced with the threat of job loss because of low productivity, for example, workers may take unsafe shortcuts or work too fast because the potential for job loss seems more “real” than the possibility of injury. These mismatches need not be mutually exclusive; decisions relating to activities that might involve exposure to toxic chemicals potentially may be subject to all three mismatches (the cost of injuries are likely to be delayed, of unknown severity, and probably occur only after multiple exposures).

In general, if individuals create rules that govern behavior with regard to workplace activities that influence the likelihood of workplace injuries, then these rules will have several implications for the predictions of the standard model laid out in the second section. We explore these implications in the following section.

INTEGRATING THE STANDARD MODEL AND THE BEHAVIORAL MODEL

Here, we come back to the results of the standard model and examine how they are affected by the principles of behavioral economics. We follow the same outline as in the second section, focusing first on compensating wage differentials and then moving on to the optimal

workers' compensation benefits and levels of workplace safety. We consider how the results of the behavioral model affect both the theoretical predictions of the standard model and the empirical studies estimating these predictions.

Compensating Wage Differentials for Job Risk

Generally speaking, integrating the principles of behavioral economics with the standard model has relatively little impact on the theory of compensating wage differentials. The standard model states that workers will require higher compensation to accept employment in occupations associated with increased risk of workplace injuries or illnesses, *ceteris paribus*. In the behavioral model, we need only refine this statement to say that individuals will require higher compensation to accept employment in occupations in which there is *perceived* to be a greater likelihood of an injury or illness.

The distinction between actual and perceived risks is an important one. The standard economic model predicts that individuals will respond to the actual level of risk. Economists interested in workplace safety have generally understood that individuals may not perceive risks accurately, however, and it is often assumed that individuals underestimate the risk of job injuries.⁵ This assumption seems widely supported by the empirical evidence on the availability bias, optimism bias and accumulation bias discussed in the third section. Given that we expect workers to respond to the risks that they perceive, the size of the compensating wage differential they demand will be based upon the perceived risk as opposed to the actual risk. Importantly, as long as the perceived risk of injury is positively related to the actual risk, the compensating wage differential will still be positive.

As discussed in Viscusi (1993), if workers systematically underestimate the level of occupational risk, then they will demand a lower compensating wage differential. To see how this can matter empirically, consider Equation (9.1) on p. 222. In this setting the true job risk variable q serves as a proxy for the perceived job risk, and the estimated parameter α represents the compensating wage differential multiplied by the correlation between the actual and perceived job risk. If workers underestimate the risk of job injury then the correlation between the

true and perceived levels of risk will be less than 1, implying a lower observed compensating wage differential.

The underestimation of risk may lead to a lower compensating wage differential than the standard model would predict, but loss aversion will tend to have the opposite effect. To see this, consider that, according to prospect theory, individuals choose between different options by comparing the gains and losses associated with each. In the case of choosing an occupation, this would suggest workers compare the “gain” of staying healthy and receiving wages against the “loss” of being injured and receiving workers’ compensation benefits.⁶ If individuals are loss averse, they will place additional weight on the loss from being injured relative to the gain from staying healthy and receiving the compensating wage differential. This suggests that if individuals are loss averse they will require extra compensation to accept higher levels of perceived risk than what is predicted by the standard model.

While the predictions of the behavioral model are fairly benign from a theoretical standpoint, they are problematic for the purposes of estimation because they have opposite effects on the size of the differential. This makes it difficult to interpret differences in the estimated coefficient (α) for different kinds of risk. For instance, the fact that past studies have had relatively more success estimating positive compensating wage differentials for fatal risks than nonfatal risks is consistent with two behavioral explanations: 1) that individuals underestimate the risk of nonfatal injuries more than fatal injuries (which perhaps are overestimated), or 2) that the impact of loss aversion will be more severe with respect to fatal injuries than nonfatal ones (because clearly it makes sense to think of fatal injuries as involving a greater loss). While these explanations need not be mutually exclusive, they complicate matters by adding two more to the (already long) laundry list of items that potentially confound the estimation of compensating wage differentials.

In some ways, the issues raised by the behavioral model pose greater challenges to obtaining meaningful compensating wage differential estimates than the standard criticisms. Measurement error and selection bias are statistical problems that can be addressed using standard econometric techniques, at least if the proper instrumental variables can be obtained. However, disentangling the estimated compensating wage differential from the impact of subjective evaluations of risk and loss

can only be accomplished by eliciting additional information from individuals.

While our discussion in this section has focused on wage differentials, disability benefits represent an alternate means of compensating individuals for bearing risk. So, if we broaden our perspective to think about the implications of the behavioral model on the total injury compensation available to workers, we obtain similar results. Viscusi and Moore (1987) model the trade-off that workers implicitly accept between wages and workers' compensation benefits as an increasing function of the level of risk. Individual behavior should be governed by perceived risk, so if workers underestimate the true level of risk then they will be willing to trade off less wages in return for benefits and thereby lower the optimal level of workers' compensation benefits. On the other hand, if individuals are loss averse then they will place a greater weight on the possibility of a loss, which will increase their willingness to trade off wages for benefits at any given level of perceived risk. Thus, elements of the behavioral model may lead to either a lower or higher optimal level of workers' compensation benefits when compared to the standard model.

Worker learning

Before moving on to discuss the optimal workers' compensation policy, it is worth considering the possibility that individuals learn to overcome their subjective evaluations as they gain experience. Viscusi (1979) hypothesizes that workers may be poorly informed about the level of risk at the start of their careers, but gradually learn about the level of risk over time. This suggests that the differences between the perceived probability of injury and the true probability may diminish over time, with workers possibly becoming perfectly informed with sufficient experience. If workers become more informed about risks, i.e., if they underestimate risk less, then workers with longer tenure in riskier jobs will demand higher compensating differentials or quit. Various works broadly support this prediction, including Viscusi (1979) and Moore and Viscusi (1990).

Another possibility is that individuals become less loss averse over time, in the sense that their relative weights on gains and losses become equalized as they gain experience. In a recent paper, List (2003) finds experimental evidence that individuals with more experience in

the market for trading cards tend to exhibit little or no evidence of loss aversion while those with less experience do. If this result held more generally to the case of workplace injuries it would suggest that workers with longer tenure would place relatively less weight on the possible loss from injuries and therefore require less compensation.

Thus, the effect of worker learning is to mitigate the impact of the behavioral model on the estimation of compensating wage differentials over time. Unfortunately, we know far too little about just how much workers actually learn over time to say with any certainty that this is the case. While the results of List (2003) are provocative, it is not clear *ex ante* whether or not individuals could learn to overcome aversion to health “losses” from injuries the same way they overcome aversion to income losses from trading goods. Additionally, while workers may become more informed about injury risk with experience, the availability bias suggests that it is possible that as risks associated with familiar tasks become better understood, individuals may revise their risk perceptions downward. Even if individuals do become more informed over time and their subjective risk assessments and loss valuations become “better,” the pace of learning may differ. This suggests that experience might have a nonmonotonic effect on the compensating differential, further complicating our ability to make predictions. Ultimately, a great deal of work needs to be done before we can understand the ways in which individuals learn about risk in the workplace.

Safety Incentives

The predictions of the behavioral model on the relationship between workers’ compensation benefits and safety incentives are varied and complex. Workers’ compensation benefits can affect the safety incentives of workers if, by reducing the financial burden of an accident, they make workers less cautious about avoiding accidents. Obviously loss aversion matters in this sense, because if individuals are loss averse then they will have more incentives to take care for a given level of benefits, but they may also be more responsive to a change in benefits. This suggests that under loss aversion, individuals may be more responsive to changes in benefits than predicted by the standard model.

When talking about compensating wage differentials and workers’ compensation benefits we focused on how individuals perceive the level

of risk, but when considering safety incentives it is important to consider how individuals perceive the way risks change as safety precautions change. Past studies such as Rea (1981) and Viscusi (1990) have generally assumed that the effect of precautions on perceived risk is directly related to the impact of precautions on actual risk. This suggests that if individuals underestimate the risk associated with workplace injuries, they will undervalue the marginal benefit of taking additional precautions. If this is so, then individuals will underinvest in safety for any given level of workers' compensation benefits. By extension, if benefits increase (decrease) then workers will generally respond by decreasing (increasing) precautions by more than what would be predicted in the standard model.

However, there are reasons to suspect that the relationship between safety precautions and perceived risk is not as straightforward as suggested in the literature. The optimism bias and the aforementioned results of Weyman, Clarke, and Cox (2003) and Rushworth et al. (1986) suggest that individuals may overestimate their ability to control risks. This suggests that for any given level of benefits individuals will tend to be more cautious than predicted by the standard model. This suggests a result opposite of the case discussed above; a change in workers' compensation benefits would have less of an impact on worker safety precautions than the standard model predicts.⁷

The implications of individual perceptions of risk on safety are not exclusive to the safety precautions taken by individual workers. As we discuss later on, it is plausible to suppose that employers, at least large corporations, are less subject to some of the behavioral criticisms than individual agents. Nevertheless, worker perceptions of risk may have an impact on employer safety measures. Rea (1981) demonstrates that if individuals underestimate risk they will demand too few safety measures from employers. On the other hand, if workers place too much faith in protective technologies, as Linville, Fischer, and Fischhoff (1993) showed individuals tend to do with condoms, they may demand supraoptimal safety measures from employers.

Note that these different effects of the behavioral model on the level of safety measures taken assume that precautions are set as the result of an implicit cost-benefit analysis made by workers, even if their subjective evaluations of probability and loss differ from the standard model. However, we discussed earlier how workplace injuries may suf-

fer from the kinds of cognitive mismatches that Prelec (1991) argues can confound cost–benefit analyses. If this is so, workers may respond by implementing decision rules that govern the level of safety precautions they take. If workers operate under decision rules such as “always wear safety goggles,” it is quite possible that relatively small changes in disability benefits will not be enough incentive to induce workers to change their safety precautions. Thus, in extreme cases the behavioral model may contend that there should be no relationship between safety levels and workers’ compensation benefits.⁸

DOES THE BEHAVIORAL MODEL APPLY TO EMPLOYERS?

Until now, all of our discussion has focused on applying the models of behavioral economics to workers. One question we have not addressed, and to our knowledge has not been addressed in the literature, is whether or not employers behave as the perfectly rational, perfectly informed economic agents they are supposed to be in the standard model. In this section we provide a brief discussion of how the behavioral model could be applied to employers and how this would change our predictions.

It is typical in economics to view employers, or firms more generally, as impersonal entities that are motivated solely by maximizing profits and share few of the behavioral nuances of individuals. For example, it is common to view employers as risk neutral while individual workers (or other agents) are typically assumed to be risk averse.⁹ Likewise, models of occupational safety that incorporate risk misperceptions by individual workers typically assume that firms are fully informed about the true injury risk. There are a number of reasons that employers may behave more like the rational economic agents than individual workers. First, employers may have access to better data on the actual risk of injury to employees. Also, it is not clear the extent to which the personal nature or risk influences individual behavior, and it is possible that employers would have a more accurate perception of risk because it did not directly affect them.

On the other hand, there are reasons to suspect that employers may not perfectly fit the rational economic model. In general, large employers are probably most likely to be able to accurately predict the risk

of injury to an individual worker, simply because of the law of large numbers.¹⁰ Small employers will simply not have enough observations to accurately formulate a probability. Even if employers as organizations understand the true risk of injury to workers, they are still driven by the decision making of individuals. It seems reasonable to suspect that individual managers might be poorly informed about the risk of injury to workers, or suffer similar cognitive biases about risk as those discussed above.

Another factor that might mitigate some of the impact of employers' risk misperceptions that will likely not be available to workers (even unionized ones) is the presence of insurance companies. Presumably, insurance companies have the knowledge and expertise to construct the most accurate estimates of the actual risk of injury for individuals. Thus, even if an employer does not place the appropriate marginal benefit on safety precautions, the insurance company could provide financial incentives for safety through discounts in workers' compensation premiums.¹¹

However, there are other ways that investment in workplace safety might enter a firm's profit function than through premiums, such as the direct cost of investment, the impact of workplace safety on the expected marginal productivity of labor, and reductions in the compensating wage differential. Even if insurance companies can mitigate some of the impact of risk misperceptions, they likely won't have much effect on the wage negotiations between workers and employers unless they are able to communicate the appropriate risk levels. Also, the ability of insurance companies to convey accurate risk information will be less for smaller firms that are not perfectly experience rated. And finally, there are some risks for which even insurance companies likely have trouble assessing accurately, such as catastrophic risks. In these special cases, which involve extreme losses but have uncertain probability, employers and workers may over- or underreact in a similar fashion.

If employers as whole, or individual managers within firms, deviate from the perfectly rational model in ways that are similar to individual workers, then our model would predict different behavior for them as well. Consider the case of compensating wage differentials. If employers underestimate the risk of injury to individual workers, we might expect that this would make them less willing to negotiate compensating wage differentials. However, note that injuries will affect the expected

marginal productivity of labor, because injured workers are (at least temporarily) less productive than healthy ones. In this case, if employers underestimate the risk of injury it might lead them to *overestimate* the expected marginal productivity of labor (because more workers will be injured, and therefore be less productive, than expected by the employer). If employer misconceptions were positively correlated with the true injury risk, i.e., if they underestimated risk more in riskier jobs, this could lead to an upward bias of the compensating wage differential.¹²

Investment in workplace safety provisions will also be affected if employers deviate from the standard model. If employers underestimate the risk of injury, they may thereby underestimate the marginal benefit of safety measures. If this is the case, it will lead employers to underinvest in safety. On the other hand, suppose that employers overestimated their ability to influence workplace safety measures. This will lead employers to “oversupply” workplace safety, meaning they will invest beyond the point where the true marginal benefit equals marginal cost. However, if employers underestimate their ability to influence risk they will tend to undersupply workplace safety provisions. Ultimately, the equilibrium level of safety will be a complex function depending on both the employer’s and the employee’s perceptions of risk as well as other fundamentals of the model.¹³

POLICY IMPLICATIONS

The discussion in the previous two sections focused on the implications of the behavioral model for research on the economics of workplace safety. However, just as this research has influenced public policy we believe that the issues we raise also have important policy implications. We focus our discussion on the two policy areas that are most closely related to our previous analysis: the use of compensating wage differentials to estimate the value of life, and policies designed to improve workplace safety.

Using Value-of-Life Estimates in Cost-Benefit Analysis

Government policies and regulations can often reduce the risk of fatal and nonfatal injuries to individuals, but sometimes only at substan-

tial cost. In order to determine which policies are most cost-effective, it is necessary to have some estimate of the willingness to pay for a reduction in the level of risk. Compensating wage differential estimates can be used to provide an estimate of the “value-of-life,” allowing a computation of the expected benefit of increased safety in terms of a dollar amount. The use of value-of-life estimates to evaluate public policies began in the 1980s and has become more widespread since (Viscusi 1993).

Obviously these estimates are only useful to the extent that we are able to identify them well empirically, and as we have discussed there are numerous problems to doing so. The criticisms that come from the behavioral model are different, however, in that they do not question the validity of the empirical predictions as much as they question how to use the predictions. Specifically, while the behavioral model does predict that the size of the estimated compensating wage differential may be different than predicted by the standard model, this is not the same as saying that the estimated differential is biased. Indeed, if we ignore the measurement error and selection issues, the estimated relationship between wages and actual job risk should be well identified. The complication comes in interpreting the coefficient, because it will implicitly reflect the relationship between the actual risk and the individuals’ subjective risk perceptions and valuations. This is particularly troubling if the value-of-life estimate is used to assess the cost and benefits of some policy designed to reduce a risk that is subject to different cognitive biases than job-related risk (such as a plane crash, the risk of which individuals overestimate).

In some sense, the key impact of the behavioral model on the use of value of life estimates is to highlight the need for additional data. We simply do not know enough about the ways workers (or employers) perceive, value, or respond to risk. Survey and experimental data that elicited this information for job-related health and income risks would not only increase our understanding of many of these issues, it would allow us to generalize and improve the policy usefulness of value-of-life estimates based on labor market data.

Promoting Safety in the Workplace

Workers' compensation is generally thought to provide employers and workers with financial incentives to improve safety. While this may be true, the behavioral model questions the effectiveness of both our ability to predict how strong the safety incentives are and whether or not they will have much effect at all. However, workers' compensation is certainly not the only public policy that deals with workplace safety. The federal Occupational Safety and Health Administration (OSHA) was founded in 1971 as a regulatory body to promote safer workplaces, and 24 states have their own health and safety plans that are approved and monitored by OSHA. Rather than rely (solely) on financial incentives, these organizations rely on traditional regulatory measures such as inspection and enforcement of safety programs.

However, it needs to be determined in light of the behavioral criticisms exactly what kinds of safety programs are most likely to be effective. Rea (1981) demonstrated that if individuals misperceive the risk of injuries they might respond to employer precautions in ways that mitigate the benefits of reduced risk. Moreover, if individual safety behavior is determined by rule-based decision making then it is difficult to predict how (if at all) individuals will respond not only to financial incentives but also to regulatory or programmatic incentives.

One important way to improve safety, or at least to improve the efficiency of safety decisions, may be to provide information to workers.¹⁴ We discussed above how experience and learning by individuals may allow them to overcome some of their cognitive biases about risk and act more like the rational economic agent. Of course, it often requires a substantial investment of time and effort to obtain and process information. If there are economies of scale in acquiring information then we might expect firms to have an advantage in this regard, which would make them a more efficient mechanism to collect and process the relevant data. More work needs to be done to say for sure, but it is possible that doing more to educate workers in risky positions, and perhaps the employers as well, would lead to more efficient long-run employment contracts between workers and employers.¹⁵

Even if information cannot fully overcome workers' or employers' biases, it may be helpful in other ways. Suppose worker safety precautions were governed by rules, but those rules were based on suboptimal

perceptions about risk. Thus, information may be able to help individuals switch to “better” rules that make them choose more efficient levels of precautions. All of this is highly speculative, but it does suggest that a better understanding of how individuals think about and respond to risk may allow us to come up with superior policies regarding workplace safety.

CONCLUSIONS

In this chapter we have attempted to highlight some principles of behavioral economics and show how they can influence the economic analysis of occupational safety. Behavioral economics predicts that in some cases individuals will fail to perceive, value, or respond to risk as predicted in the standard economic model. We have shown that if the behavioral model holds it will at the very least greatly complicate the analysis of how individuals respond to the risk of workplace injuries, and in many cases the standard model might make misleading (if not actually false) predictions about behavior.

We fully acknowledge that our analysis raises many more questions than it answers. Economists generally make assumptions to simplify analysis, and the elements of behavioral economics we discuss add complication back to our model. Given this, it is probably not surprising that, when we consider the additional dimensions that might govern individual choices, we find that these dimensions often work in different directions and restrict our ability to make clear predictions. That said, in many cases the general predictions of standard economic model hold, particularly with regard to compensating wage differentials. The strongest effect of the behavioral model seems to be to change our interpretation of the results we find empirically, and often this interpretation cannot be made without more *a priori* information about how individuals actually perceive, value, or respond to risk.

Now we come to the place that many researchers arrive at—calling for more research. In this case, it should be clear to the reader that we indeed know very little. Work is needed to disentangle the various behavioral predictions about the ways people cope with the risk of injuries and illnesses at work. Specifically, we need information not only on how individuals perceive the risk of injury in various occupations

but how these perceptions change over time and in response to worker and employer safety precautions. We need information about how individuals value the risk of injury relative to the way they value wages and higher compensation, and we also need to see how this valuation changes over time. We need to learn how individuals respond to perceived risk, and how increased information changes those responses (if at all). This information is not readily available given current sources of data, but we feel that future experimental and observational studies that address these and related issues will greatly increase our ability to conduct research and inform meaningful policy pertaining to occupational safety.

Notes

We would like to thank Karen Roberts and seminar participants at the University of Rhode Island for helpful comments. We take full responsibility for any errors. All views presented in this paper are those of the authors, and should not be attributed to any institutions that they are affiliated with.

1. It is worth noting that this argument is not necessary to justify the use of partial insurance coverage. Basic insurance theory tells us that the optimal level of insurance will equalize the marginal utility of income in the “good” and “bad” states. Viscusi and Moore (1987) and Viscusi and Evans (1990) argue that the marginal utility of income is lower for individuals with disabling injuries, possibly because working becomes more difficult when one is disabled, and so the optimal insurance contract provides less than full coverage of economic losses.
2. The distinction between predictable and unpredictable errors in judgment is important. If individuals make predictable errors, this suggests that they (might) behave in a way different than that predicted by the standard economic model. If, on the other hand, errors are random, then the economic model should predict behavior accurately *on average*.
3. The difference is equal in absolute value to $0.25[U(3,000) - U(2,000)]$.
4. Note that in many cases these mismatches are related to the subjective assignments of perception and value discussed previously. For example, the saliency mismatch is closely related to the availability bias, suggesting that individuals consistently place greater weight on situations or outcomes that are easily understood. Likewise, a failure to place the appropriate weight on costs (or benefits) that occur only after multiple actions is similar to the availability bias, in which individuals appreciate the cumulative risk resulting from multiple exposures.
5. In addition to suggesting the existence of compensating wage differentials, Adam Smith (1776) also proposed that individuals underestimate risk, noticing the relatively small number of individuals who purchased fire insurance. Spence (1977) provided a formal model of how the underestimation of risk can lead in-

dividuals to underinsure against the risk of product failure, and Diamond (1977) and Rea, Jr. (1981) examined how underestimating risk affects optimal workers' compensation insurance (which we discuss more later).

6. Presumably, the gain and loss is measured relative to some benchmark utility level that is received with certainty, i.e., the "reservation" utility level.
7. Note that we are implicitly assuming here that there is no fixed safety level that workers are trying to obtain. If workers are maximizing expected utility with respect to safety precautions then they will set the marginal benefit equal to the marginal cost, which will lead to more precautions taken if they perceive a higher marginal reduction in risk. If, on the other hand, workers are trying to attain some fixed level of (perceived) safety then overestimating the productivity of safety precautions could lead to reduced precautions, because they can achieve this perceived level with fewer precautions.
8. As mentioned before, empirical evidence has demonstrated a relationship between workers' compensation claims rates and workers' compensation benefits. However, as we cannot rule out the possibility that this relationship is driven either by fraud or simply the efficient response by individuals to some unobservable (to econometricians) costs of claim filing instead of some change in actual safety behavior, we cannot dismiss the possibility that actual workplace safety is unresponsive to benefit levels.
9. The assumption of risk-neutral firms is generally justified by the notion that shareholders drive the behavior of firms. If this is true and shareholders are able to perfectly diversify assets, they will desire the managers of firms to maximize expected profits. While this assumption of risk neutrality might be valid for large firms, the notion of perfectly diversified shareholders is probably less meaningful for small firms.
10. On the other hand, it is not clear why a large union would not have access to similar information, so it seems less likely that there would be a divergence between the risk perceptions of employers and organized labor.
11. In the long run, insurance premiums should be completely "passed on" to workers in a perfectly competitive market. If wages are sticky, however, there will be short run costs to premiums that will influence firm behavior.
12. Note that if workers underestimated risk in a similar fashion as employers, they would demand less of a compensating differential in the same occupations that firms would be willing to offer higher wages. Thus, the net effect on the compensating differential estimate would be ambiguous.
13. These other model primitives include such factors as the complementarity of worker and employer safety precautions and differences in utility and marginal utility of income in the injured and health states.
14. It is important to distinguish efforts to increase safety from efforts to make the level of safety more efficient. Some of the predictions of the standard model actually predict that there might be *too much* safety relative to the standard model. In this case, it could be efficient to make people less careful.
15. Of course, we recognize that it is difficult to communicate risk information so that it is perceived accurately.

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10

Revisiting Black Lung

Can the Feds Deliver Workers' Compensation for Occupational Disease?

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With only a few exceptions, American workers are protected from work-caused injuries and diseases under state—not federal—workers' compensation laws. As a result, it is an oddity to find a specified category of private sector workers covered under a federal workers' compensation program, and solely for one grouping of diseases. Since there are strongly held positions on the desirability of having the federal government play a dominant role in compensation for other occupational diseases, the track record of such a program can serve as an indicator of how successful such a new approach might be. The central focus of this chapter is the Black Lung Program, created to compensate workers for occupational disease due to coal dust exposure. In this chapter I first describe the history and the development of the law, and then give some emphasis to the benefits that the program has delivered. I also consider the challenges of federalizing a program that had been administered previously, solely by the states. I conclude by attempting to lay out some lessons that the program has provided us.

The origins of my interest in this subject can be traced to the early 1970s. Although the Coal Mine Health and Safety Act that created the Black Lung Program was enacted in 1969, it was actually the passage of the Occupation Safety and Health Act (OSHA) of 1970 that led me to this subject area. Section 27 of the 1970 law created the National Commission on State Workmen's Compensation Laws to evaluate and make recommendations on a host of issues related to those laws. While the commission's final report assessed a variety of issues, including those

that the OSHA statute expressly mandated, one issue that was barely considered was that of compensation for occupational disease. As a result, I considered that a necessary trail to follow.

The second factor that led in this direction also followed from the work of the commission. One of the central themes in the life of the commission was the future role, if any, of the federal government in workers' compensation programs. A steady drumbeat of those opposed to federal involvement was that the three programs for which the federal government had responsibility were, at best, no better than the state programs. Like so much in this field, it was difficult to separate fact from self-interest, conventional wisdom, and rumor.

I conducted several studies relating to occupational disease that led me to conclude that the states were doing an ineffective job of compensating afflicted workers, or their survivors, for most diseases.¹ While the temptation was strong to suggest that this be left to the federal government to remedy, it seemed irresponsible to do so without first examining an existing federal program to compensate victims of occupational disease. The result of that was my examination of the federal Black Lung Program, which left me wary of recommending that the state programs for occupational disease be scrapped.² If neither the state programs nor the federal Black Lung Program were delivering benefits well to workers with occupational diseases, what other alternatives existed? Several things about the tort experience as found in the asbestos debacle or in the Federal Employers Liability Act as it applied to railroad employees offered little hope that this was the appropriate route to take in place of workers' compensation. In the absence of any more general approaches to occupational disease compensation, it may be that the various state and federal programs should be reexamined to determine whether the more recent experience appears to be more promising.

The Black Lung experience is not the only source of learning on federal involvement in occupational disease compensation. A new federal program for occupational disease compensation recently has been created, the Energy Employees Occupational Illness Compensation Program Act of 2000. As its name indicates, this legislation targets a highly specific group of workers. However, it is probably too soon to evaluate at this point, particularly since the portion assigned to the Department of Energy (subsection D) has experienced some serious delays in its implementation.

A BRIEF HISTORY OF THE LAW

On November 20, 1968, an explosion occurred in a large mine in Farmington, West Virginia. After an extraordinary amount of media coverage of the attempt to rescue miners trapped therein, the mine was sealed 10 days after the blast, entombing 78 men. This tragedy led Congress to pass the Coal Mine Health and Safety legislation, which President Nixon signed 13 months later. The law aimed to improve the safety conditions in America's coal mines, and the bulk of the law is directed that way. However, at the urging of some powerful members of Congress from the coal-producing states, particularly West Virginia and Kentucky, a Title IV was inserted to provide "black lung benefits" to miners with the disease.

As the statute was initially enacted, it can be separated into three distinct portions. First, claims for old cases that met certain criteria were to be paid. In some instances, these cases emanated from miners or survivors of miners who had stopped working in coal mining many years before. These claims were to be paid out of U.S. Treasury funds. Secondly, compensation was to be paid for persons who became disabled or died more recently, and where claims were to be filed in the period after the old cases had had time to make their claims. These claims were to be paid initially by the U.S. government, with their liability to be shifted to coal mine operators. Finally, eligibility for benefits under the federal law would expire in several years, subject to certification by the U.S. Department of Labor that the state programs met specified standards, allowing the states to again assume sole responsibility to administer their workers' compensation programs. Table 10.1 provides a summary of the most significant developments under the law.

The case for a federal black lung benefits program partially rested on the argument that the states were not providing compensation benefits to coal miners who suffered from this condition. At the time, there was little evidence to demonstrate how frequently states were granting compensation benefits to miners disabled by respiratory illnesses caused by their employment. Supporters of a federal black lung benefits program did not differentiate between the states as to those that were doing a more conscientious job of providing compensation in a manner consistent with their laws. The case for a federal program clearly left unresolved a number of questions, including whether the states were

Table 10.1 Historic Developments, Black Lung Program

Year	Measure	Significance
1969	CMHSA enacted. Part B established in SSA. Part C established in USDOL.	Creates Black Lung Program.
1972	Law amended.	Extends Part B program by 18 months. Part C program life extended from 1976 to 1981. Federally funded benefits under Part C to end in 1973.
1977	Law amended and Black Lung Revenue Act enacted.	Interim standards imposed on Part C program. Termination of Part C program is dropped. Creates Superfund-like arrangement.
1980	Ronald Reagan elected.	New administration.
1981	Black Lung Benefits Act and Black Lung Benefits Revenue Act of 1981 enacted.	Benefit standards tightened. Coal excise tax increased. Insurers escape potentially high liabilities.
1985	COBRA enacted.	Excise tax increased as a temporary measure.
1987	PL100-203.	Period of temporary excise tax increase extended to 2013.
1988	<i>Pittston Coal Group et al. v. Sebben et al.</i> 488 U.S. 105 (1988).	Trust fund and employers dodge potentially large liability.
1997	USDOL propounds new regulations.	Proposes tighter administration and relaxation of some standards.
2000	New regulations promulgated.	

NOTE: CMHSA = Coal Mine Health and Safety Act; SSA = Social Security Administration; USDOL = U.S. Department of Labor; COBRA = Consolidated Omnibus Budget Reconciliation Act.

enabling workers with other forms of occupational diseases to receive compensation benefits. And the case in favor of enactment of Title IV was advanced vigorously on the grounds that it would be a very inexpensive draw on the federal budget. Advocates for enactment argued that it would likely be a relatively inexpensive program for the coal mine companies, who found themselves in an industry that was in secular and very serious decline, particularly in the underground sector.

Title IV largely consisted of two parts. For claims filed on or before December 31, 1971, the program, Part B, was to be administered by the Social Security Administration (SSA). The goal was straightforward enough: benefits, funded by the U.S. Treasury, were to be provided for persons who were totally disabled due to pneumoconiosis, or to dependent survivors of miners who had died from that disease. The hope was that in the first two years of the program, all the old cases would be compensated, leaving the newly developing cases for Part C of the program. The latter was to be the U.S. Department of Labor's (USDOL's) responsibility beginning in 1973. That agency was to certify that the states were meeting certain minimum standards, and that the new cases of sickened miners then would be administered by the states. As such, the Part B portion of the program would fade out of existence, as benefit determinations would cease after the initial two years, and as a result of the attrition of beneficiaries through aging and passing on. The expectation was that through attrition, Part C would become superfluous as states would administer their workers' compensation law and accept the coverage of mine workers with pneumoconiosis.

This phasing out of a federal role was linked to a timetable that proved to be wholly unrealistic. The hope was that the "old" claims would be dealt with under Part B, and that all of those claims would have been filed by Dec. 31, 1971. The transition year, 1972, was to have claims paid by SSA only until the end of the year and then handed over to USDOL. After December 31, 1972, the benefits were to be paid by coal mine operators under the USDOL's Part C program, or through the federally certified state workers' compensation programs. In essence, the plan was for those who filed a claim in the transition year to be paid after Dec. 31, 1972, in the same manner as were those who filed a claim after that date.

For those "new" claims filed in 1972 and later, where benefits were not paid under a federally certified state law or by a coal mine operator,

federal general revenues were to be used to pay benefits. The expectation by some was that the Coal Mine Health and Safety Act would lead to a sharp reduction in the incidence of black lung disease. That expectation relied upon the various health and safety provisions that were the *raison d'être* of the 1969 law. The hope was that this would enable federal involvement in these cases to cease by the end of 1976, aside from simply continuing to pay benefits under the Part B program. Indeed, benefit payments made under the Part C program, whether from a mine operator or paid by USDOL, would no longer be required after that time. Thus, the plan was that the liability of mine operators was to be a temporary one, aside from any state law benefits.

Some critics charged that Part B was not a workers' compensation program because it had characteristics that were different from all the state programs. For example, benefits for living miners was paid solely for total disability (comparable to Social Security Disability Insurance), once benefits began, they were expected to be paid for a lifetime, and benefit amounts were not linked to the worker's earnings. By contrast, all workers' compensation programs in the states (and all other jurisdictions that I know), pay benefits also for partial disability, compensation for temporary disability appears to be the cornerstone of all other programs, and benefits are almost always linked to the worker's preinjury earnings level.

Another feature that seemed to differentiate the federal program was that benefits were awarded based on the date that the claim was filed, not on the date when total disability or death occurred. Since the payments were considered to be workers' compensation benefits, any Social Security disability benefits were offset against the Part B payments, as were unemployment insurance, state workers' compensation, and temporary disability insurance benefits. Benefit levels were tied to the federal employee pay scale so that benefit payments (new and continuing) were adjusted (upward) annually in line with the federal pay schedule.

Upon enactment of the law, claims for benefits from workers or survivors poured into local SSA offices. A variety of coal worker organizations worked at spurring the submission of claims, and since benefits were to begin for successful claimants from the date of filing, any delays meant foregone income. In the first year of the program, about one-quarter of a million claims were filed. Although 350,000 claims

were filed by the end of December 1971, new claims continued to flow in at the rate of about 1,500 per week. Clearly, coal mine operators could foresee a massive liability awaiting them. Moreover, despite the unexpectedly large volume of claims by Dec. 31, 1971, it was also apparent that not all of the “old” cases had been filed; indeed, some were for death or disability that had occurred many years previously. SSA moved with extraordinary speed on the claims submitted, but much to the disappointment of the program’s supporters, about half of the claims were denied compensation. These three factors, the potentially ruinous outlook for some mine operators, the continuing inflow of old cases—many of which were based on employment in the mines that ended before 1970—and SSA’s denial rate led those who supported the 1969 enactment to push to amend the law in 1972.

The 1972 amendments extended the Part B program for an additional 18 months. This would enable more of those with “old cases” to file claims under the Part B program. The Part C program, which was to have ceased at the end of 1976, was to be maintained until December 31, 1981. This gave the states more time to amend their laws and change their practices so as to achieve certification by USDOL. It would also extend the period for which claims for newly developed illnesses or fatalities would be eligible for benefits that would be paid out of federal funds. After December 31, 1981, it was envisioned that the payments under Part C were to end. A new transition period was mandated, from July 1, 1973, to December 31, 1974. Under the 1972 amendments, claims filed prior to July 1, 1973, that were approved would receive lifetime benefits; those filed from July 1, 1973, to December 31, 1973, were to receive federally funded benefits till December 31, 1973, and then become the responsibility of the mine operators. Any claims filed after December 31, 1973, were to be the responsibility of the employers.

The hearings that led to the 1972 amendments along with the modifications caused SSA to grasp the message that Congress was conveying and substantially liberalize the standards for compensability. However, when USDOL was handed the administrative baton on July 1, 1973, a variety of disasters befell the agency. First, the agency was overwhelmed by large numbers of old claims from the transition period and from post-July 1. Second, the states did not respond as had been forecast with the result that successful state certification never material-

ized. The states did not enact legislation to enable them to be certified by USDOL, absolving the federal government from turning over the administration and funding to the states. Additionally, unlike the Part B program which used federal funds, USDOL was now responsible for identifying responsible payers, a litigious and lengthy process. Indeed, in most cases no responsible operator could be identified and made liable, so USDOL was the payer of last resort.

USDOL was not the only party that found the law difficult, and it received considerable heat for the way it carried out its responsibilities. The law's most ardent supporters were frustrated with the Labor Department as well, eventually resulting in amending the law again, this time in 1977. For a number of reasons, delays of several years in adjudicating claims meant that applicants were not learning of the resolution of their claims. Worse, for the law's advocates, fewer than 8 percent of claims were approved for benefits where a decision had been rendered. By the time of the 1977 amendments to the law, about 125,000 claims had been filed with USDOL, 6,000 received awards, and 70,000 claims were denied.³ In sharp contrast, to that date SSA had achieved an approval rate of 70 percent. The difference was that the standards USDOL used for compensability were based on the agency's best efforts at compliance with a statute that was vague at best.

The 1977 amendments enabled USDOL to set its own medical standards for determining compensability. Until those standards were finalized, however, temporary standards were to be used and here the amendments imposed very strict guidance. The labor department's interim standards were to be no more restrictive than the ones used by SSA under the Part B program after the 1972 amendments (which achieved the nearly 80 percent acceptance rate). In addition to lowering the standards for finding the presence of the disease, evidentiary requirements on the claimants were reduced, the notion of total disability was broadened, and the occupational qualifications were expanded. Previously denied claims were to be reviewed once again for entitlement by USDOL, as were previously denied Part B claims, and claimants could provide new evidence if they chose to do so.

In addition to greatly expanding the opportunity to obtain benefits, the termination date for the Part C program was dropped, essentially making the program a permanent one. Further, Congress needed to fix the financing problem that had resulted from the huge inflow of claims

under Part C, along with USDOL's inability to successfully assess liability against private coal companies in so many of the successful claims. The result was a separate piece of legislation, the Black Lung Revenue Act of 1977, which took a Superfund-like approach to financing benefits.⁴ A tonnage tax was levied on coal extracting companies to support a federal trust fund that would pay benefits in one of three instances. First, for a compensable claim where a responsible operator could not be identified, the fund would pay the appropriate benefits. Second, the fund would pay if the successful claimant had last worked in the mines prior to January 1, 1970. Finally, the fund would pay benefits in cases where a responsible operator did not begin to make payments in a timely manner, though the fund would then seek reimbursement from the business.

Despite the issuance and application of the more liberal, interim rules, many claims were denied. While USDOL promulgated its interim rules in a manner that it believed was no more strict than those it was obliged not to exceed, this led to court challenges by claimants denied benefits under the interim rules. A critical issue was one of the presumptions in USDOL rules that could be invoked by a claimant if the worker had at least 10 years of employment in coal mining. Four separate U.S. Circuit Courts found the requirement that there must be at least 10 years of employment before the presumption in the claimant's favor could be invoked to be unacceptably restrictive, and ordered that USDOL reopen over 94,000 cases. Had these cases been found to be successful, the costs could have exceeded \$13 billion, imposing a burden both on the trust fund and on employers and their insurers. Strikingly, the Supreme Court found that the application of this key presumption had been more restrictive than the interim standards were to allow, but that the 94,000 cases would not have to be reopened.⁵ Instead, the decision required reconsideration only of the small number of denied applications (6,000–7,000 claims) that had sought a judicial review at the time of the denial.

Three things led to another major turning point in the program in 1980–1981. First, USDOL issued the new regulations for the program, no longer tied to the liberal standards of the interim rules. Second, a new administration was elected in 1980. It was evident that it would not continue the more inclusive type of program that had evolved under both the SSA standards and the interim ones that USDOL employed after the

1977 amendments. Third, by 1981 many claims had been determined to be compensable. The new administration sought to tighten standards under the law. The law's most ardent supporters could consider that their war had been won and that few older miners with respiratory illnesses (or survivors) had not received compensation. In 1981, the laws were amended by enactment of the Black Lung Benefits Revenue Act of 1981 and the Black Lung Benefits Amendments of 1981. The result was legislation that emerged from compromises between the law's defenders and those who believed that it had been overly generous in the awarding of benefits. Reflecting this compromise, while some standards for benefit eligibility were toughened, claims that had been filed before the effective date were to be evaluated under the criteria that were in place previously.

The new amendments also made accommodations to most of the interested parties, including the insurance industry, which was relieved of having to pay benefits for some of about 10,000 cases that would now become the responsibility of the trust fund. At the time the 1981 amendments were passed, the trust fund was already indebted to the U.S. Treasury by over \$1.5 billion. To remedy that, the amendments increased the excise tax on the coal extraction industry. The tax was again increased (as a temporary, 10-year measure) in 1985 in the Consolidated Omnibus Budget Reconciliation Act of 1985, which also placed a 5-year moratorium on the interest charges due to the Treasury. In 1987, PL 100-203 extended the temporary tax rates that had been set in 1985 through 2013.

In 1997, USDOL announced changes that it sought to make in its regulations. One of the goals was to improve the efficiency of claims adjudication. Another aim was to reduce some of the difficulty that some applicants faced in having their claims found to be compensable. The final regulations were announced in December 2000 and then were subjected to serious challenge in the court. Widely varying estimates were made about the impact of the changes on employer and trust fund costs and on the incidence of successful claiming that would be expected to occur.

BENEFITS AND BENEFICIARIES

Compensation for benefits under the federal program varies only with the presence of and number, if any, of dependents. As of 2003, the compensation of a primary beneficiary was \$534 per month, or \$801 per month for a primary beneficiary and one dependent. (The amounts are the same in the Part B and Part C programs.) The maximum monthly benefit was \$1,069 for a primary beneficiary and three dependents. Federal black lung benefits are considerably lower than those payable in state workers' compensation programs, though the state claims appear to be more difficult to win. A sample of state workers' compensation benefits is shown here for illustrative purposes, drawing on those states that have had the largest number of federal claimants. The following were the maximum weekly benefits under state workers' compensation laws for total disability in 2003:

Alabama	\$569
Illinois	\$1,004
Kentucky	\$571
Pennsylvania	\$675
Virginia	\$681
West Virginia	\$527

The state benefits rates assume total disability, and unlike the federal benefits, are not payable for a lifetime, typically. Moreover, the monthly federal benefit rates are adjusted annually to reflect changes in average price levels. Medical benefits for treatment of the compensable condition are paid fully, theoretically, in each system.

USDOL is not able to provide a single estimate of the number of successful miner claimants over the life of the program. It can report, however, the number of beneficiaries with "active claims" in a year. Active claims (under Part C) include any of the following: those being paid from the trust fund or by responsible mine operators, cases in interim pay status, those where offsets are taken and those that have been suspended temporarily. In terms of the number of beneficiaries, both primary and total (where total includes both primary and dependent beneficiaries), the program is rapidly receding. Table 10.2 shows that the Part C program has contracted from its high point in 1983, when

Table 10.2 Black Lung Beneficiaries, Part C Program, Selective Years

	1980	1983	1988	1993	1998	2003
Miners	52,922	64,181	54,920	40,866	27,340	14,733
Widows	26,739	35,178	41,607	44,103	41,585	32,615
Total ^a	139,073	166,043	150,123	123,213	94,488	61,162

^aTotal includes all primary and dependent beneficiaries and excludes medical-benefit-only claims.

SOURCE: Unpublished and published annual reports, USDOL.

over 64,000 miners were receiving benefits.⁶ Not surprisingly, the Part B program has had a very substantial decline in the number of its beneficiaries, particularly miners, as can be seen in Table 10.3. The data demonstrate how much the Part B benefits provided financial support to an older miner population, many of whom had stopped working before the law was enacted. SSA estimates that 97 percent of the miners and widows were age 65 and over in 2001.

One of the more contentious issues over the life of the program has been its utilization. When the law was first proposed, and in its early years, the numbers of potential (successful) applicants for benefits were greatly underestimated. In 1970, the first full year of the program, coal mining employed only 132,000 workers. While that number had been declining for several decades, 15 years earlier, only 169,000 persons were employed in coal mining. (Clearly, a number of those employed in 1955 were also employed in 1970.) About 350,000 claims (some from survivors) were filed within the first two years of the Part B program. It appears that more (former) miners were drawing Part B benefits in 1974

Table 10.3 Black Lung Beneficiaries, Part B Program, Selective Years

	1974	1979	1985	1990	1995	2001
Miners	169,097	129,558	77,836	45,643	24,573	9,779
Widows	134,700	146,527	138,328	118,705	91,517	55,412
Total ^a	487,216	419,948	294,846	210,678	143,011	79,518

^aTotal includes all primary and dependent beneficiaries.

SOURCE: SSA (2002).

Table 10.4 Part C Claims, Adjudication, Initial Level, FY 2001^a

Findings	Number decided	Approval rate (%)
Trust fund approved	80	9.6
Trust fund denied	757	
Responsible operator approved	283	8.0
Responsible operator denied	3,269	
Total approved	363	8.3
Total denied	4,026	
Total findings	4,389	

^a Includes reconsidered claims.

SOURCE: USDOL (2001).

than were employed in the mines at the time or within any recent years. It is evident that a very large proportion of persons who ever worked in coal mining applied for and in many cases received benefits from either the Part B or the Part C programs. While this attests to the liberality of the compensability standards of the law, at least during its first decade, it also suggests that respiratory illness in coal miners was widespread.

Table 10.4 shows the results of Part C claims decided in fiscal year 2001, the most recent year for which these data are available from the Labor Department. While almost 4,300 Part C claims were decided that year, only 363 (8.3 percent) were approved that year. Clearly, the level of activity in terms of new claims has slowed down substantially from earlier years. It seems likely that the most recent changes in regulations will lead to a higher rate of claim acceptances, and this in turn may generate some increase in claiming.

TRUST FUND EXPENSES

Though the volume of new claims decisions and acceptances is small relative to previous years, the program's continuing expenses are not trivial. As shown in Table 10.5, expenditures by the trust fund for the Part C program in fiscal year 2001 were approximately \$1 billion,

**Table 10.5 Black Lung Benefits Program Obligations, FY 2001,
Part C (\$, 000)**

Total obligations	1,016,994
Total benefits	396,928
Income benefits	336,813
Medical benefits	60,116
Administrative costs	52,252
Interest charges	567,814
Coal tax revenues	522,200
Repayable advances from the Treasury Department	505,000
Cumulative trust fund debt	7,253,557

SOURCE: USDOL (2001).

including the interest charges to the fund for current and previous borrowing from the Treasury Department. Strikingly, though the number of recipients has been declining over the previous 10 years, obligations have increased, albeit slowly. The reason for this is that despite the decline (in nominal dollars) in expenditures for indemnity and medical benefits, the increase in interest charges has more than offset this. Since tax revenue from coal mining was about one-half of that amount, the fund needed to borrow another \$500 million in FY 2001. The result is that the fund is indebted to the Treasury by about \$7.3 billion. Note that this does not include payments made during the year by mine operators under the Part C program for new and continuing beneficiaries. Expenditures for the Part B program in 2001 continued to decline, falling to \$470 million for the year (SSA 2002). Note also the relatively small proportion of total benefits that went for medical benefits. It reflects several things, including the limited ability to treat such respiratory conditions, and the absence of certain costly medical procedures that other illnesses and injuries would require.

SOME LESSONS IN RETROSPECT FROM THE BLACK LUNG EXPERIENCE

What lessons can be drawn from the experience of a program that is almost 35 years old? The issue may be more than one of academic interest. The Energy Employees Occupational Illness Compensation Program Act (EEOICPA) is a new federal, occupational disease program. It may not be the last time that the federal government seeks to replace or augment portions of the states' workers' compensation laws.

Breadth versus Depth in Benefits

The Black Lung Program is a prototype of those transfer payment programs where government opts for extremely broad coverage (in this instance with respect to the nature of the health condition), but very modest amounts for beneficiaries. Though state workers' compensation programs can scarcely be characterized as generous in their benefits, they appear to be absolutely munificent compared to the federal standard.⁷ Any new transfer payment program may face some trade-off between coverage and benefit adequacy that is the result of implicit budget constraints. At the birth of this program, its supporters understated the potential number of benefits applicants. Once the legislation was enacted, a widespread effort to generate applications began, and the numbers of applicants—and eventually beneficiaries—swelled. Yet despite the changes enacted during the program, little effort was made by program advocates to increase the basic level of benefit.

Problems with Multiple Agency Delivery

The Black Lung Program can be analyzed as two distinct ones. Though the Part B (SSA) and Part C (USDOL) components of the law were quite clearly delineated, they both were responsible for providing benefits for black lung disease to coal mine workers or their survivors. As a result, for several years the standards for compensability were markedly different in the two agencies. This created enormous problems for those responsible for the less liberally administered program, in seeking to mollify those who were denied benefits. Thereafter, the more liberal standards applied by one agency were essentially imposed

on the other, only to change again. The observation that multiple agency administration was problematic is hardly one that required over 30 years of program experience. However, it may have been lost on those who created the Energy Employees Occupational Illness Compensation Program Act of 2000. A few years into the life of that program, a variety of groups called for the Department of Energy to relinquish its role under Part D and transfer the administration of that portion of the law to the Department of Labor. Recall also that in 1997 the administration of the Part B program was transferred from SSA to USDOL.

State Workers' Compensation Programs Still Have Difficulty with Coal Workers' Pneumoconiosis

The original plan for this law was to turn it over to the states after the federal government certified the adequacy of the state laws. That proved to be one of the many missteps taken by the law. For all purposes, the states did not rush in to do so as had been forecast. The result is that USDOL is still responsible for determining both compensability and liability under the law. There does not appear to be any statutory bar on a worker's successfully winning compensation in the state systems. And since benefit levels tend to be higher in the state programs, one would expect that most applicants would seek benefits there. Data are lacking on the numbers of workers who have successfully gained benefits in the states, but there are reasons to believe that gaining them is difficult. First, the number of workers with federally derived benefits who are also obtaining state benefits appears to be minuscule. USDOL has reported that only 4 percent of the total cohort of Black Lung Program beneficiaries have an offset of their federal awards. Additionally, USDOL provides SSA with a listing of Part C beneficiaries in order to apply the SSDI offset.⁸ The annual amount of the offset savings to SSA was less than \$400,000. Data from the states reinforces the view that the states are not paying many new black lung claims. In at least one state, Kentucky, the law was tightened in 1996, and although it appears to have been liberalized in 2002, for all purposes, virtually no new beneficiaries are being compensated. Until 1996, Kentucky may have been the most liberal of the states with regard to compensating this disease.

Defining the Disease

Historically, many jurisdictions worldwide and in the various states have “scheduled” diseases that would be compensable in their systems. By defining the conditions that would be compensable, at least under certain conditions, these laws reduced the difficulty in administering them. The Coal Mine Health and Safety Act followed that model, though it did so inadequately. Prior to its enactment in 1969, there was no disease known as black lung. (History now has it that this was a legislatively created disease.) The law’s supporters and their representatives led the miners to expect federal compensation for any respiratory ailment. Clearly, that magnified the potential scope of coverage and included a wide range of medical conditions. Certainly, the proponents of the law aimed to cover as broad a range of conditions as they could. Those who sought to limit the range of compensable conditions defined the disease as disabling or even “complicated” coal workers’ pneumoconiosis. Those who administered the law had to determine its intent in the absence of a well-defined, legislative-targeted disease condition. The various measures to amend the law and to force SSA and USDOL to review claims that had been denied were a product of this difference in perception about the coverage of the law. The issue continues to characterize the program. Two weeks before the close of the Clinton administration, USDOL promulgated final rules to revise its regulations of the law. (The original proposed rules changes were put forward in 1997.) Among other changes, the regulations expanded the definition of the disease.

The “Desk Book” of the administrative law judges points out that the disease is both medical and legal, with the former being “merely a small subset of the afflictions compensable under the Act.”⁹ It continues, “a medical diagnosis of no pneumoconiosis is not equivalent to a legal finding of no pneumoconiosis.”¹⁰

Presumptions Carry Both Advantages and Disadvantages

The statute and the regulations for Black Lung Program benefits include a number of presumptions. Presumptions are placed into laws as a way to ease or shift the burden of proof in a claim for benefits. There are several reasons why the use of presumptions can be helpful to all

parties in adjudicating workers' compensation claims for nontraumatic conditions. The major virtue of using them is that it eliminates the need to litigate the same (or broadly similar) issues repeatedly. As a result, outcomes are more predictable, and they can be derived more expeditiously and with lower transaction costs. For example, expert witnesses need not be used repeatedly in disputes over the same set of questions. Large numbers of claims can be moved through the adjudication process more rapidly in the presence of presumptions. Additionally, they reduce the likelihood that "individual justice" will result in opposite outcomes in cases with the same or similar fact conditions. The party to whom the burden of proof has been shifted can overcome rebuttable presumptions. Irrebuttable presumptions cannot be overcome and, therefore, affect more than the matter of who bears the burden of proof.

The use of presumptions for occupational disease is more commonly found in other jurisdictions than in the U.S. states, where individual justice seems to be the norm and where litigation and attorney representation are not unusual. The major downside with the use of presumptions is that they can be used as a device to manipulate the ease or difficulty in receiving compensation. Perhaps this is simply to note the obvious, i.e., presumptions that are consistent with the overall intent of the law, that are in line with medical science, and that bring greater equity are to be preferred to those that do not.

The Black Lung Law, originally and in amendments and in regulations, made extensive use of presumptions. As an example, the 1969 statute established that "if a miner who is suffering or suffered from pneumoconiosis was employed for 10 years or more in one or more coal mines there shall be a rebuttable presumption that his pneumoconiosis arose out of such employment."¹¹ Since the worker still had to prove that there had been 10 years' employment in coal mines and that he had pneumoconiosis, those burdens of proof remained with the claimant. However, if the worker was able to establish those arguments, it became the defense's burden to prove that the illness arose out of any other employment or nonemployment exposure. And if the worker could not show that 10 years had been worked in coal mining, it did not prevent the worker from seeking to establish that his condition arose out of his exposure in coal mining. Clearly, that would have made it more difficult to win compensation benefits. Perhaps this is simply to note the very obvious, that is, presumptions that are consistent with the overall intent

of the law, that are in line with medical science, and that bring greater equity are to be preferred to those that do not.

As much as anything else, presumptions were used to raise or lower rates of successful filing under the law, and they remain most susceptible to being used to loosen or tighten eligibility, regardless of the scientific merits. Congress, in particular, was responsible for this continuing effort to tweak the standards, at least for the first dozen years of the law. However, we can find a similar type of manipulation that has occurred in the states. Kentucky has witnessed a number of law changes that aimed to raise or lower the success rate in the filing of state black lung claims. In 1996, eligibility under the law was tightened in response to a concern about the cost of such claims. In 2002, the law was liberalized because the 1996 amendments were found to be excessively restrictive. The 2002 amendments have been reported to still leave virtually no claimants eligible for benefits and consideration is being given to loosening the standards further. As was the case in the federal arena, the standard does not appear to be motivated by science and medicine as it is for the number or the rate of successful claim filing.

Inconsistent Offsets of Benefits

This entire chapter could be written around the issue of offsets under the law. Suffice it to say that there have been a host of complications, indicating that a simple generalization of the treatment of the issue is not possible. Over time, the law regarding offsets has been changed several times. The Part B program operates with different rules than does Part C. Further, offsets have and have not been applied to earnings (for the totally disabled miners but not for widows), or depending upon the date that a claim was filed, to SSDI, and to state workers' compensation benefits (for respiratory diseases and/or for occupational injuries or illnesses). As an example of a further complication, at least one state (Pennsylvania) paid benefits to miners with dust diseases out of general revenues, raising the issue of whether or not this was a (offsetable) workers' compensation benefit.¹² It is difficult to establish how well the offsets are monitored, though they are likely most carefully monitored where a mine operator or insurer would be able to reduce payments due to the presence of multiple income sources. USDOL provides SSA with information on Part C beneficiaries on a monthly basis, and SSA reports

that it offsets less than \$400,000 a month from its SSDI payments. As noted earlier, fewer than 4 percent of Part C beneficiaries are affected by the offset taken by USDOL for the payment of state workers' compensation benefits. The "offset story" reveals how difficult it can be to overlay a federal program onto an existing state program, made more complex by an attempt to legislate different criteria for conditions arising in previous years (Part B-SSA) and for current and future ones (Part C-USDOL).

The Challenge of Finding Responsible Operators

About one in five approved claims become the responsibility of the trust fund. Unlike the earliest years of the program, when some miners had not worked for several years, there is less of a catch-up now, and less reason for the mine operator to have disappeared from the scene. There is little doubt that USDOL is aiming to have successful claimants become the responsibility of the employers or their insurers, and not that of the already indebted trust fund. Here are simply two kinds of problems that emerge when the responsible operator approach is used. Consider a claim where a miner submits a successful claim for benefits. Suppose that subsequently, the mine operator who was initially liable for benefits is shown to be not responsible and another operator is then identified as "responsible." The timing is likely to be such that no defense of the claim by the subsequently identified operator is practically possible. (The courts have held that once a claimant is successful in claiming a benefit, USDOL cannot assess liability against a newly named mine operator.)¹³ That would lead to a potential liability of the trust fund. To prevent that, USDOL might name several employers as a "potentially liable operator." That can result in multiple defenses being prepared to defeat the claim, including the need for multiple, duplicative medical examinations. Or consider the requirement that mine operators are required to be insured for federal black lung claims. (Approval for self-insurance is permitted under the law.) But not all responsible operators are coal mine operators—the law provides considerable latitude over coverage, occupationally. Thus, some employers may be found to be "responsible operators," yet uninsured for federal benefits, though they are in compliance with respect to coverage under state workers' compensation laws.

Can a Federal Workers' Compensation Program Be Shut Down?

Although some people argue that a federal government program is not likely ever to shut down, the Black Lung Program appears headed in that direction. Clearly, the Part B portion has experienced a huge decline in numbers of beneficiaries, and the Part C section is far smaller today than it has been. Moreover, there is no evidence that all the states have stepped up efforts to find and compensate victims of coal workers' pneumoconiosis. Some may argue that 31 years after the enactment of the Black Lung provisions, the federal government has decided that it is prepared to tackle another situation where it appeared that the states were not compensating victims of occupational disease. Again, the law creates separate, though less parallel responsibilities for two agencies in the EEOICPA of 2000. Again, it has picked a specific group of workers, and identified certain diseases to receive special treatment and benefits. As was the case with black lung, supporters of the EEOICPA of 2000 argued that state workers' compensation laws had not been providing justifiable benefits to a specific group of workers. And as was the case with black lung three decades ago, it has not taken long for bipartisan criticisms of the administration of the law to emerge, requiring amendments because of a lack of movement on benefits being delivered to workers or survivors.¹⁴

Notes

1. In particular, see Barth and Hunt (1980).
2. Barth (1987). Sources for some of the history that follows can be found in this study.
3. The Black Lung Benefits Reform Act of 1977 (PL 95-239) was actually signed into law on March 1, 1978.
4. PL95-227 was signed into law early in 1978.
5. *Pittston Coal Group et al. v. Sebben et al.* 488 U.S. 105 (1988).
6. The highest year for the number of all beneficiaries was 1982, but the high point for the number of miners receiving Part C benefits was 1983.
7. The basic, no dependent benefit was set at 50 percent of the entitlement due to a totally disabled federal employee at the GS-2, step 1 level, under the Federal Employees' Compensation Act.
8. Offsets are discussed later in the chapter. Such provisions exist in laws to limit the degree to which recipients might receive benefits from multiple sources. Off-

sets can have several aims including limiting payer costs and limiting excessive benefit amounts.

9. USDOL, Office of Administrative Law Judges, “Judges Benchbook of the Black Lung Benefits Act, August 2001,” Chap. 16, Sec III a (1). Also, see *Richardson v. Director, OWCP*, 94 F. 3d 164 (1996).
10. From *Hobbs v. Clinchfield Coal Co.*, 45 F.3d 819 (4th Cir. 1995).
11. Section 411 (c)(1).
12. *Director v. Eastern Associated Coal Corp.*, 54 F. 3d 141 (1995).
13. *Director, OWCP v. Trace Fork Coal Co.*, 67 F. 3d 503 (1995).
14. See Congressional Record—Senate, June 16, 2004, pp. 6837–6847, and S. 2400 June 7, 2004, Amendments to Title XXXVI of the Floyd D. Spence National Defense Authorization Act for FY 2001 (Bunning Amendments).

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11

Workers' Compensation in Rhode Island

Reform through Business/Labor Cooperation

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A major legislative overhaul of the Rhode Island workers' compensation system took place between 1990 and 1992. However, it is important to note that prior efforts laid the groundwork for this successful reform. Continually, throughout the 1970s and 1980s both labor and management tried, usually separately, to fix a system that was serving neither well. Despite attempts at reform, premiums continued to rise while claims' administration worsened. Injured workers were not receiving timely benefits, and little effort was put into getting people back to work. Further, the adjudication processes of the Workers' Compensation Commission were terribly inefficient, with cases often taking years to be settled.

In 1985, the legislature made a major attempt at reform. The Department of Workers' Compensation was created, and an informal hearing process—with the goal of quick dispute settlements—was established. An employer or injured worker could request a hearing, which was statutorily required to be held within 14 days. At the end of a 30-minute hearing, the parties were supposed to have received a determination as to whether benefits were granted, denied, terminated, or continued. Either party could appeal the determination to the commission, which would hear the case *de novo*. Under this system, representation by attorneys was not required during the hearing at the department. Instead, the legislation created positions for “employee assistants” who helped injured workers through the process by answering questions, helping workers assemble evidence, etc. Insurers were required to accept or

deny a claim within 45 days under a “memorandum of payment” or “notice of controversy.”

Unfortunately, soon after it was established, the system began to bog down. Separate hearings were required for matters such as the determination of wages, and occasionally hearings would have to be continued because of incomplete medical information. The 14-day requirement was, by necessity, ignored, and stretched first to 21 days, then 30 days and beyond.

A further flaw in the system was the role played by the employee assistants. The Rhode Island Bar Association brought a successful action against the department claiming the illegal practice of law by the employee assistants. In response, the department curtailed the assistants’ duties, opening the door for greater attorney involvement.

Within a couple of years, the system broke down completely. Virtually every decision of the department was appealed to the commission for a *de novo* hearing. The losing parties always wanted “another bite at the apple,” plus there was a strong financial incentive for attorneys to appeal: their allowable fee was higher at the commission than at the department level. Hence, some attorneys appealed even successful cases—citing one or another technicality—to take advantage of this perverse incentive.

It is significant that the 1986 reform had the support of business and insurance interests but lacked labor’s backing. Further, the legislation did little or nothing to coordinate the work of the department of Workers’ Compensation and the Workers’ Compensation Commission.

By the late 1980s, insurers were requesting double- and even triple-digit premium rate increases. A 32 percent increase was approved by the Rhode Island Department of Business Regulation, and a further 123 percent increase was sought by the National Council on Compensation Insurance, but was denied. The latter move resulted in an open protest by employers at the state capitol. In 1990, the informal hearing process—the centerpiece of the 1986 reforms—was scrapped.

However, in 1989, the business and labor communities had come together to discuss the severe problems with the system. That reform effort, which thus far has proven very successful, led to major legislative actions in 1990 and 1992, and some more minor reforms since. Although a number of labor, business, and government leaders deserve credit for the reforms, George Nee, Secretary-Treasurer of the RI AFL-CIO, and

Sheldon Sollosy, the (now-retired) owner of the Rhode Island division of Manpower, Inc., were the principal negotiators of the reforms. The extraordinary trust and cooperation between labor and business set the tone for the further involvement of the legal and medical communities, and, in turn, the support of the legislative and executive branches.

THE 1990 REFORMS

The Workers' Compensation Court

Prior to 1990, the Workers' Compensation Commission was the principal adjudicator of workers' compensation disputes. The 1990 legislation elevated the status of the commission to that of a court with bona fide judicial appointments. With the elimination of the informal hearing process, the court became the initial forum for resolving disputes. Judges are required by statute to hold a pretrial hearing within 21 days of request. While the parties may still request a trial, the case remains with the judge who rendered the pretrial decision. As a result, consistency has been brought to decisions, and appeals have been reduced. Under the leadership of Chief Judge Robert Arrigan, who recently retired from the bench, the pretrial conference proved to be a highly effective means of resolving disputes and avoiding costly litigation. The court has become a model of efficiency and a key ingredient in the system's success.

Changes in Administration

With the 1990 reforms, insurers are allowed to file "nonprejudicial agreements," which allow claims to be paid for up to 13 weeks with no acceptance of liability by the insurer. Hence, the injured worker receives a benefit immediately while the case is investigated. If the insurer determines that it is not liable, the worker receives notice and has two years to file a petition to establish liability. Alternatively, the insurer may voluntarily accept liability by filing a memorandum of agreement. As well, the 1990 legislation allows for a "deny and dismiss settlement," which the parties can submit to the court. If accepted, the matter

is considered a “compromised payment” and the insurer is freed from further liability.

Controls on Fraud

Despite the high levels of trust and cooperation, employee fraud proved a contentious issue for labor and business negotiators. Nonetheless, the parties agreed that workers who misrepresent injuries or fail to report income should not benefit from the system. Therefore, insurers are allowed to request periodic reports of income from injured workers and to recover money from overpayments. Further, workers’ compensation fraud was made a felony. However, the harassment of injured workers or a delay in the payment of benefits carry financial penalties for insurers.

Changes in Benefits

The 1990 reform package included major changes in partial disability benefits. Both the amount an individual may collect and the length of time that benefits may be received were changed. For injuries occurring after the effective date of the legislation, the insurer may reduce benefits to 70 percent of the weekly benefit paid once a worker has achieved “maximum medical improvement.” However, a reduction is not allowed if a worker can demonstrate a good faith, but unsuccessful, effort at obtaining work. The length of time that partial benefits may be collected was limited by the legislation to 312 weeks. However, this limit may be extended if the individual can establish that the injury or illness continues to pose a material hindrance to obtaining work. For collection beyond the 312 weeks, annual cost-of-living adjustments are required.

The Creation of a State Fund

By the late 1980s—and owing to the difficulties in the system—90 percent of Rhode Island employers were in a residual risk pool. The leaders of the reform effort determined, therefore, that the creation of a state fund to be the insurer of last resort would allow for greater local control over premium rates. Legislation created a private, domes-

tic, mutual insurance company with a \$5 million government loan. The company is now called Beacon Mutual and is the state's largest workers' compensation insurer. The loan was repaid and the company now functions completely independent of state government.

The Creation of an Advisory Council

Another key element of the success of the 1990 reform effort was the creation of an 11-member advisory council comprised of representatives of the state legislature, the executive branch, the Workers' Compensation Court, business, labor, and the general public. The council is required to make quarterly reports designed to identify and possibly head off small problems before they can grow. The creation of the advisory council was, in a sense, an attempt to codify and formalize the cooperative relationships that were formed at the time of the reform effort. The council has been very successful and has served as forum where problems, ideas, and legislative proposals can be discussed and analyzed in a nonpartisan and rational manner. The result is that solutions reflect the desires of all of the stakeholders rather than simply those with the most political power.

THE 1992 REFORMS

Evidence of the success of the advisory council and the cooperative approach came with the 1992 reforms. A legislative package was presented that built upon the measures taken in 1990. Today, many view the 1992 reforms as the final touches that truly turned the system around.

Medical Reforms

Mirroring the advisory council itself, an 11-member medical advisory board was established. The duties of the board include advising the chief judge of the court of medical protocols for the treatment of compensable illness and injuries, preparing standards to guide the court's consideration of medical evidence (particularly standards to determine the extent of an injury or illness and the achievement of maximum medical improvement), and reviewing and approving the Preferred Provider

Network lists submitted by insurers and self-insured employers. The medical advisory board may also disqualify or suspend a medical provider for certain legislated infractions.

Employee Choice and Preferred Provider Networks

Under the 1992 legislation, injured workers are allowed to choose their primary medical provider. However, if the worker wishes to change physicians he or she must select a physician from the network list or obtain prior approval from the insurer. The purpose of the reform was to reduce “doctor shopping” by individuals intent on finding a favorable medical opinion.

Fee Schedules

The legislation mandated that the Department of Labor and Training in consultation with the court develop a workers’ compensation medical fee schedule. Prior attempts to set schedules had failed, since physician reimbursement rates were set at Medicaid levels, which were considered too low by doctors. This led to good doctors leaving the system or challenging the fees in court. In consultation with the medical advisory board, fees were set that were generous when compared to other states, but were designed to keep highly regarded physicians on board. The success of the effort again showed the benefits of cooperative decision making, which took into account the needs of important stakeholders—in this case, the medical community.

Benefits

The 1992 legislation recognized that workers’ compensation benefits should, in most cases, be a temporary replacement of income, but not at levels that would provide a rational disincentive to return to work. Hence, weekly compensation was set at 75 percent of average weekly spendable base earnings (or after-tax income excluding overtime). Earlier, the benefit rate was 66.66 percent of gross earning including overtime. An offset was established for retirement income, so that employees would not receive both full workers’ compensation and retirement benefits. The offset can take place for injuries received or

illnesses occurring less than five years before retirement or after age 55. However, if the problem occurs less than two years before retirement, indemnity benefits are due.

The 1992 legislation adopted a chart, based on the American Medical Association's (AMA's) *Guides to the Value of Permanent Impairment*, to reduce partial benefits upon maximum medical improvement. This reduction was in addition to the ability to reduce benefits 70 percent per the 1990 legislation. The 1992 statute also defined *material hindrance* as a greater than 65 percent degree of functional impairment per the AMA *Guides*. Therefore, a partially incapacitated employee could not collect benefits past 312 weeks unless the disability surpassed the 65 percent degree of functional impairment.

Not all benefits were reduced by the legislation. For example, dependency benefits for totally disabled workers were actually increased, and a cost-of-living adjustment for individuals totally disabled for at least 52 weeks was also added.

Reinstatement

The 1992 legislation gave an injured worker the right to be reinstated to his or her former position with reasonable accommodation by the employer within a year of injury (or 18 months of injury if the worker had spent time in an approved rehabilitation program). This right applies only to workers injured after May 18, 1992, only to firms with 10 or more workers, and not to seasonal or temporary workers. However, the reinstatement right is significant and is another example of a compromise between labor and business. The right is a clear victory for injured workers, but it also provides an incentive to return to work before exhausting benefits.

MORE RECENT REFORMS

The cooperative system of reform, which began in the late 1980s, remains intact today, and in fact many of the same individuals are involved. Sheldon Sollosy is now the chairman of the board of Beacon Mutual, and George Nee chairs the Workers Compensation Advisory Council. Since 1992, all legislative proposals have been referred by the

house and senate labor committees for consideration by the council. While there have been no large-scale changes since 1992, a number of smaller modifications have been made.

Material Hindrance

Enforcement of the 1992 statute's definition of material hindrance has been postponed several times. Labor prefers that the determination be left to a judge rather than be based on the automatic application of an arbitrary figure. Thus far, business and insurers have agreed to the postponement, and, in exchange, labor has not sought a total repeal of the definition.

The Workers' Compensation Administration Fund

Prior to the 1992 reforms, assessments on insurers to support the Workers' Compensation Administration Fund were based on educated guesses about prospective gross premium levels. This resulted in surpluses in the fund, which were raided on a couple of occasions by the Department of Administration and the legislature to fill gaps in the state budget. This was clearly not what the fund was intended for, and was in a sense an additional tax on insurers. In 1998, the council and the court supported legislation to move the date of assessment to a time when the gross premium figure was known. This has allowed for a more accurate assessment and has prevented funds from being used for purposes other than funding the workers' compensation systems.

Adjustments to Fee Schedules

Since 1992, the collaborative model has been extended with the establishment of a fee schedule task force composed of representatives of the Department of Labor and Training, the Medical Advisory Board, and medical and insurance communities. A couple of amendments to the fee schedule have been made, but only after a consensus has been reached by the task force. In 1998, the task force agreed to the reduction of several fees, but also to a general annual escalation of fees based on the consumer price index.

Employer Compliance

The collaborative model was also used to address employer compliance issues that came to light after the tragic fire at the Station nightclub in Rhode Island in February 2003. One hundred people, including a number of club employees, died and many were injured. After the fire, it was discovered that the club lacked workers' compensation insurance. Department of Labor and Training officials, along with business, labor, and insurance industry representatives, revisited the statute and methods to ensure compliance, including sanctions against delinquent employers. The legislature approved a package to increase fines and penalties, move serious case hearings from the department to the court, and allow for the closing of businesses that do not secure insurance promptly. These measures have proven extremely successful in increasing the rate of compliance.

CONCLUSIONS

By almost any measure, the reforms that began in 1990 have proven successful. By way of illustration, let us consider the achievements of the court, the number of self-insured employers, and trend in insurance premium rates.

The Court

Unlike the former informal hearing process, the court's pretrial hearing program continues to be successful. Nearly all cases receive a hearing within 21 days and are disposed of promptly. Although credit for much of the early success rightly belongs to Chief Judge Robert F. Arrigan, his replacement, Chief Judge George Healy, has a great deal of experience both as an insurance company advocate and jurist, and is equally committed to the success of the program.

Self-Insured Employers

In the early 1990s, before the reforms began to take effect, there were 185 certified, self-insured employers in Rhode Island. Most were

self-insured because they could not afford the high premium rates at the time, even though, in general, they had low loss rates. Today, there are only 47 self-insured employers in the state. Since 1991, only two employers have applied for self-insurance certification, and both are affiliated with firms that have national self-insurance programs.

Premium Rates

Beacon Mutual, which, as mentioned earlier, is today the largest workers' compensation insurer in the state, has proven that it can, under the current system, operate profitably without the large premium increases sought by companies in the late 1980s and early 1990s. In fact, Beacon Mutual has many discount programs for employers and has decreased rates three times since 1994.

In short, the collaborative efforts at workers' compensation reform have proven very successful in Rhode Island. The system now provides adequate and timely benefits for injured workers, reasonable premium rates for employers, fair reimbursements for physicians, and a reasonable rate of return for insurance companies. The essential ingredient in all of this success was the ability of business and labor to come together, work out their problems cooperatively, and then spread the same spirit of goodwill and common endeavor to other essential stakeholders.

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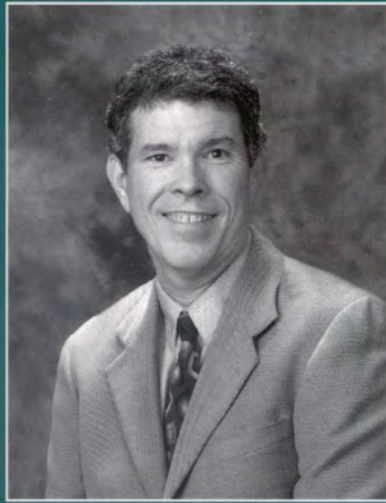
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Terry Thomason

Terry Thomason was a distinguished scholar of workers' compensation, workplace safety, and collective bargaining. He excelled in comparisons of programs in the United States, where he was born and educated, and Canada, where he spent part of his career.

Terry died in Newport, Rhode Island, in 2002. His death extinguished a life and career much too soon. This volume is a result of a conference held in his honor at the University of Rhode Island and is dedicated to his memory by all those who contributed chapters or participated in the conference.

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