Annu. Rev. Public Health. 2001. 22:1–13

MANAGED CARE IN WORKERS' COMPENSATION PLANS

Pamela B Peele[1] and David J Tollerud[2]
[1]*Graduate School of Public Health, University of Pittsburgh, 130 DeSoto Street, A649, Pittsburgh, Pennsylvania 15261; e-mail: peele@pitt.edu*
[2]*Center for Environmental and Occupational Health, MCP Hahnemann University, School of Public Health, 245 N 15th Street, Mail Stop 660, Philadelphia, Pennsylvania 19102-1192; e-mail: david.tollerud@drexel.edu*

Key Words insurance, employment, occupational health, employment benefits, health services

■ **Abstract** Workers' compensation plans have lagged behind most public and private health care plans in the adoption of managed care techniques. This is largely attributable to the underlying differences between workers' compensation and group health plans. Managed care techniques were developed within group health plans with the objective of health at the lowest cost. In workers' compensation, managed care must address a different objective—restoring a worker to health and productivity at the lowest cost. It is this fundamental difference that makes the application of managed care techniques to workers' compensation plans contentious and at times inappropriate. Research on the impact of managed care on the health and welfare of injured workers is sparse, and important questions remain about the appropriateness of care delivered under workers' compensation managed care plans. In this paper, we discuss the application of managed care to workers' compensation, and highlight the barriers to effective implementation.

INTRODUCTION

In the United States, rising medical care costs in the 1980s and 1990s provided the impetus for group health insurers to actively move from traditional fee-for-service plans to managed care plans in an attempt to decrease medical expenditures. In contrast, workers' compensation (WC) plans, which finance health care delivery and benefits for workers injured on the job, continued to use traditional fee-for-service financing arrangements. As a result, from 1985 to 1992, annual medical expenditures for WC rose at an average rate of 14.5% per year, outpacing the 10% per year rise experienced by group health plans by 45% (18).

Why did WC programs lag behind group health plans in implementing managed care techniques? Part of the answer lies in the regulatory structures governing these

programs. Each state independently designs and oversees WC regulations; there is no "national" WC structure. Although commercial group health plans could quickly implement managed care methods to control medical expenditures, WC plans were constrained by state WC insurance regulations, many of which explicitly prohibited important elements of managed care, such as restricting provider choice. By the mid-1990s, pressure to control rapidly rising WC medical expenditures resulted in over half the states adopting legislation authorizing the use of managed care techniques in WC programs (18).

Managed care has had mixed success in the WC arena. This may reflect fundamental differences between group health and WC programs in their basic objectives, the way they finance medical care, the incentives for patients and providers, and regulatory hindrances to full implementation of a managed care model. In this paper, we discuss the application of managed care to WC, starting with a brief discussion of managed care tools. We present some of the basic differences between group health insurance and WC insurance and discuss the impact of those differences on managed care implementation in WC. We conclude with a discussion of the appropriateness and effectiveness of managed care in workers' compensation.

MANAGED CARE

The term managed care describes a broad, and sometimes vague, concept of active management and control over the use of medical services. Managed care uses the principle of active oversight and control of the delivery of medical services to reduce costs and eliminate unnecessary medical services. Gatekeeping, a mechanism that controls or "gates" access to medical care, is the fundamental tool of managed care and is used in two contexts: to control access of consumers to providers by reducing the number of potential providers that can be used; and to control access to medical services by limiting the number and/or type of services available or authorized. Several gatekeeping activities and management tools used in managed care are listed and discussed below.

GATEKEEPING TOOLS

Restricted Provider Networks

Restricted provider networks limit the number of potential providers available to enrollees in an insurance plan and control expenditures in several important ways. First, patients are steered to a small group of providers, which generally increases the volume of patients to these network providers. As a consequence, providers who do not participate in the network can expect a decrease in their

patient volume, providing an incentive for providers to join a network in order to maintain or increase their patient volume. Managed care plans leverage their control over membership in provider networks to negotiate lower fees for medical services from participating providers and to maintain provider networks that have characteristics desired by the plan. Second, by restricting the size of provider networks, managed care plans have fewer providers to supervise and fewer billing sources to manage, thus decreasing administrative and management costs. Finally, a smaller provider network helps streamline utilization review and contracting costs by decreasing the number of providers with whom contracts must be negotiated.

Primary Care Physician

Most managed care plans rely on a designated physician from the provider network to be the primary care physician (PCP), who then acts as the gatekeeper for most medical services. Medical care delivered under the plan must, in general, either be provided directly or authorized by the PCP.

Preauthorization

Preauthorization requires prior approval of the health plan for some medical services. With preauthorization, the health plan, not the PCP, acts as the gatekeeper, with the plan's approval sought either directly by the patient or by their provider. Preauthorization requirements are frequently associated with expensive services, such as inpatient admissions or costly diagnostic services. Failure to comply with this requirement usually results in no insurance coverage or in some loss of insurance reimbursement for services.

Referral

Referrals also require prior approval, generally from the primary care physician. Here, the PCP acts directly as the gatekeeper, controlling patient access to specialty care and limiting the use of specialty providers and services to those deemed appropriate. Failure to obtain a referral usually results in no insurance coverage or decreased coverage for that care.

MANAGEMENT TOOLS

Utilization Review

Unlike prospective preauthorization and referral requirements, utilization reviews are retrospective analyses of patterns of care to monitor the appropriateness of service use and to identify providers with practice patterns that do not adhere to the health plan's standards (including the identification of high-cost providers).

Credentialing

Credentialing refers to the process of establishing minimum provider qualifications and is used by health plans to select network providers who meet a health plan's basic requirements for standards of care, such as board certification and continuing education activities.

Fee Schedules

Fee schedules are management tools that define maximum reimbursement rates for providers. Fee schedules can be based on regional or national standards (such as the Medicare fee schedule that is widely employed by commercial insurers to determine their reimbursement rates) or on fees explicitly negotiated between a health plan and its network providers.

Patient Cost-Sharing

A common management tool to limit demand, patient cost-sharing refers to deductibles and copayments required of the patient before any health plan reimbursement. The intent of this tool is to dampen the demand for care by providing a monetary incentive for patients to limit their use of services.

Provider Risk-Sharing

One of the most controversial tools of managed care, provider risk-sharing refers to financial arrangements between a health plan and its network providers to shift some or all of the financial burdens of medical utilization from the health plan to the provider. Under traditional fee-for-service plans, provider revenues are a function of the number and type of services delivered—more services and/or more expensive services result in higher provider revenue. Providers with excess capacity have a financial incentive to "induce demand" by delivering more care in order to increase their revenues. Demand inducement is viewed as an economic inefficiency in that "too many" services are used (see, for example, 3, 5, 17, 15). Making providers financially at risk for medical services reverses the financial incentive to induce demand. Capitation is a common example, where a provider receives a flat fee (often monthly) for each health plan enrollee for whom he/she is the PCP. In return for the flat fee, the provider supplies all the required primary care for the enrollees and serves as the gatekeeper to specialty services. Under capitation, provider revenues can be increased by providing fewer and/or less expensive services. Providers profit from enrollees with low medical utilization but may suffer substantial financial losses from those with high utilization. The controversy is whether some providers respond to such financial restraints by providing "too few" services.

These managed care techniques were developed specifically to decrease medical expenditures in traditional fee-for-service health plans with the goal of health at the lowest cost. They were not developed within the framework of WC plans. We argue that WC plans are fundamentally different from group health plans in

ways that make the application of many of these techniques contentious. In the following section, we provide a brief overview of WC and compare WC plans to group health plans.

WORKERS' COMPENSATION

With origins in Bismark's Germany, government requirements for employers to provide for the care of workers injured in the course of their employment was first enacted in the United States in the early twentieth century as state-level programs without Federal oversight (1). The state of New York passed the first state-wide WC laws in 1910, and by 1939 all but one state had implemented WC legislation (the final state, Mississippi, enacted WC legislation in 1948) (7). However, this early WC legislation placed the burden of proof on the injured employee and allowed employers to evade liability if the injury resulted from either the ordinary hazards of employment, the employee's own negligence, or the negligence of a coworker. The resulting litigation strain on both employers and employees led to the current no-fault WC plans. No-fault plans limit employer liability, provided injured employees are compensated in accordance with state laws. The goal of WC plans is to restore workers to health and productivity at the lowest cost.

Both employer-offered group health and WC plans provide medical insurance to reimburse medical expenses. However, there are fundamental differences that make the use of group health managed care techniques contentious and potentially unsuccessful in WC plans. Table 1 presents a comparison of some of the major differences between WC and group health plans.

Participation

An important element underlying the differences in group health and WC plans lies in the nature of employee and employer participation. In most states, employers voluntarily choose whether to offer group health plans to their employees, absent any mandate by the state (Hawaii is an exception, where many private-sector employers are required to enroll employees in health insurance). Furthermore, employee enrollment in such employer-offered group health plans is generally voluntary. Finally, employment-based group health plans frequently require some direct employee contribution toward the plan's premium, although employers often heavily subsidize the premiums. By contrast, all states except Texas now mandate employee enrollment in WC plans for defined groups of employees and businesses (small businesses are generally excluded, as are some classes of workers, such as agricultural workers) and require employers to bear the entire cost of the plans.[1]

[1]Economists would argue that employees ultimately pay the cost of WC plans even in the absence of direct premium contributions through lower wages. In theory, if employers did not incur the cost of WC plans, then employees would take those savings home in the form of higher wages.

TABLE 1 Workers' compensation plans compared with group health plans

Determinants	Group Health	Workers' Compensation
Participation		
Employer	Not required[a]	Required[b]
Employee	Not required	Required
Employee cost	Varies by employer	None
Level of coverage		
Employee coverage	Employer defined	State defined
Services covered		
Medical services	Employer defined	State defined
Dependents coverage	Varies by employer	No
Salary Replacement		
Lost wages and benefits	None	Required
Duration of coverage		
Medical expenses	Duration of plan enrollment	Duration of injury/illness
Regulatory oversight		
Authority	State	State

[a]Except Hawaii.

[b]Except Texas.

This means that for many firms, all employees are enrolled in a WC plan; there is no participation choice on the part of the employee.

Level of Coverage

Another difference between group health and WC plans is the level of benefit coverage. Group health plans explicitly detail services and procedures that are excluded from plan coverage, but they do not generally exclude specific diseases. It is not uncommon, however, for group health plans to exclude entire classes of medical services from coverage (such as chiropractic care, cosmetic surgery, or psychotherapy) or to limit the amount of services covered (such as limits on inpatient days or the frequency of preventive services). In contrast, all state WC plans mandate full insurance coverage for work-related injuries and illnesses encompassing all necessary treatment as determined by the state. This implicitly excludes most chronic illness such as heart disease, diabetes, and common types of cancers.

Services Covered

The nature of medical care delivered under the two types of plans also varies, reflecting the intent of the plans. Group health plans frequently cover preventive services, such as screening mammography and annual physicals. WC plans cover care strictly related to work-related injury/illness and explicitly exclude preventive

services. Group health plans frequently offer enrollment to employees' dependents; as a result, child services account for a large portion of care delivered under those plans. By contrast, WC plans cover only employees themselves and do not encompass any dependent services. Finally, most group health services are provided on a scheduled, elective basis. The focus on acute work-related injury/illness in WC plans results in a large portion of emergent care delivered under those plans.

Salary Replacement

Unlike group health plans, WC plans cover more than just medical expenditures. Medical expenditures alone account for only about 40% of all expenditures in WC plans; the majority of expenditures are cash benefits, including salary replacement for injured workers during periods when they are unable to work as a result of their injury (13). Although the minimum level of salary replacement mandated by state laws is less than full salary (typically up to 67% of full salary), this income is exempt from federal and state taxes. Further, states mandate only the minimum salary replacement; actual salary replacement can be higher, subject to negotiation under employment contracts. Absenteeism associated with a work-related injury is not debited to the employee and does not affect the employee's tenure or the accrual of time in service, sick leave, vacation time, and other benefits while absent from work.

Duration of Coverage

The duration of medical coverage differs markedly between group health and WC plans. Medical coverage under group health plans begins with employee enrollment in the plan and lasts for the duration of the enrollment. Preexisting medical conditions are commonly covered, and group health plans can inherit past injuries and illness. The Health Insurance Portability and Accountability Act of 1996 standardized this practice in the United States. In contrast, WC plans cover episodes of care defined by the length of the injury or illness. Once a work-related injury or illness occurs, employees receive coverage for medical expenses until the work-related injury or illness is resolved—whether the injury/illness lasts 3 days or 3 decades. This design of complete and ongoing medical coverage for episodes of injury/illness also means that coverage for preexisting injuries/illnesses is neither needed nor provided. Future employers (and their WC plans) do not inherit past, unresolved injuries. The basic difference is that under WC plans, employers (and their WC plans) have an open-ended future liability for medical expenditures for all injuries associated with work done in their employment, but they incur no liability for past injuries from unrelated employment. Under group health plans, the plan has a defined time frame for liability that is limited to active enrollment in the plan.

Regulatory Oversight

Although all insurance plans are subject to some state oversight and operational regulation, states generally have little involvement in the design of group health

plans, the nature of covered services, or the management of care under those plans. By contrast, WC plans are subject to extensive state oversight. Changes in the design, benefits, or management of care under these plans require state approval; major revisions may require legislative action. The result is that WC plans cannot alter the way care is delivered or managed as rapidly as group health insurance plans. However, because there is no federal oversight of WC plans, these plans may be able to change more rapidly than such federally run programs as Medicare.

APPLICATION OF MANAGED CARE TO WORKERS' COMPENSATION

Beyond the fundamental differences in the oversight and design of group health and WC plans, the underlying goals of these two types of plans are different. The goal of group health plans is health at the lowest cost, whereas the goal of WC plans is to restore a worker to health and productivity at the lowest cost. Implicit in the management of expenditures under WC plans is the need to consider salary and benefits replacement in addition to medical costs. For example, treatment of back pain with extended bed rest and few diagnostic or rehabilitation services may be a cost-effective approach under group health. However, the salary replacement costs of such an approach in WC may significantly exceed the savings from a decreased use of medical services. Studies have shown that more medical resources are used to treat injuries under WC plans than under group health plans (10). This may be appropriate in achieving the goal of a healthy, productive worker at the lowest cost when that goal requires minimizing the combined cost of medical services and lost work time.

The application of managed care approaches in WC plans has met with mixed success. Some managed care tools are simply inappropriate for WC plans. For example, WC laws explicitly prohibit patient cost-sharing. States require employers to pay for all medical care expenses and to continue to provide medical services until the injury/illness is resolved. Yet many of the gatekeeping tools important for the managed care model rely on the threat of shifting large portions of the cost of medical services to patients when gatekeeping rules are violated.

Some managed care tools, however, can be and have been successfully applied in WC plans. These include restricted provider networks, primary care providers, preauthorization, and provider risk-sharing. Here we discuss the impact of these applicable managed care tools on WC plans.

Restricted Provider Networks

Ideally, restricted provider networks give managed care plans greater control over the quality of care available to patients. Many managed care organizations require qualification standards for network providers (such as board certifications and continuing educational requirements) to ensure adequate standards of care, and to

provide ongoing review of provider performance (including patient satisfaction) to monitor quality. Restrictive provider networks can also be used to standardize treatment approaches. Providers deemed wasteful in the use of medical services, either by volume of care or by costs (for example, frequent use of inpatient care, expensive technology, or referrals to specialists) can be removed from the network and replaced with providers whose treatment profiles are more closely aligned with the managed care organization guidelines. In the WC arena, restricted provider networks can potentially improve patient care by steering patients to providers with expertise and competence in the management of occupational injury and illness. Successful managed care plans rely heavily on restricted provider networks, and evidence shows that using restricted networks in WC significantly lowers medical expenditures (2). State regulations that implement managed care in WC but continue to allow unrestricted choice of providers limit the effectiveness of the managed care approach. In those situations, Eccleston & Victor (6) note that managed care appears useful only when labor relationships between employers and employees are positive.

Restricting the choice of providers may have other consequences. Although potentially raising the quality of providers used and producing cost savings and negotiating power for managed care organizations, this approach may be associated with the undesirable side effect of decreased patient satisfaction. Even when the network has adequate numbers of qualified providers, patient satisfaction may decline if patients are denied access to providers of their choice. Evaluations of WC managed care plans in Florida, Oregon, and Washington state that use restricted networks found that injured workers are significantly and persistently less satisfied than similar workers in traditional workers' compensation plans, even though treatment outcomes for those in restricted provider networks were similar to those for patients in unrestricted networks (11, 4). Dissatisfaction was mainly attributed to a lack of provider choice.

Primary Care Provider

In group health managed care plans, the PCP directs most care and serves both as the gatekeeper and as the contact point between the patient and the medical community. However, WC care is often emergent care, and having a PCP who functions as the first contact point with the medical community may not be feasible—particularly with severe injuries. Additionally, workers with chronic work-related conditions often require ongoing specialty care, again making a generalist PCP ineffective as the main conduit for medical services. Occupational medicine specialists may be able to better serve this role by acting as the primary occupational provider (POP) for many common occupational injuries/illness, and as the gatekeeper to specialized care.

Numerous WC managed care plans employ the POP technique, and there is evidence that using POPs does give plans the ability to control access to providers (9). A summary of the impact of managed care in Florida WC plans reports that

POPs are associated with a 23%–29% drop in the average total cost per claim, with 7%–8% of those savings attributed to a decrease in lost work time (4).

Preauthorization

Although preauthorization loses its effectiveness with high volumes of emergent care, as is often the case in WC plans, it can and has been used for the management of nonemergent care. A 7-year case study comparing the hospitalization rates in WC plans with and without preauthorization requirements supports the effectiveness this approach (8). The study evaluated workers who had low back pain but did not meet the American Hospital Association minimum guidelines for hospitalization. Workers in that study who were subject to hospital preauthorization had significantly fewer admissions than did workers with no preauthorization requirements. The impact of preauthorization on lost work time was not examined.

Provider Risk-Sharing

Rewarding providers for decreasing expenditures on medical care has been controversial even in group health. The impact of such financial incentives as capitation in WC plans on the delivery of care has not been well explored, but preliminary evidence on acute occupational back injuries indicates that WC providers respond to capitation by decreasing the number and altering the mix of services provided while adhering to occupational guidelines for care (14, 14a, 16). In an evaluation of capitation in WC, Cheadle et al find a significant decline in the number of injuries with loss work time with 15% of injuries in a capitated plan incurring loss work time compared to 19% in the fee-for-service plan (2). This same study fails to show a significant change in the average number of lost works days per injury, indicating that although fewer injuries under the capitated plan incurred loss time, among those injuries that did, there were more days of loss time per injury than in fee-for-service.

CONFLICTING INCENTIVES IN WORKERS' COMPENSATION

In group health insurance plans, numerous incentives are aligned to encourage prompt recovery from illness or injury. Most group health plans include patient cost-sharing provisions, giving patients an incentive to regain their health and end treatment. In addition, there are no inherent benefits or incentives that encourage continued illness or disability. WC plans inherently contain a different incentive structure. WC not only provides full coverage for medical expenses for injured workers, it also provides salary replacement and continued employment benefits while workers are absent from their jobs. Because WC salary replacement payments are exempt from most income taxes, workers with employment contracts that provide generous salary replacement can actually earn more net income when

they are absent from work due to a work-related injury than when they return to work. A number of studies have demonstrated a positive relationship between the generosity of WC benefits and the duration of injury (12). The introduction of managed care techniques does not alter the incentives associated with the generosity of salary replacement and other WC benefits.

CONCLUSION

As WC plans increasingly adopt managed care techniques to control expenditures, questions remain about the appropriateness and effectiveness of those techniques in WC. A large number of managed care tools, including gatekeeping and provider risk-sharing, are designed to influence the amount and type of care provided. Whether or not this is appropriate depends on whether the practice patterns encouraged under managed care are appropriate. The underlying principles of managed care help to sharpen the issues on which this debate must focus. Managed care techniques are primarily designed to decrease expenditures by (*a*) changing the number or mix of services provided and (*b*) reducing the price paid for services. These two objectives have dramatically different implications for the delivery of care, especially for the delivery of care in WC plans. The first targets medical expenditures by changing provider behavior and implicitly assumes that providers are not delivering care in the most cost-effective manner. The second approach makes no assumption over the appropriateness of provider practices but rather seeks to decrease medical expenditures by lowering the nominal price of services. Neither of these approaches addresses the important objective of decreasing lost work time.

The research to date has not addressed the appropriateness of differences in practice patterns between group health and WC plans. The WC plan's objective of restoring a worker to health and productivity at the lowest cost may, in fact, be best served by more intensive and aggressive treatment when the costs of lost work time are included in the equation. This inclusion of salary replacement in cost-effectiveness analyses is not inherent to the traditional managed care market. The use of provider risk-sharing agreements such as capitation may serve to make providers more mindful of the use of resources, but it may not adequately address costs associated with lost work time. Furthermore, there is concern that providers in risk-sharing agreements may be rewarded for providing inadequate care. Although early evidence suggests that capitation in WC plans does not appear to result in inadequate care, the impact on worker productivity and labor-management negotiations associated with worker dissatisfaction with care in managed care WC plans may be substantial.

The real promise of managed care for WC plans is to discover through utilization review and outcome evaluation how to alter provider practice patterns to better deliver care and obtain the objective of a healthy, productive worker at the lowest cost. However, achieving that goal requires more than just decreasing

medical expenditures, it requires evaluation of the quality and appropriateness of care, and a timely return to work by injured employees. As more states encourage the incorporation of managed care techniques in WC plans, research focusing on comprehensive cost-effectiveness analyses and evidence-based outcomes (including return to work) will be critical in assessing the appropriate models for the delivery of medical care in the WC environment.

LITERATURE CITED

1. Carr JD. 1998. Workers' compensation systems: purpose and mandate. *Occup. Med.* 13(2):417–22
2. Cheadle A, Wichizer TM, Franklin G, Cain K, Joesch J, et al. 1999. Evaluation of the Washington state workers' compensation managed care pilot project II. *Med. Care* 37(10):982–93
3. Cromwell J, Mitchell JB. 1986. Physician induced demand for surgery. *J. Health Econ.* 5:293–313
4. Dembe AE. 1998. Evaluating the impact of managed health care in workers' compensation. *Occup. Med.* 13(4):799–821
5. Dranove D. 1988. Demand inducement and the physician/patient relationship. *Econ. Inq.* 26(2):281–98
6. Eccleston SM, Victor RA. 1998. Regulatory trends in workers' compensation managed care. *Occup. Med.* 13(4):787–98
7. Fishback PV, Kantor SE. 1998. The adoption of workers' compensation in the United States, 1900–1930. *J. Law Econ.* 41:305–41
8. Grable HR. 1989. The effect of precertification on the rate of hospitalization of patients with low back pain: a case study comparing hospitalization rates of patients covered by workers' compensation and no-fault automobile insurance in New York State. *Qual. Assur. Util. Rev.* 4(4):101–7
9. Greenberg EL, Leopold R. 1998. Performance measurement in workers' compensation managed care organizations. *Occup. Med.* 13(4):755–72
10. Johnson WG, Baldwin ML, Burton JF. 1996. Why is the treatment of work-related injuries so costly? New evidence from California. *Inquiry* 33(1): 53–65
11. Kyes KB, Wickizer TM, Franklin G, Cain K, Cheadle A, et al. 1999. Evaluation of the Washington state workers' compensation managed care pilot project I. *Med. Care* 37(10):972–81
12. Loeser JD, Henderlite SE, Conrad DA. 1995. Incentive effects of workers' compensation benefits: a literature synthesis. *Med. Care Res. Rev.* 52(1):34–59
13. Mont D, Burton JF, Reno V. 2000. *Workers' Compensation: Benefits, Coverage, and Costs, 1997–1998 New Estimates.* Washington, DC: Natl. Acad. Soc. Insur. 36 pp.
14. Peele PB, Catullo VJ, Tollerud DJ. 1999. Capitated payment systems: Do patients get adequate care? *Res. Act. Role Health Serv. Res.*, p. 272 (Abstr.)

14a. Peele PB, Tollerud DJ. 2000. Capitation in workers' compensation insurance: cost and care. *Res. Healthcare Financ. Manage.* 6:67 (Abstr.)

15. Rice TH, Labelle RJ. 1989. Do physicians induce demand for medical services? *J. Health Polit. Policy Law* 14(3):587–600
16. Tollerud DJ, Peele PB. 1999. *Changes in health care utilization for occupational back injuries with implementation of a capitated workers' compensation*

program. Presented at Annu. Meet. Am. Coll. Prevent. Med., Washington, DC

17. Wilensky GR, Rossiter LF. 1983. The relative importance of physician-induced demand for medical care. *Milbank Q.* 61:252–77

18. Workers Comp. Res. Inst. 1997. *Managed Care and Medical Cost Containment in Workers' Compensation: a National Inventory, 1997–1998. Rep. WC-97–6.* Cambridge, MA: Workers Comp. Res. Inst.

Annual Review of Public Health
Volume 22, 2001

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