these results can be replicated in settings with different socioenvironmental risk factors.

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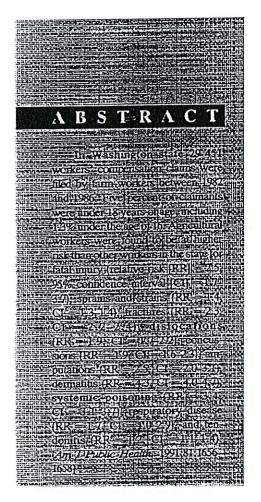
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Occupational Injuries and Illnesses among Washington State Agricultural Workers

Paul Demers, MS, and Linda Rosenstock, MD, MPH

Introduction

Agricultural employment is among the nation's most hazardous occupations. ^{1,2} Farm workers have been noted to be at increased risk for musculoskeletal disorders, noise-induced hearing loss, dermatitis, respiratory diseases, and cancer. ^{1,2,5} The most widely recognized hazards of farm work are pesticides and agricultural machinery, but farm workers are also exposed to severe climatic conditions, physical fatigue and stress, parasites, infectious diseases, toxic plants, and chemicals needed to maintain farm machinery. ^{5,6}

We reviewed workers' compensation claim data for farm workers in the state of Washington between 1982 and 1986 in order to characterize the nature of work-related illnesses and injuries among farm workers and compare their rates to those of nonagricultural workers.

Methods

The state supplied the investigators with computer tapes containing data on all claims filed in Washington between January 1, 1982, and December 31, 1986. The nature and source of injury and illness claims were derived from the first report received at the time the claim was filed, and claim status was determined as of April 1988. Using hours submitted to the state by employers for billing purposes, the number of full-time equivalent (FTE) agricultural workers was estimated. In or-

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TABLE 1 Workers Compensation
Claim Status: Washing
ton State Farm Workers
1982 to 1986 70 1984
Claim Status
Medical bills only: 1977 1971 1994
Time loss paid 7375
Total permanent disability Table 1927-
Cther 1305
Rejected 1732
Total 293515
"Kept on salary, loss of earning power, or no
decision as of the time the data were generated.

der to calculate rates for nonagricultural workers, data from the state employment security commission were used. Relative risks were calculated by comparing the rate for agricultural workers to the rate for all other workers in the state. Confidence intervals were calculated using Taylor series methods.⁷

Results

A total of 29 451 claims were filed by farm workers between 1982 and 1986. The status of all claims as of 1988 is given in Table 1. Table 2 shows the number of accepted claims by the type of injury or illness. The claims rate for agricultural workers was almost 50% higher than for nonagricultural workers, with substantial excesses for each of the categories examined except hearing loss (Table 3).

Between 1982 and 1986 only 53 claims were filed for organophosphate pesticide (OP) related illnesses, with 11 (21%) rejected and only 3 (6%) resulting in compensable time loss. Of the 54 claims filed for pesticides other than organophosphates, 9 (17%) were rejected and only 3 (6%) resulted in compensable time loss. During the study period there were 148 dermatitis claims, and 106 systemic poisoning claims were attributed to "other and unspecified chemicals."

Although 74% of all claimants were between the ages of 18 and 40, 5% were under 18 years of age and 1.3% were under 16. Ninety-four percent of these claims were accepted and 20% had compensable time loss. One claim was accepted for a childhood fatality: a 15-year-old orchard worker died from multiple injuries following a work-related motorcycle accident. Other serious injuries for which claims were accepted for children included 7 am-

putations, 90 fractures, 11 dislocations, and 8 concussions. These serious injuries represented 8.8% of all claims accepted for children vs 7.1% of all claims filed by adults.

Discussion

We found agricultural workers in the state of Washington to be at higher risk than other workers for both occupational injuries and illnesses. Approximately 5% of the claims examined by this study were filed for children. It is not possible to determine if the higher proportion of serious injuries seen in children compared to adult farm workers was because children are at higher risk or because claims were not filed for less serious injuries. Because of the serious nature of many of these claims, this population should receive special attention by regulatory and health agencies.³

We were able to identify relatively few pesticide related claims. This may be due to a lower than anticipated risk or to inaccurate or underreporting. In analyses of California pesticide-related illnesses, Kahn9 and Blanc et al. 10 found that only a small fraction of cases were reported despite the fact that physicians are required to report pesticide poisonings in that state. A survey of farm workers in Washington State found that only 8% to 15% of those who felt ill after exposure to pesticides sought medical attention.11 In addition, the relatively large number of claims attributable to other and unspecified chemicals points to the need for better reporting by physicians and more detailed coding by the responsible state agency. The recent enactment of legislation making pesticide poisonings reportable in Washington may provide a better means of surveillance in the future.

This study suffers from an inherent limitation: compensation records are known to be insensitive to the total extent of occupational disease.9.10.12-14 Despite this limitation, recent investigations have found that internal analyses of compensation data appear to be valid.15.16 Moreover, in the case of farm workers few other sources of data are available. An additional limitation was the lack of reliable estimates of the number of farm workers in the state during the study period. One advantage of using workers' compensation data is that they are based on hours and allow the calculation of FTE workers. Because of the seasonal nature of farm labor, the use of FTE workers rather than estimates made at one partic-

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ular time during the year may better represent person-years at risk.

The increased risk for agricultural workers compared to other workers could be explained by different reporting rather than a real difference between the two populations. This could occur if farm workers were more likely to submit claims or if their numbers are underestimated. Because some farm work is paid for on a piece rate rather than on an hourly basis, farm owners may sometimes be forced to calculate hours based on a formula using

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TABLE 3 Comparison of Workers Compensation Claims Rates between Agricultural
and Nonegroundral Workers: Washington State 1982 to 1988
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Workers Rate Workers Rate Workers Rate Confidence Lines
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the average number of bushels picked per hour or some other productivity estimate. While it is possible that this practice and the general difficulties of enforcing workers' compensation laws in agriculture could lead to some underreporting of hours, a bias in this direction would have to be extremely large to explain the magnitude of the observed differences for most of the outcomes, and substantial fines may be levied against an employer if a claim is filed and no workers' compensation premiums have been paid.

The analysis of workers' compensation claims submitted by farm workers in Washington State has provided a means to examine some aspects of work-related injuries and illnesses in this understudied population. The needs of farm workers should be prioritized for regulatory action and other forms of intervention.

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