

**An Analysis of Occupational Burn Injuries in Rhode Island:**  
**Workers' Compensation Claims 1998-2002**

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## **Abstract**

**Background:** Occupational burns have been determined to be a serious public health concern. The analysis of workplace risks and risk factors associated with burns are critical to developing effective interventions in the future.

**Methods:** This study examined accepted Rhode Island workers' compensation claims (n = 5,619) from 1998 to 2002 to assess the rates and risks of occupational burns. Employment data from the Department of Labor's Current Population Survey (CPS) was used for the estimation of claim rates and shift analyses.

**Results:** The overall burn rate was estimated to be 24.3 per 10,000 workers. The claim rate for workers under 25 years of age was almost double that for all other age groups. The average per-claim disability duration for claims requiring indemnity was 167.9 days and average annual total cost of claims was \$1,010,166. The highest claim rate identified was for workers in food service occupations and an increased risk was found for chemical burns among evening and night shift workers.

**Conclusions:** Increased interventions are needed to reduce occupational burns in work settings. Particular diligence should be should address occupational burn hazards in restaurant establishments, and preventative measures aimed at young employees and late shift workers.

## **Introduction**

Developing and targeting interventions for the prevention of burn injuries sustained in the workplace is of paramount importance to improving the occupational safety and health. Occupational burns have previously been ranked among the top ten causes of work-related fatalities, and a significant cause of disability leave among U.S. workers.<sup>1-2</sup> A recent study conducted using the National Health Interview Survey (NHIS) estimated that workers experience 183,000 burns occur annually, representing a rate of 3.3 percent of all work-related injuries and constitute 42.1 percent of total burn injuries.<sup>3</sup> Burn injuries that result in disability have been found to result in considerable periods of unemployment for the injured, as well as substantial costs to both injured employee and employer, while the health outcomes of less serious burns have not been well-documented.<sup>4-5</sup>

Most studies which have investigated occupational burns have come from data provided by medical and admission records of hospitals with specialized burn care services and death certificates.<sup>5, 6-14</sup> Although valuable, data from burn sources inherently underestimate the extent and distribution of work-related burns because only the most severely injured employees are brought to these treatment centers.<sup>15-16</sup> While other studies have used population-based approaches to assess risk and severity by individual characteristics and risk by occupation and industry,<sup>17-21</sup> these approaches have yielded varying results, and have led to a concurrence among investigators that continued surveillance of occupational burns using population-based methods is needed.<sup>15, 22</sup>

Previously, workers' compensation data from the states of West Virginia, Washington State and Oregon have been used as population-based means for assessing occupational burns.<sup>23-26</sup> Workers' compensation data is a very valuable source for obtaining information on the rates, costs, severity and factors affecting the risk of burn injuries in the workplace. Nevertheless, widely varying rates and risk estimates between the studies were obtained because of differences in methods of deriving denominators for rate estimation, unique workforce demographics, and state-specific regulations governing the reporting requirements of injuries.

This study examines workers' compensation burn claims from the state of Rhode Island for the period of 1998 through 2002. Information from Rhode Island is particularly useful because the state's Department of Labor and Industry mandates the reporting of both injuries that require indemnification (workers' compensation payments made for lost wages when the sustained burn injury result in time-off work for recovery), and those that necessitate medical attention but do not require absence from work for recovery (medical-only claims), and hence, capture a higher incidence of burns than for states that require reporting only in cases of indemnification.<sup>26</sup> Similar to Oregon, for claimants to receive indemnification payments in Rhode Island, a minimum of three days of lost time must be taken by employees due to their injury. Rhode Island also maintains detailed records on costs associated with both medical treatment and indemnification which is important for assessing injury severity as well as weighing the utility of various interventions. Moreover, as Rhode Island records the time of injury, shiftwork effects, which have found to be a potential risk factor for burn injuries,<sup>26</sup> can also be assessed.

## **Methods**

This study used workers' compensation claim data provided by the Rhode Island's Division of Workers' Compensation for the period 1998 – 2002. In this study only accepted claims of those workers who reported burns as the nature of injury (nature codes 120 and 130) were analyzed. The data set included information on claimant occupation and industry, individual demographics (e.g. age, gender), work schedules, nature of reported injury, body part affected, compensated days of lost work and costs associated with indemnity and injury. Claim costs were tracked through 2002 and the cost data reflect accumulated claim costs through this time. By the end of the observation period 5,559 (98.9%) of all accepted burn injury claims were closed and for these claims the cost data was complete. For the remaining 60 open claims, 51 involved no costs and are likely to have remained open because employer/insurer failed to file a notice of closure. For the remaining 9 open claims, costs accumulated through 2002 were used in the analysis.

The workers' compensation data from Rhode Island recorded information on the hour that a claimant began work. In order to investigate work injuries by shift of work, we defined day, evening and night shifts as follows: Individuals who reported starting work between 4 a.m. and 11 a.m. were classified as day shift workers, individuals who reported starting work between 12 p.m. and 7 p.m. were classified as evening shift

workers, and individuals who reported starting work between 8 p.m. and 3 a.m. were classified as night shift workers.

Data from the U.S. Bureau of the Census' Current Population Survey (CPS) was used to estimate Rhode Island employment levels for different demographic categories and time periods. The CPS is a monthly survey of approximately 60,000 households that is conducted by the United States Department of Labor. The CPS is a rotating survey with households first surveyed for four months, not surveyed for the next eight months, and then surveyed for an additional four months before permanently leaving the survey. Most of the employment estimates are based on the monthly outgoing rotation group (CPS-MORG) files for 1999 through 2002. These files contain data for all individuals participating in their fourth or eighth monthly survey. For individuals in CPS-MORG, additional questions pertaining to an individual's employment are asked. This study restricted the sample to individuals who reported residing in Rhode Island and being employed at the time of the interview. The sample size was 10,056.

Burn injury rates for specific categories of Rhode Island workers were calculated by dividing the reported number of injuries from accidents by the number an estimate of the number of workers for each particular category. Data for the numerator was obtained from the Rhode Island workers' compensation administrative data while the denominator was estimated using CPS-MORG sample data for Rhode Island workers. The worker injury rates were converted to injuries per 10,000 workers by multiplying the rate by 10,000. Since estimates were employed in calculating injury rates, 95% confidence

interval estimates were derived for categories with sufficiently large samples of Rhode Island workers from the CPS-MORG.

To estimate the fraction of Rhode Island employees who work at particular times of the day we used data from the May 1997 CPS Work Schedule Supplement Surveys (CPS-WSS). These surveys contain supplemental questions pertaining to individuals' work schedules in addition to the usual monthly survey questions. Only those workers who report residing in Rhode Island were used in the analysis (N=793).

Multivariate logistic regression analysis was used to investigate the determinants of burn claims involving indemnity payments. Estimates are reported in terms of odds ratios. All calculations reported in this paper were made using Stata (release 8.2) software (Stata Corp., College Station TX).

## **Results**

A total of 5,619 accepted claims cited burns as type of injury from 1998 through 2002. Of these claims, 3,370 (60.0%) were filed by males and 2,249 (40.0%) were filed by females. By year, the most claims filed was 1,233 (21.9%) in 2000, and the least claims filed was 937 (16.7%) in 2002. The CPS was used to estimate baseline employment populations for determining rates of injury. Over the five-year period examined, the overall estimated burn claim rate per 10,000 working employees was 24.3 (95% CI = 24.3-24.3), with the estimated rate for males totaling 28.0 (95% CI = 27.5-28.5) and females equaling 20.3 (95% CI = 19.9-20.7). Over this period, the claim rate was found to be declining, from a high of 27.2 (95% CI = 27.0 -27.4) claims in 1998 to a low of 20.0 (95% CI = 19.9 – 20.2) in 2002. A chi-squared test for year differences found a significant difference by year ( $p < 0.001$ ). Of the claims, 4,184 (74.5%) were attributed to heat, while 1,435 (25.5%) cited exposure to chemicals as cause of injury.

Claims were analyzed by those requiring indemnification (indemnity claims) and those that did not (medical-only claims). The majority of claims, 4,406 (78.4%) were medical-only, while 1,213 (21.6%) were indemnity claims. Males had a higher estimated indemnity rate of 6.9 (95% CI = 6.8 –7.0) and medical-only rate of 21.1 (20.7 –21.5) compared to the female rates of 3.4 (95% CI = 3.4-3.5) and 16.9 (95% CI = 16.6 – 17.2). Figure 1 compares indemnity and medical-only claims and total claim rate by year. By age, the highest estimated claim rate of 51.0 (95% CI = 48.7 – 53.2) claims per 10,000 was found for workers under 25 years of age, while the lowest rate of 16.5 (95% CI = 16.1 –16.9) was found for workers between 40 to 54 years of age. Additional analyses



which compared rates of indemnification and medical treatment by age were conducted and are presented in Figure 2.

The total cost of workers' compensation burn claims averaged \$1,010,166 annually, totaling \$5,050,832 for the years 1998 through 2002, of which \$3,349,914 (66.3%) was for indemnity payments and \$1,700,918 (33.7%) was for medical expenses. Overall, these expenses broke down to an average cost of \$899 per claim, of which \$596 was for indemnity and \$303 was for medical expenses. However, when the claims were examined by whether or not a claim required indemnification, the averages differed substantially with the average cost of a claim in which indemnification was required totaled \$4,075 of which \$2,740 was for indemnity payment and \$1,335 was for medical expense as compared to the average cost per claim of a medical-only claim of \$25.

The average duration of indemnity for all burn claims was 36.2 days with, though the average was substantially higher at 167.9 days when averaged among only claims with indemnity payments. The median indemnity duration of all claims was 0 days, and the 90<sup>th</sup> percentile of claim duration was 49 days. Claims by males had an average indemnity period almost three times longer than females, and the average number of days of indemnification rose steadily with age. For all heat burn claims the median duration of indemnity was 0 days, with 70.0 days representing the 90<sup>th</sup> percentile of duration spell, while for the 909 (21.7%) of only those heat burn claims that resulted in indemnification the average duration of disability was 187.0 days. The thermal burns had an average per claim cost of \$4,629, of which \$3,031 was for indemnity and \$1,598 was for medical

expenses, with the median cost of these claims being \$0 and 90<sup>th</sup> percentile \$1,420. Of the chemical burn claims, 170 (13.4%) resulted in indemnification, and averaged 197 days of disability per claim, with 0 days being the median indemnity duration and 49 days the 90<sup>th</sup> percentile of duration. The average cost for chemical burn claims was \$4,480, of which \$3,497 was for indemnity and \$983 for medical expenses, with the median cost of these claims equaling 0 and 90<sup>th</sup> percentile \$446. For claims not requiring indemnity, the per-claim medical expenses for heat burns and chemical burns averaged \$19 and \$16 respectively. Table 1 compares claim costs and indemnification durations averaged across all claims and claimant demographics. Logistic regression was conducted on the heat and chemical burns claims to assess demographic and work-related factors which affected indemnification risk. Table 2 presents the odds-ratios from analysis of these two primary occupational burn typologies.

Rates of injury, cost analysis, and periods of indemnification for burn claims were examined by industry. The highest estimated rate of workplace burn claims were filed by employees in the “utilities and sanitary services” industry with 63.6 claims per 10,000 (95%CI = 48.4-78.9), and lowest by employees in the “communication” industry 4.5 (95% CI = 3.7-5.3). Table 3 provides estimated claim rates, costs, indemnification periods, and 90<sup>th</sup> percentiles of cost and indemnification periods by industries in which 10 or more burn claims were filed. The same analysis was conducted for occupations with more than 10 claims. “Food service workers” had the highest burn claim rate of 181.0 (95% CI = 166.5 – 195.4) and “other executive and administrative” occupations to

have the lowest with 1.2 (95% CI = 1.1-1.2). Table 4 presents rates, costs indemnification periods, and percentiles of indemnification days and costs by occupation.

The frequency of burn injury claims was examined by shift. The majority of claimants, 2,819 (59.4%) were injured working during the day shift, while 981 (20.7%) were injured during the evening shift and 950 (20.0%) were injured during the night shift. Using employment data from the CPS-WSS for workers in the state of Rhode Island, the size of the workforce by shift was estimated. Day shift workers constituted 85.6% of the total workforce, while evening shift workers and night shift workers composed 15.5% and 1.9% of the workforce, respectively. Thus, in comparison, the proportion of burn injuries that occurred during evening and night shifts were substantially higher relative to the population of employees that worked during those periods.

An analysis of the etiology of burn injury claims revealed that 3,103 burns occurred to the arm and hand regions of which 25.1% resulted in indemnification. There were 319 claims reporting injury to the head, neck and face regions of which 14.9% necessitated indemnification. Additionally, there were 903 claims specifically citing the eye(s) as body part injured, of which 5.0% were indemnified. Burn injuries to the leg(s) and foot (feet) totaled 490 of which 36.3% were indemnified. Of the remaining claims 34.7% required indemnity. The most frequently reported cause of burn injury was “contact with hot object” with 3,417 (60.8%) claims, followed by “absorption/skin contact” with 901 claims, “contact with extreme temperature” with 603 claims, “struck” (including stationary and moving/flying objects) with 274 claims “particle or foreign matter” with

205 claims, “contact with electric” with 31 claims, “explosions” with 27 claims, and “inhaled toxic fumes” with 19 claims.

## **Discussion**

The number and rate of burn claims found in this study demonstrate that occupational burns remain a significant occupational problem in the workplace. The average rate of 24.3 claims per 10,000 was quite comparable to the finding of 26.4 per 10,000 found in the West Virginia workers' compensation study which had similar state reporting requirements and used a similar denominator derivation method.<sup>23</sup> The average rate of 5.2 per 10,000 for indemnity claims was higher than that reported for Oregon that had an estimated claim rate of about 2.9.<sup>26</sup> The rate of claims were found to decline over the 1998-2002 period, and this decreasing trend is consistent with the results found previously for Oregon and Washington State,<sup>25-26</sup> though unfortunately the data did not provide information on why such a decline occurred. Future research may benefit for further confirmation of whether occupational burns are declining throughout the United States as a whole, and assess factors that may be contributing to such a decline. For both states, the average payment for claims requiring indemnification were approximately the same, although the average duration of lost work time for Rhode Island claimants where indemnification was paid was longer. Results showing that males had higher rates of burn injuries than females were consistent with previous reports in the burn literature.<sup>4-5,</sup>

10,12,15,17, 22-26

It was also found that the claim rate of burn injuries for workers under the age of 25 was significantly higher than any other age group. This result is consistent with those of

the previous workers' compensation studies,<sup>23-24, 26</sup> and provides additional evidence that younger workers are at particularly greater risk of burn injuries than older workers. The uniformly higher burn injury rate observed for younger workers may be due to a lack of training and/or less attention to safety, and indicates that preventative interventions in the form of training and intensive supervision should be aimed towards this worker group. It should be noted that as the youngest group had only about half the indemnification time and a fourth of the costs associated with the older groups, the severity of injuries sustained by these workers were generally less than their older counterparts.

Studies have produced mixed findings, with some reporting the most common source of burns caused by chemicals<sup>12,22</sup> while others by heat<sup>6,24-26</sup>. The results of this study were consistent with the latter, and further discovered that the average severity of burns from heat exposure was greater with respect to claim cost and indemnity duration. This held true for both gender and all age categories. Effective preventative interventions should thus include regular use of protective clothing and increased safety training. For example, while this analysis revealed that the eyes were the body part injured in over 900 claims, other studies have determined that most, if not all, occupational eye injury could be avoided through the regular use of protective eyewear in occupational environments where the risk of such injury exists.<sup>27-30</sup> Additionally, the analysis of median costs and indemnification periods, and their corresponding 90<sup>th</sup> percentiles, illustrated that the injury severity was highly right-skewed, and thus the vast majority of burns reported were minor in nature, some occupational burns were extremely severe. This finding may indicate that what separates minor burn incidents from severe incidents within the same

industries and occupations are not all that well defined, and thus while the number of serious burns constitute a low percentage of the overall total, it is important to address all potential sources of burn injury if serious incidents are to be reduced. At the very least, studies focused on workplace safety practices that could potentially distinguish factors that affect the probability of burn incidents becoming manifested as serious injuries would be of particular value to preventing such accidents in the future.

The results of this study showing food service workers as being the occupation with the highest overall burn rate replicates the findings of some previous investigations,<sup>18,24</sup> although there is substantial variation in occupational rankings by burn rates in the literature. The findings that construction laborers, equipment cleaners and machine operators have high burn injury claim rates are consistent with the reports of many other studies. Given that these occupations continue to have notably higher rates of burn injuries relative to other occupations, it is important that employers of such workers exert greater effort to enact measures to reduce risk and specifically target areas that are identified to be common sources of these burns. The decline found in burn claims over time may be an indication that some headway is being made from greater awareness and commitment to preventative measures being adopted; nevertheless these results also indicate that occupational burns still remain a problematic source of employee injury.

The literature on shift work and injury has demonstrated that fatigue and disturbances of circadian rhythms from working late shifts contributes to decreased cognition, job performance, and increased workplace accidents.<sup>30-32</sup> This study, in conjunction with the

findings of a disproportionately high occupational burn rate for evening and night shift workers first reported in the Oregon workers' compensation study,<sup>26</sup> provides evidence that shift is an important risk factor to consider in designing effective workplace burn interventions. This may be especially true for younger workers, who because of dual demands of school and work, as well as having differing chronopathic patterns than older workers, are more profoundly affected by evening and night shift work schedules.<sup>33</sup> In addition, the analysis revealed that evening and night shift workers were at higher risk of chemical burns than day shift workers. Future studies may benefit burn prevention efforts by exploring the cause of this relationship further, as no direct explanation could be inferred from this data alone.

Readers should be aware of the study's limitations. Although this study has examined all workplace burn injury reports filed with the Rhode Island Department of Labor, this compilation should not be viewed as a measure of prevalence since workers' compensation data is particularly vulnerable to underreporting.<sup>34</sup> While the use of Rhode Island data is advantageous because of the state's requirement that any injury requiring medical attention be reported, and hence, captures less severe injuries than states which require reporting only in cases of indemnification, this study is not immune from this limitation, as not all workers, especially those sustaining minor injuries go through the administrative process of reporting them. It should be noted that the rates reported in this study are lower than estimates of workplace burns attained from the analysis of NHIS data.<sup>3</sup> Additionally while the workers' compensation data included cost information on disability payments and medical expenses, the actual costs associated with these injuries



are likely to be higher than reported. It has been shown that many indirect costs associated with workplace injury, such as decreased productivity and replacement training costs are not reported in workers compensation claims.<sup>35</sup> To this extent, this study provides a minimum quantification of the cost associated with occupational burns.

Third, the indemnification and cost data used in this study do not allow for as precise a measure of injury severity as burn surveillance studies that use medical records from clinical settings. For example, workers' compensation data do not collect information on the total burn surface area, burn depth, whether treatment was provided on an in-or-out patient basis, or when skin grafting was necessary. However, it is a reasonable assumption that the duration of disability and associated claim costs are indicative of burn injury severity, and offer particular value in providing employers incentive to engage in preventative activity beyond altruistic motivations. Last, because state workers' compensation systems are affected by both differences in laws and occupational compositions, there are inherent variations that will be found when comparing states using such data. For this reason, the continued analysis of workers' compensation data from other states is an important area of study for future research for identifying sources of occupational burns and identification of areas in need of preventative efforts.

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**Table 1****Average Indemnification Duration and Cost of Burn Claims**

| <b><u>Claimant Characteristics</u></b> | <b><u>All Claims</u></b><br>(n=5,619) |                         | <b><u>Heat Burn Claims</u></b><br>(n=4,184) |                         | <b><u>Chemical Burn Claims</u></b><br>(n=1,435) |                         |
|--|---------------------------------------|-------------------------|---|-------------------------|---|-------------------------|
|  | <b><u>Avg. Days Indemnity</u></b>     | <b><u>Avg. Cost</u></b> | <b><u>Avg. Days Indemnity</u></b>           | <b><u>Avg. Cost</u></b> | <b><u>Avg. Days Indemnity</u></b>               | <b><u>Avg. Cost</u></b> |
| <b><u>All Claims</u></b>               | 36.2                                  | \$889                   | 40.7  | \$1,020                 | 23.3  | \$545                   |
| <b><u>Gender</u></b>                   |                                       |                         |   |                         |   |                         |
| Male                                   | 48.9                                  | \$1,276                 | 57.6  | \$1,524                 | 28.9  | \$703                   |
| Female                                 | 17.2                                  | \$334                   | 19.0  | \$374                   | 9.5   | \$157                   |
| <b><u>Age</u></b>                      |                                       |                         |   |                         |   |                         |
| <25                                    | 21.4                                  | \$355                   | 23.4  | \$381                   | 10.7  | \$216                   |
| 25-39                                  | 42.1                                  | \$1,146                 | 49.6  | \$1,347                 | 25.5  | \$702                   |
| 40-54                                  | 43.0                                  | \$1,198                 | 50.8  | \$1,496                 | 25.2  | \$515                   |
| 55- over                               | 46.2                                  | \$1,042                 | 50.5  | \$1,184                 | 33.2  | \$608                   |

**Table 2****Odds Ratios (OR) for Indemnification of Heat and Chemical Burn Claims**

| Variables                        | Heat Burns |              | Chemical Burns |              |
|----------------------------------|------------|--------------|----------------|--------------|
|                                  | OR         | 95% CI       | OR             | 95% CI       |
| Age                              | 1.05       | 1.01-1.08*   | 1.11           | 1.01-1.21*   |
| Age-squared                      | 1.00       | 1.00-1.00*   | 1.00           | 1.00-1.00    |
| Female                           | 0.64       | 0.53-0.77*** | 0.46           | 0.28-0.75**  |
| Night shift                      | 0.98       | 0.79-1.23    | 2.07           | 1.35-3.19*** |
| Evening shift                    | 1.11       | 0.89-1.38    | 1.69           | 1.03-2.78*   |
| February                         | 1.27       | 0.84-1.91    | 1.26           | 0.40-4.01    |
| March                            | 0.84       | 0.54-1.29    | 2.36           | 0.85-6.51    |
| April                            | 1.19       | 0.78-1.80    | 3.65           | 1.34-9.93*   |
| May                              | 1.34       | 0.90-2.00    | 2.12           | 0.75-6.04    |
| June                             | 1.22       | 0.82-1.82    | 2.87           | 1.05-7.87*   |
| July                             | 1.11       | 0.74-1.66    | 3.09           | 1.12-8.51*   |
| August                           | 1.01       | 0.68-1.51    | 2.82           | 1.03-7.71*   |
| September                        | 1.02       | 0.68-1.53    | 3.86           | 1.40-10.65** |
| October                          | 1.00       | 0.66-1.52    | 3.31           | 1.16-9.42*   |
| November                         | 0.97       | 0.63-1.50    | 2.43           | 0.82-7.22    |
| December                         | 1.04       | 0.66-1.63    | 4.31           | 1.56-11.9**  |
| 1999                             | 1.09       | 0.84-1.41    | 0.86           | 0.50-1.48    |
| 2000                             | 1.15       | 0.89-1.48    | 0.67           | 0.39-1.13    |
| 2001                             | 1.13       | 0.87-1.46    | 1.08           | 0.63-1.83    |
| 2002                             | 1.23       | 0.94-1.62    | 0.90           | 0.50-1.62    |
| Construction                     | 1.35       | 0.89-2.05    | 0.76           | 0.26-2.20    |
| Non-durable Manufacturing        | 1.15       | 0.83-1.60    | 0.93           | 0.58-1.50    |
| Transportation and Communication | 1.30       | 0.53-3.16    | 0.42           | 0.09-1.98    |
| Utilities/Sanitary Services      | 0.57       | 0.24-1.34    | 1.17           | 0.36-3.12    |
| Wholesale Trade                  | 1.71       | 0.85-3.46    | 1.82           | 0.66-5.04    |
| Retail Trade                     | 1.26       | 0.96-1.66    | 0.89           | 0.43-1.87    |
| Finance, Insurance, Real Estate  | 0.88       | 0.44-1.76    | 0.81           | 0.17-3.91    |
| Personal Service                 | 1.80       | 1.12-2.90*   | 0.78           | 0.33-1.83    |
| Hospitals                        | 0.61       | 0.30-1.24    | 0.66           | 0.21-2.08    |
| Medical Services (not hospitals) | 0.79       | 0.51-1.23    | 0.43           | 0.12-1.51    |
| Educational Services             | 0.93       | 0.54-1.61    | 1.22           | 0.41-3.61    |
| Social Services                  | 0.24       | 0.07-0.78*   | -              | -            |
| Other Professional Services      | 1.37       | 0.93-2.01    | 0.75           | 0.24-2.34    |
| Entertainment Services           | 1.06       | 0.50-2.23    | -              | -            |
| Professional Specialty           | 1.50       | 0.78-2.89    | 0.63           | 0.16-2.44    |
| Technicians/Related Support      | 1.07       | 0.51-2.21    | 0.53           | 0.18-1.58    |
| Administrative Support           | 0.72       | 0.36-1.42    | 1.46           | 0.47-4.52    |
| Protective Services              | 0.95       | 0.19-4.89    | 1.28           | 0.14-11.67   |
| Other Services                   | 0.94       | 0.69-1.28    | 1.29           | 0.62-2.69    |
| Precision Production/Craft       | 1.30       | 0.92-1.84    | 1.73           | 0.85-3.52    |
| Machine Operators                | 1.66       | 1.12-2.39**  | 1.90           | 0.978-3.72   |
| Transportation and Moving        | 1.18       | 0.47-2.96    | 0.23           | 0.028-1.90   |
| Laborers/Handlers/Helpers        | 1.06       | 0.69-1.62    | 1.04           | 0.49-2.17    |
| Farming/Fishing/Forestry         | 1.38       | 0.34-5.62    | 0.88           | 0.10-7.69    |

Excluded categories: Male, Day Shift, January, 1998, Finance, Sales

\* p&lt;0.05 \*\* p&lt;0.01 \*\*\*p&lt;0.001

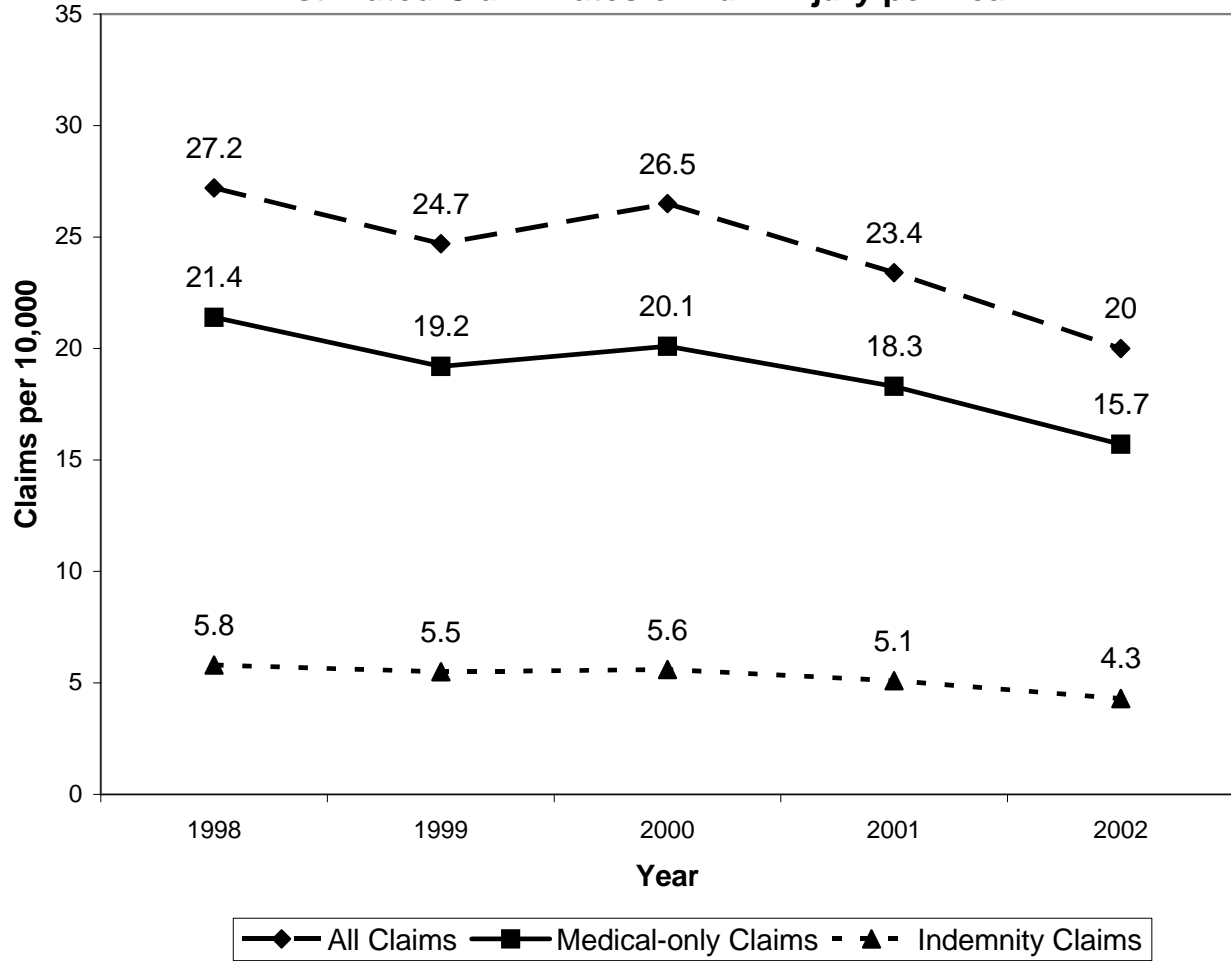
**Table 3****Analysis of Burn Claims by Industry**

| <b>Claimant Industry</b>            | <b>Est. Rate per 10,000</b> | <b>95% CI</b> | <b>Average Cost per Claim</b> | <b>Average Days Indemnity</b> | <b>90<sup>th</sup> Percentile Cost</b> | <b>90<sup>th</sup> Percentile Days</b> |
|-------------------------------------|-----------------------------|---------------|-------------------------------|-------------------------------|--|--|
| Utilities and Sanitary Services     | 63.6                        | 48.4-78.9     | \$1,860                       | 54.8                          | \$3337                                 | 154.0                                  |
| Retail Trade                        | 44.2                        | 42.4-45.9     | \$631                         | 33.3                          | \$813                                  | 21.0                                   |
| Mfg. Non-durable Goods              | 35.1                        | 32.6-37.7     | \$2,505                       | 73.9                          | \$2250                                 | 121.0                                  |
| Mfg. Durable Goods                  | 32.2                        | 30.5-33.9     | \$994                         | 46.3                          | \$2340                                 | 130.0                                  |
| Personal Services                   | 29.5                        | 25.7-33.2     | \$278                         | 8.5                           | \$481                                  | 3.0                                    |
| Hospitals                           | 27.5                        | 25.2-29.8     | \$294                         | 13.0                          | \$312                                  | 5.5                                    |
| Medical Services (except hospitals) | 24.4                        | 22.7-26.1     | \$306                         | 16.8                          | \$248                                  | 2.0                                    |
| Entertainment and Recreation        | 18.7                        | 16.3-21.2     | \$467                         | 26.4                          | \$450                                  | 15.0                                   |
| Construction                        | 16.1                        | 14.9-17.4     | \$2,765                       | 48.4                          | \$4280                                 | 110.0                                  |
| Other Professional Services         | 15.6                        | 14.3-17.0     | \$444                         | 27.9                          | \$1125                                 | 75.0                                   |
| Social Services                     | 13.7                        | 12.2-15.3     | \$64                          | 4.3                           | \$0                                    | 0.0                                    |
| Auto Repair                         | 12.5                        | 11.7-13.4     | \$950                         | 43.8                          | \$1493                                 | 44.0                                   |
| Wholesale Trade                     | 11.0                        | 9.9-12.1      | \$2,901                       | 117.0                         | \$2700                                 | 175.0                                  |
| Educational Services                | 7.8                         | 7.4-8.3       | \$517                         | 22.3                          | \$207                                  | 0.0                                    |
| Agriculture                         | 7.2                         | 8.6-5.0       | \$685                         | 28.6                          | \$2847                                 | 87.0                                   |
| Transportation                      | 6.5                         | 5.8-7.1       | \$305                         | 13.8                          | \$812                                  | 26.0                                   |
| Fin/Ins/Real Estate                 | 5.8                         | 5.5-6.2       | \$418                         | 23.9                          | \$869                                  | 22.0                                   |
| Communications                      | 4.5                         | 3.7-5.3       | \$757                         | 47.8                          | \$2968                                 | 175.0                                  |

**Table 4****Analysis of Burn Claims by Occupation**

| <b>Claimant Occupation</b>            | <b>Est. Rate per 10,000</b> | <b>95% CI</b> | <b>Average Cost per Claim</b> | <b>Average Days Indemnity</b> | <b>90<sup>th</sup> Percentile Cost</b> | <b>90<sup>th</sup> Percentile Days</b> |
|---------------------------------------|-----------------------------|---------------|-------------------------------|-------------------------------|--|--|
| Food Services                         | 181.0                       | 166.5-195.4   | \$587                         | 31.1                          | \$630                                  | 18.0                                   |
| Handlers/Equipment Cleaners           | 92.2                        | 78.4-106.1    | \$1,078                       | 53.0                          | \$1350                                 | 63.0                                   |
| Construction Laborers                 | 90.8                        | 64.9-116.7    | \$4,195                       | 29.1                          | \$1895                                 | 55.0                                   |
| Cleaning and Building Service         | 52.9                        | 46.3-59.5     | \$303                         | 14.6                          | \$464                                  | 11.0                                   |
| Machine Operators/<br>Tenders         | 49.7                        | 45.5-53.9     | \$1,089                       | 60.8                          | \$2487                                 | 140.0                                  |
| Fabricators/Assemblers/<br>Inspectors | 39.2                        | 34.3-44.0     | \$856                         | 51.4                          | \$3497                                 | 192.0                                  |
| Technicians (except health)           | 37.7                        | 30.1-45.4     | \$255                         | 14.1                          | \$504                                  | 9.0                                    |
| Mechanics and Repairers               | 37.5                        | 33.6-41.1     | \$1,651                       | 57.4                          | \$2516                                 | 105.0                                  |
| Precision Production                  | 35.9                        | 32.3-39.5     | \$1,005                       | 31.6                          | \$1540                                 | 70.0                                   |
| Health Technologies                   | 29.7                        | 25.2-34.2     | \$789                         | 22.2                          | \$254                                  | 0.0                                    |
| Health Services                       | 25.3                        | 22.5-28.2     | \$107                         | 5.8                           | \$0                                    | 0.0                                    |
| Construction Trades                   | 21.8                        | 19.8-23.8     | \$1,083                       | 43.5                          | \$3845                                 | 106.0                                  |
| Other Transportation                  | 18.2                        | 13.8-22.6     | \$364                         | 9.2                           | \$1350                                 | 35.0                                   |
| Engineering and Science<br>Techs      | 13.8                        | 11.2-16.5     | \$3,685                       | 130.8                         | \$8458                                 | 350.0                                  |
| Farm Workers                          | 12.6                        | 10.2-15.1     | \$244                         | 13.0                          | \$1048                                 | 49.0                                   |
| Freight/Stock/Material<br>Handlers    | 11.8                        | 10.0-13.5     | \$169                         | 6.1                           | \$842                                  | 20.0                                   |
| Health Assessment                     | 10.0                        | 8.9-11.2      | \$131                         | 5.7                           | \$238                                  | 8.0                                    |
| Personal Service                      | 9.8                         | 8.5-11.2      | \$692                         | 45.4                          | \$396                                  | 9.0                                    |
| Sales Workers, Retail                 | 8.5                         | 7.9-9.1       | \$206                         | 9.6                           | \$467                                  | 5.0                                    |
| Supervisors and Proprietors           | 7.6                         | 6.9-8.3       | \$411                         | 21.9                          | \$447                                  | 11.0                                   |
| Engineers                             | 7.2                         | 6.2-8.1       | \$1,118                       | 45.3                          | \$3461                                 | 105.0                                  |
| Administrative Support                | 6.8                         | 6.4-7.2       | \$289                         | 17.7                          | \$316                                  | 3.0                                    |
| Motor Vehicle Operators               | 5.9                         | 5.2-6.6       | \$180                         | 4.8                           | \$0                                    | 0.0                                    |
| Teachers (except<br>colleges/univ.)   | 5.5                         | 5.0-6.0       | \$29                          | 0.4                           | \$52                                   | 0.0                                    |
| Management Occupations                | 4.7                         | 4.2-5.1       | \$416                         | 18.0                          | \$827                                  | 9.0                                    |
| Protective Services                   | 4.3                         | 3.8-4.9       | \$1,236                       | 53.3                          | \$5653                                 | 267.0                                  |
| Other Professional Specialty          | 2.5                         | 2.3-2.7       | \$329                         | 11.6                          | \$227                                  | 5.0                                    |
| Other Executives,<br>Administrators   | 1.2                         | 1.1-1.2       | \$4,184                       | 105.3                         | 338                                    | 3.0                                    |

**Figure 1**  
**Estimated Claim Rates of Burn Injury per Year**



**Figure 2**  
**Estimated Burn Claim Rates by Age**

