
Work-Related Asthma in Washington State:

**A Review of Workers' Compensation
Claims from 1995-2002**

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TABLE OF CONTENTS

List of Tables and Figures.....	2
Report Summary.....	3
Introduction.....	4
Methods.....	4
Washington's Workers' Compensation System.....	4
Case Ascertainment.....	4
Descriptive and Statistical Analyses.....	4
Results.....	5
General Overview.....	5
Claim Costs and Lost Workdays.....	6
Asthma Rates by Year.....	6
Exposure Sources.....	6
Occupations.....	7
Claims Acceptance.....	7
Washington Industrial (Risk) Classes.....	7
Standard Industrial Classifications.....	8
Claim Summaries.....	8
Discussion.....	11
Comparison with Other Studies.....	11
Contributions to the Literature.....	12
Limitations.....	12
Conclusions.....	13
References.....	14
Tables and Figures.....	16

LIST OF TABLES AND FIGURES

Figure 1: Work-Related Asthma Claims Rates for State Fund Claims Filed, Accepted Claims and Compensable Claims, Washington State, 1995-2002

Table 1: Exposure Sources for All Asthma Claims Filed, Washington State, 1995-2002 (n=1377)

Table 2: Occupations for All Asthma Claims Filed, Washington State, 1995-1999, (n =723)

Table 3: Occupations for All Asthma Claims Filed, Washington State, 2000-2002 (n = 654)

Table 4: Acceptance Rate for Asthma Claims by 4-Digit Washington Industrial Classification (WIC) Groups, Washington State, 1995-2002

Table 5: Acceptance Rate for Asthma Claims by 2-Digit Standard Industrial Classification (SIC) Divisions, Washington State, 1995-2002

Table 6: Counts and Rates for All State Fund Asthma Claims Filed by 4-Digit Washington Industrial Classification (WIC) Groups, Ranked by the Prevention Index (PI), Washington State, 1995-2002

Table 7: Counts and Rates for Accepted State Fund Asthma Claims by 4-Digit Washington Industrial Classification (WIC) Groups, Ranked by the Prevention Index (PI), Washington State, 1995-2002

Table 8: Counts and Rates for Compensable State Fund Asthma Claims by 4-Digit Washington Industrial Classification (WIC) Groups, Ranked by the Prevention Index (PI), Washington State, 1995-2002

Table 9: Counts and Rates for Compensable, Closed Self-Insured Asthma Claims by 4-Digit Washington Industrial Classification (WIC) Groups, Ranked by the Prevention Index (PI), Washington State, 1995-2002

Table 10: Counts and Rates for Compensable, Closed State Fund and Self-Insured Combined Asthma Claims by 4-Digit Washington Industrial Classification (WIC) Groups, Ranked by the Prevention Index (PI), Washington State, 1995-2002

Table 11: Counts and Rates for All State Fund Asthma Claims Filed by 2-Digit Standard Industrial Classification (SIC) Divisions, Ranked by the Prevention Index (PI), Washington State, 1995-2002

Table 12: Counts and Rates for Accepted State Fund Asthma Claims by 2-Digit Standard Industrial Classification (SIC) Divisions, Ranked by the Prevention Index (PI), Washington State, 1995-2002

Table 13: Counts and Rates for Compensable State Fund Asthma Claims by 2-Digit Standard Industrial Classification (SIC) Divisions, Ranked by Prevention Index (PI), Washington State, 1995-2002

REPORT SUMMARY

This report describes the frequency, incidence rate, cost, and industry distribution of work-related asthma in Washington State. For this report, work-related asthma includes both occupational asthma (asthma caused exclusively by exposures in the workplace) as well as work-aggravated asthma (pre-existing asthma worsened by workplace exposures).

A total of 1,377 claims for work-related asthma were received by the Washington State Department of Labor and Industries from 1995-2002. Overall, 59% of claims were accepted; however, the percent of accepted claims varied considerably by industry.

There were 1,099 claims originating from the state fund. These claims incurred total workers' compensation costs of \$12 million and resulted in almost 79,000 lost workdays. Almost 10% of the workers' compensation costs were paid toward disability reimbursements for workers who developed permanent breathing problems.

Over the eight-year period, the rate of work-related asthma claims filed increased significantly from 7.9 to 12.9 claims per 100,000 full-time equivalent employees per year. The rate of accepted asthma claims increased slightly (the increase was not statistically significant), while the rate of compensable claims (i.e., those accepted for timeloss reimbursement and/or permanent partial disability payments) decreased.

The results from this analysis reveal that work-related asthma occurs in a very large number of industries and as a result of a diverse array of exposures. Nonetheless, several Washington risk classes were identified as priorities for prevention, including Sawmills, Plastic Products Manufacturing, Wood Products Manufacturing, Fiberglass Manufacturing, State Government (clerical), and Physician and Medical Clinics. In order to make a measurable impact on the morbidity of work-related asthma in Washington, multiple industries and hazards must be targeted for prevention.

INTRODUCTION

According to the National Institute for Occupational Safety and Health, work related asthma is the most common occupational lung disease diagnosed among patients visiting occupational medicine clinics (NIOSH, 2003). The costs associated with work-related asthma were estimated at \$1.5 billion in 1999 (Leigh *et al.*, 2003). Occupational exposures likely account for 10-25% of all adult asthma cases (Blanc and Toren, 1999; Mannino, 2000).

This report characterizes workers' compensation claims for work-related asthma received by the Washington State Department of Labor and Industries (L&I) during the eight-year time period from 1995 through 2002. It updates a previous report, which reviewed work-related asthma claims from 1994 through 1998 (Baggs *et al.*, 2000). The information in this report will be used as part of an overall system to identify high-risk industries and workplace hazards to focus resources for prevention.

METHODS

Washington's Workers' Compensation System

In Washington State, non-federal employers are required to obtain workers' compensation insurance through L&I, unless they meet specific requirements to self-insure. There are approximately 400 self-insured entities (individual companies or groups of companies), which tend to be the largest employers in the state. L&I's state fund covers approximately two-thirds of the state's workers. The state fund generally does not cover self-employed workers, though optional coverage is available.

Case Ascertainment

All claims received by L&I from January 1, 1995 through December 31, 2002 with the word "asthma" written on the Report of Accident form were identified for inclusion in this report. The worker and physician initiate a claim by completing a Report of Accident form. Information from the Report of Accident form is entered into the workers' compensation claims database for all state fund claims; however, only limited data from self-insured claims that are accepted for reimbursement of medical treatment only are entered into the database. Therefore, this case ascertainment method generally excludes the non-compensable self-insured claims.

Descriptive and Statistical Analyses

In Washington State, medical billing information for self-insured claims is rarely provided in the workers' compensation claims database, therefore workers' compensation costs and time-loss estimates were calculated only for claims originating from the state fund. Unless otherwise stated, workers' compensation costs have been adjusted to 2002 dollars, and include costs for medical care, as well as reimbursements for lost work time and permanent partial disability. Costs reflect those that have actually incurred plus the actuarially estimated future costs for open claims.

Claims incidence rates were calculated by dividing the number of claims by the number of hours worked, where hours were extracted from payroll data reported to L&I. In addition, hours were converted to full-time equivalent workers (FTEs) by assuming the average FTE works 2,000 hours per year. Claims incidence rates for state fund claims were assessed for trends over time using Poisson regression.

Frequencies of asthma claims filed by source and occupation are provided. Sources were coded using American National Standards Institute Z16.2 codes (ANSI, 1969). In the year 2000, occupation coding switched from Census Occupation Classifications (Bureau of Census, 1992) to Standard Occupational Classifications (US Office of Management and Budget, 2000).

Claim frequencies and incidence rates were calculated by industry – both by 2-digit Standard Industrial Classifications (SIC) to compare with national estimates, as well as by Washington Industrial Classifications (WIC), which combine occupation and industry to group employees by similar risk of injury and illness (referred to as risk classes). Analyses by industry were limited to those WIC and SIC classifications with at least 5 cases over the 8-year time period. The Prevention Index (PI), which is the average of the frequency and incidence rate rankings, was calculated to prioritize industries for prevention (Silverstein and Kalat, 2002).

The proportion of accepted claims was calculated for SIC and WIC groups. Only SIC and WIC categories with at least 5 accepted claims were included in the analyses. In Washington, in order for an occupational disease claim (such as asthma) to be accepted, three criteria must be met:

- A physician must present an opinion that work conditions, on a more probable than not basis (a greater than 50% chance), are the cause of the illness or have temporarily or permanently aggravated a pre-existing condition; **AND**
- Objective medical findings must support the diagnosis; **AND**
- The disease must arise “naturally and proximately” out of employment (Office of the Medical Director, 1999).

RESULTS

General Overview

From 1995 through 2002, 1,377 claims for work-related asthma were received by the Washington State Department of Labor and Industries. The majority (1,099 claims) originated from the state fund, 269 from self-insured employers, and nine claims originated from the Department of Energy.

Of the 1,377 claims filed, 808 (59%) were accepted, 548 (40%) were rejected, and the remaining were in a provisional status. Of the accepted claims, 460 (57%) were non-

compensable (i.e., accepted for medical aid reimbursement only) and 348 (43%) were compensable (i.e., accepted for time-loss reimbursement and/or permanent partial disability in addition to medical care costs).

Over half of the claims (57%) were filed by women. Claimants ranged in age from 15 to 77 years, with an average age of 41 years (both mean and median).

Claim Costs and Lost Workdays

The total workers' compensation costs for the 1,099 state fund claims was over \$12.0 million. Of those costs, over \$5.0 million went toward reimbursement for 78,761 lost workdays and another \$1.2 million went toward permanent partial disability payments. The median cost of the non-compensable claims was \$184 (mean, \$676), while the median cost for the compensable claims was \$10,890 (mean, \$46,427). The most expensive claim during this time period incurred workers' compensation costs of over half of a million dollars.

Asthma Rates by Year

Over the eight-year time period, the filing rate for state fund asthma claims increased from 7.9 to 12.9 claims per 100,000 full-time equivalent employees (FTEs) per year (Figure 1). This was a significant increase of approximately 7.1% per year (95% Confidence Interval [CI] = 2.7% to 11.7%, $p = 0.0014$). The average annual claims incidence rate during the eight-year time period was 9.8 claims per 100,000 FTEs.

Similarly, the rate of accepted asthma claims also increased from 5.0 claims/100,000 FTEs in 1995 to 6.6 claims/100,000 FTEs in 2002. This increase of approximately 3.9% per year was not statistically significant (95% CI = -1.1% to 9.1%, $p = 0.1313$). The average annual claims incidence rate for accepted asthma claims was 5.8 claims per 100,000 FTEs. Over this period, the proportion of claims that was rejected increased from 37% in 1995 to 49% in 2002.

The rate of compensable claims decreased from 2.4 to 1.7 claims per 100,000 FTEs per year, a decrease of approximately 7.8% per year (95% CI = -16.2% to 0.01%, $p = .0502$). The average annual incidence rate for compensable claims was 2.2 claims per 100,000 FTEs.

Exposure Sources

Over 20% of all claims filed had either an invalid source code (171 claims) or an unknown source (116 claims). Commonly reported sources were chemicals and chemical compounds, either not stated or not elsewhere classified (308 claims, 22%); unidentified particles (132 claims, 10%); flame, fire, and smoke (104 claims, 8%); paint, lacquer, shellac, and varnish (47 claims, 3%); infections and parasitic agents, e.g., mold (29 claims, 2%); and wood dusts (29 claims, 2%). Table 1 provides a more complete listing of sources.

Occupations

Table 2 provides the frequencies of claims by occupation for the 723 claims filed from 1995 through 1999 using the Census Occupation Classification coding scheme. Table 3 uses the Standard Occupational Classification system for the 654 claims filed from 2000 through 2002.

Overall (for the eight year time period), 303 (22%) of the claims had either no occupation reported, or an invalid occupation code. For the time period 1995-1999, occupations with the highest percentage of claim filing included non-construction laborers (52 claims, 7%); farm workers (25 claims, 4%); managers and administrators, not elsewhere classified (17 claims, 2%); and retail and personal services sales workers (17 claims, 2%). From 2000 through 2002, the occupations with the highest percentage of claim filing included the category “other production occupations,” which includes transportation equipment painters, photographic processing workers, production workers’ assistants, etc. (44 claims, 7%); construction trades workers (43 claims, 7%); material moving workers (36 claims, 6%); and agricultural workers (25 claims, 4%).

Claims Acceptance

While 59% of asthma claims were accepted overall, the percent of accepted claims varied by risk class, from 100% among both Electroplating and Boilermaking risk classes, to 33% among Orchards (Table 4). Claims acceptance among SIC industry divisions also varied considerably, from 86% in the Administration of Economic Programs industry group to 43% among the Agricultural Production of Crops industry group (Table 5).

Washington Industrial (Risk) Classes

Tables 6-8 present frequencies and rates among Washington risk classes for all claims filed, all accepted claims, and compensable claims, respectively. A total of 65 different risk classes had at least five claims filed for asthma during the eight-year period.

Sawmills, Plastic Products Manufacturing, and Wood Products Manufacturing risk classes are consistently among the top priority risk classes based on the Prevention Index (i.e., high magnitude and/or high risk).

Fiberglass Manufacturing (i.e., the manufacture of fiberglass products) had the highest rate (84 claims/100,000 FTE-years) and ranking by the Prevention Index for all asthma claims filed as well as the third highest rate for all accepted claims. However, because there were only two compensable claims in Fiberglass Manufacturing, it was not included in the analysis of compensable claims. State Government (clerical) and Physicians and Medical Clinics both consistently ranked among the top five risk classes with respect to frequencies of claims and presented as high priorities according to the Prevention Index for compensable claims. Colleges and Universities and Clerical Office (not otherwise classified) both had high frequency rankings; however their relatively low rates kept them from being high priorities according to the Prevention Index.

Table 9 shows the frequencies and rates for compensable, closed, self-insured asthma claims by risk class. Only three risk classes had at least five compensable claims

associated with them – these were Hospitals, Schools (all other employers), and Aircraft Manufacturing.

By combining compensable claims for state fund and self-insured employers, all Washington employers are included in the same analysis to prioritize risk classes by the Prevention Index (Table 10). Sawmills, State Government (clerical), Physicians and Medical Clinics, and Hospitals were the risk classes with the greatest priority in this analysis.

Standard Industrial Classifications

Tables 11-13 present frequencies and rates among 2-digit SIC divisions for all claims filed, accepted claims, and compensable claims, respectively. Among the industry divisions that are consistently high priority are Lumber and Wood Products, Health Services, Transportation Equipment, Fabricated Metal Products, and Rubber and Miscellaneous Plastics Products.

Claim Summaries

In order to better understand the type of workplace tasks and exposures that may be related to the development of work-related asthma, documents from individual compensable claims were reviewed for several of the risk classes identified as high risk: Sawmills, Plastic Products Manufacturing, Wood Products Manufacturing, Fiberglass Manufacturing, State Government (clerical), and Physician and Medical Clinics.

Sawmills

Of the eight workers with compensable state-fund claims in the sawmill risk class, all but one was exclusively exposed to Western Red Cedar dust in the mill. One of these workers' stories is described in Box 1. The eighth worker had asthma as a child, and developed an aggravation of his asthma after a thirty-year exposure to a variety of wood dusts, including pine, fir, and hemlock. The workers' compensation costs for these eight claims were \$271,883 with a median cost per claim of \$35,540 (mean \$33,985).

Box 1: Sawmill Worker Exposed to Western Red Cedar Dust

A male sawmill worker in his early twenties with no prior history of respiratory problems, developed asthma after becoming sensitized to Western Red Cedar dust. Approximately one-year after he starting working in the cedar mill, he developed symptoms including sneezing and itchy eyes. His symptoms progressed over time, and he developed coughing, shortness of breath, and a rash. No respiratory protection was required for the workers in the sawmill, though he did try to protect himself by wearing a dust mask. His physician diagnosed him with cedar wood asthma, allergic rhinitis, and allergic conjunctivitis and recommended that he be removed from further cedar exposures. After quitting his job to work in another trade, his symptoms gradually improved.

Plastic Products Manufacturing

The ten compensable state fund claims in this risk class varied considerably with respect to product, work tasks and exposures. In four of the cases, the workers were machine

operators or material handlers that were exposed to plastic dusts while performing tasks such as mixing, welding, cutting, grinding, and trimming. These four workers manufactured various products including pipe and molding. Two additional workers manufactured sporting equipment, including fly fishing rods and golf shafts – one was exposed primarily to graphite and the other to a variety of solvents, paints, and other chemicals. Two other workers manufactured plastic parts for the aerospace industry – one was a laminator and the other was a janitor, both of whom were exposed to fiberglass and a variety of resins. In another case, a machine operator who made plastic siding was exposed to chlorine gas for approximately three hours as a result of a machine malfunction – his breathing symptoms began immediately and lasted for several months. The last worker was exposed to isocyanates during an industrial spill – his story is described in more detail in Box 2. The workers' compensation costs incurred by these ten claims cost a total of \$596,445, with a median cost per claim of \$5,830 (mean \$59,644).

Box 2: Maintenance Worker Exposed to Isocyanates

A male maintenance worker was employed for a company that manufactured skiing and snowboarding equipment using epoxy and isocyanate compounds. He had worked for the company for several years when there was a spill of approximately 300 gallons of isocyanates. The worker assisted with the clean-up, which took over seven hours to complete. During the clean-up process, he wore rubber gloves and boots, but no respiratory protection. Only the doors of the building were opened to allow better air circulation. Within 24-hours of this spill, he began having difficulty breathing. He continued to work for the company, and as a maintenance worker, he worked in all areas of the facility including around the manufacturing equipment, and was therefore routinely exposed to isocyanates. His symptoms recurred and slowly worsened over time. Initially, his asthma episodes began in the afternoon and evening, sometimes preventing sleep. Over time, he began having breathing difficulties immediately upon entering the workplace. He began to wear a respirator, at first only in higher concentration areas, and then later as his symptoms worsened, he used the respirator throughout the majority of the workday. In addition to his asthma symptoms, he developed a rash on his hands, arms, feet, and lower legs. He had several job modifications and changes in order to reduce his exposure to isocyanates. Even as his symptoms progressed, he continued to work for the company for 25 years until they went out of business and he was laid off.

Wood Products Manufacturing

Of the six compensable state-fund asthma claims, four were as a result of wood dust exposures: two for cedar dust, one for alder wood dust, and one for an unspecified type of wood. Another worker was an industrial cleaner and painter in a chip mill, who worked with a variety of chemical substances, including urethane paints containing isocyanates. Finally, the last claimant worked in a lumber mill where he performed a variety of tasks including welding, which contributed to the onset of his asthma symptoms. Workers' compensation costs for these six claims were \$320,898 with a median cost per claim of \$21,172 (mean \$53,483).

Fiberglass Manufacturing

Two state fund claims filed in this risk class were compensable. One was a fiberglass laminator who was exposed primarily to polyester and vinylester resins during the manufacturing of boat parts. The other was exposed to epoxy resins during the manufacturing and repair of truck cabs. The workers' compensation costs for these two claims were \$59,736 and \$26,425, respectively, for a total of \$86,161.

State Government (Clerical)

There were 14 state-fund compensable asthma claims filed by clerical workers in State Government, all but one worked in a general office environment. Six workers were exposed to general indoor air pollutants and two were exposed to dust and other pollutants associated with building renovation. Four workers were exposed to molds in the indoor environment, generally as a result of water damage due to flooding and broken pipes. The final office worker was exposed to an unspecified cleaning chemical used during the service of a photocopy machine. Finally, a photographer's assistant, who regularly works in a darkroom, was exposed to a variety of chemicals used in the development of photographs. These 14 claims incurred workers' compensation costs of \$131,103 with a median cost per claim of \$5,876 (mean \$9,364).

Physicians and Medical Clinics

Of the 17 state fund compensable claims, seven were due to latex sensitivity – five in dental hygienists/assistants, one in a surgical assistant, and one in a dental office worker. A more detailed claim summary for one of these workers is provided in Box 3. An additional seven workers were exposed to indoor air pollutants in an office environment, including freon from an air conditioning unit, general contaminants during building renovation, paint fumes, and mold. One x-ray technician was exposed to x-ray processing chemicals as a result of a spill. Another worker's asthma was exacerbated due to stress. In the final case, a sterilization technician in a dental office was exposed to glutaraldehyde. The workers' compensation costs incurred for these 17 claims were \$444,367 with a median cost per claim of \$11,236 (mean \$26,139).

Box 3: Dental Hygienist Exposed to Latex

A registered dental hygienist in her thirties began developing allergy symptoms, wheezing, and a rash several years after working as a dental hygienist. She noticed that her symptoms seemed to be associated with her workplace, and more specifically with exposure to latex gloves. As a result, she switched to non-latex gloves. Several of her coworkers switched from the powdered to the non-powdered variety of latex gloves in order to help reduce exposures, however, the dentist she worked for continued to use the powdered gloves. Her symptoms continued and progressed, despite her substitution to the non-latex gloves, as latex was still used throughout the dental office. She was diagnosed with latex allergy and asthma following a number of objective medical tests to confirm the diagnosis and attribute her asthma symptoms to her workplace. In the end, she was forced to leave her employment as a dental hygienist and seek vocational retraining.

DISCUSSION

We used Washington State workers' compensation data to identify work-related asthma cases. Trends suggest an increasing incidence of work-related asthma claims filed in Washington State, which is concerning when viewed in the context of declining claims incidence rates for other types of occupational injury and illness (Silverstein and Kalat 2002; Cohen and Marino, 2003). The average state fund work-related asthma claim cost nearly \$11,000. In addition, the impacts of work-related asthma were shown to be considerable. Each year, the workers' compensation state fund reimbursed workers for nearly 10,000 lost workdays, and \$150,000 was paid annually toward permanent partial disability payments for workers who developed permanent breathing problems.

Opportunities for prevention exist in several Washington risk classes, including Sawmills, Plastic Products Manufacturing, Wood Products Manufacturing, Fiberglass Manufacturing, State Government (clerical), and Physician and Medical Clinics. In order to make a measurable impact on the morbidity of work-related asthma in Washington, multiple industries and hazards must be targeted for prevention.

Comparison with Other Studies

Results from this analysis of work-related asthma claims from 1995 through 2002 are similar to those from a previous investigation of claims data from 1994 through 1998 (Baggs *et al.*, 2000). As with the previous report, there was a statistically significant increase in the rate of all asthma claims filed. In addition, the claims incidence rate for accepted claims also increased (though not significantly), despite the fact that the incidence rate for all state fund claims was on a decreasing trend (data from 1995-2000, Silverstein and Kalat, 2002). As with the previous report, the proportion of claims rejected continued to increase over the time period of the current investigation. The trend of a decreasing rate of compensable claims also continued in this report.

The average annual claims incidence rate for all asthma claims filed during the eight-year period of this investigation was 9.8 claims/100,000 FTE-years (i.e., 98 claims per million FTEs per year). This is higher than the estimated incidences, ranging from 5 to 37 cases per million workers per year, reported from three other states conducting work-related asthma surveillance, yet similar to a corrected estimate from Michigan ranging from 58-204 cases per million workers per year (Henneberger *et al.*, 1999). In California, the estimated incidence rate for work-related asthma from 1993-1996 was 25 cases per million workers per year, or 78 cases per million workers after adjustment for underreporting (Reinisch *et al.*, 2001).

Frequencies and incidence rates were calculated for SIC divisions in order to compare industry-specific data with those of other states conducting work-related asthma surveillance. From these analyses, the industries identified as high-risk in Washington included Lumber and Wood Products, Health Services, Transportation Equipment, Fabricated Metal Products, and Rubber and Miscellaneous Plastics Products. Of those industries, Health Services and Transportation Equipment Manufacturing were also

identified as priorities based on claim frequencies among the states conducting work-related asthma surveillance under the Sentinel Event Notification System for Occupational Risks (SENSOR) model (Jajosky *et al.*, 2000). In California, industries identified with elevated rates were Local and Suburban Transit; Electric, Gas, and Sanitary Services; Lumber and Wood Products; and Chemical and Allied Products (Reinisch *et al.*, 2001). Of those, Lumber and Wood Products was the only industry also identified as high-risk in Washington based on rates, though the estimated annual incidence rates were quite different. In Washington, the estimated rate was 286 claims per million FTEs, almost four times the rate of 74 cases per million workers in California. However, the case ascertainment method used in California was estimated to identify only 32% of work-related illnesses (Blanc *et al.*, 1989); therefore the actual incidence may be much closer to that identified in Washington.

Contributions to the Literature

The intent of the current investigation was to identify and examine claims that had a physician's diagnosis of work-related asthma. Thus, many of the analyses were conducted for all asthma claims filed, rather than for only accepted claims, since it is perhaps more difficult to meet the claims acceptance criteria for an occupational disease. The relatively low acceptance rate for asthma claims of 59% supports this hypothesis. From 1995-2000, the overall acceptance rate for all state fund claims was almost 90% (Silverstein and Kalat, 2002). Interestingly, the percent of accepted claims by industry (both by WIC and SIC) varied considerably. One possible explanation for this disparity is that typical exposures and their relationship to the onset of asthma are less understood in some industries than in others.

This investigation identified several Washington risk classes to be a priority for future prevention efforts, including Sawmills, Plastic Products Manufacturing, Wood Products Manufacturing, Fiberglass Manufacturing, State Government (clerical), and Physician and Medical Clinics. High-risk exposures and work tasks within these risk classes likely vary considerably. Analyses by exposure source and occupation revealed that approximately 20% of claims were either missing those data or were given invalid codes. In addition, large percentages receive codes for very general categories, such as chemicals or particles for source, and laborers or material moving workers for occupation. Because these data do not adequately provide a clear picture of the workplace risk factors that may contribute to asthma within different risk classes, a review of individual claim documents was conducted. This qualitative analysis provided some very useful information about more specific exposures and work tasks that can be used to guide the development of industry-specific educational materials and other interventions.

Limitations

The text word search method used in this investigation, identifies both cases of occupational asthma (i.e., asthma caused exclusively by exposures in the workplace) as well as work-aggravated asthma (i.e., pre-existing asthma worsened by workplace exposures). This case ascertainment method was previously evaluated and determined to be the best of three case ascertainment methods under consideration (Baggs *et al.*, 2000).

The evaluation demonstrated that: (1) of all cases extracted using the text word search method, 81% should be true work-related asthma claims, and (2) of all true work-related asthma claims in the workers' compensation database, 72% should be identified. Despite this validation, there are limitations to its use. At the time of claim filing, workers may still be undergoing clinical evaluation for work-related asthma, and in some cases, the diagnosis of asthma may later be ruled out. Therefore, this method may provide an overestimate of the magnitude of work-related asthma in the state. Equally, the physician may not immediately recognize a case of work-related asthma when filing a claim. If the diagnosis is identified following claim filing the incidence rates in our study would be underestimated. Work-related asthma is still generally thought to be both under recognized and underreported, and therefore identifying cases through a review of workers' compensation records (regardless of the method used) likely significantly underestimates the burden of this disease.

The interpretation of workers' compensation claim rate trends is problematic when a relatively rare condition such as work-related asthma is poorly recognized and underreported. Small changes in the recognition of work-related asthma over time may produce spurious trend analysis results. External factors such as cost shifting by health insurers and improved physician knowledge promote changes in the recognition and reporting of work-related asthma. Likewise, changes in industrial processes, either with the introduction or elimination of asthma causing agents in the workplace, may influence trend results. No measures exist to determine if the recognition of work-related asthma significantly changed over the time frame of this study. The decreases in the overall Washington State claims rate and in other selected occupational disease claim rates suggest that the increasing claims trend for work-related asthma is not solely due to improved recognition.

CONCLUSIONS

Work-related asthma remains a problem in Washington State, as evidenced by an increase in the rate of claim filing, which more than likely cannot be explained exclusively by an increase in the recognition of the disease. Furthermore, work-related asthma incurs considerable workers' compensation costs, results in many lost workdays, and often leaves workers with permanent breathing problems. The results from this analysis reveal that work-related asthma occurs in a very large number of industries and as a result of a diverse array of exposures. Therefore, in order to make a measurable impact on the morbidity of work-related asthma in Washington, multiple industries and hazards must be targeted for prevention.

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Figure 1:
Work-Related Asthma Claims Rates for State Fund Claims Filed, Accepted Claims, and
Compensable Claims, Washington State, 1995-2002

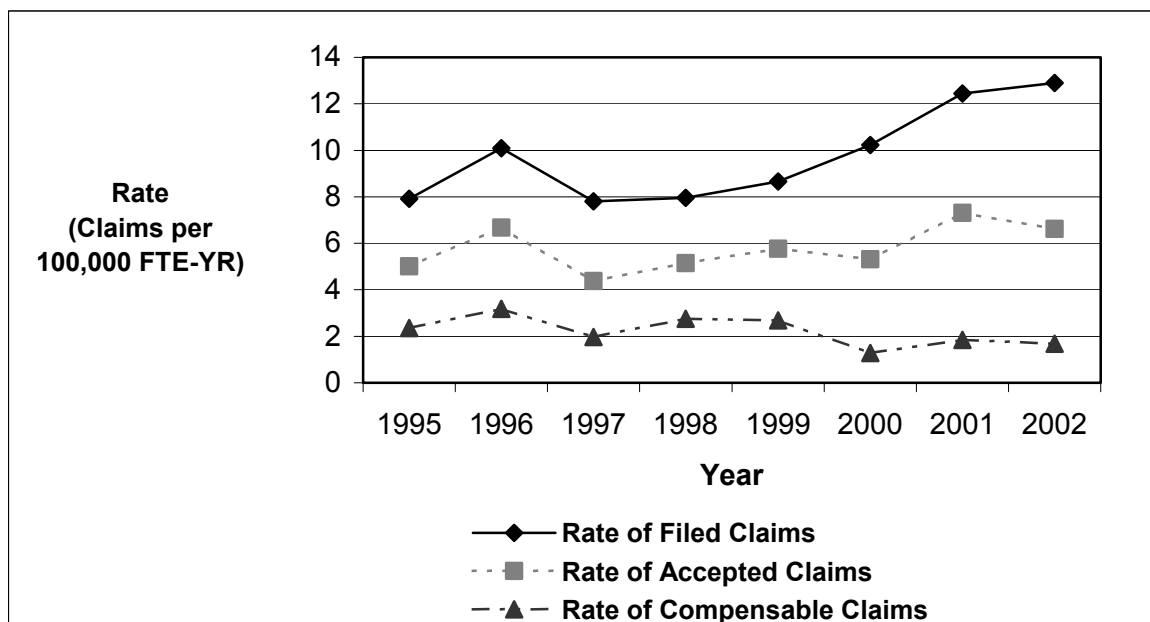


Table 1:
Exposure Sources for All Asthma Claims Filed, Washington State, 1995-2002 (n = 1377)

ANSI Z 16.2 Source Code and Description	Frequency¹	Percent
0900 – chemicals, chemical compounds (type not stated)	268	19.5%
0000 – invalid	171	12.4%
4600 – particles (unidentified)	132	9.6%
9800 – unknown, unidentified	116	8.4%
1700 – flame, fire, smoke	104	7.6%
8800 – miscellaneous, not elsewhere classified (NEC)	72	5.2%
0987 – paint, lacquer, shellac, varnish	47	3.4%
5910 – person, injured (no cause indicated)	43	3.1%
0999 – chemicals, chemical compounds, NEC	40	2.9%
2700 – infections and parasitic agents, NEC	29	2.1%
5770 – wood dusts	29	2.1%
0958 – chlorine and its compounds	20	1.5%
0979 – insecticide, fungicide, fumigant, weed killer, herbicide, NEC	17	1.2%
0985 – metal and metallic compounds, NEC	17	1.2%
0991 – soaps, detergents, cleaning compounds, NEC	15	1.1%
4320 – asbestos	15	1.1%
0988 – plastics, resins, etc.	13	0.9%
0954 – carbon monoxide	12	0.9%
2001 – fiberglass	11	0.8%
4700 – plants, trees, vegetation	11	0.8%
5900 – person, other than injured	11	0.8%
0946 – beauty preparations and cosmetics	10	0.7%
1010 – gloves	10	0.7%
5510 – rubber items	8	0.6%
0201 – animals	7	0.5%
0965 – glue, adhesive, paste	6	0.4%
1140 – hydrocarbon gases	6	0.4%
0399 – animal products, NEC	5	0.4%
0630 – boxes, crates, cartons, freight, cases	5	0.4%
0940 – ammonia and ammonium compounds	5	0.4%
0992 – solvents and degreasers, NEC	5	0.4%
2400 – heat, atmospheric, environmental	5	0.4%
Total:	1265	91.9%

¹ Only sources that were associated with at least five claims are included.

Table 2:
Occupations for All Asthma Claims Filed, Washington State, 1995-1999, (n =723)

Census Occupation Code and Description	Frequency¹	Percent
000 – invalid	78	10.8%
999 – occupation not reported	69	9.5%
889 – laborers, except construction	52	7.2%
479 – farm workers	25	3.5%
019 – managers and administrators, not elsewhere classified (NEC)	17	2.4%
260 – sales workers, retail and personal services	17	2.4%
095 – registered nurses	13	1.8%
389 – administrative support occupations, NEC	13	1.8%
447 – nursing aids and orderlies	13	1.8%
313 – secretaries	11	1.5%
337 – bookkeepers and accounting clerks	11	1.5%
174 – social workers	9	1.2%
449 – maids and housemen	9	1.2%
777 – miscellaneous machine operators, NEC	9	1.2%
779 – machine operators, not specified	9	1.2%
020 – management related occupations	8	1.1%
438 – food counter, fountain, and related occupations	8	1.1%
453 – janitors and cleaners	8	1.1%
783 – welders and cutters	8	1.1%
804 – truck drivers except logging	8	1.1%
207 – licensed practical nurses	7	1.0%
436 – cooks, except short order	7	1.0%
549 – mechanics and repairers, not specified	7	1.0%
575 – electricians and apprentices	7	1.0%
883 – freight and stock handlers, NEC	7	1.0%
208 – health technicians, NEC	6	0.8%
319 – receptionists	6	0.8%
379 – general office clerk	6	0.8%
514 – auto body and related repairers	6	0.8 5
016 – managers, property and real estate	5	0.7%
203 – clinical lab technicians	5	0.7%
235 – technicians, not elsewhere classified	5	0.7%
445 – dental assistants	5	0.7%
579 – painters, construction and maintenance	5	0.7%
888 – hand packers and packagers	5	0.7%
Total:	484	66.9%

¹ Only occupations that were associated with at least five claims are included.

Table 3:
Occupations for All Asthma Claims Filed, Washington State, 2000-2002 (n = 654)

Standard Occupation Code (SOC2K) and Description	Frequency¹	Percent
---- no code provided	93	14.2%
999 – occupation not provided	63	9.6%
519 – other production occupations	44	6.7%
472 – construction trades workers	43	6.6%
537 – material moving workers	36	5.5%
452 – agricultural workers	25	3.8%
439 – other workers and administrative support workers	22	3.4%
434 – information and record clerks	19	2.9%
119 – other management occupations	16	2.4%
514 – metal workers and plastic workers	15	2.3%
292 – health technologists and technicians	13	2.0%
211 – counselors, social workers, other community/social service	12	1.8%
412 – retail sales workers	12	1.8%
533 – motor vehicle operators	12	1.8%
493 – vehicle and mobile equipment mechanics, installers, repairers	11	1.7%
499 – other installation, maintenance, and repair occupations	11	1.7%
372 – building cleaning and pest control workers	10	1.5%
517 – woodworkers	10	1.5%
512 – assemblers and fabricators	9	1.4%
291 – health diagnosing and treating practitioners	8	1.2%
319 – other healthcare support occupations	8	1.2%
433 – financial clerks	8	1.2%
399 – other professional care and service workers	7	1.1%
431 – supervisors, office and administrative support workers	7	1.1%
436 – secretaries and administrative assistants	7	1.1%
131 – business operations specialists	6	0.9%
252 – primary, secondary, and special education school teachers	6	0.9%
253 – other teachers and instructors	6	0.9%
332 – fire fighting and prevention workers	6	0.9%
359 – other food preparation and serving related workers	6	0.9%
419 – other sales and related workers	6	0.9%
132 – financial specialists	5	0.8%
311 – nursing, psychiatric, and home health aides	5	0.8%
435 – material recording, scheduling, dispatching, distributing workers	5	0.8%
471 – supervisors, construction and extraction workers	5	0.8%
Total	577	88.2%

¹ Only occupations that were associated with at least five claims are included.

Table 4:
Acceptance Rate for Asthma Claims by 4-Digit Washington Industrial Classification (WIC)
Groups, Washington State, 1995-2002

WIC	Description	Claims Filed	Claims Accepted¹	Percent Accepted
3603	Electroplating	5	5	100.0%
5209	Boilermaking	5	5	100.0%
2903	Wood Products Manufacturing	20	18	90.0%
3902	Food Products Manufacturing	7	6	85.7%
6110	Home Health Care, Nursing	6	5	83.3%
5307	State Government -- Manual Labor	17	14	82.4%
6109	Physicians and Medical Clinics	45	37	82.2%
4811	Hop/Mint Growing	9	7	77.8%
6406	Retail Stores, NOC	9	7	77.8%
4902	State Government -- Clerical	52	39	75.0%
3412	Auto Repair	8	6	75.0%
0504	Painting	8	6	75.0%
4906	Colleges and Universities	64	45	70.3%
7103	State Government -- Law Enforcement	10	7	70.0%
3510	Plastic Products Manufacturing	23	16	69.6%
6303	Sales Personnel, Outside, NOC	13	9	69.2%
6509	Boarding Homes	13	9	69.2%
6108	Nursing Homes	19	13	68.4%
6709	Sheltered Workshops	9	6	66.7%
6909	Medical Labs and Blood Banks	9	6	66.7%
6103	Schools, Professional Staff	23	15	65.2%
3304	Meat Dealers Wholesale	11	7	63.6%
4910	Property and Building Management	19	12	63.2%
1002	Sawmills	13	8	61.5%
4905	Motels and Hotels	10	6	60.0%
0510	Wood Frame Building Construction	10	6	60.0%
4904	Clerical Office, NOC	54	32	59.3%
3404	Aluminum Product Manufacturing	14	8	57.1%
3602	Electronic Products Manufacturing	16	9	56.3%
6502	Banks, Savings and Loans	13	7	53.8%
3905	Restaurants	41	22	53.7%
3511	Fiberglass Manufacturing	10	5	50.0%
0306	Plumbing	10	5	50.0%
3402	Machine Shops	25	12	48.0%
2104	Fruit and Vegetable Packing	15	7	46.7%
7201	State Health Care Facilities	14	6	42.9%
4803	Orchards	33	11	33.3%

¹ All WIC groups with five or more accepted claims were included in the analysis and are shown.

Table 5:
Acceptance Rate for Asthma Claims by 2-Digit Standard Industrial Classification (SIC)
Divisions, Washington State, 1995-2002

SIC	Description	Claims Filed	Claims Accepted¹	Percent Accepted
96	Administration of Economic Programs	7	6	85.7%
02	Agricultural Production -- Livestock	6	5	83.3%
45	Transportation By Air	6	5	83.3%
20	Food and Kindred Products	15	12	80.0%
36	Electronic and Other Electric Equipment	9	7	77.8%
24	Lumber and Wood Products	40	31	77.5%
92	Justice, Public Order, and Safety	25	19	76.0%
80	Health Services	90	67	74.4%
34	Fabricated Metal Products	23	17	73.9%
60	Depository Institutions	7	5	71.4%
83	Social Services	55	38	69.1%
51	Wholesale Trade -- Nondurable Goods	28	19	67.9%
82	Educational Services	84	56	66.7%
59	Miscellaneous Retail	27	18	66.7%
58	Eating and Drinking Places	29	19	65.5%
35	Industrial Machinery and Equipment	17	11	64.7%
94	Administration of Human Resources	14	9	64.3%
76	Miscellaneous Repair Services	8	5	62.5%
75	Auto Repair, Services, and Parking	21	13	61.9%
65	Real Estate	21	13	61.9%
17	Special Trade Contractors	60	36	60.0%
95	Environmental Quality and Housing	10	6	60.0%
91	Executive, Legislative, and General	21	12	57.1%
30	Rubber and Miscellaneous Plastics Products	16	9	56.3%
15	General Building Contractors	13	7	53.8%
37	Transportation Equipment	25	13	52.0%
42	Trucking and Warehousing	18	9	50.0%
50	Wholesale Trade -- Durable Goods	20	10	50.0%
73	Business Services	67	33	49.3%
86	Membership Organizations	17	8	47.1%
87	Engineering, Accounting, Research, Mgmt, and Related	13	6	46.2%
70	Hotels and Other Lodging Places	24	11	45.8%
01	Agricultural Production -- Crops	44	19	43.2%

¹ All SIC divisions with five or more accepted claims were included in the analysis and are shown.

Table 6:
Counts and Rates for All State Fund Asthma Claims Filed by 4-Digit Washington Industrial
Classification (WIC) Groups, Ranked by the Prevention Index (PI),
Washington State, 1995-2002¹

WIC	Description	Count²	Count Rank	Hours	Rate³	Rate Rank	PI⁴
3511	Fiberglass Manufacturing	10	17	23866793	83.8	1	9.0
1002	Sawmills	13	15	40433192	64.3	5	10.0
3510	Plastic Products Manufacturing	23	8	109255459	42.1	12	10.0
2903	Wood Products Manufacturing	20	9	103968170	38.5	14	11.5
2905	Furniture/Casket Manufacturing	6	21	17336631	69.2	3	12.0
7113	Temporary Help, Maintenance	5	22	12501046	80.0	2	12.0
4811	Hop/Mint Growing	9	18	30774165	58.5	7	12.5
6504	Stores, Second Hand	6	21	17784574	67.5	4	12.5
7201	State Health Care Facilities	14	14	67928792	41.2	13	13.5
3503	Potteries and Glassware Mfg.	5	22	16795323	59.5	6	14.0
6105	Hospitals	6	21	21355730	56.2	8	14.5
3603	Electroplating	5	22	20217016	49.5	9	15.5
4902	State Government -- Clerical	52	3	526229647	19.8	29	16.0
0502	Floor Covering Installation	5	22	20606927	48.5	10	16.0
3402	Machine Shops	25	7	209165404	23.9	26	16.5
2101	Grain Milling	5	22	23190033	43.1	11	16.5
6709	Sheltered Workshops	9	18	51170626	35.2	17	17.5
3304	Meat Dealers Wholesale	11	16	74478470	29.5	20	18.0
7114	Temporary Help, Assembly	5	22	26669282	37.5	15	18.5
3412	Auto Repair	8	19	49175408	32.5	19	19.0
4803	Orchards	33	6	347100541	19.0	32	19.0
2201	Laundry and Dry Cleaning	5	22	28308659	35.3	16	19.0
4906	Colleges and Universities	64	1	823960883	15.5	38	19.5
4910	Property and Building Mgmt.	19	10	196036431	29.0	30	20.0
0504	Painting	8	19	55130888	19.4	21	20.0
4809	Greenhouses	5	22	30697258	32.6	18	20.0
7103	State Gov.-- Law Enforcement	10	17	80475424	24.9	24	20.5
3404	Aluminum Product Mfg.	14	14	132229752	21.2	28	21.0
5307	State Gov. -- Manual Labor	17	11	175968993	19.3	31	21.0
6110	Home Health Care, Nursing	6	21	41708662	28.8	22	21.5
Total :		423	(38% of all State Fund claims filed)				

¹ The top 30 WIC groups ranked by the Prevention Index are shown.

² Only WIC groups with five or more cases were included in the analysis.

³ Rates are calculated per 100,000 FTE-years.

⁴ The Prevention Index is the average of the count and rate rankings.

Table 7:
Counts and Rates for Accepted State Fund Asthma Claims by 4-Digit Washington
Industrial Classification (WIC) Groups, Ranked by the Prevention Index (PI),
Washington State, 1995-2002¹

WIC	Description	Count²	Count Rank	Hours	Rate³	Rate Rank	PI⁴
2903	Wood Products Manufacturing	18	6	103968170	34.6	5	5.5
3510	Plastic Products Mfg.	16	7	109255459	29.3	6	6.5
4811	Hop/Mint Growing	7	15	30774165	45.5	2	8.5
1002	Sawmills	8	14	40433192	39.6	4	9.0
3603	Electroplating	5	17	20217016	49.5	1	9.0
4902	State Government – Clerical	39	2	526229647	14.8	17	9.5
3511	Fiberglass Manufacturing	5	17	23866793	41.9	3	10.0
4906	Colleges and Universities	45	1	823960883	10.9	21	11.0
3412	Auto Repair	6	16	49175408	24.4	8	12.0
5209	Boilermaking	5	17	34984529	28.6	7	12.0
5307	State Gov. – Manual Labor	14	9	175968993	15.9	16	12.5
6709	Sheltered Workshops	6	16	51170626	23.5	10	13.0
6110	Home Health Care, Nursing	5	17	41708662	24.0	9	13.0
3304	Meat Dealers Wholesale	7	15	74478470	18.8	12	13.5
0504	Painting	6	16	55130888	21.8	11	13.5
6109	Physicians/Medical Clinics	37	3	762370582	9.7	24	13.5
7201	State Health Care Facilities	6	16	67928792	17.7	13	14.5
4910	Property and Building Mgmt.	12	11	196036431	12.2	18	14.5
7103	State Gov. – Law Enforcement	7	15	80475424	17.4	14	14.5
3402	Machine Shops	12	11	209165404	11.5	20	15.5
3902	Food Products Manufacturing	6	16	74677708	16.1	15	15.5
3404	Aluminum Product Mfg.	8	14	132229752	12.1	19	16.5
6108	Nursing Homes	13	10	270634898	9.6	25	17.5
3905	Restaurants	22	5	1534520399	2.9	33	19.0
0306	Plumbing	5	17	92612147	10.8	22	19.5
6909	Medical Labs and Blood Banks	6	16	123537780	9.7	23	19.5
6103	Schools, Professional Staff	15	8	616167028	4.9	32	20.0
6509	Boarding Homes	9	13	214527186	8.4	27	20.0
4904	Clerical Office, NOC	32	4	3304542053	1.9	36	20.0
3602	Electronic Products Mfg.	9	13	239761792	7.5	29	21.0
4905	Motels and Hotels	6	16	140367504	8.5	26	21.0
Total:		397	(61% of all accepted State Fund claims)				

¹ The top 31 WIC groups ranked by the Prevention Index are shown.

² Only WIC groups with five or more cases were included in the analysis.

³ Rates are calculated per 100,000 FTE-years.

⁴ The Prevention Index is the average of the count and rate rankings.

Table 8:
Counts and Rates for Compensable State Fund Asthma Claims by 4-Digit Washington
Industrial Classification (WIC) Groups, Ranked by the Prevention Index (PI),
Washington State, 1995-2002

WIC	Description	Count¹	Count Rank	Hours	Rate²	Rate Rank	PI³
1002	Sawmills	8	6	40433192	39.6	1	3.5
3510	Plastic Products Manufacturing	10	5	109255459	18.3	3	4.0
4902	State Government -- Clerical	14	2	526229647	5.3	8	5.0
6109	Physicians and Medical Clinics	17	1	762370582	4.5	9	5.0
3412	Auto Repair	5	9	49175408	20.3	2	5.5
2903	Wood Products Manufacturing	6	8	103968170	11.5	4	6.0
3404	Aluminum Product Mfg.	7	7	132229752	10.6	5	6.0
3402	Machine Shops	6	8	209165404	5.7	6	7.0
4906	Colleges and Universities	12	4	823960883	2.9	11	7.5
5307	State Gov. -- Manual Labor	5	9	175968993	5.7	7	8.0
4904	Clerical Office, NOC	13	3	3304542053	0.8	13	8.0
3602	Electronic Products Mfg.	5	9	239761792	4.2	10	9.5
6303	Sales Personnel, Outside, NOC	5	9	1008493030	1.0	12	10.5
Total:		113	(46% of all compensable State Fund claims)				

¹ All WIC groups with five or more cases were included in the analysis and are shown in the table.

² Rates are calculated per 100,000 FTE-years.

³ The Prevention Index is the average of the count and rate rankings.

Table 9:
Counts and Rates for Compensable, Closed Self-Insured Asthma Claims by 4-Digit
Washington Industrial Classification (WIC) Groups, Ranked by the Prevention Index (PI),
Washington State, 1995-2002

WIC	Description	Count¹	Count Rank	Hours	Rate²	Rate Rank	PI³
6105	Hospitals	17	1	881466134	3.9	2	1.5
6104	Schools, All Other Employers	6	3	223924033	5.4	1	2.0
3403	Aircraft Manufacturing	12	2	1216008252	2.0	3	2.5
Total:		35	(49% of all compensable, closed, self-insured claims)				

¹ All WIC groups with five or more cases were included in the analysis and are shown in the table.

² Rates are calculated per 100,000 FTE-years.

³ The Prevention Index is the average of the count and rate rankings.

Table 10:
Counts and Rates for Compensable, Closed State Fund and Self-Insured Combined
Asthma Claims by 4-Digit Washington Industrial Classification (WIC) Groups, Ranked by
the Prevention Index (PI), Washington State, 1995-2002

WIC	Description	Count¹	Count Rank	Hours	Rate²	Rate Rank	PI³
1002	Sawmills	11	5	116399372	18.9	1	3.0
4902	State Government, Clerical	14	3	526229647	5.3	6	4.5
6109	Physicians and Medical Clinics	17	2	850613530	4.0	7	4.5
6105	Hospitals	18	1	902821864	4.0	8	4.5
1802	Aluminum Smelting	5	8	75552549	13.2	2	5.0
3510	Plastic Products Manufacturing	6	7	124100986	9.7	3	5.0
3404	Aluminum Product Mfg.	7	6	192605421	7.3	4	5.0
5307	State Gov. -- Manual Labor	5	8	175968993	5.7	5	6.5
4906	Colleges and Universities	12	4	844147830	2.8	11	7.5
6104	Schools, All Other	6	7	313737743	3.8	9	8.0
3403	Aircraft Manufacturing	12	4	1219863962	2.0	12	8.0
4904	Clerical Office, NOC	14	3	4395530236	0.6	13	8.0
3602	Electronic Products Mfg.	5	8	305274080	3.3	10	9.0
Total:		132	(50% of all compensable, closed claims)				

¹ All WIC groups with five or more cases were included in the analysis and are shown in the table.

² Rates are calculated per 100,000 FTE-years.

³ The Prevention Index is the average of the count and rate rankings.

Table 11:
Counts and Rates for All State Fund Asthma Claims Filed by 2-Digit Standard Industrial
Classification (SIC) Divisions, Ranked by the Prevention Index (PI),
Washington State, 1995-2002¹

SIC	Description	Count¹	Count Rank	Hours	Rate²	Rate Rank	PI³
24	Lumber and Wood Products	40	7	280017284	28.6	2	4.5
37	Transportation Equipment	25	11	183400713	27.3	3	7.0
83	Social Services	55	5	718045514	15.3	10	7.5
82	Educational Services	84	2	1166048592	14.4	14	8.0
80	Health Services	90	1	1292548387	13.9	16	8.5
92	Justice, Public Order, and Safety	25	11	237713399	21.0	6	8.5
34	Fabricated Metal Products	23	13	194718252	23.6	5	9.0
30	Rubber and Misc. Plastic Products	16	18	108553459	29.5	1	9.5
01	Agricultural Production -- Crops	44	6	630504418	14.0	15	10.5
94	Administration of Human Resources	14	20	112602043	24.9	4	12.0
35	Industrial Machinery and Equipment	17	17	215514959	15.8	8	12.5
17	Special Trade Contractors	60	4	1214603844	9.9	25	14.5
73	Business Services	67	3	1466776987	9.1	27	15.0
95	Environmental Quality and Housing	10	22	127435790	15.7	9	15.5
75	Auto Repair, Services, and Parking	21	14	318600814	13.2	18	16.0
33	Primary Metal Industries	6	26	72832719	16.5	7	16.5
70	Hotels and Other Lodging Places	24	12	417541206	11.5	22	17.0
91	Executive, Legislative, and General	21	14	360968907	11.6	21	17.5
39	Misc. Manufacturing Industries	6	26	79072857	15.2	11	18.5
51	Wholesale Trade-Nondurable Goods	28	9	683780645	12.7	29	19.0
20	Food and Kindred Products	15	19	235386224	8.2	19	19.0
32	Stone, Clay, and Glass Products	6	26	81206882	14.8	12	19.0
02	Agricultural Production -- Livestock	6	26	81791203	14.7	13	19.5
59	Miscellaneous Retail	27	10	707984653	10.1	30	20.0
42	Trucking and Warehousing	18	16	355703256	7.6	24	20.0
76	Miscellaneous Repair Services	8	24	115716037	13.8	17	20.5
65	Real Estate	21	14	604575800	6.9	32	23.0
36	Electronic & Other Electric Equip.	9	23	175220250	10.3	23	23.0
Total:		792	(72% of state fund claims filed)				

¹ The top 28 SIC divisions ranked by the Prevention Index are shown.

² Only SIC divisions with five or more cases were included in the analysis.

³ Rates are calculated per 100,000 FTE-years.

⁴ The Prevention Index is the average of the count and rate rankings.

Table 12:
Counts and Rates for Accepted State Fund Asthma Claims by 2-Digit Standard Industrial Classification (SIC) Divisions, Ranked by the Prevention Index (PI), Washington State, 1995-2002¹

SIC	Description	Count²	Count Rank	Hours	Rate³	Rate Rank	PI⁴
24	Lumber and Wood Products	31	6	280017284	22.1	1	3.5
80	Health Services	67	1	1292548387	10.4	9	5.0
83	Social Services	38	3	718045514	10.6	8	5.5
92	Justice, Public Order, and Safety	19	7	237713399	16.0	4	5.5
34	Fabricated Metal Products	17	9	194718252	17.5	2	5.5
82	Educational Services	56	2	1166048592	9.6	13	7.5
37	Transportation Equipment	13	10	183400713	14.2	6	8.0
30	Rubber and Misc. Plastics Products	9	14	108553459	16.6	3	8.5
94	Administration of Human Resources	9	14	112602043	16.0	5	9.5
35	Industrial Machinery and Equipment	11	12	215514959	10.2	11	11.5
20	Food and Kindred Products	12	11	235386224	10.2	12	11.5
17	Special Trade Contractors	36	4	1214603844	5.9	21	12.5
02	Agricultural Production -- Livestock	5	18	81791203	12.2	7	12.5
01	Agricultural Production -- Crops	19	7	630504418	6.0	20	13.5
75	Auto Repair, Services, and Parking	13	10	318600814	8.2	17	13.5
45	Transportation By Air	5	18	97816566	10.2	10	14.0
51	Wholesale Trade -Nondurable Goods	19	7	683780645	5.6	22	14.5
91	Executive, Legislative, and General	12	11	360968907	6.6	19	15.0
73	Business Services	33	5	1466776987	4.5	26	15.5
95	Environmental Quality and Housing	6	17	127435790	9.4	14	15.5
59	Miscellaneous Retail	18	8	707984653	5.1	24	16.0
76	Miscellaneous Repair Services	5	18	115716037	8.6	15	16.5
96	Admin. of Economic Programs	6	17	144650831	8.3	16	16.5
36	Electronic & Other Electric Equip.	7	16	175220250	8.0	18	17.0
70	Hotels and Other Lodging Places	11	12	417541206	5.3	23	17.5
65	Real Estate	13	10	604575800	4.3	27	18.5
58	Eating and Drinking Places	19	7	1456434876	2.6	31	19.0
42	Trucking and Warehousing	9	14	355703256	5.1	25	19.5
Total:		518	(80% of accepted state fund claims)				

¹ The top 28 SIC divisions ranked by the Prevention Index are shown.

² Only SIC divisions with five or more cases were included in the analysis.

³ Rates are calculated per 100,000 FTE-years.

⁴ The Prevention Index is the average of the count and rate rankings.

Table 13:
Counts and Rates for Compensable State Fund Asthma Claims by 2-Digit Standard
Industrial Classification (SIC) Divisions, Ranked by Prevention Index (PI),
Washington State, 1995-2002

SIC	Description	Count¹	Count Rank	Hours	Rate²	Rate Rank	PI³
24	Lumber and Wood Products	22	2	280017284	15.7	1	1.5
34	Fabricated Metal Products	11	6	194718252	11.3	2	4.0
80	Health Services	28	1	1292548387	4.3	8	4.5
37	Transportation Equipment	8	8	183400713	8.7	4	6.0
30	Rubber and Misc. Plastics Products	6	9	108553459	11.1	3	6.0
75	Auto Repair, Services, and Parking	9	7	318600814	5.6	5	6.0
17	Special Trade Contractors	17	3	1214603844	2.8	11	7.0
83	Social Services	12	5	718045514	3.3	10	7.5
35	Industrial Machinery and Equipment	6	9	215514959	5.6	6	7.5
20	Food and Kindred Products	6	9	235386224	5.1	7	8.0
42	Trucking and Warehousing	6	9	355703256	3.4	9	9.0
82	Educational Services	14	4	1166048592	2.4	15	9.5
51	Wholesale Trade -Nondurable Goods	9	7	683780645	2.6	13	10.0
91	Executive, Legislative, and General	5	10	360968907	2.8	12	11.0
15	General Building Contractors	5	10	411287063	2.4	14	12.0
01	Agricultural Production -- Crops	6	9	630504418	1.9	16	12.5
Total:		170	(69% of compensable state fund claims)				

¹ All SIC divisions with five or more cases were included in the analysis and are shown.

² Rates are calculated per 100,000 FTE-years.

³ The Prevention Index is the average of the count and rate rankings.