Research Paper

Occupational Disease

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February 2015
Document 215005
Ce document sera bientôt disponible en français.

Committee on Workers' Compensation

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Introduction

Background

The Canadian Institute of Actuaries (CIA) engaged Oliver Wyman Actuarial Consulting, Inc., to provide information on issues relating to the consideration and measurement of unpaid costs associated with occupational diseases generated by the cumulative physical effect of long-term exposure to repetitive activities or hazardous substances.

The purpose of this assignment is to generate sufficient information and intellectual capital on occupational diseases to allow each individual workers' compensation board (WCB) in Canada to make informed decisions as to:

1. Which occupational diseases generate claims of sufficient frequency and severity to warrant investigation of potential costs of the disease in question;
2. Whether or not the expected cost of potential claims due to the cumulative physical effect of long-term exposure to repetitive activities or hazardous substances of currently active employees should be quantified and included as part of the liability for unpaid claim costs; and
3. What actuarial approaches to use to generate reasonable estimates of unpaid costs.

Philosophies and approaches related to the items above likely vary among the individual WCBs. There is concern within the actuarial community in Canada, represented by the CIA, that sufficient information may not be currently available (or at least currently available in a single document) to the individual jurisdictions for the purpose of making informed decisions on these items. Ideally, the information presented in this report, with supporting data acquired by Oliver Wyman, will serve as the basis for decision-making that reflects the unique risk exposure, current practice, and general operating philosophy of each individual WCB in the context of common practice in the numerous jurisdictions within the U.S. as well as other parts of the world.

Definitions

For the purpose of this report, the following definitions apply:

Traumatic (Acute) Claims: Claims generated by traumatic injuries are due to specific incidents at specific points in time. Examples are amputations and fractures. Another example is claims due to bee stings suffered by beekeepers. Data acquired for this assignment classified the latter claims as "occupational disease" given that poisoning due to bee venom is an occupational hazard for beekeepers. Nevertheless, these claims (and claims generated under similar circumstances for other occupations) are due to specific incidents at specific points in time and are therefore traumatic claims for the purpose this report.

Occupational Disease: Diseases generated by the cumulative physical effect of long-term exposure to repetitive activities or environmental hazards (generally referred to as "exposure to loss" in this report). Data acquired for this assignment suggests that *long-term* refers to a minimum exposure of at least five to 10 years, extending through decades. Examples of occupational diseases are cancer and carpal tunnel syndrome. In this sense, for the purpose of this report, the definition of *occupational disease* is strict and does *not* include injuries or conditions commonly referred to as occupational but which are caused by incidents at a specific point in time (see the above paragraph). Data suggests two general categories of occupational diseases: latent occupational diseases and non-latent occupational diseases.

Latent Occupational Disease: Latent occupational diseases generally emerge at higher ages (50s and above), often after retirement, and are due to the cumulative effect of long-term exposure to environmental hazards over the working life of an individual. Data suggests that for latent occupational diseases, exposure occurs over the course of many decades. Examples include cancer, coal worker pneumoconiosis, asbestosis, and hearing loss. Data shows that latent occupational diseases generally emerge later in life, in some cases many years (often decades) after the last date of exposure to loss.

Non-latent Occupational Disease: Non-latent occupational diseases emerge at lower ages (30s to 40s) and are due to the cumulative effect of long-term exposure to repetitive motion. Data suggests that for non-latent occupational diseases, exposure occurs over the course of five to 20 years. Examples include carpal tunnel syndrome and various inflammatory conditions of the muscular-skeletal system (bursitis, tendonitis). Non-latent occupational diseases generally emerge relatively quickly after the last date of exposure to loss, often while the employee is still working.

Latency Period: *Latency Period* refers to the time required, from first exposure to loss, for a specific disease to manifest itself in an individual. The data acquired for this assignment does not have sufficient information to precisely measure latency periods. However, the data does imply (assuming employees generally start work at the same age) that latency periods for latent

occupational disease claims are materially longer, perhaps by decades, than non-latent occupational disease claims, because they emerge at much greater ages.

Active Employee: Individuals currently employed in occupations that expose them to the underlying hazards that generate occupational disease claims.

Inactive Employee: Individuals no longer exposed to underlying hazards that generate occupational disease claims. Inactive employees either have retired from the workforce or changed employment to occupations that no longer expose them to loss.

Date of Loss: The date the injury generating a claim occurred. For a traumatic claim, the date of loss is the date the injury occurred, and is unambiguous. For an occupational disease claim, the date of loss is ambiguous given that occupational diseases are due to long-term exposure to repetitive motion or hazardous substances. In practice, as respects insurance contracts and the analysis of data for determining the financial responsibility for occupational disease claims[1] and liability valuations, the most common definition is the last date of exposure to loss. For an inactive employee, the last date of exposure loss is the last date worked. For an active employee, the last date of exposure to loss is generally coincident with the date the employee filed a claim. For the purpose of this report, the date of loss is defined using this common definition.

Reported Claim: This is a claim that has been filed with (reported to) the respective WCB.

> *Inactive Employee*: The date of loss of a reported claim is the last date worked.
>
> *Active Employee*: The date of loss of a reported claim is the date the employee files a claim, which is assumed to be (and generally is) coincident with the last date of exposure to loss.

Unreported Claim: An unreported claim has a defined date of loss, but has *not* yet been filed with (reported to) the respective WCB. *Incurred but not reported claims* (IBNR) is a common term for unreported claims.

> *Inactive Employee*: Inactive employees generate IBNR claims the date they leave the workforce. The claims exist because exiting the workforce establishes a date of loss for any future claim due to the accumulated exposure to loss during the working life of the employee. For latent occupational disease claims, claims may remain unreported for decades, until the underlying disease manifests itself and the employee files a claim for benefits.

[1] The WCBs in Canada function as monopolistic provincial agencies. Financial responsibility lies almost exclusively with the respective WCBs. In most U.S. jurisdictions, as well as jurisdictions in other countries, workers' compensation insurance is sold through a competitive marketplace and the date of loss, as respects the assignment of the financial responsibility of an occupational disease claim, is important when an employer has contracted with different insurance enterprises over time.

Active Employee: Using the definitions established for the purpose of this report, unreported occupational disease claims *do not* exist for active employees because a date of loss, as defined earlier, does not exist until an active employee files a claim or leaves the workforce. Active employees therefore have an accumulated exposure to loss with an associated liability that reflects the expected cost of potential future claims. The liability associated with active employees is referred to as the Active Employee Component, or AEC.

Report Lag (or Lag): The time difference between the date of loss (as defined above) and the date of report. Report lag is an indicator (though not a precise measure) of the degree of latency associated with a specific occupational disease. Latent occupational diseases generally have much greater lag (years to decades) than non-latent occupational diseases (zero to several years). For example, cancer often manifests itself years after the last date of exposure to loss while employees report carpal tunnel syndrome claims generally while still working.

The definitions above suggest that there are three distinct cost components of occupational disease claims:

Reported Claim Costs: The expected cost of occupational disease claims that have been reported to the respective WCBs/employers.

Unreported (IBNR) Claim Costs: The expected cost of occupational disease claims that have not been reported to the respective WCBs/employers. Unreported claim costs, or IBNR, are exclusively due to inactive employees.[2]

Active Employee Component (AEC): The expected cost of potential future claims due to the cumulative exposure to loss associated with active employees.

[2] In practice, IBNR does exist for active employees. However, the nature of active employee IBNR is fundamentally different from IBNR due to terminated employees. IBNR for active employees is almost exclusively due to delays in recording the claim into databases used for the purpose of analysis. Report lags associated with these claims are extraordinarily small, ranging for days to months. These claims are commonly referred to as "pipeline" claims. Pipeline claims are fundamentally different from IBNR claims associated with terminated employees, where claims are reported years or decades after the last exposure to loss.

Detailed Scope

Oliver Wyman was engaged to address the following items, subject to data availability:

1. Identify a superset of occupational disease claims provided for by insurance in Canada.

2. Identify a superset of cumulative trauma claims that potentially could be included in the superset of occupational disease claims.

3. Identify occupational diseases currently classified as workers' compensation claims in jurisdictions outside of Canada and not currently classified as workers' compensation claims in Canadian jurisdictions.

4. Recommend a set of occupational disease claims for which a liability potentially could be determined.

5. Identify the set of occupational disease claims using the NWISP/ICD9 coding system in Canada.

6. Recommend and discuss the following occupational disease periods for each disease in the set identified in item 4 above:
   a. Minimum exposure period required to contract the disease
   b. Average latency period from start of exposure to disease emergence
   c. Variance of exposure by industry
   d. Minimum latency period required for qualification as a latent occupational disease.

7. Identify, rank, and discuss the cost of the occupational diseases identified in item 4 above.

8. Propose and discuss potential liability calculations.

9. Illustrate potential liability calculations.

10. Identify best practices in the U.S., Canada, and other countries.

11. The final report will be the result of a collaborative effort on the part of the CIA and Oliver Wyman and will address the items listed previously as well as the following:
    a. Impact of health and safety improvements
    b. Changes to exposure levels over time
    c. Changes in average age and other demographics
    d. Improvements to mortality
    e. Improvements to disease treatment
    f. Approaches to calculated and allocated liabilities by industry
    g. Other considerations.

General Approach

The most important element of this assignment was the acquisition and subsequent compilation, examination, and analysis of data. This portion of the assignment directly addresses items 1 through 7 of the scope, and provides required information and context to address items 8 through 11. The following is an outline of this process:

Data Acquisition

Oliver Wyman and the CIA jointly approached a number of Canadian provinces to discuss the contribution of data to this assignment. Additionally, Oliver Wyman approached current clients and contacts within the U.S. The following entities contributed data to this assignment:

The Alberta Workers' Compensation Board
The Workers' Compensation Board of British Columbia (WorkSafeBC)
A competitive state fund in the U.S.
Two large U.S. ship manufacturing, repair, and servicing corporations.

Data Editing

Oliver Wyman reviewed, sorted, and tested data from each source for structure, information content, and reasonability, and removed data with little or no informational value as well as data with irrational content. Information initially acquired consisted of over 400,000 claim entries. Of this data, approximately 150,000 claim entries were used.

Data Compilation

The form and content of the final database evolved during the editing and compilation process. The approach was iterative, in the sense that the editing and compilation process gave context and background to data structure and differences in content from the various contributors. The format accommodated common available data from all sources. Additionally, the form and structure of the final database considered the need to ensure confidentiality of contributor data. The structure of the final database follows. There is a discussion of the individual data elements later in this report.

Age at Date of Loss	Claim Cost at Current Level	Secondary Disease/Injury
Age at Claim Report	Industry Group	Source of Injury
Gender	Primary Disease/Injury Category	Body Part 1
Report Lag	Primary Disease/Injury Classification	Body Part 2
	Primary Disease/Injury	

Data Analysis

Data was examined throughout the editing and compilation process to determine the key metrics that would address the CIA's needs (as described in the scope), as well as to determine the most efficient and informative way to present the selected metrics. Data volume and reasonability were key considerations.

Best Practices, Liability Calculations, and Other Issues

Oliver Wyman investigated how other jurisdictions outside North America address the liability for latent diseases. Other aspects of items 8 through 11 of the scope were developed throughout the acquisition, editing, compilation, and analysis of data. Items 8 through 11 were addressed to the degree permitted by available data.

Executive Summary

Occupational Diseases

Identified Diseases[3]

The study identified the following as potential occupational diseases, as defined previously for the purpose of this report.

CANCER-RELATED CLAIMS
- MESOTHELIOMA
- LUNG CANCER
- ALL OTHER CANCER

RESPIRATORY-RELATED CLAIMS
- OBSTRUCTIVE RESPIRATORY DISEASE
- PNEUMOCONIOSIS (EXCLUDING ASBESTOSIS)
- ASBESTOSIS
- ALL OTHER RESPIRATORY

HEARING LOSS
INFECTION
EYE CONDITIONS
MENTAL STRESS
PHYSICAL STRESS
REACTION TO A FOREIGN SUBSTANCE
VASCULAR
CUMULATIVE TRAUMA CLAIMS
- BURSITIS
- EPICONDYLITIS
- TENDONITIS
- TENOSYNOVITIS
- OTHER INFLAMMATION
- SPRAIN/STRAIN/TEAR
- HERNIA
- OTHER CUMULATIVE TRAUMA
- CARPAL TUNNEL SYNDROME
- CUMULATIVE NERVE DISEASE

These diseases are potentially due to the cumulative effect of long-term exposure to loss. The following are important considerations underlying this list:

[3] There is a detailed discussion of each disease in the Methodology and Discussion section of this report.

1. The list includes diseases defined as occupational disease in the underlying data. However, identification as an occupational disease in the underlying data does not necessarily mean that the disease or condition is due to the cumulative effect of long-term exposure to loss, the definition of occupational disease for the purpose of this report. Additional investigation demonstrated that certain conditions on this list are generally due to singular events and are therefore traumatic, not occupational disease, claims. A simple example is infection. The majority of these claims are due to hepatitis, with some tuberculosis claims. All of these claims are generally traceable to a specific incident exposing the employee to infection. Additionally, employees generally report these claims very quickly after the exposure incident. So while properly classified as occupational disease, this group of claims is not due to either repetitive motion or long-term exposure to hazardous substances. As such, while included in the initial list, the recommendation (later in this report) is to exclude this specific group of claims from consideration.

2. The absence of a specific disease on this list means that the specific disease is more likely due to a specific incident at a specific point in time, rather than the cumulative exposure to repetitive motion or hazardous substances. In the simplest case, a claim due to a torn rotator cuff associated with a trip or fall would not be included. On the other hand, a claim identified as a shoulder sprain due to driving as an occupation would be included.

Recommended Diseases for Consideration

Oliver Wyman recommends that the following diseases be included in the group of occupational diseases for which there is a significant loss component, either as potential costs due to the cumulative exposure to loss associated with active employees, or due to unreported costs associated with inactive employees. These diseases represent the starting point for any additional investigation by the individual WCBs. Ultimately, each individual WCB is responsible for the decision as to which specific diseases to consider. The following diseases are termed the "recommended set of diseases" for the remaining portion of this report:

MESOTHELIOMA/ASBESTOSIS/LUNG CANCER
ALL OTHER CANCER
HEARING LOSS
PNEUMOCONIOSIS (EXCLUDING ASBESTOSIS)
OBSTRUCTIVE RESPIRATORY DISEASES (combined with All Other Respiratory)
CUMULATIVE TRAUMA CLAIMS COMBINED (excluding Carpal Tunnel Syndrome)
CARPAL TUNNEL SYNDROME

This list is a recommendation based on Oliver Wyman's examination of underlying data as well as research into the nature of specific diseases. Detailed data and metrics for all diseases are included in this report in Appendix B so that individual jurisdictions may independently assess the need to consider other diseases, or exclude diseases in the list above.

For the purpose of future analysis, the recommendation is to combine Mesothelioma, Asbestosis, and Lung Cancer into a single category. This is due to the similarity of key metrics for each of these individual diseases.

All Other Cancer, Hearing Loss, and Pneumoconiosis (excluding Asbestosis) are single categories due to either data volume and/or uniqueness of underlying metrics. Metrics and distributions generated by data from pneumoconiosis (excluding asbestosis) were not consistent, as respects latency and age at emergence, with coal workers' pneumoconiosis data from the U.S. Department of Labor database. Closer examination of the underlying data showed that the observed differences were due to 40 byssinosis[4] claims included in this data. A detailed discussion of this and other concerns with data for this disease appears later in this report. For the purposes of this report, Oliver Wyman based key metrics as respects age at emergence and latency for pneumoconiosis on coal workers' pneumoconiosis data from the U.S. Department of Labor.

Oliver Wyman combined obstructive respiratory disease and all other respiratory disease into a single category for the purpose of analysis, given similarities in underlying metrics and distributions. The recommendation to include this combined category in the recommended set of diseases is contingent on excluding claims with relatively low report lag. An analysis of underlying claim data demonstrated there are likely two groups of fundamentally different claims in the combined category, best defined as claims with lag less than two years and claims with lag greater than two years.[5] The first group, with lag less than two years, is composed of relatively low-cost claims with very low average lag that emerge at relatively low ages. The second group, with lag greater than two years, is composed of relatively high-cost claims with higher average lag that emerge at relatively high ages. Discussions with data sources indicated that lower-cost claims emerging at lower ages with minimal lag are likely due to respiratory conditions generated by short-term acute exposure to hazardous substances. These claims are more properly defined as traumatic claims, rather than latent occupational disease claims. Higher-cost claims emerging at higher ages with significant lag are likely due to longer-term exposure to hazardous substances resulting in respiratory diseases that emerge later in life. Examination of claim detail supports this interpretation. A detailed discussion of this disease appears later in this report.

Oliver Wyman combined cumulative trauma claims into a single category, with the exception of carpal tunnel syndrome claims, due to almost identical underlying key metrics. Carpal tunnel syndrome claims are treated separately only because of the volume of claims and general interest in this specific disease.

[4] Byssinosis is commonly referred to as brown lung disease and is caused by the inhalation of cotton fibres over time.

[5] Data indicated that a two-year report lag was a logical point to partition the data. Oliver Wyman provided underlying data to the CIA. The CIA has the option of examining this data and selecting a different point to partition the data.

Recommended as Excluded Diseases

The following diseases are not included in the recommended set of diseases due to low incidence, low cost, or claim characteristics that indicate a traumatic source of injury.

INFECTION
EYE CONDITION ALL
MENTAL STRESS
PHYSICAL STRESS
REACTION TO A FOREIGN SUBSTANCE
VASCULAR
CUMULATIVE NERVE DISEASE

There is a detailed discussion of the underlying reasons for excluding the above diseases later in this report. However, a brief note regarding cumulative nerve disease is warranted at this time. There are approximately 1,400 claims in this category, of which over 900 are in the Vessel Operation industry group. The large number of claims in this industry group is an artifact of the underlying data sources, of which two were U.S. shipbuilding firms. It is likely not useful to consider this disease group in general. However, for shipbuilding and possibly related occupations, cumulative nerve disease could reasonably be included in the recommended group of diseases. Ultimately, the decision regarding the treatment of this disease category is the responsibility of the individual jurisdictions.

Latency and Categorization of Diseases

Analysis of underlying data suggests using the profiles of diseases such as mesothelioma, asbestosis, and lung cancer to establish key characteristics representative of latent occupational diseases is a preferred approach, as opposed to defining benchmarks based on point values of certain metrics. Specifically, the profile of age at claim report (disease emergence) and the profile of report lag are used to establish key characteristics of latent occupational diseases[6].

[6] The primary reason why latent diseases emerge at later ages, well into retirement, is relatively long latency periods, as compared to non-latent (repetitive motion) claims. This is the same reason why there is significant report lag with latent diseases. Correlation between report lag and age at emergence therefore exists, given that long latency periods is the primary causative factor for both observations. Therefore it is, to a degree, redundant to use both metrics to categorize a disease as latent or non-latent, given that both metrics have the same primary causative factor. However, another possible outcome would have been latency periods long enough to increase the age at emergence of latent diseases to a value high enough to distinguish them from non-latent diseases, but still low enough to allow the majority of claims due to latent diseases to emerge while employees were still active, resulting in low report lag. In this case, report lag would have been similar for both groups and age at emergence would have been the only differentiator between latent and non-latent diseases. Though this is clearly not the case, Oliver Wyman had no preconceived notion as to what the results of data analysis would show, and selected report lag and age at emergence as benchmark measures of latency at the start of the study.

1. The age profile at claim report for mesothelioma, asbestosis, and lung cancer demonstrates claim emergence in older individuals:

   95% of claims are reported at ages greater than the mid-40s to the early 50s:
   Mesothelioma: 51 (for example, 95% of claims are reported after age 51)
   Asbestosis: 43
   Lung Cancer: 45

   The mean age at report is at or near the expected end of working life:
   Mesothelioma: 68
   Asbestosis: 64
   Lung Cancer: 66

   5% of claims are reported at ages significantly past expected career end:
   Mesothelioma: 83 (for example, 5% of claims are reported after age 83)
   Asbestosis: 81
   Lung Cancer: 81

2. The lag profile at claim report demonstrates significant latency, in the sense that the diseases emerge years after the last date of exposure to loss:

	Average Lag Measured in Years		
	All Claims	Top 90%	Top 10%
Mesothelioma:	1.7	1.9	13.0
Asbestosis:	3.9	4.4	24.7
Lung Cancer:	8.3	9.3	26.3

   Top 90% refers to the average lag excluding 10% of total claims having the lowest lag.
   Top 10% refers to the average lag excluding 90% of total claims having the lowest lag.

Therefore, latent occupational disease claims exhibit a high age of disease emergence relative to expected retirement date as well as a significant amount of time between the last date of exposure to loss and the date of claim report.

To cement these concepts, consider a comparison to the metrics identified above for the three benchmark latent diseases combined and all cumulative trauma claims combined:

	Age Profile		
	5% Level	Mean	95% Level
Meso/Asbes/Cancer	45	65	82
Cumulative Trauma	23	42	59

	Lag Profile		
	Mean	Excluding 10% Lowest	Excluding 90% Lowest
Meso/Asbes/Cancer	3.6	4.0	22.8
Cumulative Trauma	0.2	0.2	1.6

Cumulative trauma claims are reported at relatively low ages during active employment, with little or no time passage between last date of exposure to loss and the date of claim report (disease emergence). Latent disease claims are reported at relatively high ages extending well past expected retirement with material lag between the last date of exposure to loss and claim report (disease emergence). The highest lag for latent disease claims has values in decades.

The scope suggests establishment of a minimum level of latency that would assist in liability calculations. Latency period, as defined in this report, is the time interval from the first exposure to loss to the age at disease emergence. Data acquired for this study is robust as respects age at disease emergence (assumed equal to age at claim report). However, information regarding first exposure to loss is simply not available. Nevertheless, an assumption that all individuals began working at a specific age, such as 20, combined with data gathered for this study, will allow an assessment of minimum latency periods. For example, one definition of minimum latency might be the time from age 20, the assumed age at which employment (and therefore exposure to loss) began, to the age at which 5% of all claims due to a specific disease are reported. Oliver Wyman provided this data to the CIA. Appendix C provides detailed metrics used for the analysis of latency for all diseases.

Given this discussion, the recommended set of diseases is (as listed previously):

Latent Occupational Diseases
MESOTHELIOMA/ASBESTOSIS/LUNG CANCER
ALL OTHER CANCER
HEARING LOSS
PNEUMOCONIOSIS (EXCLUDING ASBESTOSIS)
OBSTRUCTIVE RESPIRATORY DISEASES (combined with All Other Respiratory)

Non-latent Occupational Diseases (Cumulative Trauma Diseases)
CUMULATIVE TRAUMA CLAIMS COMBINED (excluding Carpal Tunnel Syndrome)
CARPAL TUNNEL SYNDROME

Excluded diseases generally appear to be non-latent diseases in the context of the above discussion. There does not appear to be any question regarding the following:

INFECTION
MENTAL STRESS
REACTION TO A FOREIGN SUBSTANCE
VASCULAR

However, the lag for the remaining diseases listed below tends to be somewhat higher than other non-latent diseases, as does the age at claim report for physical stress. Nevertheless, the age and lag profiles for these diseases are closer to non-latent diseases. Note that metrics for eye-related claims are highly variable due to low data volume.

EYE CONDITION ALL
PHYSICAL STRESS
CUMULATIVE NERVE DISEASE

Other Disease-Related Items

Coverage of Occupational Diseases

Coverage of occupational disease varies between jurisdictions. The data collected for this assignment is primarily from two jurisdictions (provinces) in Canada, and four jurisdictions in the U.S. (three states and one federal jurisdiction). The 2013 Analysis of Workers' Compensation Laws, published annually by the U.S. Chamber of Commerce, provides a detailed description of the coverage of occupational disease claims for all jurisdictions in the U.S. and Canada. Chart IV provides a description of occupational disease coverage. Chart V discusses hearing loss specifically. Copies of the 2013 edition of this publication have been provided with the final version of this report as a courtesy to the CIA. New editions are available shortly after they are published for a nominal cost (US$68) from the U.S. Chamber of Commerce[7].

NWISP/ICD9

Jurisdictions outside of Canada provided the majority of the underlying claims data for this study. Additionally, the Canadian data acquired did not have precise mapping information.

[7] www.uschamber.com/bookstore, or 1-800-638-6582.

Variance of Exposure by Industry

Oliver Wyman defined the following industry groups for the purpose of this report:

AGRICULTURE/FARMING/AQUACULTURE
AIRCRAFT OPERATION, SERVICE, MANUFACTURING, OR REPAIR
ANIMAL CARE, TRAINING, BREEDING, BOARDING
AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR
BUILDING MAINTENANCE AND OPERATIONS
CLERICAL
CONSTRUCTION
CONTRACTING
EDUCATION AND RELIGIOUS INSTITUTIONS
FIREFIGHTER
FOOD MANUFACTURING
FOOD SERVICE
GENERAL SERVICES
GOVERNMENT
HEALTH CARE SERVICES
HOSPITALITY AND ENTERTAINMENT
LANDSCAPING
LIVESTOCK AND POULTRY FARMING
LOGGING AND TREE SERVICE
MANUFACTURING GENERAL
MARINE TERMINAL OPERATION
MOTOR VEHICLE OPERATION OTHER THAN TRUCKING
NATURAL RESOURCE EXTRACTION, REFINING, STORAGE, TRANSPORT
POLICE OFFICERS
RETAIL SERVICES
SOCIAL SERVICES
TELECOMMUNICATION AND BROADCASTING
TRUCKING
UNKNOWN
UTILITY PRODUCTION, DISTRIBUTION, MAINTENANCE
VEHICLE OTHER THAN AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR
VESSEL OPERATION, SERVICE, MANUFACTURING, OR REPAIR
WHOLESALE AND RETAIL GENERAL

Appendix D provides a detailed (but not complete list) of classifications by industry group. Appendix E provides charts detailing claim incidence by disease by industry group for the recommended set of diseases. Note that the measurement of incidence of diseases *within* each industry group is not biased. However, the distribution of incidence of a single disease *by industry group* is likely biased due to over- or under-representation of different industry groups within the source data. This is especially applicable to Vessel Operation due to the use of data from two large U.S. shipbuilding firms.

Cost Ranking

To present a formal cost ranking, the calculated average claim cost for each disease excluded claims with a cost less than 10% of the raw mean, and excluded the cost of the five largest claims. This approach eliminates the impact of a large number of low- or zero-cost claims in some disease categories, and eliminates the potential distortion of extraordinarily large claims. All claim costs represent historical claim cost data[8,9] adjusted from the date of loss to December 31, 2012, using 3% annual trends for expenses and wage replacement benefits, and a 5% annual trend for medical benefits. Combined data[10] from U.S. and Canadian sources, without adjustment for current or historical exchange rates between currencies, underlies the cost ranking analysis. The summary for each disease, and each recommended disease grouping, is on the following page. Cost metrics by disease and disease combinations are in Appendix B (individual disease), Appendix F (combined metrics for recommended diseases combinations), and Appendix H (summary).

The average claim cost results presented on the following page are reasonable in the context of the underlying diseases and relativities. The cost of pneumoconiosis, asbestosis, mesothelioma, obstructive respiratory, hearing loss, and carpal tunnel syndrome claims are consistent with Oliver Wyman's experience examining these claims on behalf of clients in the U.S. Note the similarity of cost between obstructive respiratory disease and claims in the All Other Respiratory Disease category. The observed similarity of cost and other metrics was part of the basis for combining these categories. Additionally, observe that the cumulative trauma claims have costs between $25,000 and $40,000, with the exception of hernia injuries. Based on information provided by claims professionals, hernias are generally easily repaired tears in body tissue. Carpal tunnel syndrome and other cumulative trauma injuries generally require more complex medical treatment for longer time intervals than hernia injuries.

[8] Claim costs include the cost of medical, wage replacement, and any other benefit (such as survivorship benefits and lump sum compensation settlements for injuries) provided for in the jurisdiction in which the employee filed the claim. Claim adjustment expense, defence costs, and any other expenses associated with claims administration are not included.

[9] The cost of a closed claim is the total paid cost of the claim at the time Oliver Wyman acquired the data. The cost of open claims is the total paid cost plus case reserves. Case reserves are best estimates of expected future claim costs established by claim adjustment professionals. Case reserves for workers' compensation claims almost always prove to be too low when compared to the final cost of claims, when closed. This is primarily due to the unpredictability of medical costs associated with individual workers' compensation claims. Actuaries will include a provision for case reserve inadequacy in estimates of unpaid costs. For the purpose of this study, the impact of this issue is not material because the majority of claims in the underlying data are closed.

[10] Oliver Wyman did not attempt to examine differences between claim cost data from U.S. sources and Canadian sources, nor were differences between jurisdictions within each country considered. Such an examination would have required consideration of exchange rates, income replacement benefits by jurisdiction and injury type, and other items unique to each jurisdiction and claim type. Notwithstanding feasibility, it is questionable as to what value, if any, such an exercise would have added to the conclusions of this study. As such, Oliver Wyman made a decision at the start of the analysis of data to simply combine data without consideration of exchange rates and jurisdictional differences. This decision is justified by the results of the cost analysis, which are consistent with Oliver Wyman experience with workers' compensation claim costs at current cost levels.

The higher cost of physical stress claims is reasonable given that almost all of these claims involve heart disease, primarily heart attacks occurring while performing job functions. Medical treatment and long-term disability payments are the primary contributors to the high cost of these claims.

Of the recommended set of diseases, the following are of relatively low frequency with higher average cost. This set includes all diseases categorized as latent, except hearing loss, and excludes all diseases categorized as non-latent:

MESOTHELIOMA/ASBESTOSIS/LUNG CANCER
ALL OTHER CANCER
PNEUMOCONIOSIS (EXCLUDING ASBESTOSIS)
OBSTRUCTIVE/ALL OTHER RESPIRATORY DISEASES

Of the recommended set of diseases, the following are of relatively high frequency with lower average cost. This set includes all diseases categorized as non-latent, as well as hearing loss. Hearing loss is the only disease categorized as latent with high-frequency, low-cost claims:

CUMULATIVE TRAUMA CLAIMS COMBINED (excluding Carpal Tunnel Syndrome)
CARPAL TUNNEL SYNDROME
HEARING LOSS

	INDIVIDUAL DISEASES	RECOMMENDED COMBINATIONS
MESOTHELIOMA	307,663	293,246
ASBESTOSIS	267,089	
LUNG CANCER	294,929	
OBSTRUCTIVE RESPIRATORY	176,181	174,717
ALL OTHER RESPIRATORY	168,024	
ALL OTHER CANCER	287,330	287,330
PNEUMOCONIOSIS EXCEPT ASBESTOSIS	294,103	294,103
HEARING LOSS	14,100	14,100
BURSITIS	34,742	34,092
EPICONDYLITIS	27,305	
TENDONITIS	27,613	
TENOSYNOVITIS	24,209	
OTHER INFLAMMATION	30,381	
SPRAIN / STRAIN / TEAR	39,014	
HERNIA	17,693	
ALL OTHER CUMULATIVE TRAUMA	32,761	
CARPAL TUNNEL SYNDROME	32,158	32,158
EXCLUDED DISEASES		
INFECTION	17,633	17,633
MENTAL STRESS	34,089	34,089
PHYSICAL STRESS	241,072	241,072
NERVE DISEASE	79,758	79,758
EYE CONDITION	3,869	3,869
REACTION TO FOREIGN SUBSTANCE	59,682	59,682
VASCULAR	49,161	49,161

Miscellaneous Items

Health and Safety Improvements

Data was not available to quantify the impact of health and safety improvements on occupational disease frequency. If such data were available, measurements of frequency per employee-year worked for employees exposed to loss, by year of claim report, would be used to test correlation with implementation of health and safety improvements.

The impact of statutory and regulatory changes on disease frequency is an important consideration that illustrates the difference between physical disease and legal disease. Changes to statutes and regulations governing the adjudication of occupational disease claims in a specific jurisdiction will affect the observed frequency of claims. In the U.S., changes to the Federal Black Lung Benefits Act implemented in 2010 materially decreased the legal challenges to successfully securing benefits under the act. The effect was a surge in claim filings and a subsequent surge in benefit awards. Some publications in the U.S. used this data as evidence of a surge in black lung disease, which was not the case as respects the physical disease, but which was the case with the *legal* disease.

Additionally, over time various jurisdictions have enacted statutory and regulatory rules to differentiate the emergence of certain occupational diseases from diseases associated with ordinary life and/or aging. These changes will also affect measurements of occupational disease frequency.

Changes to Exposure Levels

Exposure is the annual number of employee-years worked with exposure to loss that generates occupational disease claims. Data was not available to quantify this item. However, in the U.S. long-term employment data by industry is generally available from the Department of Labor, Bureau of Labor Statistics. Using this data, analysts might identify general trends with respect to both employment responsible for latent occupational disease claims, and employment responsible for cumulative trauma claims.

Changes in Average Age and Other Demographics

Oliver Wyman did not research underlying demographics or changes to those demographics by province. Information regarding the age distribution, as well as gender distribution, of an active employee population can be gleaned from the general population, though it may be questionable as to whether it is appropriate to impute that distribution to specific industries. A material concern would be that high growth or new industries are likely populated by younger individuals, while mature or contracting industries are likely populated by higher-age

individuals. The actual age distribution of a specific employer, or industry, would be useful in forecasting the timing of occupational disease claim reports using the results of this study.

Improvements to Mortality

Improvement to mortality of the general population is a material concern as respects workers' compensation claims. For valuation purposes, this author uses information published by the Social Security Administration of the U.S. to reflect expected improvements to mortality over time. This information is useful for valuing lifetime benefits for claimants without material medical impairments and for general adjustments to other actuarial parameters used for valuing unpaid workers' compensation claim costs. The necessity for this type of valuation will vary with the jurisdiction. For individual claimants or groups of claimants with medical conditions that impact life expectancy, information from individual claim records is used to adjust life expectancy using rated age approaches (approaches where ages are increased to reflect greater-than-typical mortality).

Improvements to Disease Treatment

Improvement to disease treatment is a material issue as respects latent disease claims because of the additional costs inherent with improving treatment. An example is mesothelioma. Ten years ago, survival beyond 12 to 24 months after diagnosis was not expected and claim costs were composed of essentially a survivorship pension and end of life medical care. Since that time, improvements in treatment have extended survival times to five years, or more. However, treatment costs are extraordinarily expensive. This author is currently conducting research to determine the impact of changes in treatment for paraplegic and quadriplegic injuries. To date, information gathered suggests that long-term life expectancies, which are somewhat lower than general population life expectancies, are unchanged. However, the portion of individuals with these severe injuries that survive the first three years after injury has increased materially over the past 30 years. Currently, this author does not make direct adjustments to actuarial parameters for this contingency.

Reported Claims, IBNR, and the AEC

The underlying exposure to loss associated with occupational disease claims is the accumulated exposure to hazardous substances (latent diseases) or repetitive motion (non-latent diseases) that ultimately results in workers' compensation claims. There are three fundamental questions associated with this exposure to loss:

1) What is the expected cost of claims that have occurred, and how is it determined?

2) What is the expected cost of claims that have not yet occurred, and how is it determined?

3) What elements of expected cost should be recorded as a liability valuation? That is, should the liability valuation include only the expected cost of claims that have occurred, or both the expected cost of claims that have occurred and of claims that have not yet occurred?

As respects traumatic claims, the response to these questions is straightforward:

1) For the purpose of a liability valuation, the expected cost of traumatic claims that have occurred is quantified through actuarial analysis of historical loss data and includes provisions for claims that have been reported as well as claims that have not yet been reported, but for which the incidents have occurred (IBNR). Claims due to traumatic injuries are generally close to 100% reported within a year of the date of occurrence. The IBNR component due to traumatic claims is non-zero, but generally small, and is included in the calculated liability.

2) For the purpose of a liability valuation, the expected cost of traumatic claims that have not yet occurred is zero. There is no underlying accumulated exposure to loss associated with traumatic incidents.

3) The full cost of claims that have occurred (both reported claims and IBNR claims) must be recorded as a liability. As noted above, the expected cost of claims that have not yet occurred is zero.

The response for occupational disease claims is significantly more complex.

1) For the purpose of a liability calculation, the expected cost of occupational disease claims that have occurred is quantified through actuarial analysis of historical loss data and includes provisions for claims that have been reported as well as IBNR claims. Using the definitions presented at the beginning of this report, IBNR occupational disease claims are claims where the underlying disease has not yet manifested itself, but for which the last date of exposure to loss has passed. This means that by definition, the only source of IBNR claims are inactive employees, that is, individuals no longer exposed to underlying hazards that generate occupational disease claims. Inactive employees have either retired from the

workforce or changed employment to occupations that no longer expose them to underlying hazards that generate occupational disease claims. Latent occupational disease claims have significant IBNR components, given the relatively high ages at which these diseases manifest themselves and the high report lag associated with these claims. Non-latent occupational disease claims have an IBNR component greater than a typical traumatic claim, but materially lower than a latent disease claim given that these diseases manifest themselves at much younger ages with much lower associated report lag.

2) There is an expected cost associated with the potential for latent occupational disease and cumulative trauma claims due to accumulated exposure to loss during an active employee's working career. If the active employee has not filed a claim, the claim has not occurred and therefore does not exist. The expected cost of potential claims associated with active employees is the Active Employee Component, or AEC. The AEC will grow as exposure continues to accumulate for active employees. If the active employee develops a disease while working, the AEC attributable to that specific employee transforms immediately into a reported claim with an associated cost. If the active employee becomes inactive (that is, either retires from the workforce or changes employment to an occupation that no longer exposes the employee to loss), the AEC transforms immediately into IBNR, with an associated cost.

3) The full cost of occupational disease claims that have occurred (both reported claims and IBNR claims) must be recorded as a liability. This is no different from the treatment of costs due to traumatic claims, with the exception that occupational disease claims have a materially greater IBNR component than traumatic claims. However, unlike traumatic claims, a material AEC cost exists for occupational disease claims. The question is whether an entity should quantify and record the AEC as a liability. In the U.S., the answer to this question depends on the accounting standard underlying the basis for the accrual:

   - **Financial Accounting Standard (FAS) 5**, Contingencies
     Under FAS 5, liability valuations provide for losses that are reasonably estimable and relate to the current or prior period. The term "relate to the current or prior period" is the key element of this standard. Liability valuations should provide for losses associated with events (claims) in the current and past periods. This would exclude the AEC since, by definition, a claim has not occurred (though at least a portion of the exposure to loss that will ultimately generate claims has occurred with each active employee).

   - **FAS 106**, Accounting for Postretirement Benefits Other than Pensions
     Under FAS 106, workers' compensation programs are treated as a post-retirement benefit in a manner similar to retiree health plans. Liability valuations provide for losses associated with claims that have occurred as well as the expected cost due to potential future claims associated with active employees.

Almost all of Oliver Wyman's clients in the U.S. treat liability valuations for workers' compensation claims under FAS 5 and do not provide for the AEC. Notably, this includes the

two ship manufacturing firms that contributed data for this study. Both of these firms have a substantial AEC associated with potential future claims due to the accumulated exposure to hazardous substances and repetitive motion associated with their active employee workforce. Oliver Wyman has had numerous discussions with one of these firms regarding the magnitude of the AEC and whether or not the AEC should be quantified, even if it is not recorded as a liability. Rough estimates by Oliver Wyman for this client demonstrated that the AEC is on the order of 20% to 40% of the entity's total liability for reported and unreported claims (occupational disease and traumatic).[11]

A small number of Oliver Wyman clients, several large coal mining operators, treat traumatic workers' compensation injuries as a FAS 5 balance sheet item, but treat black lung claims filed under the Federal Coal Mine Health and Safety Act as a post-retirement benefit plan. These entities record liabilities for both current claims as well as the expected cost of potential claims associated with the active employee workforce. The reasons for this treatment are not clear, but appear to have evolved during the 1970s after enactment of the United States Federal Coal Mine Health and Safety Act. All of these operators are large and self-insure all of their workers' compensation exposures.

Oliver Wyman is aware of one coal operator that is currently insured (through a large deductible insurance program) that was forced, this year, by its current auditor to establish a liability for the AEC under FAS 106.

Finally, Oliver Wyman is aware of only one other situation in the U.S. where the expected cost of potential workers' compensation claims associated with active employees is considered. This is in the state of Nevada, regarding presumptive benefit statutes. These statutes state that there is a presumption that public safety officers (police, firefighters, corrections officials, sheriffs, emergency medical personnel, etc.) who develop heart disease, lung disease, hepatitis, or various cancers and have worked a minimum number of years developed these diseases due to employment and are therefore entitled to workers' compensation benefits. The presumption is generally non-rebuttable (conclusive), but may be rebuttable depending on the specific disease or whether a specific employee has worked the required number of years defined by statute. In practice, case law supports the presumption as conclusive. The impact is essentially an extraordinarily large unfunded liability for municipalities in Nevada. The concern of the magnitude of this liability as well as questions of how to fund it led Nevada to publish regulations requiring municipalities to estimate the cost of both claims that have occurred

[11] The large size of the AEC is due to high age of the current active workforce (average age in the early 50s) and therefore the large accumulated exposure to loss for the active employee population. Additionally, many of this client's employees (those in the upper half of the age distribution) began their working careers during the late 1960s through to the late 1970s, prior to full implementation of U.S. federal and/or individual state statutes and regulations governing exposure to hazardous substances such as asbestos. Consequently, these employees have a material accumulated exposure to loss expected to generate latent occupational disease claims as these individuals age. Current latent occupational disease claim emergence from this population of employees is as expected, based on the results of this study.

(reported and IBNR) as well as the AEC. However, while municipalities must record the unpaid cost of reported and IBNR claims (as per GAAP), the regulation does *not* require municipalities to record a liability valuation for the AEC. Oliver Wyman is aware of only one municipality that records the AEC as a liability valuation (City of Las Vegas).

Discussions with jurisdictions in other parts of the world (Europe and Australia) indicate that liability valuations for workers' compensation claims generally follow the FAS 5 approach, where the loss exists only if the claim has occurred. That is, jurisdictions in other parts of the world record liabilities for reported claims and IBNR, as defined earlier in this report, but do not record a liability for the AEC.

Oliver Wyman is not an expert in auditing matters. Conversations with clients, auditing firms, and other actuaries as well as independent investigation forms the basis of information presented in this report. Oliver Wyman believes the basic information as to the applicable standards described to be correct. However, Oliver Wyman is not qualified to offer a formal opinion on these matters.

Considerations

Current actuarial standards of practice in Canada require that the AEC be included as part of the liability for future claim costs. There is potential benefit to knowing the specific value of the AEC, as opposed to determining a total value for future claim costs that includes, but does not specifically quantify, the AEC component. As noted earlier, the AEC may be significant. Additionally, the AEC transforms into IBNR upon employee termination. Sudden changes in economic conditions that lead to significant workforce reductions will cause a measurable portion of the AEC (the portion associated with terminated employees) to transform immediately into IBNR, or actual claims.

The Relationship of IBNR to the AEC

This following example illustrates how the AEC accumulates over time and transforms into reported claim cost if an employee files a claim during active employment. In this example, IBNR does not materialize.

Active Coal Miner

Hired	06/30/1980
Claim Filed	06/30/1990

Liability Valuation Measurement Dates from 6/30/1980 through 6/29/1990

IBNR: IBNR associated with an active employee will always be zero.

AEC: The AEC will continuously grow in value through 6/29/1990 due to the accumulation of exposure to coal dust.

Liability Valuation Measurement Dates on or after 6/30/1990

IBNR: IBNR associated with an active employee will always be zero.

AEC: On 6/30/1990 the AEC becomes zero and is replaced with the expected cost of the filed claim.

The following example demonstrates the migration of cost from the AEC, which represents the potential cost of claims due to accumulating exposure to loss in active employees, to IBNR upon termination, to the actual cost associated with a filed claim. If the employee never files a claim, the IBNR will taper down to zero as the employee ages, and equal zero upon death.

Inactive Coal Miner

Hired	06/30/1980
Terminated	06/30/2005
Claim Filed	06/30/2015

Liability Valuation Measurement Dates from 6/30/1980 through 6/29/2005

IBNR: IBNR associated with an active employee is always zero.

AEC: The AEC will continuously grow in value through 6/29/2005 due to the accumulation of exposure to coal dust.

Liability Valuation Measurement Dates from 6/30/2005 through 6/29/2015

IBNR: IBNR associated with this employee will change from zero to an actuarially determined value on 6/30/2005, the date of termination.

AEC: On 6/30/2005, the AEC becomes zero and is replaced with IBNR.

Liability Valuation Measurement Dates on or after 6/30/2015

IBNR: IBNR associated with this employee becomes zero the day this employee files a claim.

AEC: The AEC is zero as this is no longer an active employee.

Date of Last Exposure and the Date of Loss

This report defines date of loss as the last date of exposure to loss. For inactive employees, this is generally the last date worked. For active employees, it is generally the date of claim filing. In most U.S. jurisdictions (and other jurisdictions with competitive markets) the date of loss is necessary to place the financial responsibility for a specific claim. In Canada, where the WCBs are essentially the only markets for workers' compensation insurance, the date of loss is necessary for the purpose of analysis to determine the point in time when the AEC (the cost of potential claims from active employees) transforms into IBNR.

In Canada, the date of loss, as defined in this report, can serve as the basis of allocating the financial impact of the cost of claims to a specific time interval (policy or accident year). Alternatively, the WCBs can distribute, or apportion, the cost of individual claims to the time intervals during which the employees filing the claims have been exposed to loss, that is, across the employees' years of service. For example, if the cost of a cancer claim reported by an employee in 2013 is $100,000, and the employee worked in a chemical conversion plant from 1990 to 1999, then $10,000 would be apportioned to each individual year of service from 1990 through 1999. In many respects, this type of distribution is more equitable than the singular date of loss approach used in most other jurisdictions, as it ties the financial impact of these claims back to the periods of loss exposure that generated the injuries.

Methods of Calculation

The following are descriptions of general approaches used by Oliver Wyman to estimate the cost of reported claims, IBNR, and the AEC. The intent of these general descriptions is to convey concepts. The final approach used by any jurisdiction will depend critically on available data.

Reported Claims

Claim administrators are generally the best estimators of the expected cost of reported claims. In the U.S., Oliver Wyman's experience has been that actuarial input can refine these estimates as respects ensuring appropriate life expectancy tables are used, as well as ensuring that claims with an annual expected medical cost for the life expectancy of the claimant have cost estimates that consider medical inflation and the potential for future significant medical procedures.

IBNR Using Aggregate Claim Methods

Oliver Wyman has developed models that forecast the reporting pattern of IBNR claims, as defined in this report, as of a specific liability valuation date. The reporting pattern is based on actual claims data, and generates the expected number of IBNR claims by report year. The IBNR liability is the expected number of claims to be reported by year, multiplied by the expected

cost of claims by year of emergence. This method requires detailed claim data, but *does not* require terminated employee data. Oliver Wyman uses these methods to estimate IBNR associated with coal worker pneumoconiosis for coal operator clients, as well as presumptive benefit claims for clients in the state of Nevada. The general approach is commonly referred to as a claim count-severity method.

AEC

All approaches reviewed by Oliver Wyman as well as approaches used by Oliver Wyman rely on details of the active employee population. Key elements include date of birth, gender, and date of hire. The process is straightforward and similar to approaches used to determine pension obligations. Essentially, each individual life is incrementally moved forward one year at a time. The life is decremented by mortality, the likelihood of termination, the likelihood of filing a claim, etc. At each age, the likelihood of a claim is multiplied by the expected cost of a claim if filed at that age, etc. The final estimated liability for a specific life is prorated to reflect the portion of the expected work life earned. For coal worker pneumoconiosis, models consider the likelihood of an employee leaving the workforce at every age, with a general assumption that at some point between age 65 and age 70, all workers will have left the workforce. For presumptive benefit calculations, actual retirement age data is used to determine the working lifetime. Oliver Wyman has not come across any approaches used to calculate the AEC that use a period to prorate other than the ratio of expected earned work life to total work life.

As respects the WCBs, this detailed active employee data is likely not available. However, assumptions regarding employment levels, age distribution, and working life could be made, assuming that general industrial employment data is available in Canada at the provincial level. This type of data is generally available in the U.S. from the Department of Labor, Bureau of Labor Statistics.

Presentation and Discussion of Results

Diseases Identified in the Study

The study identified the following diseases as potentially occupational diseases, as defined for the purpose of this report.

CANCER-RELATED CLAIMS
- MESOTHELIOMA
- LUNG CANCER
- ALL OTHER CANCER

RESPIRATORY-RELATED CLAIMS
- OBSTRUCTIVE RESPIRATORY DISEASE
- PNEUMOCONIOSIS (EXCLUDING ASBESTOSIS)
- ASBESTOSIS
- ALL OTHER RESPIRATORY

HEARING LOSS
INFECTION
EYE CONDITION ALL
MENTAL STRESS
PHYSICAL STRESS
REACTION TO A FOREIGN SUBSTANCE
VASCULAR
CUMULATIVE TRAUMA CLAIMS
- BURSITIS
- EPICONDYLITIS
- TENDONITIS
- TENOSYNOVITIS
- OTHER INFLAMMATION
- SPRAIN/STRAIN/TEAR
- HERNIA
- OTHER CUMULATIVE TRAUMA
- CARPAL TUNNEL SYNDROME
- CUMULATIVE NERVE DISEASE

Understanding the Metrics

Disease selection must consider the nature of the underlying causative factor (cumulative exposure to loss or a specific incident), relative occurrence or frequency, as well as average cost per claim, or severity, on both an overall basis as well as for the selected industry groups. Clearly, if the primary causative factor for a specific disease is a traumatic incident as opposed to cumulative exposure to loss, it is not a viable candidate. Diseases of relatively low frequency

and cost overall as well as for all the individual industry groups are likely not viable candidates. However, there are specific diseases with low relative occurrence and cost, but for which claims are concentrated in a specific industry group. In this latter situation, including this disease for the specific industry group in question is a reasonable consideration.

The basic analysis of each disease provides calculations/tabulations of claim count, average cost, average age at report, and average lag for the following groups of claims within each disease category:

Metric	*Claims Included*
Raw Mean:	All Claims
Cut Off:	Claims with cost equal to or less than 10% of the raw mean
Adjusted Mean:	All claims excluding cut-off claims
Adj. X 5 Largest:	All claims excluding cut-off claims as well as the five largest claims
5 Largest:	The five largest claims
Largest:	The largest claim.

These metrics provide information for all claims combined, information excluding the impact of low-cost claims, and information excluding the potential distortion of extraordinarily high cost claims. Low-cost claims presented an issue in the analysis, most notably because of a very high number of zero- or minimal-cost claims, even for extraordinarily complex diseases such as cancer. One reason for zero- or minimal-cost claims is incomplete data, according to one data source. Nevertheless, low-cost claims data was included because it contained viable information on lag and age at claim report. The approach of examining metrics including and excluding claims systemically provides unedited information as well as insight into the impact of low-cost claims, without introducing a bias into the analysis by simply excluding groups of data because the cost (or any other metric) does not appear to be sensible.

Additionally, there is an analysis of lag for each industry group. The analysis calculates the average age and average lag for all claims, for claims with lag less than or equal to two years, and for claims with lag greater than two years. The distribution of claims by lag is included as well. This basic analysis provides key insight into the underlying latency as respects time between last exposure to loss and the date the disease emerges. The distribution by gender is also included.

Graphical presentations show distribution of claim reports by age and the distribution of claim costs as a percentage of the raw mean. Distribution of costs as a percentage of the raw mean provides a method of easily comparing distributions for diseases with materially different average claim costs. It also readily identifies diseases potentially distorted by low-cost claims.

The selected base metrics and presentation for each individual disease are included in Appendix B. Results using carpal tunnel syndrome as an example follow:

CARPAL TUNNEL SYNDROME

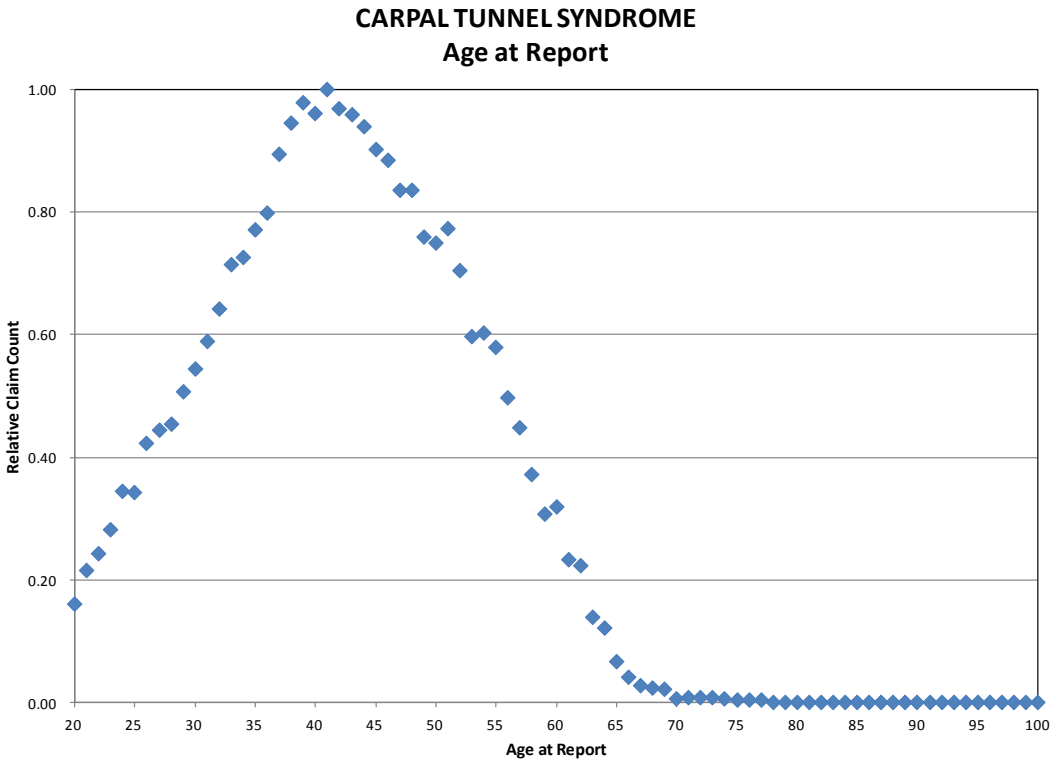
	COUNT	AVERAGE COST	AVERAGE AGE	AVERAGE LAG (DAYS)
RAW MEAN	22,092	29,951	42	122
CUT OFF	1,912	2,995		
ADJ MEAN	20,180	32,555	42	124
ADJ X 5 LARGEST	20,175	32,158	42	124
5 LARGEST	5	1,637,173	46	55
LARGEST	1	2,394,022	39	3

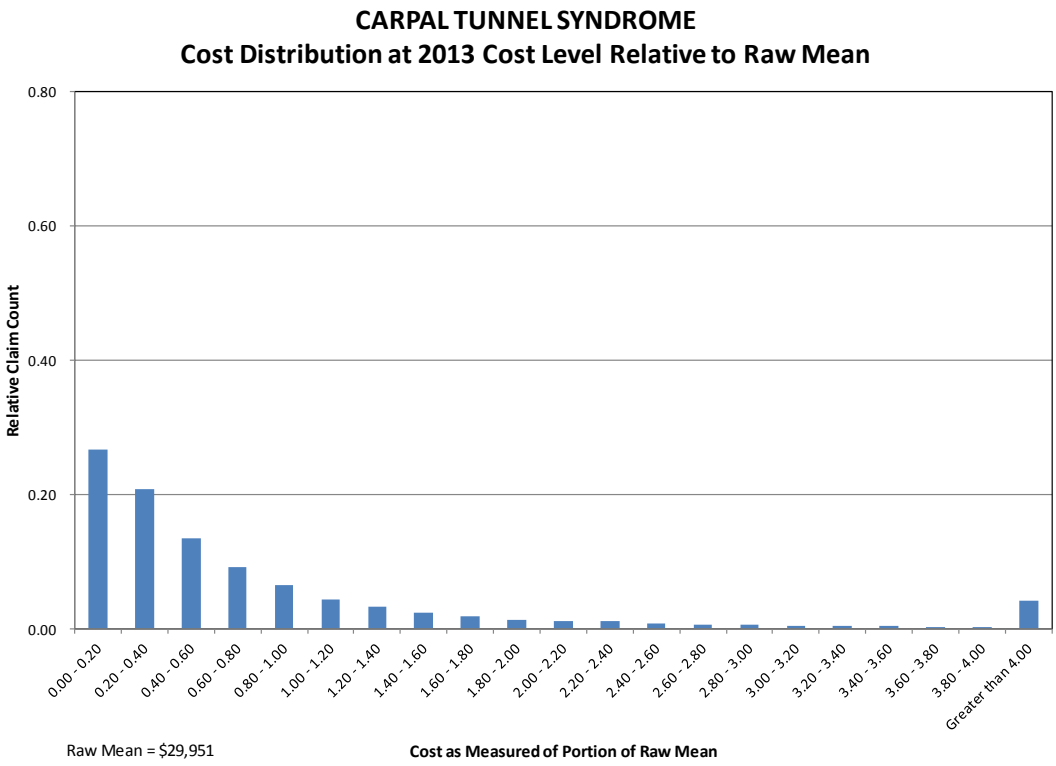
	ALL	LAG <= 2 Yrs	LAG > 2 Yrs
AVERAGE AGE	42	42	47
AVERAGE LAG (YEARS)	0.3	0.2	5.0
COUNT	21,705	21,008	697
COUNT PERCENTAGE		97%	3%

	M	F	U
GENDER	11,056	10,869	167
GENDER PERCENTAGE	50%	49%	1%

CARPAL TUNNEL SYNDROME

	COUNT	PERCENTAGE
AGRICULTURE / FARMING / AQUACULTURE	146	1%
AIRCRAFT OPERATION, SERVICE, MANUFACTURING, OR REPAIR	105	0%
ANIMAL CARE, TRAINING, BREEDING, BOARDING	39	0%
AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	1,096	5%
BUILDING MAINTAINENCE AND OPERATIONS	440	2%
CLERICAL	1,424	6%
CONSTRUCTION	736	3%
CONTRACTING	1,648	7%
EDUCATION AND RELIGIOUS INSTITUTIONS	622	3%
FIREFIGHTER	17	0%
FOOD MANUFACTURING	1,473	7%
FOOD SERVICE	1,031	5%
GENERAL SERVICES	165	1%
GOVERNMENT	1,764	8%
HEALTH CARE SERVICES	1,360	6%
HOSPITALITY AND ENTERTAINMENT	641	3%
LANDSCAPING	98	0%
LIVESTOCK AND POULTRY FARMING	111	1%
LOGGING AND TREE SERVICE	285	1%
MANUFACTURING GENERAL	3,667	17%
MARINE TERMINAL OPERATION	89	0%
MOTOR VEHICLE OPERATION OTHER THAN TRUCKING	162	1%
NATURAL RESOURCE EXTRACTION, REFINING, STORAGE, TRANSPORT	458	2%
POLICE OFFICERS	29	0%
RETAIL SERVICES	406	2%
SOCIAL SERVICES	284	1%
TELECOMMUNICATION AND BROADCASTING	111	1%
TRUCKING	360	2%
UNKNOWN	215	1%
UTILITY PRODUCTION, DISTRIBUTION, MAINTAINENCE	103	0%
VEHICLE OTHER THAN AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	48	0%
VESSEL OPERATION, SERVICE, MANUFACTURING, OR REPAIR	1,474	7%
WHOLESALE AND RETAIL GENERAL	1,485	7%


CARPAL TUNNEL SYNDROME
Age at Report
Relative Claim Count
1.00
0.80
0.60
0.40
0.20
0.00
20
25
30
35
40
45
50
55
60
65
70
75
80
85
90
95
100
Age at Report


CARPAL TUNNEL SYNDROME
Cost Distribution at 2013 Cost Level Relative to Raw Mean
Relative Claim Count
0.80
0.60
0.40
0.20
0.00
0.00 - 0.20
0.20 - 0.40
0.40 - 0.60
0.60 - 0.80
0.80 - 1.00
1.00 - 1.20
1.20 - 1.40
1.40 - 1.60
1.60 - 1.80
1.80 - 2.00
2.00 - 2.20
2.20 - 2.40
2.40 - 2.60
2.60 - 2.80
2.80 - 3.00
3.00 - 3.20
3.20 - 3.40
3.40 - 3.60
3.60 - 3.80
3.80 - 4.00
Greater than 4.00
Raw Mean = $29,951
Cost as Measured of Portion of Raw Mean

Appendix C provides a series of matrices showing key metrics used to define latency, by disease. The grouping of diseases by matrix anticipates recommendations for combining disease types presented later in this report. The key metric information provided is as follows:

Age at the 5% Level:
Ninety-five percent of claims are reported at ages greater than the 5% level. Age at claim report is assumed to represent age at disease emergence.

Mean Age:
Average age at report, all claim.

Age at the 95% Level:
Five percent of claims are reported at ages greater than the 95% level.

Average Lag, All Claims:
Lag is defined as the time between date of last exposure to loss (generally the last date worked) and the date of claim report.

Average Lag, Excluding Lowest 10%:
Average lag for 90% of claims. Measurement excludes 10% of total claims with the lowest lag.

Average Lag, Excluding Lowest 90%:
Average lag for 10% of claims. Measurement excludes 90% of total claims with the lowest lag.

Discussion

The metrics and matrices in the various appendices allow for an analysis of underlying disease data that considers the occurrence or frequency of claims, cost, and underlying latency (as measured by lag). The analysis provides for an examination of all claims combined as well as experience individually by industry grouping. In addition to base quantitative data, there must be consideration of overrepresentation of claims data within the industry grouping labelled Vessel Operation, Service, Manufacturing, or Repair (Vessel Operation). This is a natural consequence of the source data—two large U.S. ship manufacturers contributed 10 to 30 years of claims data. This data proved to be critical in measuring latency and emergence of asbestosis (and other claims) that have measurable occurrence in other industry groupings. On the other hand, 70% of nerve disease claims are in this industry group. Finally, there is a qualitative context underlying the quantitative aspects of the data. The source of the qualitative context was Oliver Wyman's review of comments and notations for tens of thousands of claims. The following are Oliver Wyman's recommendations.

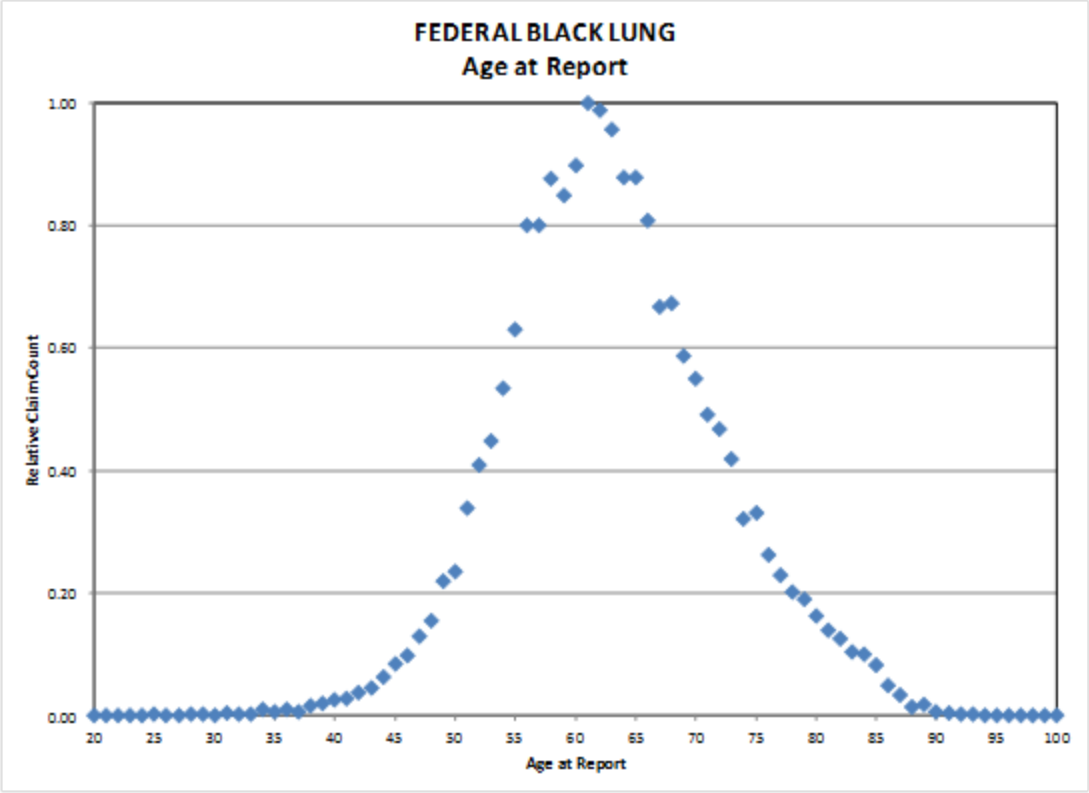
Included Diseases

Oliver Wyman recommends that the following diseases be included in the group of occupational diseases for which there is a significant unreported loss component due to cumulative exposure to some underlying hazard. These diseases are termed the "recommended set of diseases".

Mesothelioma, Asbestosis, and Lung Cancer:
Underlying key metrics for these three diseases are extraordinarily similar, with the exception of the portion of claims with lag greater than two years. As respects this latter difference, it is not clear as to why this is the case. Notwithstanding concerns regarding quality of data (that is, accuracy of date of report and date of loss), age at retirement is a direct determinant of measured lag. Put simply, if all workers in a contracting operation remain employed and retire between age 65 and 70, unless they develop a lung disease earlier, the measured lag for this group of employees will be materially lower than the lag for an identical operation, but where all workers generally retire between age 55 and 60. This type of information was simply not available for this analysis. The approach taken for the purpose of this assignment was to combine the data of these three diseases and assume that the combined data generates an accurate measurement of underlying claim reporting patterns for all three diseases combined.

All Other Cancer:
This disease potentially could have been included in a common class with Mesothelioma, Asbestosis, and Lung Cancer. However, the latter three diseases involve the lungs or body tissues associated with the lungs, and have sufficiently similar metrics to warrant combination. All Other Cancer shows somewhat different metrics and affects other organs or body systems.

All Other Pneumoconiosis
Age at emergence as well as underlying latency is unique and warrants separate treatment. Metrics generated by data in this category are not consistent with metrics generated by coal worker pneumoconiosis (CWP or black lung) data from the U.S. The primary issue is the distribution of age at emergence, which includes claims from relatively young ages. Examination of underlying data shows that this issue is primarily due to 40 claims due to byssinosis (a lung disease caused by inhalation of cotton dust, also known as brown lung disease). The average age at emergence from this group of claims is 41, while the average age at emergence for all other claims is 57. The latter is consistent with expectations based on black lung data. Given this observation, the recommendation is to exclude byssinosis from this category and base emergence metrics on U.S. black lung data. Relevant metrics based on U.S. data are displayed on the following graph:



Obstructive Respiratory Disease and All Other Respiratory Disease

The initial recommendation is to include obstructive respiratory disease, combined with all other respiratory disease, in the set of latent occupational diseases for which a liability could be determined. However, as noted earlier, there are concerns regarding underlying metrics and the impact of U.S. shipbuilding data. Specifically, the following is noted:

- Both groups exhibit age distributions with high dispersion.
- Both groups exhibit a materially lower age at emergence for claims with low lag when compared to age at emergence for claims with high lag.

These observations indicate that these disease categories are composed of two fundamentally different types of claims. The following metrics, individually by disease group as well as for Vessel Operation and for all other industry groups combined, were calculated to better understand underlying claims data:

OBSTRUCTIVE RESPIRATORY DISEASE

		COUNT	AGE	LAG	**COST**
All Other Industry Groups	Lag > 2 Years	39	56	5.5	338,627
	Lag <= 2 Years	965	43	0.1	55,530
Vessal Operation….	Lag > 2 Years	9	48	6.9	463,710
	Lag <= 2 Years	78	42	0.4	220,333

ALL OTHER RESPIRATORY DISEASE

		COUNT	AGE	LAG	**COST**
All Other Industry Groups	Lag > 2 Years	115	57	6.6	272,148
	Lag <= 2 Years	2,578	41	0.2	69,964
Vessal Operation….	Lag > 2 Years	254	60	11.5	210,912
	Lag <= 2 Years	469	50	0.4	165,445

The metrics above indicate two fundamentally different types of claims. The first type is relatively low-cost claims with low lag that emerge at relatively low ages. The second type is relatively high-cost claims with higher lag that emerge at relatively high ages. Discussions with data sources indicate that lower-cost claims emerging at lower ages with minimal lag may be due to respiratory conditions generated by short-term acute exposure to hazardous substances. This is to be compared to higher-cost claims emerging at higher ages with significant lag, which are likely due to longer term exposure to hazardous substances resulting in respiratory diseases that emerge later in life. Additionally, metrics specific to Vessel Operation have similar relative behavior between claims with short and long lag, though claims with short lag for Vessel Operation are more expensive than for other industry groups. This may be an artifact of the U.S. shipbuilding data, which comprised the bulk of the Vessel Operation industry group.

Given the above discussion, the recommendation is to include obstructive and other respiratory claims due to longer-term exposure to hazardous substances that emerge at later ages with material latency. These claims are characterized by the metrics and distribution on the following pages. This data underlying this information is compiled from both disease categories and all industry groups, but for claims with measured lag greater than two years. Metrics and distribution for claims with measured lag less than two years follow and are included for the sake of completeness.

OBSTRUCTIVE RESPIRATORY DISEASES - LAG> 2 YEARS

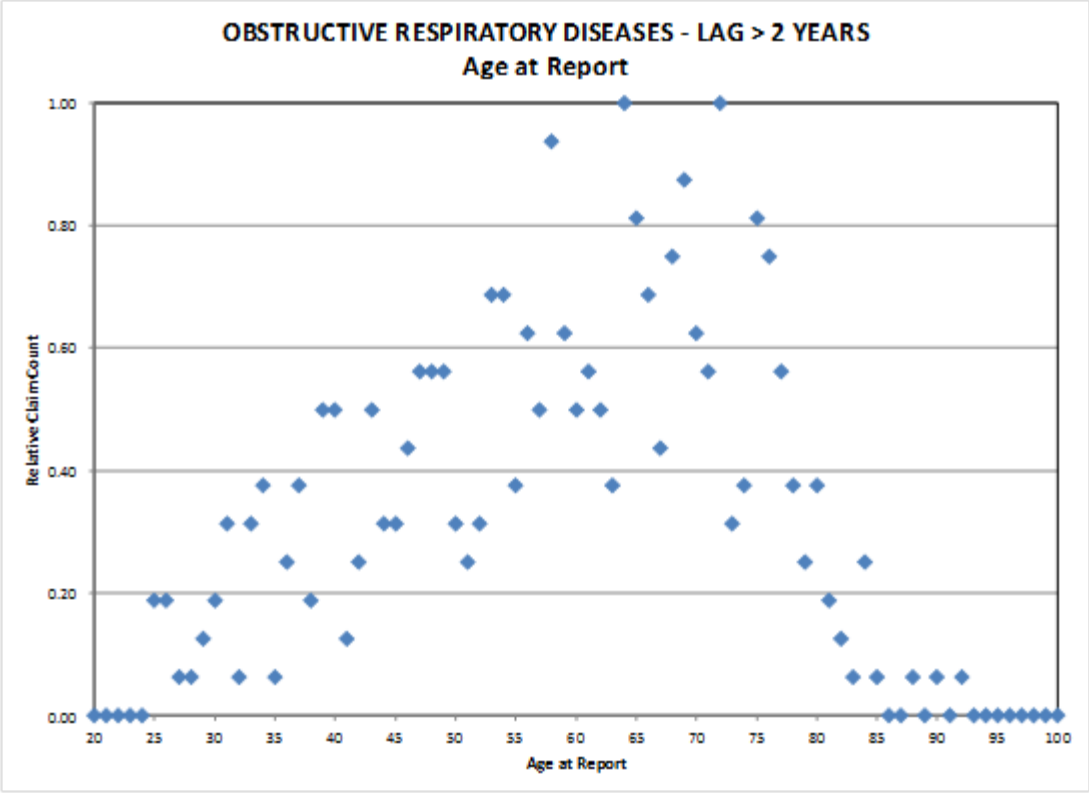
	COUNT	AVERAGE COST	AVERAGE AGE	AVERAGE LAG (DAYS)
RAW MEAN	417	195,938	59	3,462
CUT OFF	208	19,594		
ADJ MEAN	209	386,179	61	3,150
ADJ X 5 LARGEST	204	310,397		
5 LARGEST	5	3,478,079		
LARGEST	1	7,187,845	47	5,852

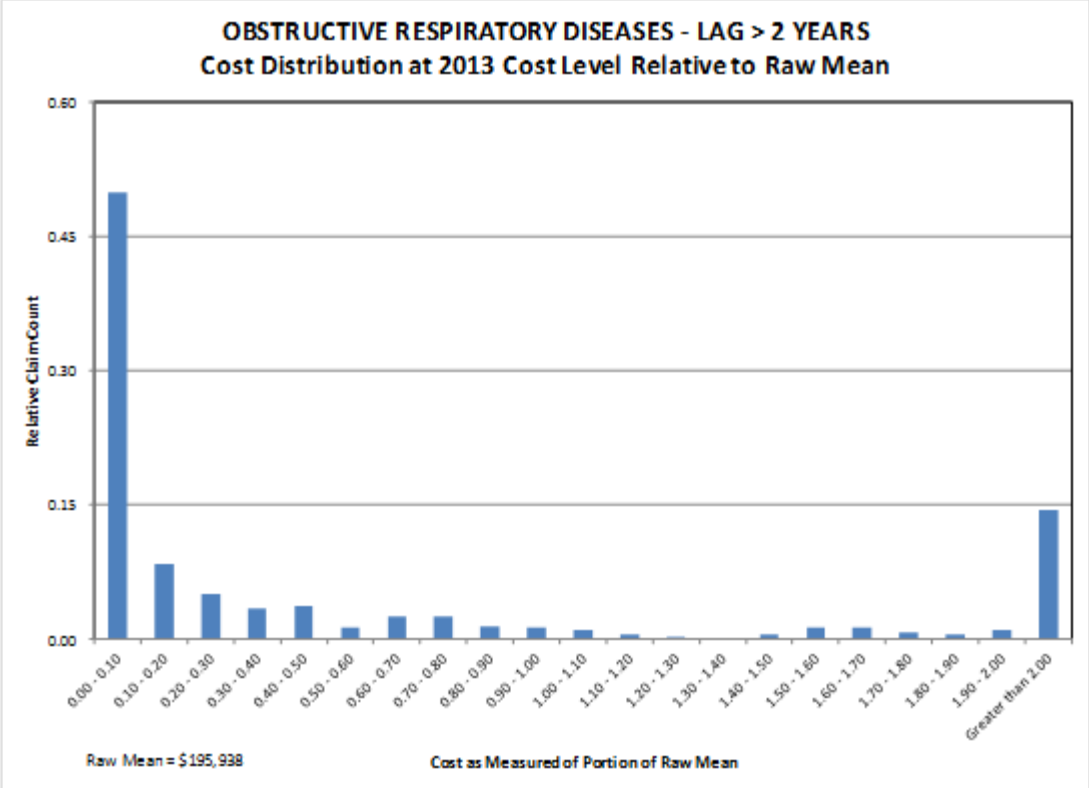
	ALL	LAG <= 2 Yrs	LAG > 2 Yrs
AVERAGE AGE	59	N/A	59
AVERAGE LAG (YEARS)	9.5	N/A	9.5
COUNT	417	N/A	417
COUNT PERCENTAGE		0%	100%

	M	F	U
GENDER	394	23	-
GENDER PERCENTAGE	94%	6%	0%

OBSTRUCTIVE RESPIRATORY DISEASES - LAG> 2 YEARS

	COUNT	PERCENTAGE
AGRICULTURE / FARMING / AQUACULTURE	0	0%
AIRCRAFT OPERATION, SERVICE, MANUFACTURING, OR REPAIR	0	0%
ANIMAL CARE, TRAINING, BREEDING, BOARDING	0	0%
AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	9	2%
BUILDING MAINTAINENCE AND OPERATIONS	5	1%
CLERICAL	1	0%
CONSTRUCTION	11	3%
CONTRACTING	13	3%
EDUCATION AND RELIGIOUS INSTITUTIONS	5	1%
FIREFIGHTER	1	0%
FOOD MANUFACTURING	6	1%
FOOD SERVICE	0	0%
GENERAL SERVICES	6	1%
GOVERNMENT	18	4%
HEALTH CARE SERVICES	8	2%
HOSPITALITY AND ENTERTAINMENT	3	1%
LANDSCAPING	0	0%
LIVESTOCK AND POULTRY FARMING	1	0%
LOGGING AND TREE SERVICE	0	0%
MANUFACTURING GENERAL	40	10%
MARINE TERMINAL OPERATION	1	0%
MOTOR VEHICLE OPERATION OTHER THAN TRUCKING	0	0%
NATURAL RESOURCE EXTRACTION, REFINING, STORAGE, TRANSPORT	8	2%
POLICE OFFICERS	2	0%
RETAIL SERVICES	2	0%
SOCIAL SERVICES	0	0%
TELECOMMUNICATION AND BROADCASTING	0	0%
TRUCKING	1	0%
UNKNOWN	8	2%
UTILITY PRODUCTION, DISTRIBUTION, MAINTAINENCE	0	0%
VEHICLE OTHER THAN AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	0	0%
VESSEL OPERATION, SERVICE, MANUFACTURING, OR REPAIR	263	63%
WHOLESALE AND RETAIL GENERAL	5	1%


OBSTRUCTIVE RESPIRATORY DISEASES - LAG > 2 YEARS
Age at Report
Relative Claim Count
1.00
0.80
0.60
0.40
0.20
0.00
20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100
Age at Report


OBSTRUCTIVE RESPIRATORY DISEASES - LAG > 2 YEARS
Cost Distribution at 2013 Cost Level Relative to Raw Mean
Relative Claim Count
0.60
0.45
0.30
0.15
0.00
0.00 - 0.10
0.10 - 0.20
0.20 - 0.30
0.30 - 0.40
0.40 - 0.50
0.50 - 0.60
0.60 - 0.70
0.70 - 0.80
0.80 - 0.90
0.90 - 1.00
1.00 - 1.10
1.10 - 1.20
1.20 - 1.30
1.30 - 1.40
1.40 - 1.50
1.50 - 1.60
1.60 - 1.70
1.70 - 1.80
1.80 - 1.90
1.90 - 2.00
Greater than 2.00
Raw Mean = $195,938
Cost as Measured of Portion of Raw Mean

OBSTRUCTIVE RESPIRATORY DISEASES - LAG <= 2 YEARS

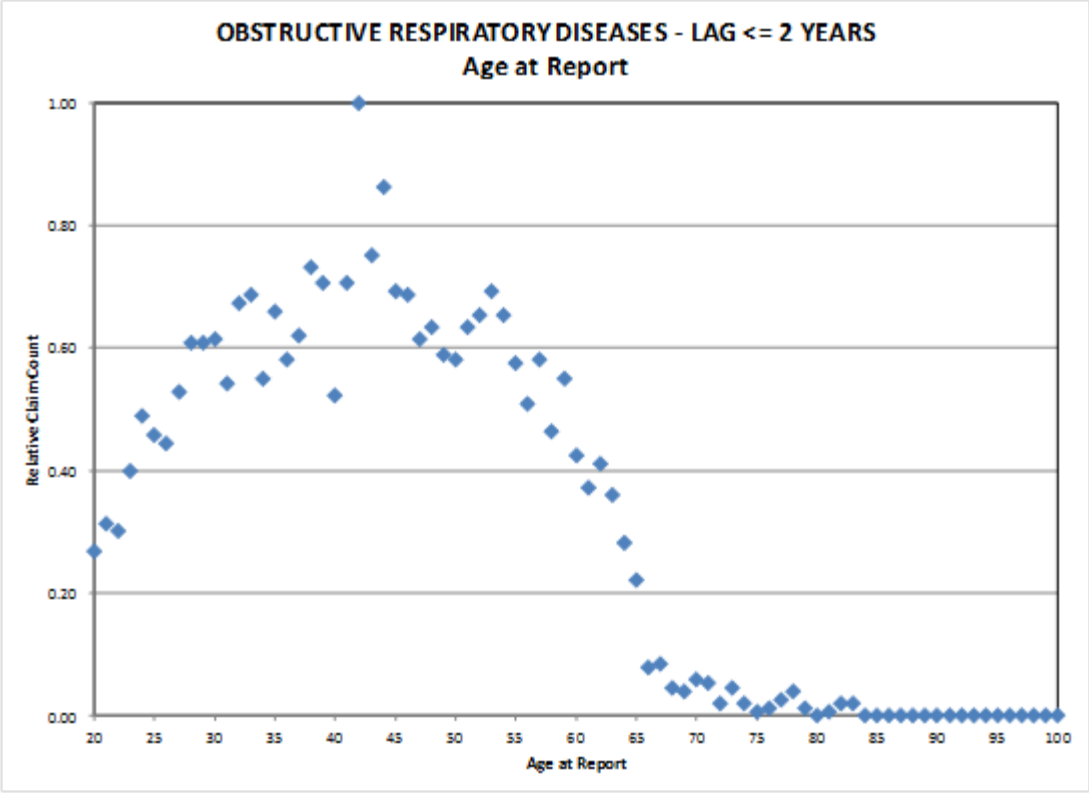
	COUNT	AVERAGE COST	AVERAGE AGE	AVERAGE LAG (DAYS)
RAW MEAN	4,090	74,901	43	65
CUT OFF	2,257	7,490		
ADJ MEAN	1,833	163,859	45	88
ADJ X 5 LARGEST	1,828	153,348		
5 LARGEST	5	4,006,593		
LARGEST	1	6,686,422	29	729

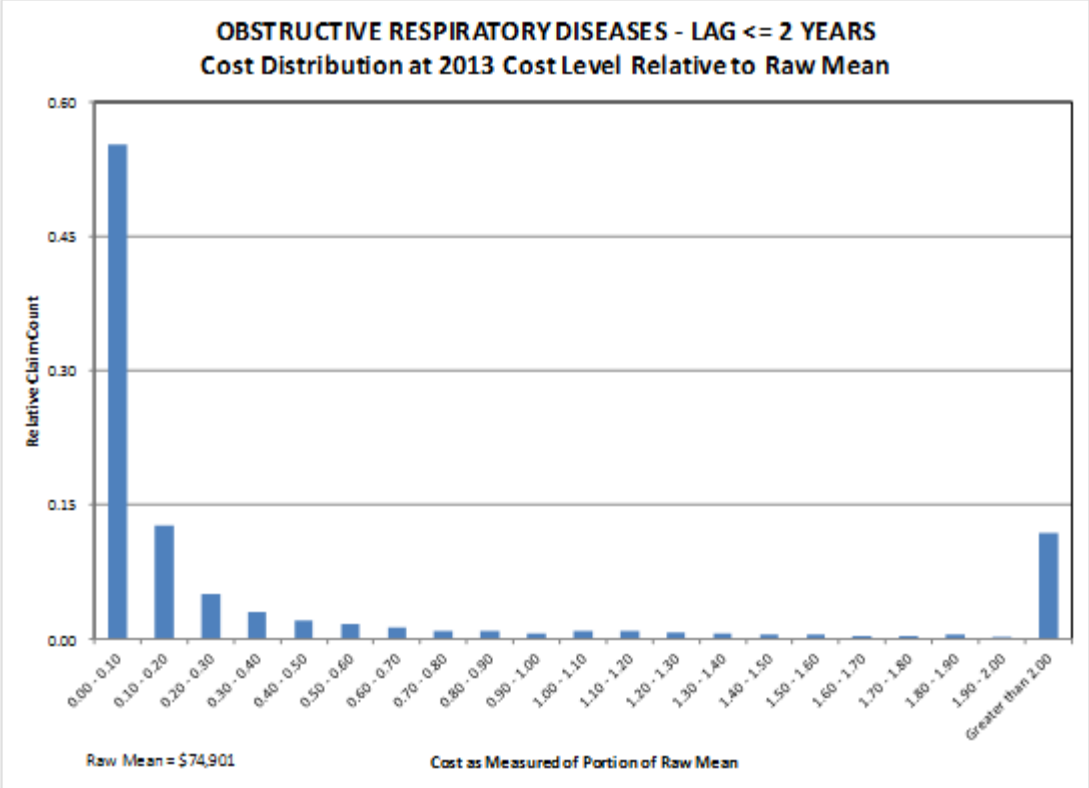
	ALL	LAG <= 2 Yrs	LAG > 2 Yrs
AVERAGE AGE	43	43	N/A
AVERAGE LAG (YEARS)	0.2	0.2	N/A
COUNT	4,089	4,089	N/A
COUNT PERCENTAGE		100%	0%

	M	F	U
GENDER	2,901	1,175	14
GENDER PERCENTAGE	71%	29%	0%

OBSTRUCTIVE RESPIRATORY DISEASES - LAG <= 2 YEARS

	COUNT	PERCENTAGE
AGRICULTURE / FARMING / AQUACULTURE	14	0%
AIRCRAFT OPERATION, SERVICE, MANUFACTURING, OR REPAIR	41	1%
ANIMAL CARE, TRAINING, BREEDING, BOARDING	2	0%
AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	231	6%
BUILDING MAINTAINENCE AND OPERATIONS	102	2%
CLERICAL	89	2%
CONSTRUCTION	148	4%
CONTRACTING	262	6%
EDUCATION AND RELIGIOUS INSTITUTIONS	173	4%
FIREFIGHTER	10	0%
FOOD MANUFACTURING	124	3%
FOOD SERVICE	48	1%
GENERAL SERVICES	68	2%
GOVERNMENT	321	8%
HEALTH CARE SERVICES	325	8%
HOSPITALITY AND ENTERTAINMENT	83	2%
LANDSCAPING	4	0%
LIVESTOCK AND POULTRY FARMING	10	0%
LOGGING AND TREE SERVICE	25	1%
MANUFACTURING GENERAL	717	18%
MARINE TERMINAL OPERATION	17	0%
MOTOR VEHICLE OPERATION OTHER THAN TRUCKING	22	1%
NATURAL RESOURCE EXTRACTION, REFINING, STORAGE, TRANSPORT	208	5%
POLICE OFFICERS	13	0%
RETAIL SERVICES	44	1%
SOCIAL SERVICES	49	1%
TELECOMMUNICATION AND BROADCASTING	8	0%
TRUCKING	99	2%
UNKNOWN	103	3%
UTILITY PRODUCTION, DISTRIBUTION, MAINTAINENCE	8	0%
VEHICLE OTHER THAN AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	9	0%
VESSEL OPERATION, SERVICE, MANUFACTURING, OR REPAIR	547	13%
WHOLESALE AND RETAIL GENERAL	166	4%


OBSTRUCTIVE RESPIRATORY DISEASES - LAG <= 2 YEARS
Age at Report
Relative Claim Count
1.00
0.80
0.60
0.40
0.20
0.00
20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100
Age at Report


OBSTRUCTIVE RESPIRATORY DISEASES - LAG <= 2 YEARS
Cost Distribution at 2013 Cost Level Relative to Raw Mean
Relative Claim Count
0.60
0.45
0.30
0.15
0.00
0.00 - 0.10
0.10 - 0.20
0.20 - 0.30
0.30 - 0.40
0.40 - 0.50
0.50 - 0.60
0.60 - 0.70
0.70 - 0.80
0.80 - 0.90
0.90 - 1.00
1.00 - 1.10
1.10 - 1.20
1.20 - 1.30
1.30 - 1.40
1.40 - 1.50
1.50 - 1.60
1.60 - 1.70
1.70 - 1.80
1.80 - 1.90
1.90 - 2.00
Greater than 2.00
Raw Mean = $74,901
Cost as Measured of Portion of Raw Mean

Hearing Loss

Eight percent of hearing loss claims are reported more than two years after the date of loss. While this metric is materially greater than the comparable metric for cumulative trauma, it is a great deal lower than the comparable metric for respiratory diseases, most notably cancer and asbestos. The following are key considerations underlying this recommendation:

- The overall frequency of hearing loss claims is extraordinarily high—representing about one-third of collected data;
- The incidence of hearing loss claims is broad and across all industry groupings; and
- The measured lag for claims with lag greater than two years is 8.6 years, which is materially greater than comparable metrics for cumulative trauma claims, similar to the metric for obstructive respiratory disease, though somewhat lower than the comparable metrics for cancer and asbestos-related respiratory diseases.

Calculations of unpaid costs for hearing loss claims must reflect underlying workers' compensation law within the specific jurisdiction.

Cumulative Trauma and Carpal Tunnel Syndrome

The recommendation is that with the exception of Carpal Tunnel Syndrome, all diseases within the cumulative trauma category be combined into a single category labelled Cumulative Trauma/Repetitive Motion. Carpal Tunnel Syndrome is included in this recommendation, but as an individual category. The following is the basis for this recommendation:

- All metrics as respects age, lag, and cost for all diseases in the cumulative trauma category are extraordinarily close, if not identical.
- Claim cost distributions for all diseases in the cumulative trauma category are extraordinarily close, if not identical.
- Metrics and claim cost distributions for Carpal Tunnel Syndrome are similar to other cumulative trauma diseases. However, Carpal Tunnel Syndrome is a unique condition that represents approximately 10% of the overall database.

Excluded Diseases

The decision as to what diseases should or should not be included in the recommended set of diseases lies with the individual jurisdictions. Oliver Wyman recommends that the following diseases be excluded, based on the review of underlying claims data. There is a brief discussion of the underlying reasoning for each disease.

Eye Conditions: There are too few claims to warrant consideration. Additionally, this disease does not contribute materially to overall measured cost, nor do claims exhibit material lag.

Infection: There are too few claims to warrant consideration. Additionally, this disease does not contribute materially to overall cost. There is an implied latency because the metrics show that for claims with lag greater than two years, the average lag is over five years. This measurement is due to only four data elements. A large number of these claims were excluded due to low

cost. Examination of individual claims data shows that many of these claims are due to singular incidents exposing the employee to bodily fluids or other infectious agents.

Vascular: There are too few claims to warrant consideration. Additionally, this disease does not contribute materially to overall cost. Finally, there is no implied latency.

Reaction to a Foreign Substance: There is a non-trivial claim volume in this category (1,183), with a measurable average cost of approximately $60,000, excluding cut-off claims and the five largest claims. Additionally, there is an implied lag of approximately eight years for claims with lag greater than two years. Nevertheless, Oliver Wyman does not recommend including this disease in the recommended set of diseases for which a liability should be determined. The following are considerations:

- Slightly less than half the claims have recorded costs below the cut-off, or less than 10% of the raw mean. The implication is that this is a relatively low claim cost category.

- Respiratory and other claims stemming from exposure to foreign substances were mapped into other disease categories. In this sense, as discussed earlier, this is a residual disease category. One-third of the claims in this category have no information regarding underlying disease, and list body system or an internal organ as part of body affected. It is likely that had additional details been available on individual claims, a measurable portion of these claims would have mapped elsewhere.

Physical Stress: Oliver Wyman recommends excluding this disease category. The following are considerations:
- Approximately 66% of the claims have costs below 10% of the mean. The remaining claims are extraordinarily expensive.
- There is little or no lag associated with these claims.
- The disease type is overrepresented in the Vessel Operation industry group.
- The claims are generally heart disease related.

Given there is little or no lag associated with these claims and the claims are almost exclusively heart disease related, these claims are likely more a manifestation of general health-related disease rather than latent occupational disease. The large number of claims with low cost potentially is an indicator of denial of benefits, though this is speculation. Additionally, overrepresentation from the Vessel Operation industry group exaggerates the cost and frequency of these claims.

Mental Stress: Oliver Wyman recommends excluding this disease category. The following are considerations:
- Unlike cumulative trauma, there is a question as to whether these claims are triggered by a near-term incident or change of circumstance, or long-term exposure to a loss generating hazard.

- 90% of the claims data are from one non-Canadian contributor. It is possible that these claims are a manifestation of the specific statutes within the jurisdictions that the contributor operates.
- There are no claims in this category from Canadian contributors.
- Some Canadian provinces specifically exclude mental stress unless the condition results from an acute reaction to a traumatic event.

Nerve Disease: There are approximately 1,400 claims in this category, of which over 900 are in the Vessel Operation industry group. The large number of claims in this industry group is an artifact of the underlying data sources, of which two were U.S. shipbuilding firms. Most injuries associated with this group are to the hand, wrist, or fingers, as noted below:

Distribution by Body Part	
1,015	Fingers
143	Hand
84	Wrist
149	Other

The vast majority of the injuries are associated with Raynaud's syndrome, also known as vibratory white finger. This is a disease where long-term use of vibratory tools damages nerves in the hand area. The nerve damage impedes circulation, resulting in this disease. In this category, 1,023 of the 1,391 claims are listed as Raynaud's syndrome. There are an additional 103 claims listed with numbness as a symptom associated with fingers or hands. There is high likelihood that these claims are Raynaud's syndrome cases as well.

It is therefore likely not useful to consider this disease group in general. However, for shipbuilding and possibly related occupations, cumulative nerve disease could reasonably be included in the group of diseases for which consideration is given to determining a liability. Ultimately, the decision regarding the treatment of this disease category is the responsibility of the individual jurisdictions.

Diseases with a Significant Report Lag

MESOTHELIOMA/ASBESTOSIS/LUNG CANCER
ALL OTHER CANCER
PNEUMOCONIOSIS (EXCLUDING ASBESTOSIS)
OBSTRUCTIVE RESPIRATORY DISEASES/ALL OTHER RESPIRATORY DISEASES
HEARING LOSS

The diseases listed above demonstrate a significant level of latency with a material IBNR component.

Diseases with Minimal Report Lag

BURSITIS
EPICONDYLITIS
TENDONITIS
TENOSYNOVITIS
OTHER INFLAMMATION
SPRAIN/STRAIN/TEAR due to repetitive motion
HERNIA
OTHER CUMULATIVE TRAUMA due to repetitive motion
CARPAL TUNNEL SYNDROME
Oliver Wyman combined data for all cumulative trauma diseases, except Carpal Tunnel Syndrome, to calculate metrics for this analysis as well as for potential liability calculations. Additionally, the categories labelled Strain/Sprain/Tear and Other Cumulative Trauma include claims due to repetitive motion only.

Other Disease-Related Items

Jurisdictional Differences

There do not appear to be diseases identified in the study that are specifically excluded from compensation in any Canadian or U.S. jurisdiction.

- There are limitations on claims due to mental illness in some Canadian jurisdictions and U.S. jurisdictions. Examples include:
  - North Dakota excludes mental illness except stress due to an acute event.
  - Washington State and West Virginia exclude all conditions due to mental illness.
  - New Brunswick and Nova Scotia exclude mental illness except stress due to an acute event.
- Constraints, rules, and administration of hearing loss claims vary widely among jurisdictions. For example, in some U.S. jurisdictions, failure to wear protective devices is an absolute defense against hearing loss claims. In all Canadian provinces, this specific issue has no impact, but administrative and statutory rules vary.
- In addition to statute, case law and administration will vary materially between jurisdictions.
- Oliver Wyman did not conduct a detailed review of statutes in all jurisdictions. The basis of the content of this section is a review of summary charts published by the U.S. Department of Commerce.

Variance of Exposure by Industry

Appendix E provides the following information by industry group and recommended disease combination:
Raw Claims

Raw Claims Normalized by Recommended Disease Combination across each Industry Group

The sum of percentages equal 100% for each industry group. Conclusions drawn as respects the incidence of each disease type within each industry group are viable and unbiased. The information in this chart is useful in understanding the relative distribution of disease by industry group. For example, within clerical, over 90% of the claims are cumulative trauma claims, with 44% Carpal Tunnel Syndrome, the highest of any industry group. For clerical exposures, this result was expected. However, an interesting observation is that the majority of claims for logging and tree service are hearing loss.

Raw Claims Normalized by Industry Group across each Recommended Disease Combination

The sum of percentages equal 100% for each disease type. Conclusions drawn as respects the portion of each disease type by industry group are potentially biased by over- or under-representation of each industry group within the underlying data. This is true for Vessel Operation, simply because two large contributors to the assignment are large U.S. shipbuilding concerns. Information in this chart would be accurate if the cross-section of claims underlying the charts represented the actual distribution of claims for a province in a specified accident period. This is likely not the case.

Definition of Industry Groups

Oliver Wyman defined the industry groups during an iterative process of review of underlying claims data. The selection reflected an attempt to keep the number of industry groups reasonably low while concurrently attempting to create reasonably homogenous groups as respects employment description. Another important consideration was to ensure that certain employee classifications unique to a single contributor were not discernible in the final database to preserve confidentiality of data submitted for this assignment. The following are general descriptions of the employee classifications mapped into each industry group.

AGRICULTURE/FARMING/AQUACULTURE
Farming, fishing, hatcheries, fish farming, orchard workers, nurseries

AIRCRAFT OPERATION, SERVICE, MANUFACTURING, OR REPAIR
Fixed wing and rotary aircraft, aviation school, commercial airlines, airport operation

ANIMAL CARE, TRAINING, BREEDING, BOARDING
Grooming, kennels, ranching, breeding, training, shelters, veterinary

AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR
Dealers, service, wreckers, junking, parts, garage operations, service stations, towing

BUILDING MAINTENANCE AND OPERATIONS
Cleaning, custodial, janitorial, operations, inspection
CLERICAL

Accounting, banks, administration, advertising, data processing, engineering, computer operations, financial services, insurance services, actuarial, legal, medical administration, real estate, telemarketing

CONSTRUCTION

Bridge, asbestos removal, concrete, towers, building demolition, building movers, debris removal, tunnel, foundation, equipment operation, road, rail, iron worker, painting structures, steel framing

CONTRACTING

Acoustic material installation, alarm, sprinkler, boiler, window treatment installation, carpentry, cabinets, interior finishing, chimney, drywall, plaster, doors, windows, HVAC, electrical, fence, flooring, framing, glazier, home maintenance, lighting, fireproofing, insulation, painting, wall treatments, pools, hot tubs, roofing, siding, tiling, wood working

EDUCATION AND RELIGIOUS INSTITUTIONS

Charitable, church, college, driving, daycare, primary, secondary, kindergarten, vocational

FIREFIGHTER

EMS, forest, firefighter

FOOD MANUFACTURING

Bakery, brewery, dairy products, candy, cannery, grain products, egg, fruit juice, packing, milling, ice cream, preserving, processing, liquor, meat, pasta, wine, pickle, rendering, sugar, vineyard, vegetables, smoking, curing, prepared meat

FOOD SERVICE

Catering, butchering, shops, concessions, restaurants

GENERAL SERVICES

Avalanche control, cemeteries, commercial diving, recycling, delivery services, funeral, equipment rental and service, inspection, design, laundries, surveying, photographer, packing, storage, employment agencies, light repair

GOVERNMENT

Municipal, counties, state, provincial, federal, library, labor union, associations, professional trade associations, toll collector

HEALTH CARE SERVICES

Adult home, acute care, chiropractic, ambulance, home health care, nursing, medical diagnostics, physician, physician assistant, paramedic, pharmaceutical preparation, optometry, ophthalmologist, hospitals

HOSPITALITY AND ENTERTAINMENT

Theatre, amusement park, arcades, art galleries, museums, actions, gaming, bowling, camping, exhibitions, golf, circus, carnival, hotels, motels, horse racing, motion picture, ballet, maid, pub, bar, nightclub, ski, park, zoo, sports

LANDSCAPING
Brush cutting, lawn, landscaping, garden supply, landscape supply

LIVESTOCK AND POULTRY FARMING
Fur-bearing animal farming, hog farming, poultry farming, poultry farming, ranching

LOGGING AND TREE SERVICE
Logging, forest management, log towing, log scaling, manual tree felling, timber management, tree trimmer, tree services, tree removal, tree climber, tree worker

MANUFACTURING GENERAL
Feed, ornament, battery, coatings, clothing, clay, chemical, coffin, cord, rope, concrete products, electrical components, fertilizer, explosives, steel, sheetrock, gaskets, filters, foam, footwear, luggage, leather, heat treating, hardware, gypsum, jewellery, iron product, metal, machinist, metal goods, plywood, mattress, wood products, welding, tools, rubber products, valves, vinyl window, tanneries, stoves, ovens, sporting goods

MARINE TERMINAL OPERATION
Stevedoring, salvage, garbage collection, operation, container handling

MOTOR VEHICLE OPERATION OTHER THAN TRUCKING
Bus, taxi, tractor, armored car, limousine, route drivers

NATURAL RESOURCE EXTRACTION, REFINING, STORAGE, TRANSPORT
Drilling, storage, gas main construction, mining, gas processing, petrochemical manufacture, pipeline maintenance, smelting, refining, gravel pit

POLICE OFFICERS
Private security, police, law enforcement

RETAIL SERVICES
Carpet, tailoring, dry cleaners, blacksmith, barber, beauty, Laundromats, office services, locksmiths, appliances, small equipment, vending, office services

SOCIAL SERVICES
Counselling, day homes, domestic child care, retirement living centre, social club, alcohol/drug treatment, community services, continuing care

TELECOMMUNICATION AND BROADCASTING

Station broadcasting, cable service, security and alarm systems, telephone operations, telecommunication system operations

TRUCKING
All codes with “trucking” in description

UTILITY PRODUCTION, DISTRIBUTION, MAINTENANCE
Gas, electric, sewage, water, power poles, telecommunication line construction

VEHICLE OTHER THAN AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR
Buses, trailers, mobile homes, sport vehicles, trucks, cabs

VESSEL OPERATION, SERVICE, MANUFACTURING, OR REPAIR
Barge, tub, boat, ship, tours, commercial marine, dredging, pleasure craft, marina, ferry, docking, water taxi

WHOLESALE AND RETAIL GENERAL
Hardware, clothing, dry goods, sheet metal, shoe, scrap, junk, retailers, specialty, wholesalers, supermarket, newspaper, newsstand, plumbing

Methodology and Discussion

Data

Oliver Wyman and the CIA jointly approached a number of Canadian provinces to discuss the contribution of data to this assignment. Additionally, Oliver Wyman approached current clients and contacts within the U.S. The following entities contributed data to this assignment:

The Alberta Workers' Compensation Board
The British Columbia Workers' Compensation Board (WorkSafeBC)
A competitive state fund in the U.S.
First large U.S. ship manufacturing, repair, and servicing corporation
Second large U.S. ship manufacturing, repair, and servicing corporation.

Data was received over a six-month period beginning early in 2013. Data from the Alberta and British Columbia boards was received first and was therefore reviewed first. Data from the other U.S. sources was received later in the process, with the final data received in July 2013. A brief discussion of the nature and quality of the data from each source follows.

Alberta Workers' Compensation Board

- Approximately 119,400 claims with detailed claim information were acquired.
- Approximately 54,400 claims were used.
- Approximately 55,700 claims had reported costs less than $1,500 and were excluded.
- Approximately 200 asbestosis, silicosis, and pneumoconiosis claims had costs less than $1,500 but were included to capture age and lag information.
- The remaining claims were excluded due to injury descriptions not consistent with cumulative trauma (slips, falls, struck by, etc.), lack of information, or contradictory data elements.

The $1,500 benchmark represents the trended current cost of the claims using a 3% annual trend factor for non-medical benefits (temporary wage replacement, disability, fatality, other compensation, and Non-Economic Loss Payment and a 5% annual trend factor for medical benefits (Personal Care Allowance and all other medical). The very low cost of a large number of claims raised concerns regarding whether the data from low-cost claims would distort claim cost measurements. On the other hand, there was a concern that excluding a large portion of the data would eliminate valuable information by lag. The selected cut-off represented a balance between these two items.

WorkSafeBC

- Approximately 54,700 claims with detailed claim information were acquired.
- Approximately 44,900 claims were used.
- Approximately 8,300 claims had a reported cost of less than $1,500 and were excluded.
- Less than 20 asbestosis, cancer, and other respiratory claims had costs less than $1,500 but were included to capture age and lag information.

- Approximately 1,500 claims were excluded due to injury descriptions not consistent with cumulative trauma (slips, falls, struck by, etc.), lack of information, or contradictory data elements.

U.S. Competitive State Fund

- Approximately 86,400 claims with detailed claim information were acquired.
- Approximately 30,700 claims were used.
- Approximately 50,100 claims had reported cost less than $1,500 and were excluded. There were no claims with costs less than $1,500 used in the study.
- Approximately 5,600 claims were excluded due to injury descriptions not consistent with cumulative trauma (slips, falls, struck by, etc.), lack of information, or contradictory data elements.

U.S. Ship Manufacturing Data

- Approximately 143,600 claims with detailed claim information were acquired.
- Approximately 20,300 claims were used.
- No claims were excluded due to cost benchmarking. Many claims simply had no cost data available due to age and data limitations. However, many claims with no cost information did have viable and usable information regarding other claim characteristics. As such, the approach was to use all claims with good claim information regardless as to whether cost information was provided. Claims included in the database with costs less than $1,500 were composed of the following injury types:

  91 cancer
  580 respiratory, including 189 asbestosis claims
  963 hearing loss claims

  All of the information in claims with costs less than $1,500 was viable and useful.
- Claims were excluded from the data if they had injury descriptions not consistent with cumulative trauma (slips, falls, struck by, etc.), lack of information, or contradictory data elements. There were many of these claims because the entities providing the data could not easily isolate claims due to hazardous substance exposure or cumulative trauma. However, given that this data was provided gratis, Oliver Wyman attempted to limit the amount of work requested from these entities, with the thought that Oliver Wyman would screen the acquired data.

Database Form and Content

The form and content of the final database evolved during the editing and compilation process. The approach was iterative, in the sense that the editing and compilation process gave context and background to data structure and differences in content from the various contributors. The format accommodated common available data from all sources. Additionally, the form and structure of the final database considered the need to ensure confidentiality of contributor data. The structure of the final database follows, with explanation.

List of Data Elements

Age at Date of Loss
Age at Claim Report
Gender
Report Lag
Claim Cost at Current Level
Industry Group
Primary Disease/Injury Category
Primary Disease/Injury Classification
Primary Disease/Injury Detail
Secondary Disease/Injury Detail
Source of Injury
Body Part 1
Body Part 2

Discussion of Data Elements

Age at Date of Loss: this is self-explanatory.

Age at Claim Report: this is self-explanatory.

Gender: this is self-explanatory.

Report Lag: this is the difference between the date of loss and date of report. Report lag is a direct measure of latency.

Claim Cost at Current Level: reported medical costs are adjusted to a 12/31/12 cost level using a 5% annual inflation factor. All other costs are adjusted to a 12/31/12 cost level using a 3% annual inflation factor.

Industry Group: each individual claim was mapped into one of 33 industry groups. Oliver Wyman defined the industry groups based on the examination of the employer classification and employer industry data acquired from each contributor as well as the claim volume of individual classifications. Information and nomenclature varied materially between contributors. There were approximately 1,500 individual employee classifications.

Additionally, there were a large number of claims without a true employee classification, but with a description of employee job function. An approach of searching for key words using various spreadsheet functions assisted in the categorization of the employee classifications into potential groups. The definition of the industry groups also considered the need to ensure confidentiality. Upon analysis of employee classifications, it was readily apparent that some classifications were unique to a specific contributor. The mapping process was especially sensitive to this issue because it was imperative that there exist no possibility for any reader of this report to be able to glean information from a specific contributor. The final mapping was reasonable, but by no means perfect from an underwriting perspective. For example, it is not clear whether certain codes in construction would be better suited for contracting, or vice versa. From an analytical viewpoint, it might be best to combine the two groups. Education/religious institutions and government is another example of two groups that potentially could be combined.

Another concern is that the mapping process entailed manual examination of a large number of individual claim descriptions. However, Oliver Wyman did not individually review every claim. As a result, the placement of some classifications is not ideal. An example would be highway repair work with a government indicator in the description. The process mapped these claims into *government*, but a more appropriate group for these claims potentially is *construction*. The following are the industry groups defined in this study.

AGRICULTURE/FARMING/AQUACULTURE
AIRCRAFT OPERATION, SERVICE, MANUFACTURING, OR REPAIR
ANIMAL CARE, TRAINING, BREEDING, BOARDING
AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR
BUILDING MAINTAINENCE AND OPERATIONS
CLERICAL
CONSTRUCTION
CONTRACTING
EDUCATION AND RELIGIOUS INSTITUTIONS
FIREFIGHTER
FOOD MANUFACTURING
FOOD SERVICE
GENERAL SERVICES
GOVERNMENT
HEALTH CARE SERVICES
HOSPITALITY AND ENTERTAINMENT
LANDSCAPING
LIVESTOCK AND POULTRY FARMING
LOGGING AND TREE SERVICE
MANUFACTURING GENERAL
MARINE TERMINAL OPERATION
MOTOR VEHICLE OPERATION OTHER THAN TRUCKING
NATURAL RESOURCE EXTRACTION, REFINING, STORAGE, TRANSPORT
POLICE OFFICERS
RETAIL SERVICES
SOCIAL SERVICES
TELECOMMUNICATION AND BROADCASTING
TRUCKING
UNKNOWN
UTILITY PRODUCTION, DISTRIBUTION, MAINTENANCE

VEHICLE OTHER THAN AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR
VESSEL OPERATION, SERVICE, MANUFACTURING, OR REPAIR
WHOLESALE AND RETAIL GENERAL

Primary Disease/Injury Category:
The intent of this data element is to define the primary disease or injury category. Bolded labels indicate that there are classifications or specific injuries/diseases within the category—see the next data element.

CANCER
CUMULATIVE TRAUMA
EYE CONDITION
HEARING LOSS
INFECTION
MENTAL STRESS
PHYSICAL STRESS
REACTION TO A FOREIGN SUBSTANCE
RESPIRATORY DISEASE
VASCULAR

Primary Disease/Injury Classification:
This category provides a distribution of the primary category by classification. For example, the process partitioned the primary category of cancer into three classifications: Lung, Mesothelioma, and All Other Cancer. The definition and number of classifications is data driven—there were sufficient lung cancer and mesothelioma claims to warrant their own classification. Remaining types are included in the All Other Classification. Classifications are further refined in the primary disease/injury data field. In some situations, such as for the category labelled Eye Condition, separate classifications are not warranted, so the category description is repeated in the classification description. However, there are individual diseases associated with the classification, which are listed in the Primary Disease/Injury data field. This is an artifact of how the data was sorted and compiled. (Bolded labels indicate that there are detailed injuries within the classification.)

	ALL OTHER CANCER
CANCER	LUNG
	MESOTHELIOMA
	BURSITIS
	CARPAL TUNNEL SYNDROME
	EPICONDYLITIS
	HERNIA

CUMULATIVE TRAUMA	**NERVE DISEASE** **OTHER CUMULATIVE TRAUMA** **OTHER INFLAMMATION** TENDONITIS **SPRAIN/STRAIN/TEAR** **TENOSYNOVITIS**
EYE CONDITION	EYE CONDITION (See Primary Injury/Disease data field for specific injuries or diseases in this classification.)
INFECTION	INFECTION (See Primary Injury/Disease data field for specific injuries or diseases in this classification.)
MENTAL STRESS	MENTAL STRESS (See Primary Injury/Disease data field for specific injuries or diseases in this classification.)
PHYSICAL STRESS	PHYSICAL STRESS (See Primary Injury/Disease data field for specific injuries or diseases in this classification.)
REACTION TO A FOREIGN SUBSTANCE	REACTION TO A FOREIGN SUBSTANCE (See Primary Injury/Disease data field for specific injuries or diseases in this classification.)
RESPIRATORY DISEASE	**ALL OTHER RESPIRATOR**Y ASBESTOSIS **OBSTRUCTIVE RESPIRATORY DISEASE** **PNEUMOCONIOSIS ALL EXCEPT ASBESTOSIS**
VASCULAR	VASCULAR (See Primary Injury/Disease data field for specific injuries or diseases in this classification.)

Primary Disease/Injury Detail:
This is the additional detailed information associated with the above bolded categories.

ALL OTHER CANCER

BLADDER	BRAIN	BREAST
COLON-RECTAL	ESOPHOGEAL	LYMPHOMA
LIVER	FOLLICULAR LARGE CELL	GASTROINTESTINAL
MELANOMA	HODGKIN'S DISEASE	KIDNEY
LARYNX	LEUKEMIA	LYMPHOSARCOMA
MOUTH	MULTIPLE MYELOMA	PROSTATE
SEMINOMA	SINUSES	SKIN (NOT MELANOMA)
STOMACH	TESTICULAR	THROAT
VOCAL CHORDS	UNKNOWN	

NERVE DISEASE

NUMBNESS	NERVE DISEASE (NOC)	NERVE DAMAGE
SCIATICA	RAYNAUD'S SYNDROME OR PHENOMENA	
	THORACIC OUTLET SYNDROME	

OTHER CUMULATIVE TRAUMA

BENIGN NEOPLASM	BRUISE/CONTUSION	BUNION
CALLOUSES	CYST (NON-GANGLION)	DORSOPATHY
DUPUYTREN'S	FACET SYNDROME	FIBROMYALGIA
FISTUAL ANAL	FRACTURE	HEADACHE
HAEMORRHOIDS	INGROWN NAIL	LARYNGITIS
MALAISE	OSTEOPATHY	POLYP
SPASMS	ULCER	UNKNOWN
	GENERAL SORENESS/PAIN/HURT	
	REFLEX SYMPATHETIC DYSTROPHY	

OTHER INFLAMMATION

ARTHRITIS	BONE SPUR	CAPSULITIS
GANGLION CYST	HEEL SPUR	MYOSITIS
OSTEOARTHRITIS	OTHER INFLAMMATION	PLANTAR FASCIITIS
SYNOVITIS		

SPRAIN/STRAIN/TEAR

DISC DISEASE	DISLOCATION	ROTATOR CUFF SYNDROME
HERNIATED DISC	MENISCUS TEAR	MUSCULOSKELETAL DISORDER
TORN TENDON	ROTATOR CUFF TEAR	SPRAIN/STRAIN/TEAR NOC

TENOSYNOVITIS

TENOSYNOVITIS NOC	DE QUERVAIN'S	TRIGGER FINGER

EYE CONDITION

CATARACT	EYE CONDITION NOC	INFECTION
REACTION TO A FOREIGN SUBSTANCE		VISION LOSS

INFECTION

BRUCELLOSIS	SALMONELLA		CAMPHYLOBACTERIA
CAT SCRATCH FEVER	CELLULITIS		PSITTACOSIS
CHICKENPOX	CHLAMYDIAE		CRYPTOCOCCOSIS
DYSENTERY	GASTROENTERITIS		HEPATITIS
HERPES ZOSTER	HISTOPLASMOSIS		SCARLET FEVER
INFLUENZA	LEPTOSPIROSIS		UNDULANT FEVER
MENINGITIS	MONONUCLEOSIS		TYPHOID FEVER
TULAREMIA	MYCOBACTERIUM		PARONYCHIA
MUMPS	MALARIA	SHIGELLA	SCABIES
STAPH	MRSA	RUBELLA	IMPETIGO

MENTAL STRESS

ANEURYSM	ANGINA	ANXIETY
COLITIS	DEPRESSION	EXHAUSTION
GASTRITIS	HEADACHE/MIGRAINE	HEART ATTACK
HEART DISEASE	NERVE DISEASE	NERVOUS BREAKDOWN
SEIZURES	SLEEP APNEA	ULCER
VERTIGO	UNKNOWN	

PHYSICAL STRESS

HEART DISEASE	HEART ATTACK	ANGINA
UNKNOWN	RESPIRATORY DISEASE	

REACTION TO A FOREIGN SUBSTANCE

ALLERGIC REACTION	ANGINA	POISONING
GASTROENTERITIS	SCLERODERMA	INCONTINENCE
SKIN RELATED		INFLAMMATION OF JOINT/MUSCLE
LIVER DISEASE		NERVOUS SYSTEM DISEASE
HEADACHE/MIGRAINE	HEART ATTACK	UNKNOWN
VOMITING		

ALL OTHER RESPIRATORY

PSITTACOSIS	PNEUMONIA	COUGH
RADIATION SICKNESS	PULMONARY FIBROSIS	PULMONARY EDEMA
SEPTIC SHOCK		REACTION TO A FOREIGN SUBSTANCE
SINUSITIS	TUBERCULOSIS	UNKNOWN

OBSTRUCTIVE RESPIRATORY DISEASE

COPD	BRONCHITIS	ASTHMA
		EMPHYSEMA

PNEUMOCONIOSIS EXCEPT ASBESTOSIS

BLACK LUNG	BYSSINOSIS	ASTHMA
	SILICOSIS	PNEUMOCONIOSIS NOC

VASCULAR

	REACTION TO A FOREIGN SUBSTANCE	VASCULAR INJURY

Secondary Disease/Injury:
Multiple injuries or multiple diseases are associated with many claims. For example, with cancer, the individual may have lung cancer and kidney cancer. In that specific situation, lung cancer would have been listed as the primary disease/injury, and kidney cancer would have been listed as the secondary disease/injury. In these situations, the primary injury would have been chosen to maximize the number of data elements for a specific condition, in this case lung cancer. Similar situations exist with cumulative trauma, where carpal tunnel would be listed with another disease, such as tendonitis. The same approach would have been used in those cases, where carpal tunnel syndrome would be the primary disease, and tendonitis would be the secondary disease.

Source of Injury:
This is self-explanatory. Note that the review of data shows that typing and keyboard entry was the source of a large number of cumulative trauma claims.

Body Part 1:
The body part associated with the primary injury.

Body Part 2:
The body part associated with the secondary injury.

Discussion of Individual Diseases

A discussion of each individual disease follows.

CANCER-RELATED CLAIMS

MESOTHELIOMA: Mesothelioma is a cancer of the cells composing the membrane that lines the internal organs of the body. Mesothelioma most often occurs in the pleural membrane lining the lungs. Medical literature generally considers exposure to asbestos as the only known cause of mesothelioma. Claims identified in the database as mesothelioma include claims specifically labelled as mesothelioma in the source data as well as claims labelled as cancer of the pleura or pleural membrane. There are 935 claims labelled as mesothelioma.

LUNG CANCER: This was the second most common cancer claim in the data (after mesothelioma). There are 249 claims labelled as lung cancer. These include claims with multiple cancer sites.

ALL OTHER CANCER: There are 452 claims in this category. The specific cancers found in the data are listed in the prior section.

RESPIRATORY-RELATED CLAIMS

OBSTRUCTIVE RESPIRATORY DISEASE: There are 1,165 claims in this category. Obstructive respiratory disease includes diseases that obstruct the airways leading to the lungs. Diseases in this category differ from restrictive respiratory diseases, which inhibit the ability of the lungs to expand and fill with air. Obstructive diseases include asthma, emphysema, bronchitis, and cardio obstructive pulmonary disease (a general term that refers to all obstructive respiratory diseases). Restrictive respiratory diseases include the class of diseases termed pneumoconiosis (discussed below), pneumonia, and other medical conditions that inhibit the ability of the lungs to expand. Pneumoconiosis is the primary restrictive lung disease in the class of latent occupational diseases.

PNEUMOCONIOSIS (EXCLUDING ASBESTOSIS): Pneumoconiosis is a disease caused by the inhalation of dust. The dust remains in the lungs, causing lesions and scarring. Forms of pneumoconiosis include coal worker pneumoconiosis (black lung), asbestosis, silicosis, byssinosis (cotton dust), and others. This study treated asbestosis claims individually as a class, with the remaining pneumoconiosis claims combined into a single category. There are two reasons for this approach. The first is that there are 2,228 asbestosis claims and only 188 all other claims. The second is that the metric profile for asbestosis is fundamentally different from the other pneumoconiosis claims. Most notably, the average age at report for all other pneumoconiosis claims is 54, which is consistent with coal miner data in the U.S. The average age at report for asbestosis claims is 64. Other differences exist as well.

ASBESTOSIS: Discussed above.

ALL OTHER RESPIRATORY: There are 3,795 claims in this category, of which approximately 2,900 claims have no disease information and 800 have reaction to a foreign substance as the only disease information. The remaining claims include 33 pneumonia claims and 30 tuberculosis claims. About 2,800 of the claims list exposure to chemicals, fumes, fire, smoke, chips, particles, or dust as the source of injury.

HEARING LOSS: There are 56,628 claims in this category. Note that hearing loss represents more than one-third of the entire database.

INFECTION: There are 249 infection claims. Hepatitis represents about one-third of these claims. Note that claims due to tuberculosis were included in the All Other Respiratory disease group. The remaining claims in this category are due to a variety of generally non-respiratory infections. The individual diseases are listed in the prior section.

EYE CONDITION: There are 35 claims in this category, which includes all injuries involving vision. This category generally includes cataracts (resulting from radiation exposure from welding or other manufacturing operations), eye damage resulting from exposure to chemicals or other substances, and eye strain. It is important to note that a large portion of the claims excluded due to low cost are associated with eye damage due to welding. These claims were generally of very low lag and very low cost.

MENTAL STRESS: There are 2,990 claims in this category. Mental stress claims manifest themselves as angina, anxiety, depression, gastro-intestinal disorders, heart disease, headache, ulcers, hypertension, and others.

PHYSICAL STRESS: There are 376 claims in this category. The underlying presumption is that cumulative long-term exposure to physical exertion due to employment generated the physical symptoms/diseases associated with these claims. These claims are almost exclusively due to heart disease (angina and heart attack).

REACTION TO A FOREIGN SUBSTANCE: There are 1,183 claims in this category; 468 are poisoning, most of which are due to lead or carbon monoxide; 272 claims are skin-related conditions; and 390 claims have unknown conditions. Note that this disease category is in a sense residual, given that it is composed of claims not mapped into other disease categories. For example, many cancer claims had “reaction to a foreign substance” recorded as source of injury. These claims were included in the cancer claim categories. Similarly, respiratory illnesses due to exposure to chemicals, fumes, or any other foreign substance, were included in the appropriate respiratory disease category as well.

VASCULAR: There are 114 claims in this category, composed primarily of varicose veins, phlebitis, blood clots, strokes, and hypertension. Though small, this category is interesting because of over-representation in trucking, other motor vehicle operation, police officers, retail

services, and food service industry groups. Driving occupations, and occupations requiring long periods of sitting or standing, increase the likelihood of the diseases included in this category.

CUMULATIVE TRAUMA: This is the class of claims generated by repetitive motion. The general class of cumulative trauma claims is composed of three subgroups: inflammatory diseases, nerve-related diseases, and sprain/strain/tear-related injuries.

INFLAMMATORY DISEASES: This is class of diseases with symptoms characterized by inflammation. Inflammation is pain, heat, redness, and swelling, resulting in loss of function of a specific body part.

BURSITIS: There are 5,149 claims for this disease. Bursa are small sacs of fluid located at key points where muscle and tendons slide across bone, and promote frictionless movement. Bursitis is the inflammation of one or more bursa. Seventy-three percent of these claims are elbow related and 17% are shoulder related, with the remaining claims generally associated with upper body parts and the back.

EPICONDYLITIS: There are 2,384 claims for this disease. The epicondyle is a bony protrusion at the end of the humerus in the elbow joint. Ligaments attached to the epicondyle in the humerus and the bones in the lower arm form the elbow joint. Epicondylitis is the inflammation of the area of the epicondyle where the ligaments attach. "Tennis Elbow" commonly refers to epicondylitis originating from the epicondyle on the outer portion of the elbow. "Golfer's Elbow" commonly refers to epicondylitis originating from the epicondyle on the inner portion of the elbow. Almost all claims have the elbow coded as the affected body part. The remaining data shows other body parts; however, this information is likely incorrect, by definition.

TENDONITIS: There are 14,944 claims of this type. Tendonitis is inflammation of tendons, which are fibrous tissue that join muscles to bone (as opposed to ligaments, which are fibrous tissue that attach bone to bone). Ninety-five percent of all tendonitis claims are due to upper body parts: 34% involve the wrist, 26% the shoulder, 11% the arm, 9% the elbow, and 15% involve other upper body parts.

TENOSYNOVITIS: There are 351 claims of this type. Tenosynovitis is the inflammation of a fluid-filled sheath that surrounds the tendon. Eighty percent of the claims are specifically identified with the hand, wrist, or fingers. One-third of the claims are labelled as De Quervain's disease, which is tenosynovitis of the two tendons passing through the wrist that control the thumb. One-third of these claims are labelled as *trigger finger,* also known as *stenosing tenosynovitis* (this term was also found in the source data). Trigger finger is tenosynovitis of a tendon controlling finger movement.

OTHER INFLAMMATION: there are 4,268 claims of this type. Roughly 95% of the claims have no disease description other than inflammation. The remaining 5% are composed of arthritis, ganglion cysts, myositis, capsulitis, synovitis, and bone spurs. The category

includes claims that impact primarily upper body parts, though there are a measurable number of knee injuries.

NERVE-RELATED DISEASES: Carpal tunnel syndrome is included in this category because the primary nature of the disease is nerve related. The remaining category, nerve disease, is a miscellaneous grouping of nerve-related diseases generated by repetitive motion.

CARPAL TUNNEL SYNDROME: There are 14,092 claims in this category, representing approximately 10% of the total claim volume in the study. The carpal tunnel is a passageway, defined by bones and tendons, on the underside of the wrist. The carpal tunnel connects the arm to the hand. The median nerve and tendons controlling finger movement pass through the carpal tunnel. Carpal tunnel syndrome results when there is compression to the median nerve due to inflammation or degeneration of any of the tendons passing through the carpal tunnel. The body parts listed for claims labelled and included in the data as carpal tunnel syndrome include the arm, fingers, wrist, shoulder, and hand. Nevertheless, carpal tunnel syndrome is a disease of the wrist. In circumstances when the data had other body parts for claims labelled as carpal tunnel, such as the knee, neck, or back, Oliver Wyman tested claim descriptions to verify the precise nature of the injury. The process mapped claims to the appropriate disease category when descriptions indicated an injury other than carpal tunnel syndrome.

NERVE DISEASE: There are 1,391 claims in this category. Approximately 73% of these claims are Raynaud's Disease, or vibratory white finger disease. Long-term exposure to tool-related vibration causes this disease, which damages nerves in the fingers, which in turn results in circulatory problems. The majority of other claims in this category included numbness as an injury description with no specific disease listed. Approximately 90% of the claims are due to injuries to the wrist, hand, or fingers. Approximately 70% of the claims are associated with Vessel Operation. This is consistent with over-representation of this industry group in the source data (two of the five data sources are shipbuilding operations).

SPRAIN/STRAIN/TEAR: There are 24,558 claims in this category. The disease title is self-explanatory. These claims involve all body parts.

HERNIA: There are 1,161 claims in this category. Hernias are, by definition, a sprain/strain/tear. These claims were isolated during the initial examination simply because of their number. Approximately 70% are associated with Vessel Operation.

OTHER CUMULATIVE TRAUMA: There are 3,411 claims in this category. Approximately 94% of these claims have no description or general pain or soreness.

Understanding the Metrics

Disease selection for liability determination must consider relative occurrence, or frequency, as well as average cost per claim, or severity, on both an overall basis as well as for the selected industry groups. Clearly, if a disease within the superset is of low frequency and cost overall as well as for all the individual industry groups, it is not a viable candidate. However, there are specific diseases with low relative occurrence and cost, but for which claims are concentrated in a specific industry group. In this latter situation, including this disease for the specific industry group in question is a reasonable consideration.

The selected base metrics and presentation for each disease, using carpal tunnel syndrome as an example, follows this discussion. Results for each individual disease are included in Appendix E. The basic analysis provides calculations/tabulations of claim count, average cost, average age at report, and average lag for the following groups of claims:

Metric	*Claims Included*
Raw Mean:	All claims
Cut Off:	Claims with cost equal to or less than 10% of the raw mean.
Adjusted Mean:	All claims excluding cut-off claims.
Adj. X 5 Largest:	All claims excluding cut-off claims as well as the five largest claims.
5 Largest:	The five largest claims.
Largest:	The largest claim.

These metrics provide information for all claims combined, information excluding the impact of low-cost claims, and information excluding the potential distortion of extraordinarily high cost claims. Low-cost claims presented an issue in the analysis, most notably because of a very high number of zero- or minimal-cost claims, even for extraordinarily complex diseases such as cancer. One reason for zero- or minimal-cost claims is incomplete data, according to one data source. Nevertheless, low-cost claims data was included because it contained viable information on lag and age at claim report. The approach of examining metrics including and excluding claims systemically provides unedited information as well as insight into the impact of low-cost claims, without introducing a bias into the analysis by simply excluding groups of data because the cost (or any other metric) does not appear to be sensible.

Additionally, there is an analysis of lag for each industry group. The analysis calculates the average age and average lag for all claims, for claims with lag less than or equal to two years, and for claims with lag greater than two years. The distribution of claims by lag is included as well. This basic analysis provides key insight into the underlying latency as regards time between last exposure to loss and the date the disease emerges. The distribution by gender is also included.

The graphical presentations show distribution of claim reports by age and the distribution of claim costs as a percentage of the raw mean. Distribution of costs as a percentage of the raw mean provides a method of easily comparing distributions for diseases with materially different average claim costs. It also readily identifies diseases potentially distorted by low-cost claims.

Matrix Analysis of Key Metrics

Appendix D provides a series of matrices showing key metrics by disease. The grouping of diseases by matrix anticipates recommendations for combining disease types presented later in this report. The key metric information provided is as follows:

COUNT
Raw Mean
Cut Off
Adjusted Mean

AVERAGE COST
Raw Mean
Cut Off
Adjusted Mean
Adjusted Excluding Five Largest
Five Largest
Largest

AVERAGE AGE
Raw Mean
Adjusted Mean
Lag <= 2 Years
Lag >= 2 Years

AVERAGE LAG
Raw Mean
Adjusted Mean
Lag <= 2 Years
Lag > 2 Years
% Claims <= 2 Years
% Claims > 2 Years

Matrix Analysis by Disease Type and Industry Group

Appendix C provides a series of matrices showing claim distribution and cost by disease type an industry group, described below:

Distribution of Claims by Disease Type and Industry Group
This displays the distribution of all claims in the database by disease type and industry group.

Distribution of Claims by Disease Type and Industry Group, Normalized by Industry Group
This is Exhibit 1, normalized by industry group. The sum of the percentages for each industry group is 100%.

Distribution of Cost by Disease Type and Industry Group
This displays the cost by disease type and industry group. Each cell is equal to the product of the corresponding claim count multiplied by the average cost per claim for the applicable disease type. The average cost per claim used for this analysis excludes all claims below the selected cut-off value and excludes the five largest claims.

Distribution of Cost by Disease Type and Industry Group, Normalized by Industry Group
This is Exhibit 4, normalized by industry group. The sum of the percentages for each industry group is 100%.

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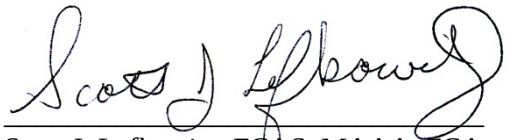
Appendix A: Acknowledgement of Qualification

I, Scott J. Lefkowitz, am a Partner for Oliver Wyman Actuarial Consulting Inc. I am a member of the American Academy of Actuaries, a Fellow of the Casualty Actuarial Society, and a Fellow of the Conference of Consulting Actuaries.

I meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.



Scott J. Lefkowitz, FCAS, MAAA, FCA

Appendix B: Basic Metrics

The following are the basic metric analysis for each identified disease.

CARPAL TUNNEL SYNDROME

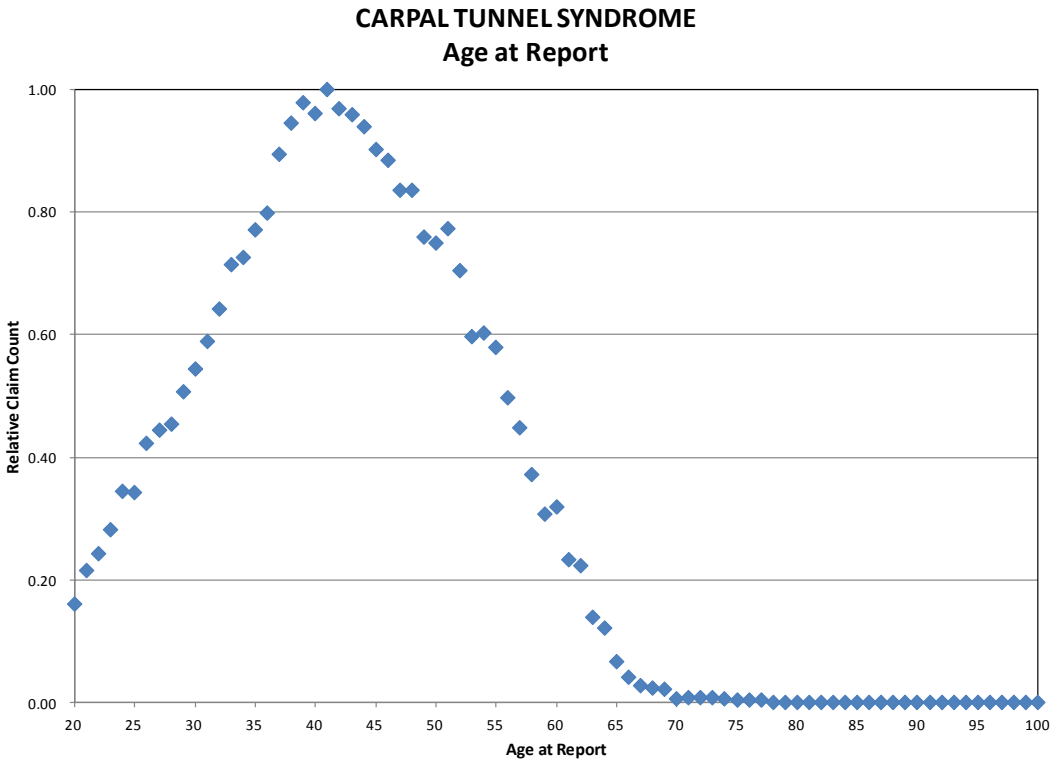
	COUNT	AVERAGE COST	AVERAGE AGE	AVERAGE LAG (DAYS)
RAW MEAN	22,092	29,951	42	122
CUT OFF	1,912	2,995		
ADJ MEAN	20,180	32,555	42	124
ADJ X 5 LARGEST	20,175	32,158	42	124
5 LARGEST	5	1,637,173	46	55
LARGEST	1	2,394,022	39	3

	ALL	LAG <= 2 Yrs	LAG > 2 Yrs
AVERAGE AGE	42	42	47
AVERAGE LAG (YEARS)	0.3	0.2	5.0
COUNT	21,705	21,008	697
COUNT PERCENTAGE		97%	3%

	M	F	U
GENDER	11,056	10,869	167
GENDER PERCENTAGE	50%	49%	1%

CARPAL TUNNEL SYNDROME

	COUNT	PERCENTAGE
AGRICULTURE / FARMING / AQUACULTURE	146	1%
AIRCRAFT OPERATION, SERVICE, MANUFACTURING, OR REPAIR	105	0%
ANIMAL CARE, TRAINING, BREEDING, BOARDING	39	0%
AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	1,096	5%
BUILDING MAINTAINENCE AND OPERATIONS	440	2%
CLERICAL	1,424	6%
CONSTRUCTION	736	3%
CONTRACTING	1,648	7%
EDUCATION AND RELIGIOUS INSTITUTIONS	622	3%
FIREFIGHTER	17	0%
FOOD MANUFACTURING	1,473	7%
FOOD SERVICE	1,031	5%
GENERAL SERVICES	165	1%
GOVERNMENT	1,764	8%
HEALTH CARE SERVICES	1,360	6%
HOSPITALITY AND ENTERTAINMENT	641	3%
LANDSCAPING	98	0%
LIVESTOCK AND POULTRY FARMING	111	1%
LOGGING AND TREE SERVICE	285	1%
MANUFACTURING GENERAL	3,667	17%
MARINE TERMINAL OPERATION	89	0%
MOTOR VEHICLE OPERATION OTHER THAN TRUCKING	162	1%
NATURAL RESOURCE EXTRACTION, REFINING, STORAGE, TRANSPORT	458	2%
POLICE OFFICERS	29	0%
RETAIL SERVICES	406	2%
SOCIAL SERVICES	284	1%
TELECOMMUNICATION AND BROADCASTING	111	1%
TRUCKING	360	2%
UNKNOWN	215	1%
UTILITY PRODUCTION, DISTRIBUTION, MAINTAINENCE	103	0%
VEHICLE OTHER THAN AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	48	0%
VESSEL OPERATION, SERVICE, MANUFACTURING, OR REPAIR	1,474	7%
WHOLESALE AND RETAIL GENERAL	1,485	7%


CARPAL TUNNEL SYNDROME
Age at Report
Relative Claim Count
1.00
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0.60
0.40
0.20
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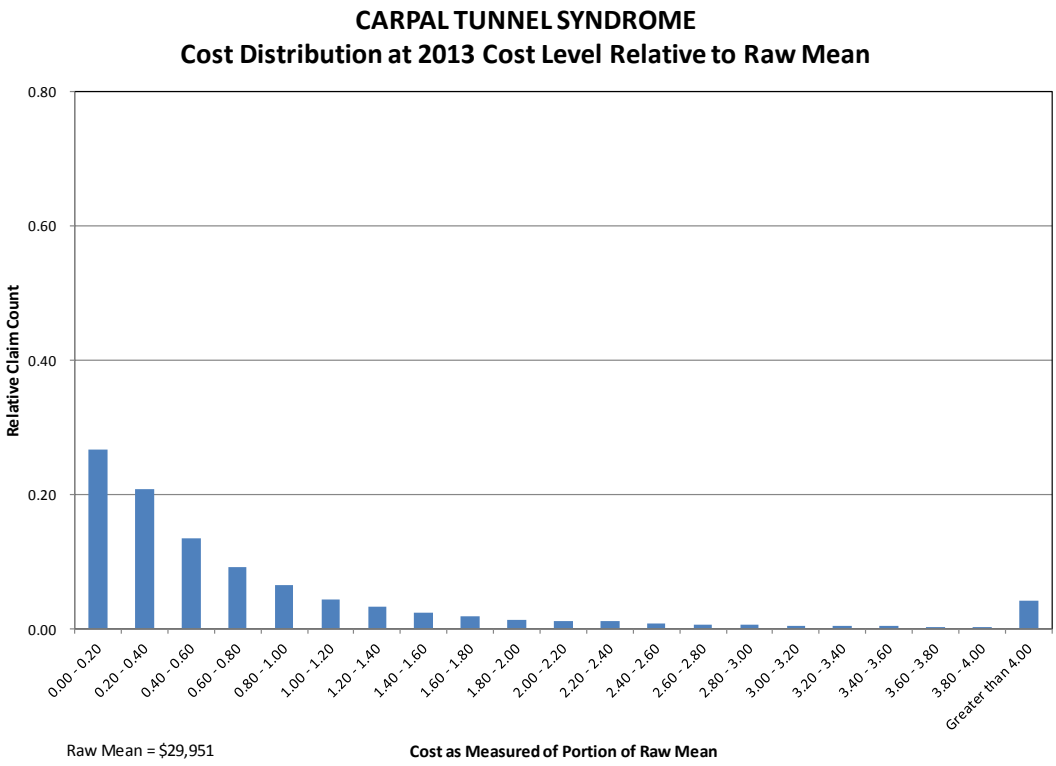
75
80
85
90
95
100
Age at Report


CARPAL TUNNEL SYNDROME
Cost Distribution at 2013 Cost Level Relative to Raw Mean
Relative Claim Count
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0.40
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0.00 - 0.20
0.20 - 0.40
0.40 - 0.60
0.60 - 0.80
0.80 - 1.00
1.00 - 1.20
1.20 - 1.40
1.40 - 1.60
1.60 - 1.80
1.80 - 2.00
2.00 - 2.20
2.20 - 2.40
2.40 - 2.60
2.60 - 2.80
2.80 - 3.00
3.00 - 3.20
3.20 - 3.40
3.40 - 3.60
3.60 - 3.80
3.80 - 4.00
Greater than 4.00
Raw Mean = $29,951
Cost as Measured of Portion of Raw Mean

BURSITIS

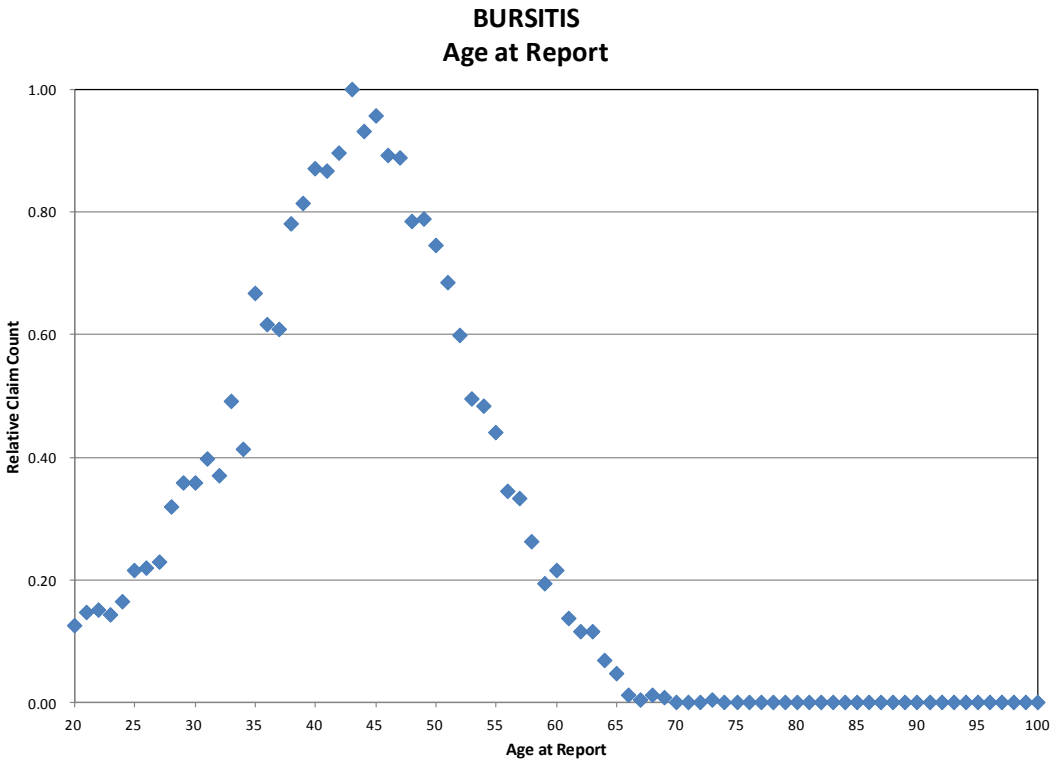
	COUNT	AVERAGE COST	AVERAGE AGE	AVERAGE LAG (DAYS)
RAW MEAN	5,149	31,182	43	33
CUT OFF	744	3,118		
ADJ MEAN	4,405	36,025	43	34
ADJ X 5 LARGEST	4,400	34,742	43	34
5 LARGEST	5	1,164,316	42	51
LARGEST	1	1,478,077	31	5

	ALL	LAG <= 2 Yrs	LAG > 2 Yrs
AVERAGE AGE	43	43	46
AVERAGE LAG (YEARS)	0.1	0.1	3.2
COUNT	5,081	5,064	17
COUNT PERCENTAGE		100%	0%

	M	F	U
GENDER	3,165	1,966	18
GENDER PERCENTAGE	61%	38%	0%

BURSITIS

	COUNT	PERCENTAGE
AGRICULTURE / FARMING / AQUACULTURE	63	1%
AIRCRAFT OPERATION, SERVICE, MANUFACTURING, OR REPAIR	63	1%
ANIMAL CARE, TRAINING, BREEDING, BOARDING	5	0%
AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	182	4%
BUILDING MAINTAINENCE AND OPERATIONS	80	2%
CLERICAL	69	1%
CONSTRUCTION	124	2%
CONTRACTING	747	15%
EDUCATION AND RELIGIOUS INSTITUTIONS	192	4%
FIREFIGHTER	1	0%
FOOD MANUFACTURING	195	4%
FOOD SERVICE	139	3%
GENERAL SERVICES	46	1%
GOVERNMENT	342	7%
HEALTH CARE SERVICES	385	7%
HOSPITALITY AND ENTERTAINMENT	207	4%
LANDSCAPING	43	1%
LIVESTOCK AND POULTRY FARMING	48	1%
LOGGING AND TREE SERVICE	129	3%
MANUFACTURING GENERAL	853	17%
MARINE TERMINAL OPERATION	29	1%
MOTOR VEHICLE OPERATION OTHER THAN TRUCKING	58	1%
NATURAL RESOURCE EXTRACTION, REFINING, STORAGE, TRANSPORT	55	1%
POLICE OFFICERS	5	0%
RETAIL SERVICES	66	1%
SOCIAL SERVICES	48	1%
TELECOMMUNICATION AND BROADCASTING	42	1%
TRUCKING	46	1%
UNKNOWN	2	0%
UTILITY PRODUCTION, DISTRIBUTION, MAINTAINENCE	15	0%
VEHICLE OTHER THAN AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	19	0%
VESSEL OPERATION, SERVICE, MANUFACTURING, OR REPAIR	164	3%
WHOLESALE AND RETAIL GENERAL	687	13%


BURSITIS
Age at Report
Relative Claim Count
1.00
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0.60
0.40
0.20
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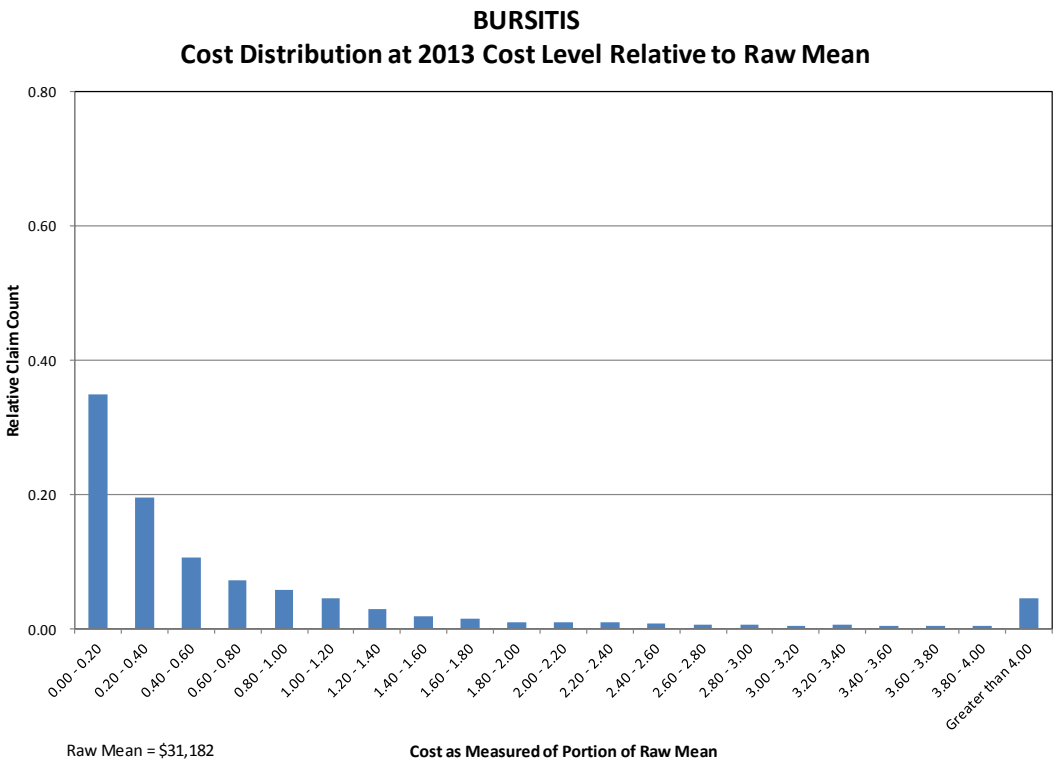
100
Age at Report


BURSITIS
Cost Distribution at 2013 Cost Level Relative to Raw Mean
Relative Claim Count
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0.40
0.20
0.00
0.00 - 0.20
0.20 - 0.40
0.40 - 0.60
0.60 - 0.80
0.80 - 1.00
1.00 - 1.20
1.20 - 1.40
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1.60 - 1.80
1.80 - 2.00
2.00 - 2.20
2.20 - 2.40
2.40 - 2.60
2.60 - 2.80
2.80 - 3.00
3.00 - 3.20
3.20 - 3.40
3.40 - 3.60
3.60 - 3.80
3.80 - 4.00
Greater than 4.00
Raw Mean = $31,182
Cost as Measured of Portion of Raw Mean

EPICONDYLITIS

	COUNT	AVERAGE COST	AVERAGE AGE	AVERAGE LAG (DAYS)
RAW MEAN	2,384	26,287	44	57
CUT OFF	238	2,629		
ADJ MEAN	2,146	28,949	44	59
ADJ X 5 LARGEST	2,141	27,305	44	58
5 LARGEST	5	732,837	41	586
LARGEST	1	1,036,253	39	224

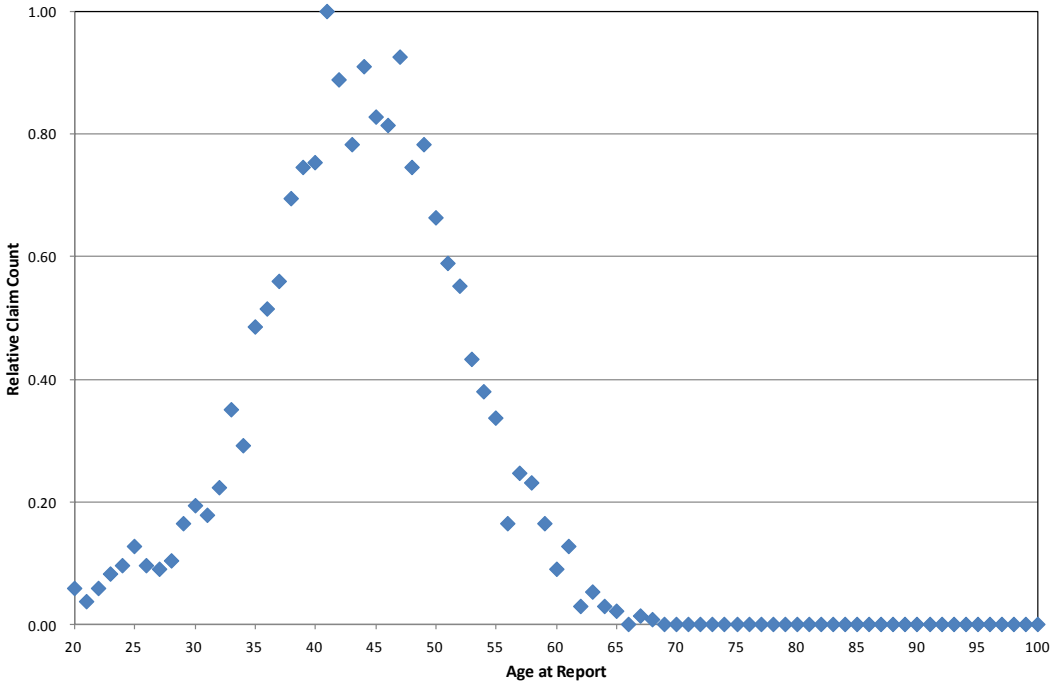
	ALL	LAG <= 2 Yrs	LAG > 2 Yrs
AVERAGE AGE	44	44	45
AVERAGE LAG (YEARS)	0.2	0.1	4.0
COUNT	2,381	2,364	17
COUNT PERCENTAGE		99%	1%

	M	F	U
GENDER	49	47	2
GENDER PERCENTAGE	50%	48%	2%

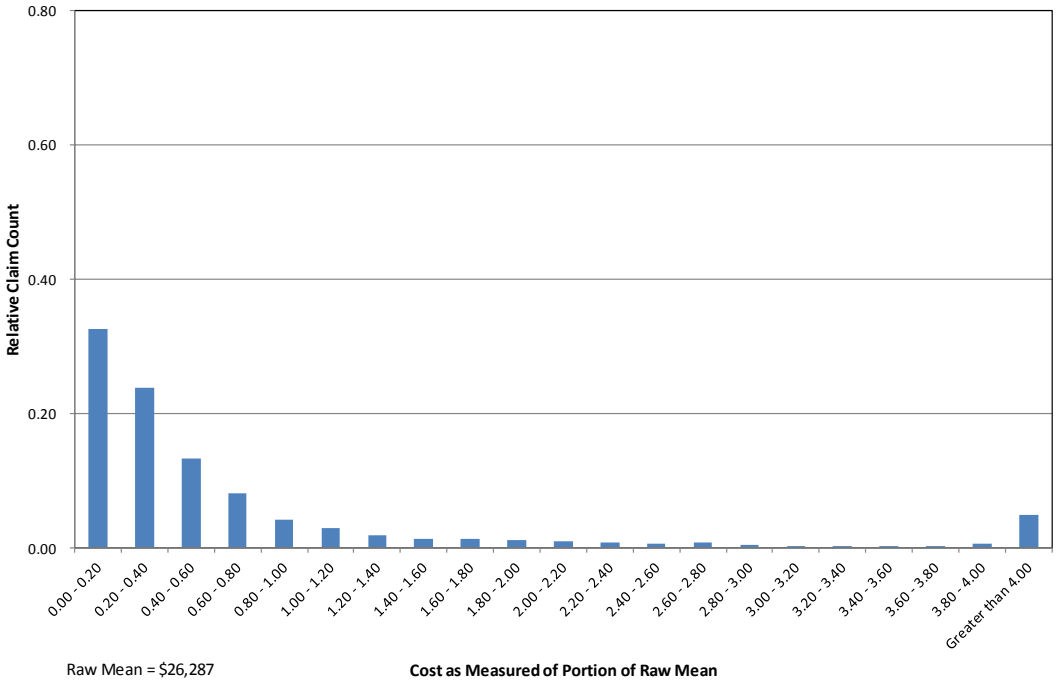
EPICONDYLITIS

	COUNT	PERCENTAGE
AGRICULTURE / FARMING / AQUACULTURE	2	0%
AIRCRAFT OPERATION, SERVICE, MANUFACTURING, OR REPAIR	32	1%
ANIMAL CARE, TRAINING, BREEDING, BOARDING	1	0%
AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	100	4%
BUILDING MAINTAINENCE AND OPERATIONS	29	1%
CLERICAL	27	1%
CONSTRUCTION	112	5%
CONTRACTING	179	8%
EDUCATION AND RELIGIOUS INSTITUTIONS	87	4%
FIREFIGHTER	0	0%
FOOD MANUFACTURING	290	12%
FOOD SERVICE	113	5%
GENERAL SERVICES	50	2%
GOVERNMENT	205	9%
HEALTH CARE SERVICES	196	8%
HOSPITALITY AND ENTERTAINMENT	84	4%
LANDSCAPING	8	0%
LIVESTOCK AND POULTRY FARMING	0	0%
LOGGING AND TREE SERVICE	5	0%
MANUFACTURING GENERAL	345	14%
MARINE TERMINAL OPERATION	21	1%
MOTOR VEHICLE OPERATION OTHER THAN TRUCKING	17	1%
NATURAL RESOURCE EXTRACTION, REFINING, STORAGE, TRANSPORT	68	3%
POLICE OFFICERS	5	0%
RETAIL SERVICES	30	1%
SOCIAL SERVICES	78	3%
TELECOMMUNICATION AND BROADCASTING	21	1%
TRUCKING	58	2%
UNKNOWN	6	0%
UTILITY PRODUCTION, DISTRIBUTION, MAINTAINENCE	13	1%
VEHICLE OTHER THAN AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	7	0%
VESSEL OPERATION, SERVICE, MANUFACTURING, OR REPAIR	8	0%
WHOLESALE AND RETAIL GENERAL	187	8%

EPICONDYLITIS
Age at Report



EPICONDYLITIS
Cost Distribution at 2013 Cost Level Relative to Raw Mean



TENDONITIS

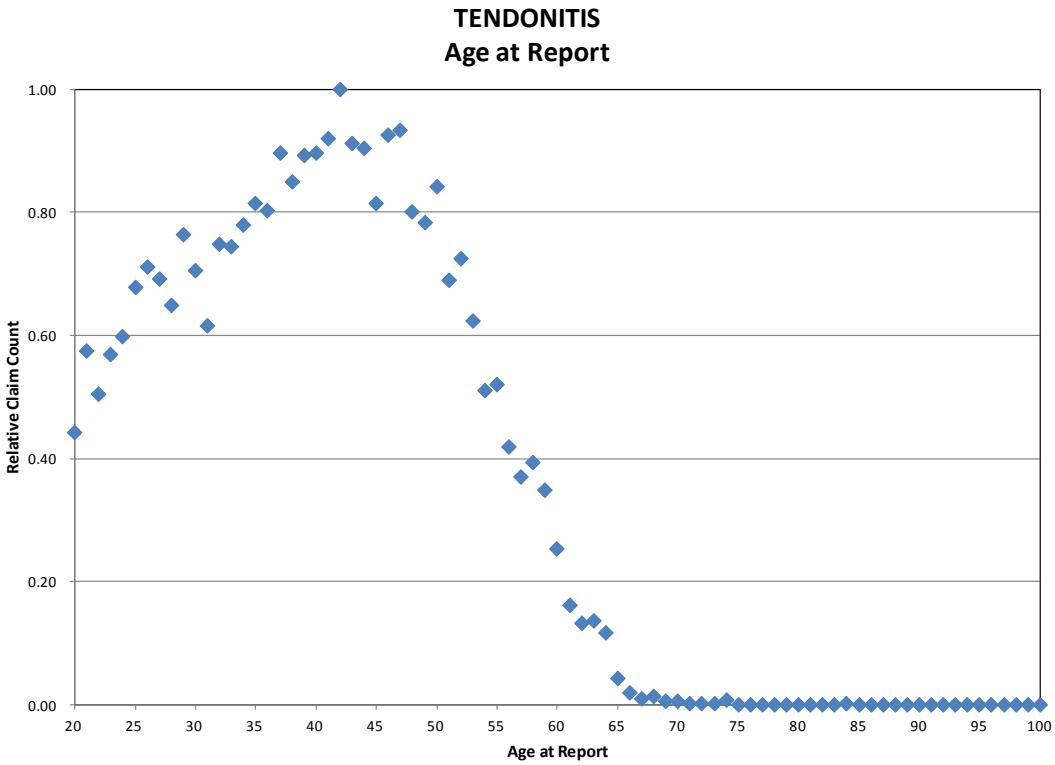
	COUNT	AVERAGE COST	AVERAGE AGE	AVERAGE LAG (DAYS)
RAW MEAN	14,944	25,517	40	35
CUT OFF	1,490	2,552		
ADJ MEAN	13,454	28,092	40	37
ADJ X 5 LARGEST	13,449	27,613	40	37
5 LARGEST	5	1,316,688	37	8
LARGEST	1	1,686,616	41	2

	ALL	LAG <= 2 Yrs	LAG > 2 Yrs
AVERAGE AGE	40	40	48
AVERAGE LAG (YEARS)	0.1	0.1	3.7
COUNT	14,883	14,814	69
COUNT PERCENTAGE		100%	0%

	M	F	U
GENDER	6,708	8,169	67
GENDER PERCENTAGE	45%	55%	0%

TENDONITIS

	COUNT	PERCENTAGE
AGRICULTURE / FARMING / AQUACULTURE	228	2%
AIRCRAFT OPERATION, SERVICE, MANUFACTURING, OR REPAIR	175	1%
ANIMAL CARE, TRAINING, BREEDING, BOARDING	16	0%
AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	341	2%
BUILDING MAINTAINENCE AND OPERATIONS	161	1%
CLERICAL	293	2%
CONSTRUCTION	331	2%
CONTRACTING	1,167	8%
EDUCATION AND RELIGIOUS INSTITUTIONS	512	3%
FIREFIGHTER	2	0%
FOOD MANUFACTURING	1,546	10%
FOOD SERVICE	650	4%
GENERAL SERVICES	209	1%
GOVERNMENT	1,053	7%
HEALTH CARE SERVICES	1,413	9%
HOSPITALITY AND ENTERTAINMENT	582	4%
LANDSCAPING	119	1%
LIVESTOCK AND POULTRY FARMING	152	1%
LOGGING AND TREE SERVICE	344	2%
MANUFACTURING GENERAL	2,426	16%
MARINE TERMINAL OPERATION	77	1%
MOTOR VEHICLE OPERATION OTHER THAN TRUCKING	89	1%
NATURAL RESOURCE EXTRACTION, REFINING, STORAGE, TRANSPORT	186	1%
POLICE OFFICERS	19	0%
RETAIL SERVICES	325	2%
SOCIAL SERVICES	210	1%
TELECOMMUNICATION AND BROADCASTING	115	1%
TRUCKING	118	1%
UNKNOWN	9	0%
UTILITY PRODUCTION, DISTRIBUTION, MAINTAINENCE	40	0%
VEHICLE OTHER THAN AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	30	0%
VESSEL OPERATION, SERVICE, MANUFACTURING, OR REPAIR	138	1%
WHOLESALE AND RETAIL GENERAL	1,868	13%


TENDONITIS
Age at Report
Relative Claim Count
1.00
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0.60
0.40
0.20
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85
90
95
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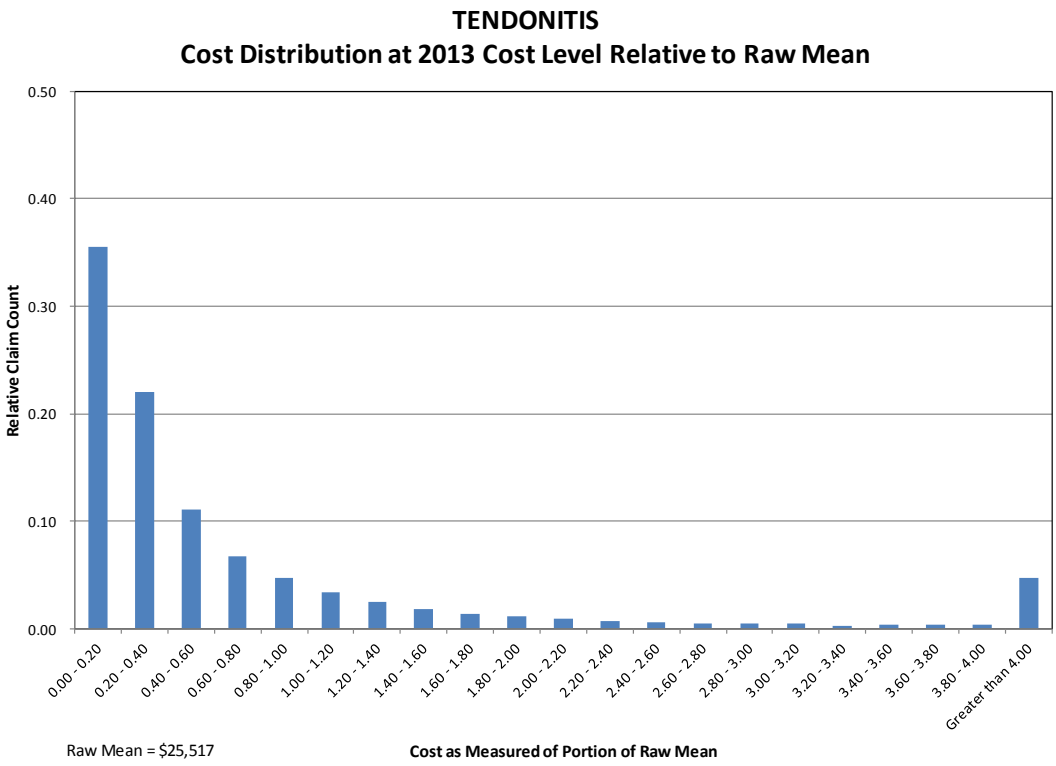
Age at Report


TENDONITIS
Cost Distribution at 2013 Cost Level Relative to Raw Mean
Relative Claim Count
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0.20
0.10
0.00
0.00 - 0.20
0.20 - 0.40
0.40 - 0.60
0.60 - 0.80
0.80 - 1.00
1.00 - 1.20
1.20 - 1.40
1.40 - 1.60
1.60 - 1.80
1.80 - 2.00
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2.20 - 2.40
2.40 - 2.60
2.60 - 2.80
2.80 - 3.00
3.00 - 3.20
3.20 - 3.40
3.40 - 3.60
3.60 - 3.80
3.80 - 4.00
Greater than 4.00
Raw Mean = $25,517
Cost as Measured of Portion of Raw Mean

TENOSYNOVITIS

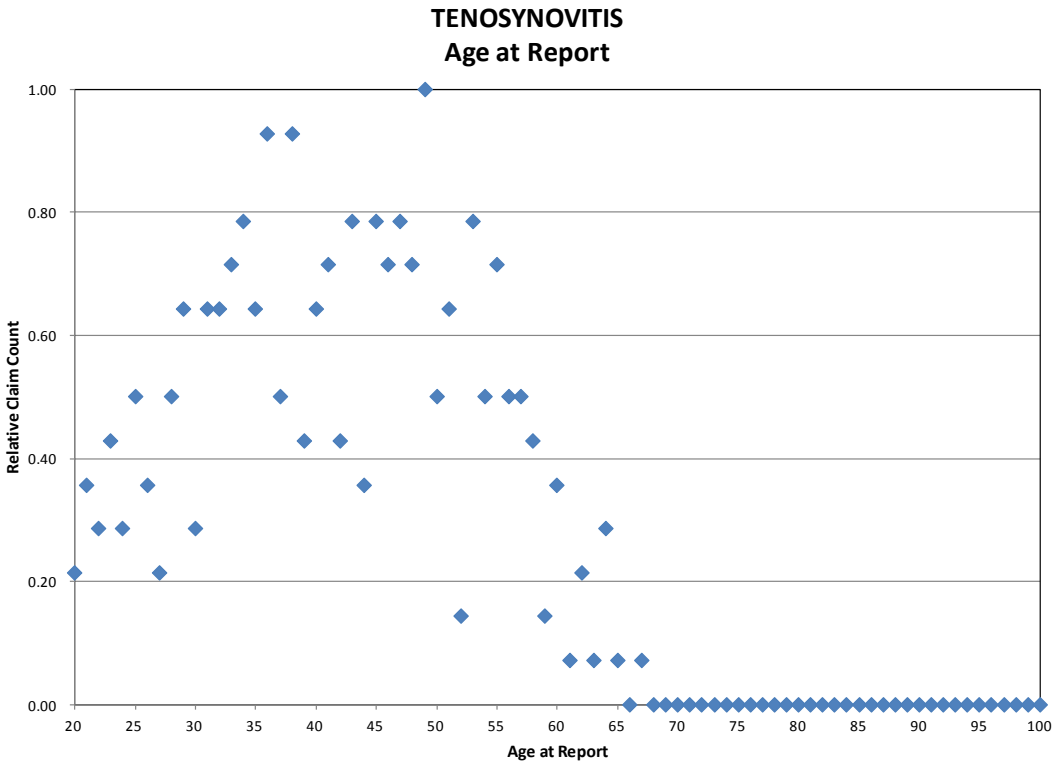
	COUNT	AVERAGE COST	AVERAGE AGE	AVERAGE LAG (DAYS)
RAW MEAN	351	28,215	41	63
CUT OFF	55	2,821		
ADJ MEAN	296	33,014	42	69
ADJ X 5 LARGEST	291	24,209	42	67
5 LARGEST	5	545,484	34	223
LARGEST	1	955,931	35	6

	ALL	LAG <= 2 Yrs	LAG > 2 Yrs
AVERAGE AGE	41	41	49
AVERAGE LAG (YEARS)	0.2	0.1	3.8
COUNT	327	323	4
COUNT PERCENTAGE		99%	1%

	M	F	U
GENDER	140	206	5
GENDER PERCENTAGE	40%	59%	1%

TENOSYNOVITIS

	COUNT	PERCENTAGE
AGRICULTURE / FARMING / AQUACULTURE	2	1%
AIRCRAFT OPERATION, SERVICE, MANUFACTURING, OR REPAIR	2	1%
ANIMAL CARE, TRAINING, BREEDING, BOARDING	0	0%
AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	12	3%
BUILDING MAINTAINENCE AND OPERATIONS	5	1%
CLERICAL	14	4%
CONSTRUCTION	11	3%
CONTRACTING	13	4%
EDUCATION AND RELIGIOUS INSTITUTIONS	16	5%
FIREFIGHTER	1	0%
FOOD MANUFACTURING	71	20%
FOOD SERVICE	23	7%
GENERAL SERVICES	1	0%
GOVERNMENT	18	5%
HEALTH CARE SERVICES	26	7%
HOSPITALITY AND ENTERTAINMENT	9	3%
LANDSCAPING	1	0%
LIVESTOCK AND POULTRY FARMING	0	0%
LOGGING AND TREE SERVICE	2	1%
MANUFACTURING GENERAL	56	16%
MARINE TERMINAL OPERATION	1	0%
MOTOR VEHICLE OPERATION OTHER THAN TRUCKING	0	0%
NATURAL RESOURCE EXTRACTION, REFINING, STORAGE, TRANSPORT	7	2%
POLICE OFFICERS	1	0%
RETAIL SERVICES	10	3%
SOCIAL SERVICES	3	1%
TELECOMMUNICATION AND BROADCASTING	4	1%
TRUCKING	5	1%
UNKNOWN	0	0%
UTILITY PRODUCTION, DISTRIBUTION, MAINTAINENCE	0	0%
VEHICLE OTHER THAN AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	0	0%
VESSEL OPERATION, SERVICE, MANUFACTURING, OR REPAIR	10	3%
WHOLESALE AND RETAIL GENERAL	27	8%


TENOSYNOVITIS
Age at Report
Relative Claim Count
1.00
0.80
0.60
0.40
0.20
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75
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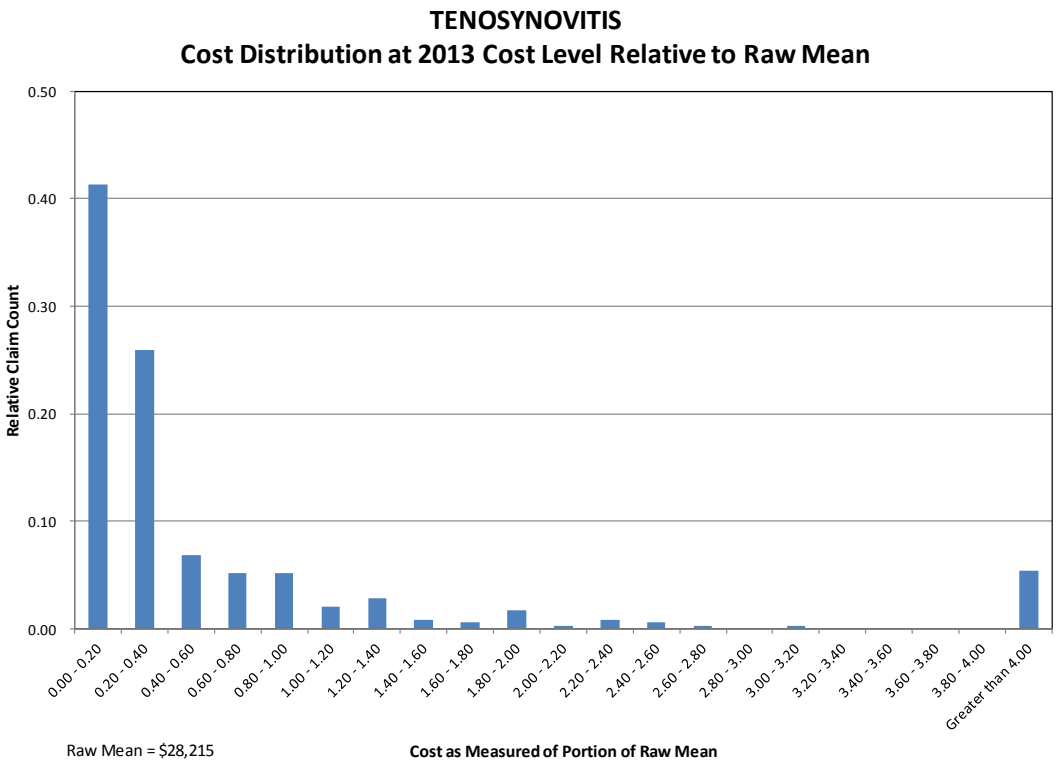
90
95
100
Age at Report


TENOSYNOVITIS
Cost Distribution at 2013 Cost Level Relative to Raw Mean
Relative Claim Count
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0.30
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0.10
0.00
0.00 - 0.20
0.20 - 0.40
0.40 - 0.60
0.60 - 0.80
0.80 - 1.00
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1.20 - 1.40
1.40 - 1.60
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2.40 - 2.60
2.60 - 2.80
2.80 - 3.00
3.00 - 3.20
3.20 - 3.40
3.40 - 3.60
3.60 - 3.80
3.80 - 4.00
Greater than 4.00
Raw Mean = $28,215
Cost as Measured of Portion of Raw Mean

OTHER INFLAMMATION

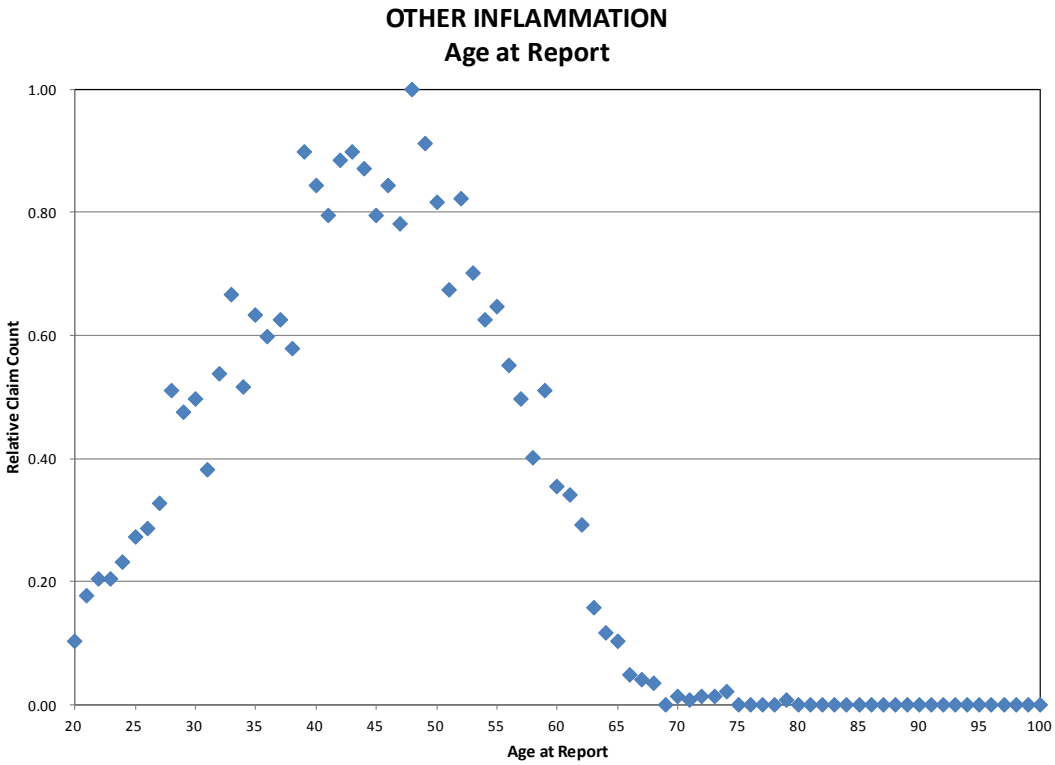
	COUNT	AVERAGE COST	AVERAGE AGE	AVERAGE LAG (DAYS)
RAW MEAN	4,268	28,386	44	115
CUT OFF	584	2,839		
ADJ MEAN	3,684	32,507	44	122
ADJ X 5 LARGEST	3,679	30,381	44	122
5 LARGEST	5	1,597,070	40	169
LARGEST	1	3,645,086	39	748

	ALL	LAG <= 2 Yrs	LAG > 2 Yrs
AVERAGE AGE	44	43	49
AVERAGE LAG (YEARS)	0.3	0.2	5.8
COUNT	3,707	3,605	102
COUNT PERCENTAGE		97%	3%

	M	F	U
GENDER	2,187	2,050	31
GENDER PERCENTAGE	51%	48%	1%

OTHER INFLAMMATION

	COUNT	PERCENTAGE
AGRICULTURE / FARMING / AQUACULTURE	24	1%
AIRCRAFT OPERATION, SERVICE, MANUFACTURING, OR REPAIR	12	0%
ANIMAL CARE, TRAINING, BREEDING, BOARDING	8	0%
AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	204	5%
BUILDING MAINTAINENCE AND OPERATIONS	152	4%
CLERICAL	252	6%
CONSTRUCTION	126	3%
CONTRACTING	366	9%
EDUCATION AND RELIGIOUS INSTITUTIONS	78	2%
FIREFIGHTER	6	0%
FOOD MANUFACTURING	258	6%
FOOD SERVICE	228	5%
GENERAL SERVICES	34	1%
GOVERNMENT	398	9%
HEALTH CARE SERVICES	310	7%
HOSPITALITY AND ENTERTAINMENT	113	3%
LANDSCAPING	5	0%
LIVESTOCK AND POULTRY FARMING	6	0%
LOGGING AND TREE SERVICE	64	1%
MANUFACTURING GENERAL	755	18%
MARINE TERMINAL OPERATION	9	0%
MOTOR VEHICLE OPERATION OTHER THAN TRUCKING	55	1%
NATURAL RESOURCE EXTRACTION, REFINING, STORAGE, TRANSPORT	27	1%
POLICE OFFICERS	12	0%
RETAIL SERVICES	89	2%
SOCIAL SERVICES	49	1%
TELECOMMUNICATION AND BROADCASTING	7	0%
TRUCKING	98	2%
UNKNOWN	76	2%
UTILITY PRODUCTION, DISTRIBUTION, MAINTAINENCE	28	1%
VEHICLE OTHER THAN AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	5	0%
VESSEL OPERATION, SERVICE, MANUFACTURING, OR REPAIR	123	3%
WHOLESALE AND RETAIL GENERAL	291	7%


OTHER INFLAMMATION
Age at Report
Relative Claim Count
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0.40
0.20
0.00
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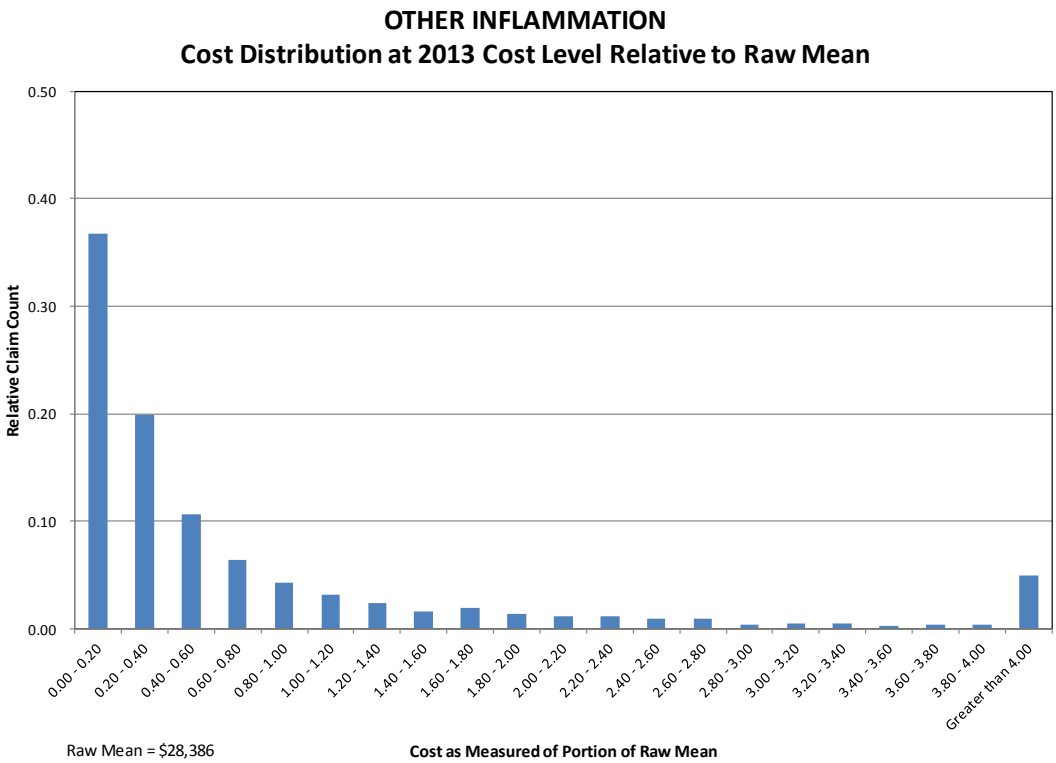
Age at Report


OTHER INFLAMMATION
Cost Distribution at 2013 Cost Level Relative to Raw Mean
Relative Claim Count
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0.20
0.10
0.00
0.00 - 0.20
0.20 - 0.40
0.40 - 0.60
0.60 - 0.80
0.80 - 1.00
1.00 - 1.20
1.20 - 1.40
1.40 - 1.60
1.60 - 1.80
1.80 - 2.00
2.00 - 2.20
2.20 - 2.40
2.40 - 2.60
2.60 - 2.80
2.80 - 3.00
3.00 - 3.20
3.20 - 3.40
3.40 - 3.60
3.60 - 3.80
3.80 - 4.00
Greater than 4.00
Raw Mean = $28,386
Cost as Measured of Portion of Raw Mean

HERNIA

	COUNT	AVERAGE COST	AVERAGE AGE	AVERAGE LAG (DAYS)
RAW MEAN	1,161	19,917	44	96
CUT OFF	0	1,992		
ADJ MEAN	1,161	19,917	44	96
ADJ X 5 LARGEST	1,156	17,693	44	96
5 LARGEST	5	534,013	48	58
LARGEST	1	1,187,016	40	90

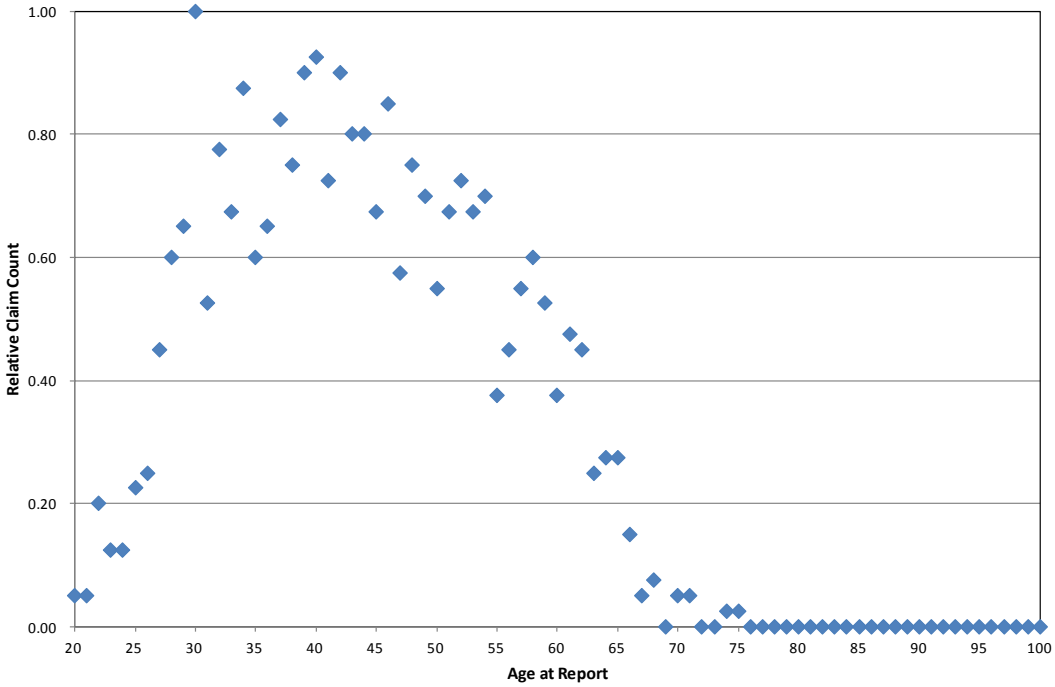
	ALL	LAG <= 2 Yrs	LAG > 2 Yrs
AVERAGE AGE	44	44	44
AVERAGE LAG (YEARS)	0.3	0.2	4.3
COUNT	1,054	1,031	23
COUNT PERCENTAGE		98%	2%

	M	F	U
GENDER	1,131	28	2
GENDER PERCENTAGE	97%	2%	0%

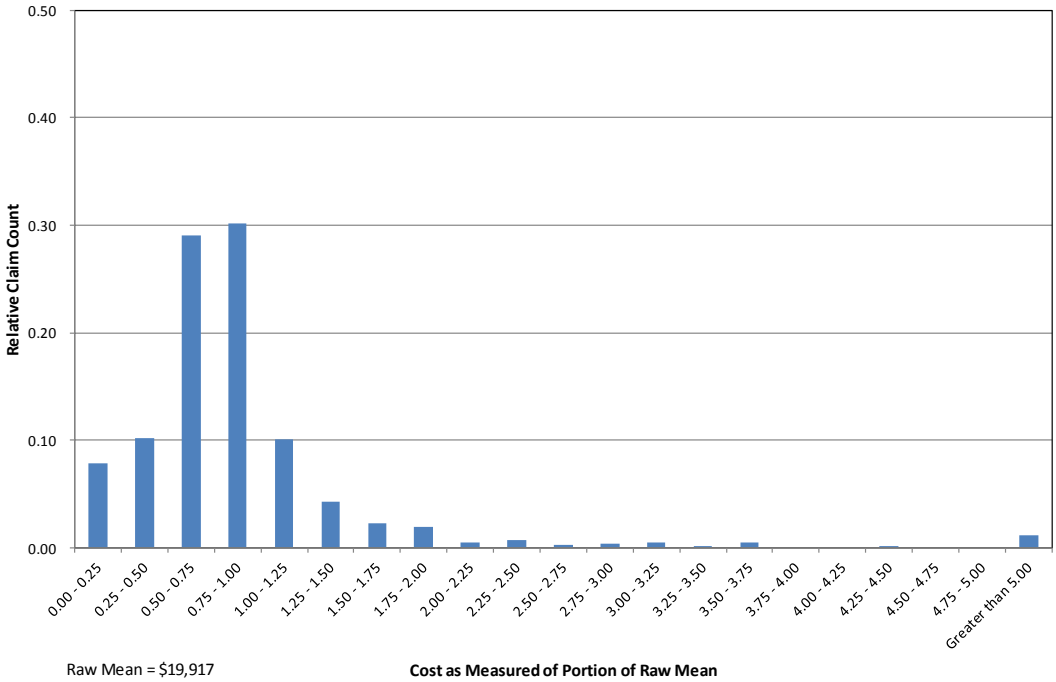
HERNIA

	COUNT	PERCENTAGE
AGRICULTURE / FARMING / AQUACULTURE	1	0%
AIRCRAFT OPERATION, SERVICE, MANUFACTURING, OR REPAIR	0	0%
ANIMAL CARE, TRAINING, BREEDING, BOARDING	0	0%
AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	35	3%
BUILDING MAINTAINENCE AND OPERATIONS	11	1%
CLERICAL	0	0%
CONSTRUCTION	18	2%
CONTRACTING	32	3%
EDUCATION AND RELIGIOUS INSTITUTIONS	0	0%
FIREFIGHTER	1	0%
FOOD MANUFACTURING	4	0%
FOOD SERVICE	14	1%
GENERAL SERVICES	2	0%
GOVERNMENT	17	1%
HEALTH CARE SERVICES	5	0%
HOSPITALITY AND ENTERTAINMENT	9	1%
LANDSCAPING	3	0%
LIVESTOCK AND POULTRY FARMING	4	0%
LOGGING AND TREE SERVICE	8	1%
MANUFACTURING GENERAL	81	7%
MARINE TERMINAL OPERATION	0	0%
MOTOR VEHICLE OPERATION OTHER THAN TRUCKING	4	0%
NATURAL RESOURCE EXTRACTION, REFINING, STORAGE, TRANSPORT	0	0%
POLICE OFFICERS	1	0%
RETAIL SERVICES	2	0%
SOCIAL SERVICES	1	0%
TELECOMMUNICATION AND BROADCASTING	0	0%
TRUCKING	22	2%
UNKNOWN	7	1%
UTILITY PRODUCTION, DISTRIBUTION, MAINTAINENCE	0	0%
VEHICLE OTHER THAN AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	0	0%
VESSEL OPERATION, SERVICE, MANUFACTURING, OR REPAIR	837	72%
WHOLESALE AND RETAIL GENERAL	42	4%

HERNIA
Age at Report



HERNIA
Cost Distribution at 2013 Cost Level Relative to Raw Mean



SPRAIN/STRAIN/TEAR

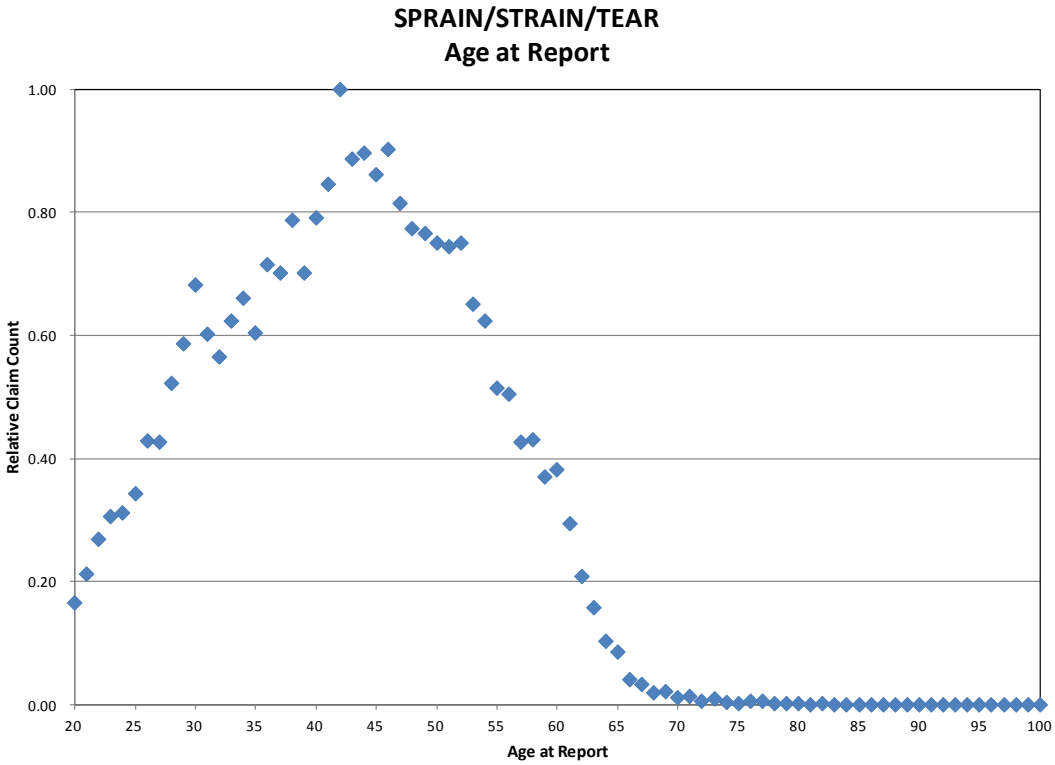
	COUNT	AVERAGE COST	AVERAGE AGE	AVERAGE LAG (DAYS)
RAW MEAN	24,558	33,022	42	107
CUT OFF	4,618	3,302		
ADJ MEAN	19,940	40,069	43	119
ADJ X 5 LARGEST	19,935	39,014	43	118
5 LARGEST	5	4,248,385	38	1,629
LARGEST	1	5,717,959	66	5,264

	ALL	LAG <= 2 Yrs	LAG > 2 Yrs
AVERAGE AGE	42	42	49
AVERAGE LAG (YEARS)	0.3	0.1	7.0
COUNT	23,008	22,439	569
COUNT PERCENTAGE		98%	2%

	M	F	U
GENDER	14,507	9,699	352
GENDER PERCENTAGE	59%	39%	1%

SPRAIN/STRAIN/TEAR

	COUNT	PERCENTAGE
AGRICULTURE / FARMING / AQUACULTURE	56	0%
AIRCRAFT OPERATION, SERVICE, MANUFACTURING, OR REPAIR	136	1%
ANIMAL CARE, TRAINING, BREEDING, BOARDING	11	0%
AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	805	3%
BUILDING MAINTAINENCE AND OPERATIONS	340	1%
CLERICAL	764	3%
CONSTRUCTION	537	2%
CONTRACTING	1,179	5%
EDUCATION AND RELIGIOUS INSTITUTIONS	611	2%
FIREFIGHTER	25	0%
FOOD MANUFACTURING	2,223	9%
FOOD SERVICE	572	2%
GENERAL SERVICES	208	1%
GOVERNMENT	1,645	7%
HEALTH CARE SERVICES	1,843	8%
HOSPITALITY AND ENTERTAINMENT	585	2%
LANDSCAPING	41	0%
LIVESTOCK AND POULTRY FARMING	16	0%
LOGGING AND TREE SERVICE	132	1%
MANUFACTURING GENERAL	2,726	11%
MARINE TERMINAL OPERATION	55	0%
MOTOR VEHICLE OPERATION OTHER THAN TRUCKING	217	1%
NATURAL RESOURCE EXTRACTION, REFINING, STORAGE, TRANSPORT	380	2%
POLICE OFFICERS	45	0%
RETAIL SERVICES	242	1%
SOCIAL SERVICES	411	2%
TELECOMMUNICATION AND BROADCASTING	83	0%
TRUCKING	429	2%
UNKNOWN	201	1%
UTILITY PRODUCTION, DISTRIBUTION, MAINTAINENCE	89	0%
VEHICLE OTHER THAN AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	22	0%
VESSEL OPERATION, SERVICE, MANUFACTURING, OR REPAIR	6,692	27%
WHOLESALE AND RETAIL GENERAL	1,237	5%


SPRAIN/STRAIN/TEAR
Age at Report
Relative Claim Count
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0.60
0.40
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0.00
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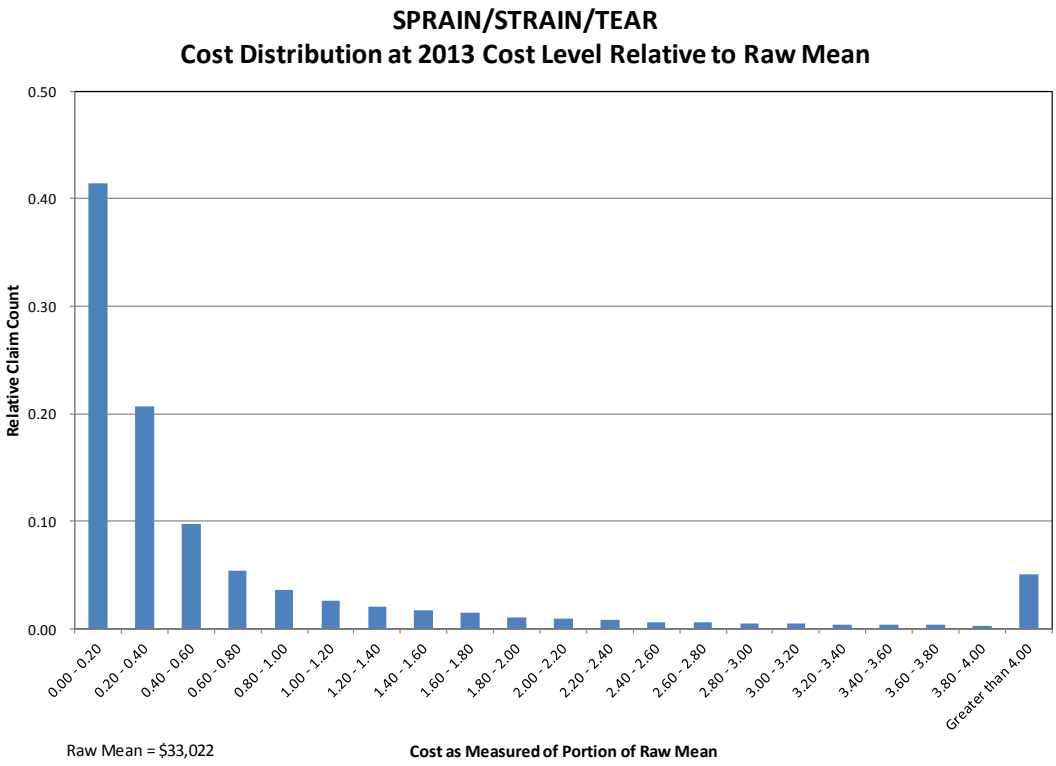
Age at Report


SPRAIN/STRAIN/TEAR
Cost Distribution at 2013 Cost Level Relative to Raw Mean
Relative Claim Count
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0.30
0.20
0.10
0.00
0.00 - 0.20
0.20 - 0.40
0.40 - 0.60
0.60 - 0.80
0.80 - 1.00
1.00 - 1.20
1.20 - 1.40
1.40 - 1.60
1.60 - 1.80
1.80 - 2.00
2.00 - 2.20
2.20 - 2.40
2.40 - 2.60
2.60 - 2.80
2.80 - 3.00
3.00 - 3.20
3.20 - 3.40
3.40 - 3.60
3.60 - 3.80
3.80 - 4.00
Greater than 4.00
Raw Mean = $33,022
Cost as Measured of Portion of Raw Mean

CUMULATIVE ALL OTHER

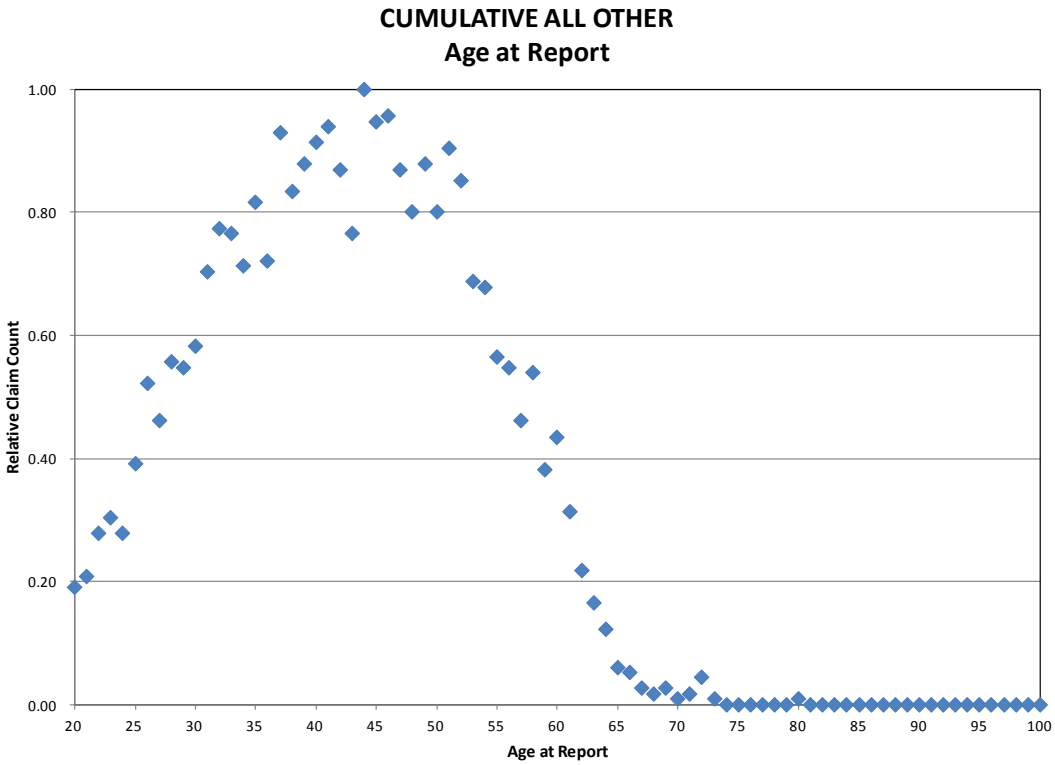
	COUNT	AVERAGE COST	AVERAGE AGE	AVERAGE LAG (DAYS)
RAW MEAN	3,411	29,689	42	102
CUT OFF	569	2,969		
ADJ MEAN	2,842	35,147	43	108
ADJ X 5 LARGEST	2,837	32,761	43	108
5 LARGEST	5	1,388,614	35	56
LARGEST	1	1,813,565	0	0

	ALL	LAG <= 2 Yrs	LAG > 2 Yrs
AVERAGE AGE	42	42	49
AVERAGE LAG (YEARS)	0.3	0.1	6.1
COUNT	3,277	3,205	72
COUNT PERCENTAGE		98%	2%

	M	F	U
GENDER	1,735	1,647	29
GENDER PERCENTAGE	51%	48%	1%

CUMULATIVE ALL OTHER

	COUNT	PERCENTAGE
AGRICULTURE / FARMING / AQUACULTURE	7	0%
AIRCRAFT OPERATION, SERVICE, MANUFACTURING, OR REPAIR	22	1%
ANIMAL CARE, TRAINING, BREEDING, BOARDING	4	0%
AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	127	4%
BUILDING MAINTAINENCE AND OPERATIONS	65	2%
CLERICAL	106	3%
CONSTRUCTION	116	3%
CONTRACTING	252	7%
EDUCATION AND RELIGIOUS INSTITUTIONS	128	4%
FIREFIGHTER	3	0%
FOOD MANUFACTURING	760	22%
FOOD SERVICE	106	3%
GENERAL SERVICES	43	1%
GOVERNMENT	303	9%
HEALTH CARE SERVICES	229	7%
HOSPITALITY AND ENTERTAINMENT	107	3%
LANDSCAPING	5	0%
LIVESTOCK AND POULTRY FARMING	2	0%
LOGGING AND TREE SERVICE	33	1%
MANUFACTURING GENERAL	422	12%
MARINE TERMINAL OPERATION	13	0%
MOTOR VEHICLE OPERATION OTHER THAN TRUCKING	28	1%
NATURAL RESOURCE EXTRACTION, REFINING, STORAGE, TRANSPORT	69	2%
POLICE OFFICERS	2	0%
RETAIL SERVICES	56	2%
SOCIAL SERVICES	68	2%
TELECOMMUNICATION AND BROADCASTING	12	0%
TRUCKING	77	2%
UNKNOWN	29	1%
UTILITY PRODUCTION, DISTRIBUTION, MAINTAINENCE	20	1%
VEHICLE OTHER THAN AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	3	0%
VESSEL OPERATION, SERVICE, MANUFACTURING, OR REPAIR	4	0%
WHOLESALE AND RETAIL GENERAL	190	6%


CUMULATIVE ALL OTHER
Age at Report
Relative Claim Count
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0.80
0.60
0.40
0.20
0.00
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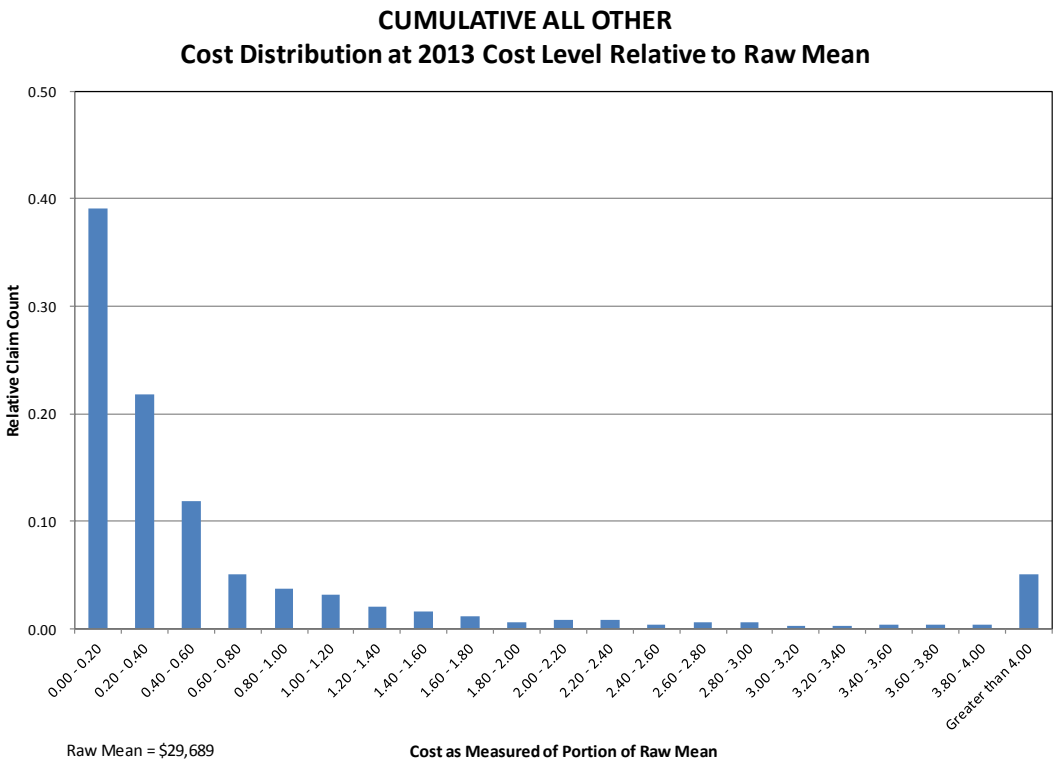
Age at Report


CUMULATIVE ALL OTHER
Cost Distribution at 2013 Cost Level Relative to Raw Mean
Relative Claim Count
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0.40
0.30
0.20
0.10
0.00
0.00 - 0.20
0.20 - 0.40
0.40 - 0.60
0.60 - 0.80
0.80 - 1.00
1.00 - 1.20
1.20 - 1.40
1.40 - 1.60
1.60 - 1.80
1.80 - 2.00
2.00 - 2.20
2.20 - 2.40
2.40 - 2.60
2.60 - 2.80
2.80 - 3.00
3.00 - 3.20
3.20 - 3.40
3.40 - 3.60
3.60 - 3.80
3.80 - 4.00
Greater than 4.00
Raw Mean = $29,689
Cost as Measured of Portion of Raw Mean

ASBESTOSIS

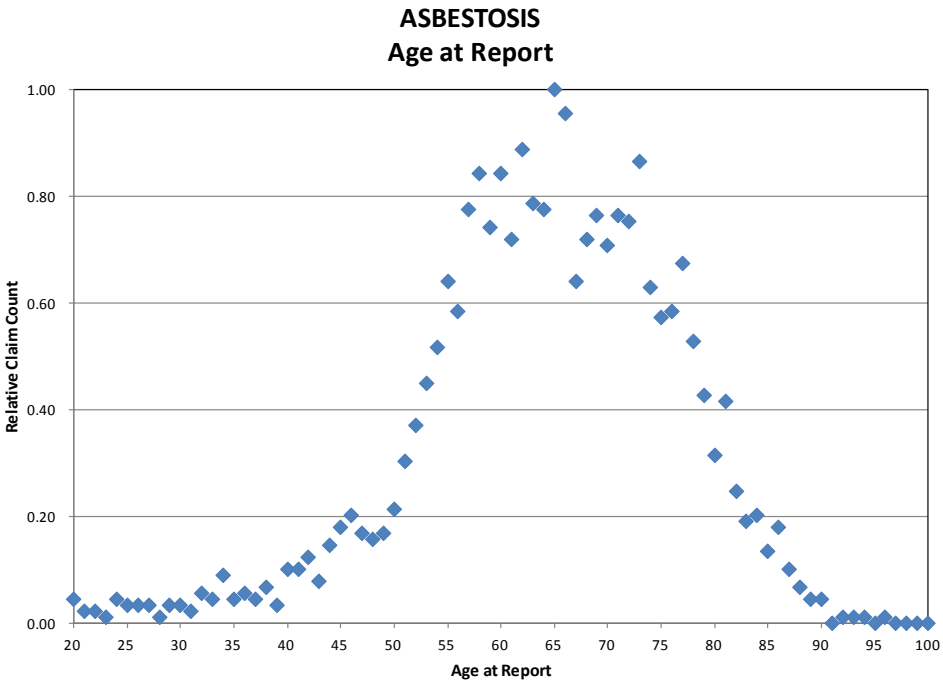
	COUNT	AVERAGE COST	AVERAGE AGE	AVERAGE LAG (DAYS)
RAW MEAN	2,228	166,223	64	1,431
CUT OFF	905	16,622		
ADJ MEAN	1,323	277,441	66	1,535
ADJ X 5 LARGEST	1,318	267,089	66	1,515
5 LARGEST	5	3,006,278	59	6,741
LARGEST	1	5,318,207	55	7,540

	ALL	LAG <= 2 Yrs	LAG > 2 Yrs
AVERAGE AGE	64	63	67
AVERAGE LAG (YEARS)	3.9	0.4	12.4
COUNT	2,159	1,524	635
COUNT PERCENTAGE		71%	29%

	M	F	U
GENDER	2,164	36	28
GENDER PERCENTAGE	97%	2%	1%

ASBESTOSIS

	COUNT	PERCENTAGE
AGRICULTURE / FARMING / AQUACULTURE	0	0%
AIRCRAFT OPERATION, SERVICE, MANUFACTURING, OR REPAIR	3	0%
ANIMAL CARE, TRAINING, BREEDING, BOARDING	0	0%
AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	16	1%
BUILDING MAINTAINENCE AND OPERATIONS	54	2%
CLERICAL	3	0%
CONSTRUCTION	202	9%
CONTRACTING	495	22%
EDUCATION AND RELIGIOUS INSTITUTIONS	22	1%
FIREFIGHTER	0	0%
FOOD MANUFACTURING	7	0%
FOOD SERVICE	0	0%
GENERAL SERVICES	38	2%
GOVERNMENT	62	3%
HEALTH CARE SERVICES	18	1%
HOSPITALITY AND ENTERTAINMENT	4	0%
LANDSCAPING	0	0%
LIVESTOCK AND POULTRY FARMING	0	0%
LOGGING AND TREE SERVICE	1	0%
MANUFACTURING GENERAL	221	10%
MARINE TERMINAL OPERATION	37	2%
MOTOR VEHICLE OPERATION OTHER THAN TRUCKING	0	0%
NATURAL RESOURCE EXTRACTION, REFINING, STORAGE, TRANSPORT	93	4%
POLICE OFFICERS	0	0%
RETAIL SERVICES	0	0%
SOCIAL SERVICES	1	0%
TELECOMMUNICATION AND BROADCASTING	1	0%
TRUCKING	9	0%
UNKNOWN	102	5%
UTILITY PRODUCTION, DISTRIBUTION, MAINTAINENCE	24	1%
VEHICLE OTHER THAN AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	3	0%
VESSEL OPERATION, SERVICE, MANUFACTURING, OR REPAIR	787	35%
WHOLESALE AND RETAIL GENERAL	25	1%


ASBESTOSIS
Age at Report
Relative Claim Count
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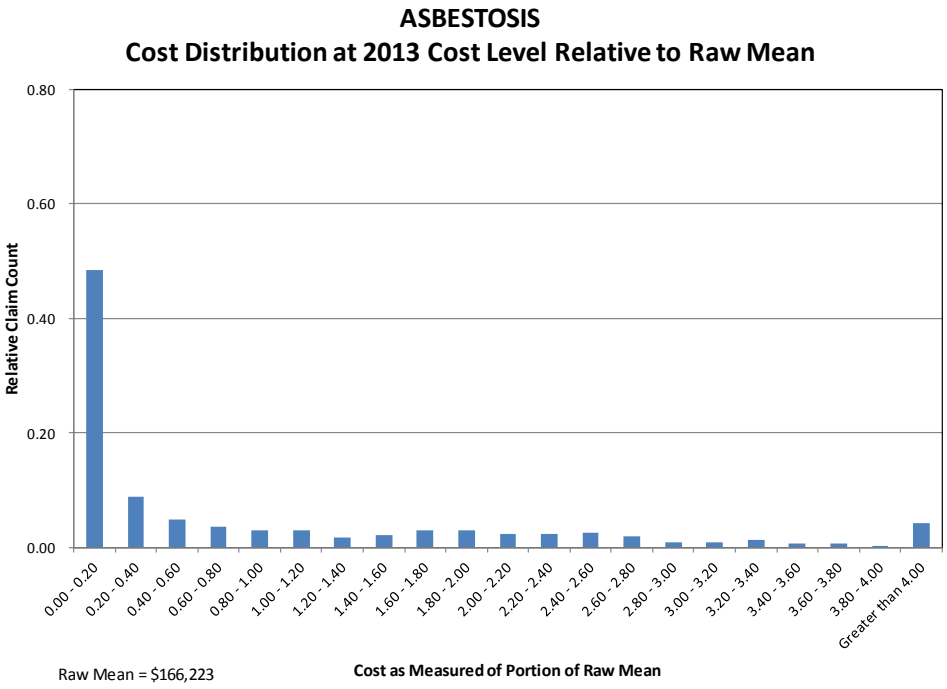
Age at Report


ASBESTOSIS
Cost Distribution at 2013 Cost Level Relative to Raw Mean
Relative Claim Count
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0.40
0.20
0.00
0.00 - 0.20
0.20 - 0.40
0.40 - 0.60
0.60 - 0.80
0.80 - 1.00
1.00 - 1.20
1.20 - 1.40
1.40 - 1.60
1.60 - 1.80
1.80 - 2.00
2.00 - 2.20
2.20 - 2.40
2.40 - 2.60
2.60 - 2.80
2.80 - 3.00
3.00 - 3.20
3.20 - 3.40
3.40 - 3.60
3.60 - 3.80
3.80 - 4.00
Greater than 4.00
Raw Mean = $166,223
Cost as Measured of Portion of Raw Mean

MESOTHELIOMA

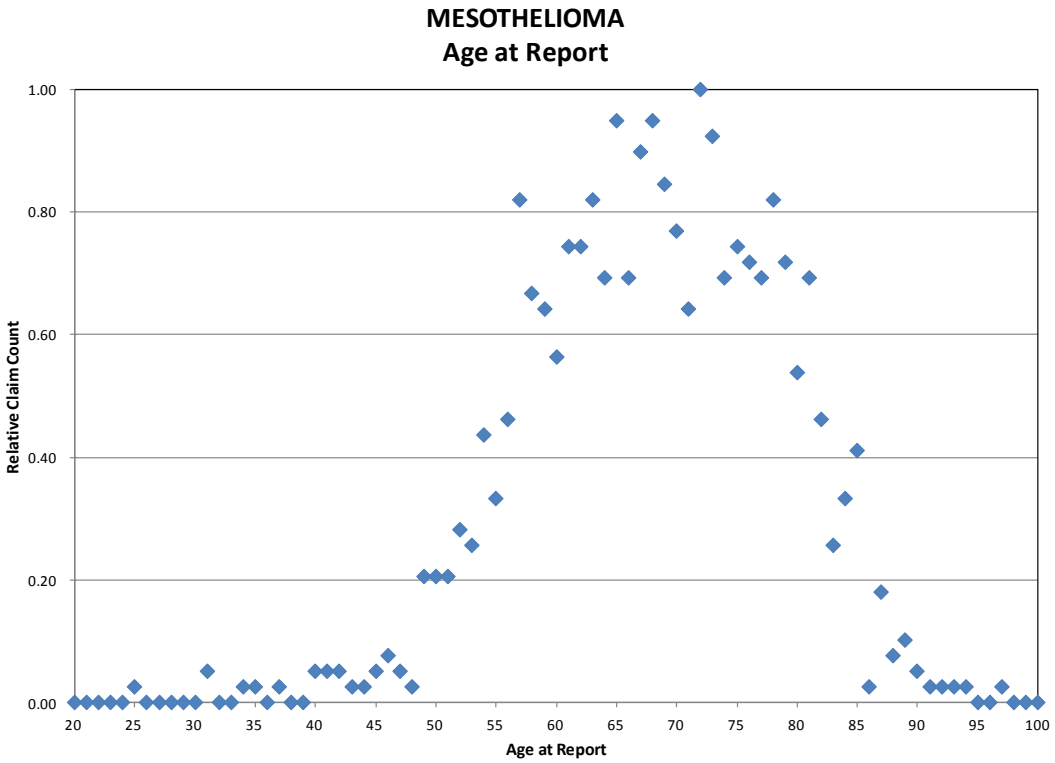
	COUNT	AVERAGE COST	AVERAGE AGE	AVERAGE LAG (DAYS)
RAW MEAN	935	273,907	68	619
CUT OFF	128	27,391		
ADJ MEAN	807	316,188	68	446
ADJ X 5 LARGEST	802	307,663	68	448
5 LARGEST	5	1,683,616	60	206
LARGEST	1	2,069,935	63	50

	ALL	LAG <= 2 Yrs	LAG > 2 Yrs
AVERAGE AGE	68	68	68
AVERAGE LAG (YEARS)	1.7	0.4	10.7
COUNT	934	815	119
COUNT PERCENTAGE		87%	13%

	M	F	U
GENDER	894	36	5
GENDER PERCENTAGE	96%	4%	1%

MESOTHELIOMA

	COUNT	PERCENTAGE
AGRICULTURE / FARMING / AQUACULTURE	0	0%
AIRCRAFT OPERATION, SERVICE, MANUFACTURING, OR REPAIR	3	0%
ANIMAL CARE, TRAINING, BREEDING, BOARDING	0	0%
AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	21	2%
BUILDING MAINTAINENCE AND OPERATIONS	15	2%
CLERICAL	7	1%
CONSTRUCTION	47	5%
CONTRACTING	236	25%
EDUCATION AND RELIGIOUS INSTITUTIONS	22	2%
FIREFIGHTER	0	0%
FOOD MANUFACTURING	6	1%
FOOD SERVICE	2	0%
GENERAL SERVICES	28	3%
GOVERNMENT	29	3%
HEALTH CARE SERVICES	13	1%
HOSPITALITY AND ENTERTAINMENT	8	1%
LANDSCAPING	1	0%
LIVESTOCK AND POULTRY FARMING	0	0%
LOGGING AND TREE SERVICE	4	0%
MANUFACTURING GENERAL	140	15%
MARINE TERMINAL OPERATION	17	2%
MOTOR VEHICLE OPERATION OTHER THAN TRUCKING	2	0%
NATURAL RESOURCE EXTRACTION, REFINING, STORAGE, TRANSPORT	66	7%
POLICE OFFICERS	1	0%
RETAIL SERVICES	2	0%
SOCIAL SERVICES	1	0%
TELECOMMUNICATION AND BROADCASTING	6	1%
TRUCKING	16	2%
UNKNOWN	52	6%
UTILITY PRODUCTION, DISTRIBUTION, MAINTAINENCE	14	1%
VEHICLE OTHER THAN AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	0	0%
VESSEL OPERATION, SERVICE, MANUFACTURING, OR REPAIR	142	15%
WHOLESALE AND RETAIL GENERAL	34	4%


MESOTHELIOMA
Age at Report
Relative Claim Count
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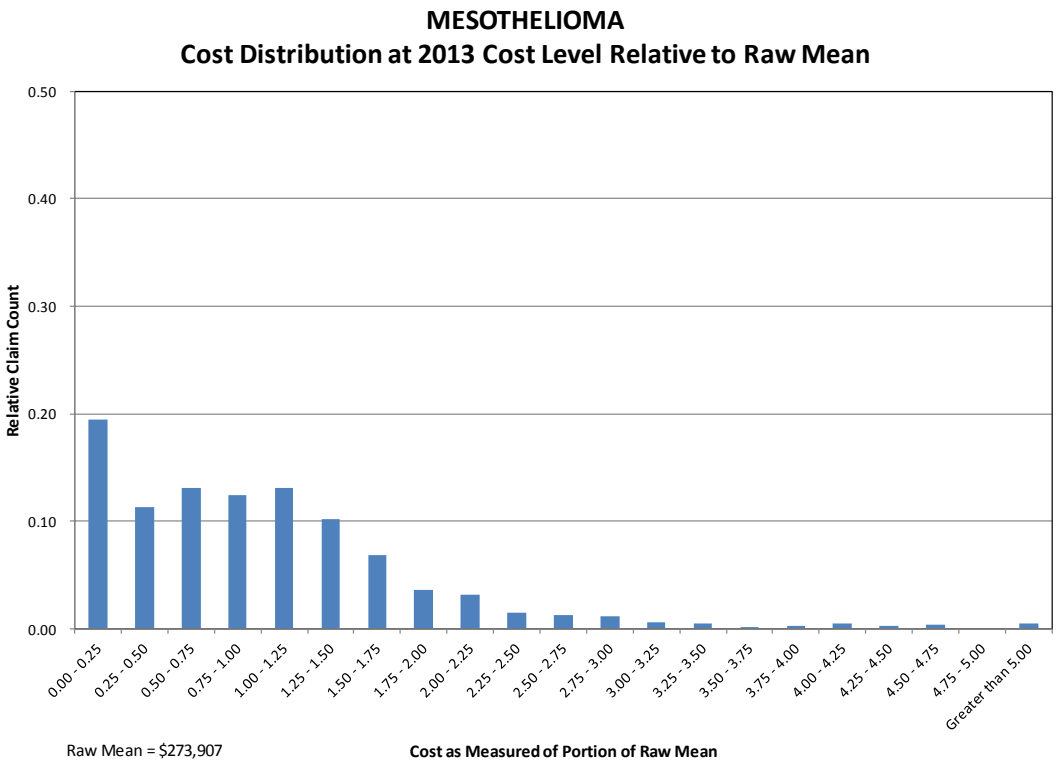
Age at Report


MESOTHELIOMA
Cost Distribution at 2013 Cost Level Relative to Raw Mean
Relative Claim Count
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0.10
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3.50 - 3.75
3.75 - 4.00
4.00 - 4.25
4.25 - 4.50
4.50 - 4.75
4.75 - 5.00
Greater than 5.00
Raw Mean = $273,907
Cost as Measured of Portion of Raw Mean

LUNG CANCER

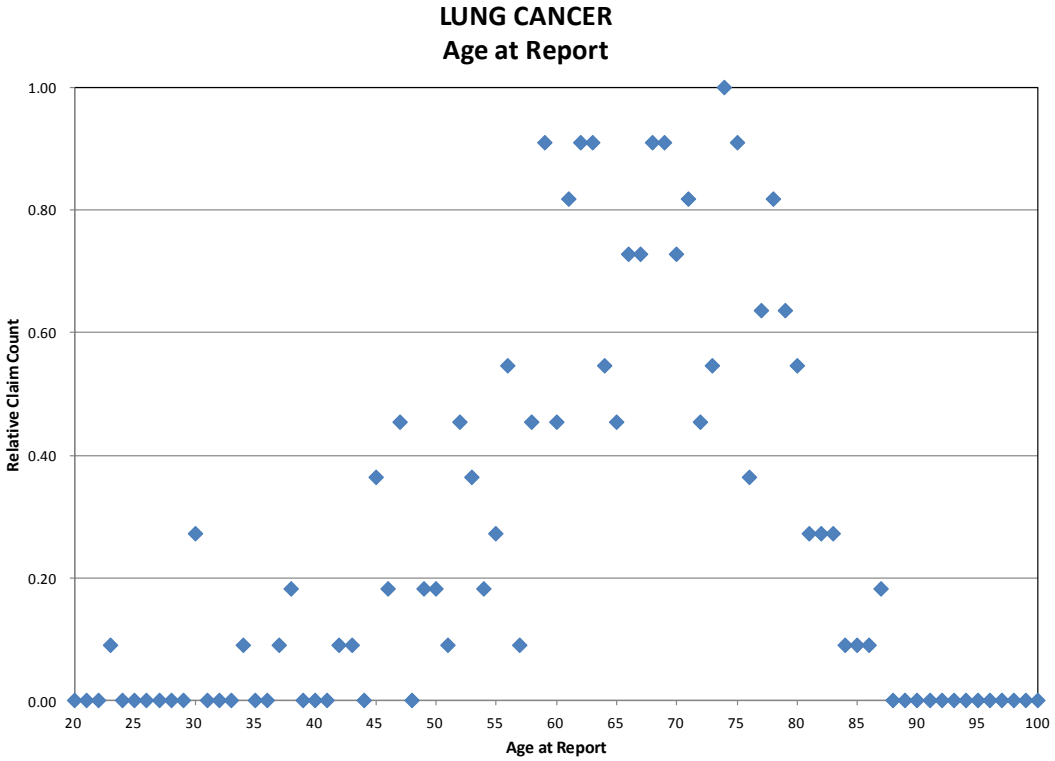
	COUNT	AVERAGE COST	AVERAGE AGE	AVERAGE LAG (DAYS)
RAW MEAN	249	237,012	66	3,044
CUT OFF	84	23,701		
ADJ MEAN	165	354,825	67	2,642
ADJ X 5 LARGEST	160	294,929	67	2,674
5 LARGEST	5	2,271,490	45	1,613
LARGEST	1	3,373,094	43	363

	ALL	LAG <= 2 Yrs	LAG > 2 Yrs
AVERAGE AGE	66	62	68
AVERAGE LAG (YEARS)	8.3	0.5	13.2
COUNT	239	91	148
COUNT PERCENTAGE		38%	62%

	M	F	U
GENDER	243	6	0
GENDER PERCENTAGE	98%	2%	0%

LUNG CANCER

	COUNT	PERCENTAGE
AGRICULTURE / FARMING / AQUACULTURE	0	0%
AIRCRAFT OPERATION, SERVICE, MANUFACTURING, OR REPAIR	0	0%
ANIMAL CARE, TRAINING, BREEDING, BOARDING	0	0%
AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	1	0%
BUILDING MAINTAINENCE AND OPERATIONS	0	0%
CLERICAL	0	0%
CONSTRUCTION	4	2%
CONTRACTING	7	3%
EDUCATION AND RELIGIOUS INSTITUTIONS	3	1%
FIREFIGHTER	3	1%
FOOD MANUFACTURING	0	0%
FOOD SERVICE	1	0%
GENERAL SERVICES	6	2%
GOVERNMENT	10	4%
HEALTH CARE SERVICES	1	0%
HOSPITALITY AND ENTERTAINMENT	0	0%
LANDSCAPING	0	0%
LIVESTOCK AND POULTRY FARMING	0	0%
LOGGING AND TREE SERVICE	0	0%
MANUFACTURING GENERAL	11	4%
MARINE TERMINAL OPERATION	0	0%
MOTOR VEHICLE OPERATION OTHER THAN TRUCKING	0	0%
NATURAL RESOURCE EXTRACTION, REFINING, STORAGE, TRANSPORT	4	2%
POLICE OFFICERS	0	0%
RETAIL SERVICES	0	0%
SOCIAL SERVICES	0	0%
TELECOMMUNICATION AND BROADCASTING	0	0%
TRUCKING	0	0%
UNKNOWN	0	0%
UTILITY PRODUCTION, DISTRIBUTION, MAINTAINENCE	0	0%
VEHICLE OTHER THAN AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	1	0%
VESSEL OPERATION, SERVICE, MANUFACTURING, OR REPAIR	195	78%
WHOLESALE AND RETAIL GENERAL	2	1%


LUNG CANCER
Age at Report
Relative Claim Count
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0.20
0.00
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50
55
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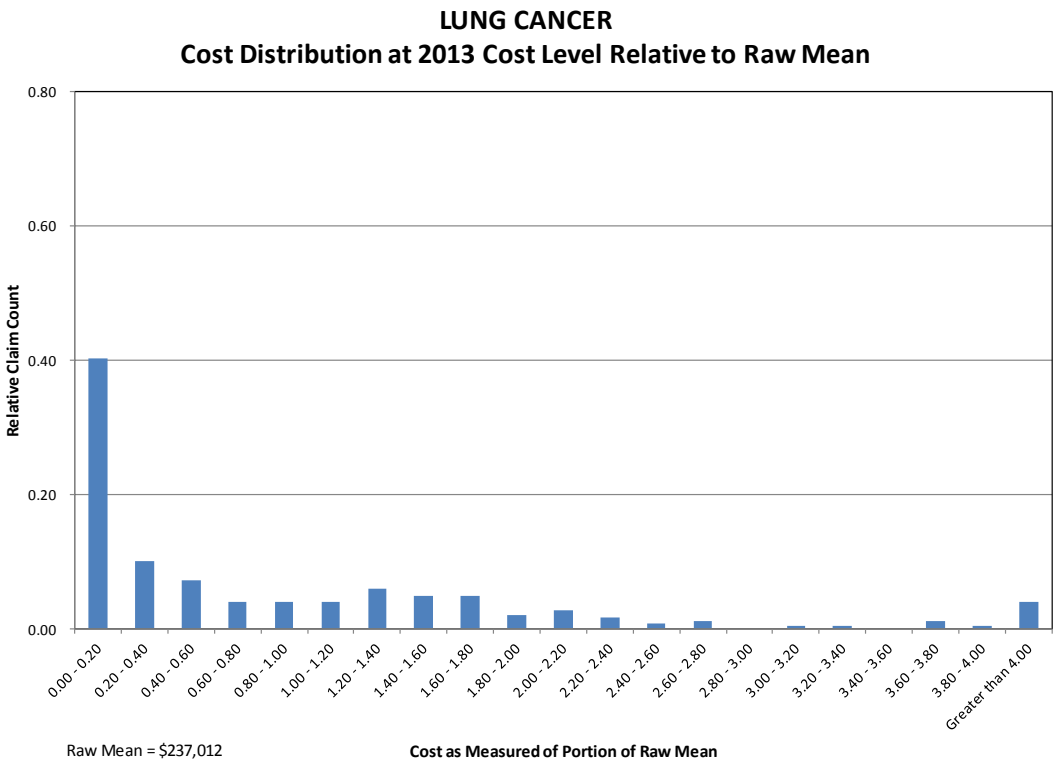
65
70
75
80
85
90
95
100
Age at Report


LUNG CANCER
Cost Distribution at 2013 Cost Level Relative to Raw Mean
Relative Claim Count
0.80
0.60
0.40
0.20
0.00
0.00 - 0.20
0.20 - 0.40
0.40 - 0.60
0.60 - 0.80
0.80 - 1.00
1.00 - 1.20
1.20 - 1.40
1.40 - 1.60
1.60 - 1.80
1.80 - 2.00
2.00 - 2.20
2.20 - 2.40
2.40 - 2.60
2.60 - 2.80
2.80 - 3.00
3.00 - 3.20
3.20 - 3.40
3.40 - 3.60
3.60 - 3.80
3.80 - 4.00
Greater than 4.00
Raw Mean = $237,012
Cost as Measured of Portion of Raw Mean

RESPIRATORY ALL OTHER

	COUNT	AVERAGE COST	AVERAGE AGE	AVERAGE LAG (DAYS)
RAW MEAN	3,795	84,006	44	456
CUT OFF	2,075	8,401		
ADJ MEAN	1,720	181,735	48	574
ADJ X 5 LARGEST	1,715	168,024	48	571
5 LARGEST	5	4,884,754	43	1,507
LARGEST	1	7,187,645	55	7,316

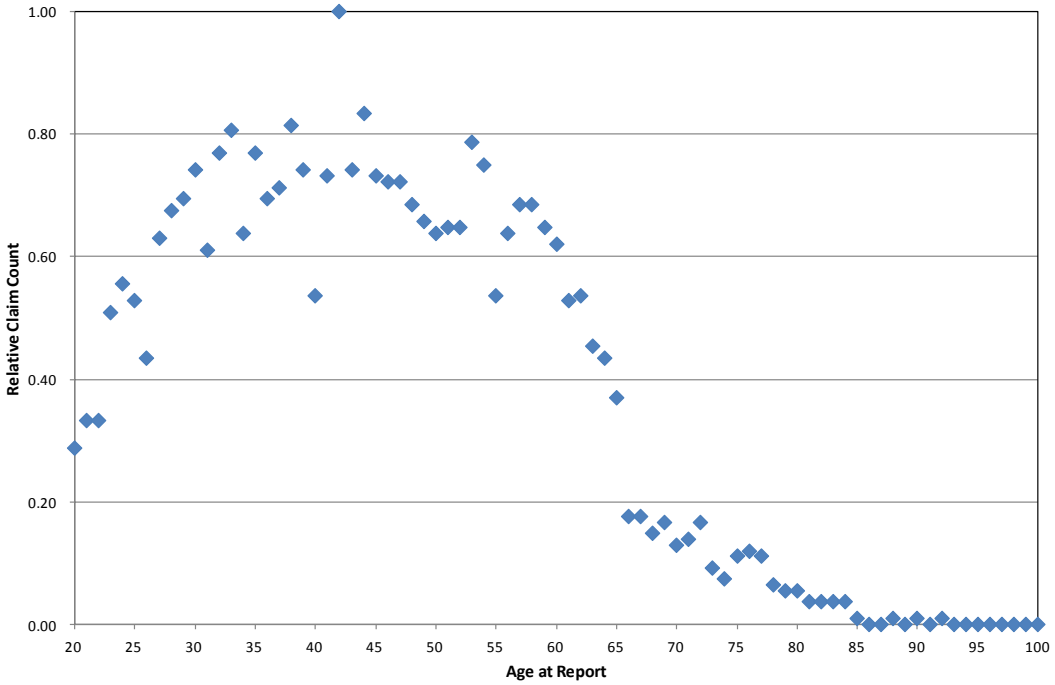
	ALL	LAG <= 2 Yrs	LAG > 2 Yrs
AVERAGE AGE	44	43	59
AVERAGE LAG (YEARS)	1.2	0.2	9.9
COUNT	3,416	3,046	370
COUNT PERCENTAGE		89%	11%

	M	F	U
GENDER	3,003	783	9
GENDER PERCENTAGE	79%	21%	0%

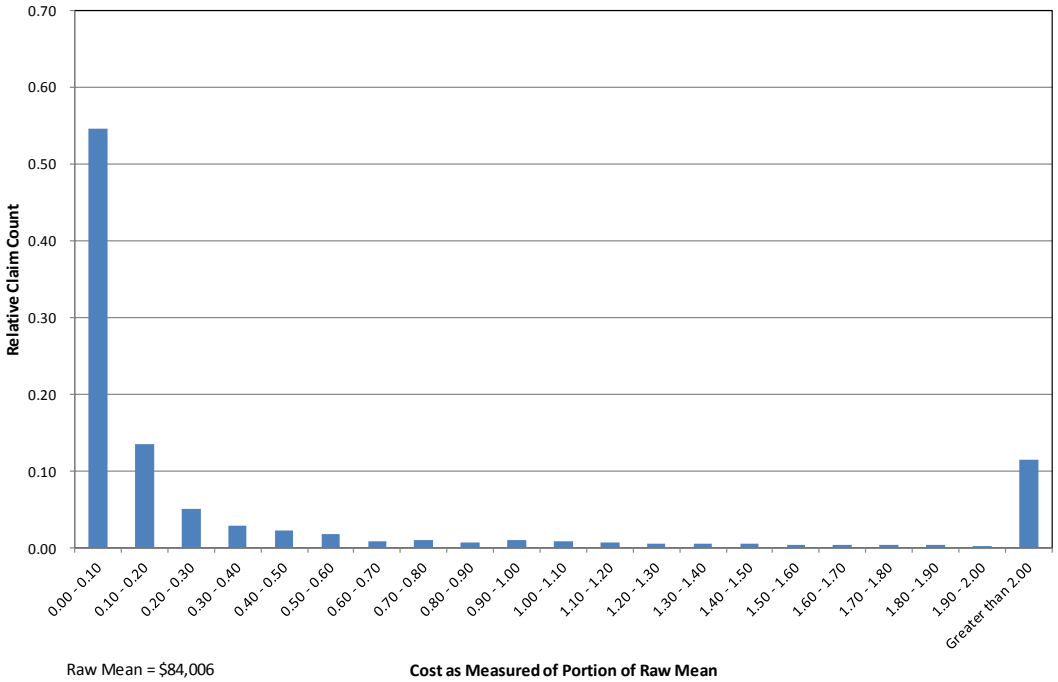
RESPIRATORY ALL OTHER

	COUNT	PERCENTAGE
AGRICULTURE / FARMING / AQUACULTURE	14	0%
AIRCRAFT OPERATION, SERVICE, MANUFACTURING, OR REPAIR	21	1%
ANIMAL CARE, TRAINING, BREEDING, BOARDING	1	0%
AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	206	5%
BUILDING MAINTAINENCE AND OPERATIONS	101	3%
CLERICAL	59	2%
CONSTRUCTION	151	4%
CONTRACTING	241	6%
EDUCATION AND RELIGIOUS INSTITUTIONS	109	3%
FIREFIGHTER	25	1%
FOOD MANUFACTURING	107	3%
FOOD SERVICE	33	1%
GENERAL SERVICES	64	2%
GOVERNMENT	271	7%
HEALTH CARE SERVICES	181	5%
HOSPITALITY AND ENTERTAINMENT	56	1%
LANDSCAPING	4	0%
LIVESTOCK AND POULTRY FARMING	7	0%
LOGGING AND TREE SERVICE	23	1%
MANUFACTURING GENERAL	588	15%
MARINE TERMINAL OPERATION	15	0%
MOTOR VEHICLE OPERATION OTHER THAN TRUCKING	14	0%
NATURAL RESOURCE EXTRACTION, REFINING, STORAGE, TRANSPORT	203	5%
POLICE OFFICERS	13	0%
RETAIL SERVICES	43	1%
SOCIAL SERVICES	25	1%
TELECOMMUNICATION AND BROADCASTING	5	0%
TRUCKING	94	2%
UNKNOWN	99	3%
UTILITY PRODUCTION, DISTRIBUTION, MAINTAINENCE	7	0%
VEHICLE OTHER THAN AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	8	0%
VESSEL OPERATION, SERVICE, MANUFACTURING, OR REPAIR	880	23%
WHOLESALE AND RETAIL GENERAL	127	3%

RESPIRATORY ALL OTHER
Age at Report



RESPIRATORY ALL OTHER
Cost Distribution at 2013 Cost Level Relative to Raw Mean



RESPIRATORY OBSTRUCTIVE

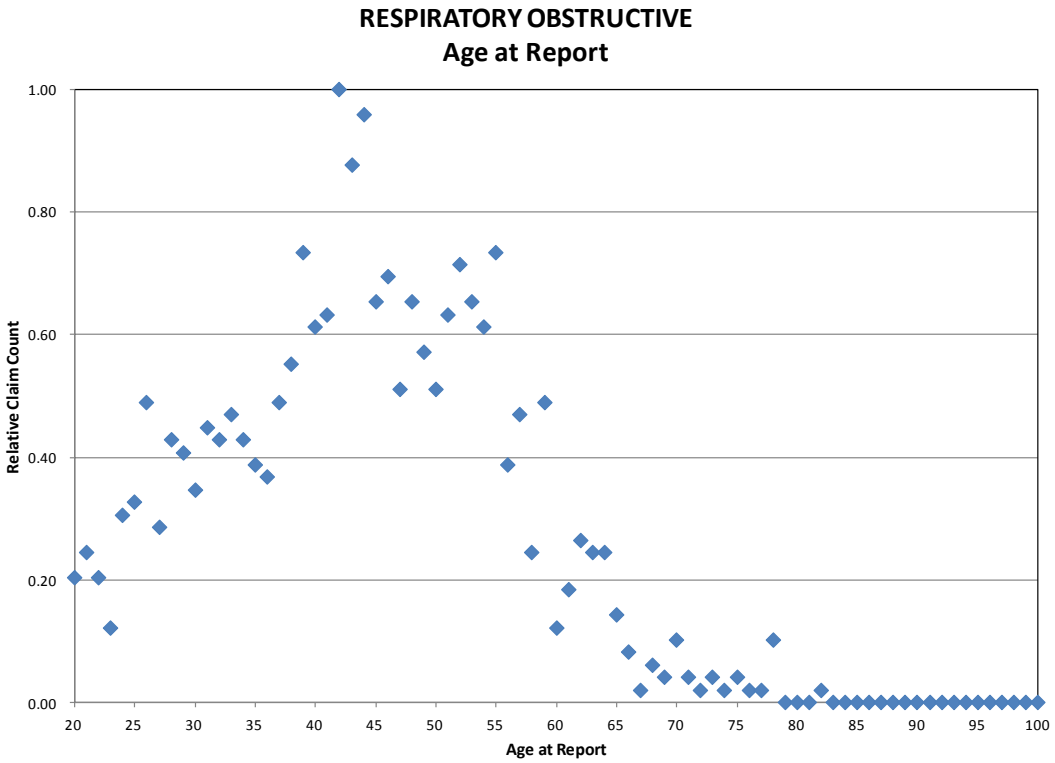
	COUNT	AVERAGE COST	AVERAGE AGE	AVERAGE LAG (DAYS)
RAW MEAN	1,165	80,334	44	138
CUT OFF	713	8,033		
ADJ MEAN	452	204,040	46	281
ADJ X 5 LARGEST	447	176,181	46	277
5 LARGEST	5	2,694,641	36	612
LARGEST	1	3,420,807	0	0

	ALL	LAG <= 2 Yrs	LAG > 2 Yrs
AVERAGE AGE	44	43	54
AVERAGE LAG (YEARS)	0.4	0.1	5.8
COUNT	1,090	1,043	47
COUNT PERCENTAGE		96%	4%

	M	F	U
GENDER	684	474	7
GENDER PERCENTAGE	59%	41%	1%

RESPIRATORY OBSTRUCTIVE

	COUNT	PERCENTAGE
AGRICULTURE / FARMING / AQUACULTURE	5	0%
AIRCRAFT OPERATION, SERVICE, MANUFACTURING, OR REPAIR	24	2%
ANIMAL CARE, TRAINING, BREEDING, BOARDING	2	0%
AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	44	4%
BUILDING MAINTAINENCE AND OPERATIONS	16	1%
CLERICAL	35	3%
CONSTRUCTION	19	2%
CONTRACTING	60	5%
EDUCATION AND RELIGIOUS INSTITUTIONS	75	6%
FIREFIGHTER	3	0%
FOOD MANUFACTURING	26	2%
FOOD SERVICE	17	1%
GENERAL SERVICES	11	1%
GOVERNMENT	98	8%
HEALTH CARE SERVICES	161	14%
HOSPITALITY AND ENTERTAINMENT	33	3%
LANDSCAPING	2	0%
LIVESTOCK AND POULTRY FARMING	5	0%
LOGGING AND TREE SERVICE	9	1%
MANUFACTURING GENERAL	258	22%
MARINE TERMINAL OPERATION	3	0%
MOTOR VEHICLE OPERATION OTHER THAN TRUCKING	10	1%
NATURAL RESOURCE EXTRACTION, REFINING, STORAGE, TRANSPORT	15	1%
POLICE OFFICERS	3	0%
RETAIL SERVICES	13	1%
SOCIAL SERVICES	24	2%
TELECOMMUNICATION AND BROADCASTING	3	0%
TRUCKING	8	1%
UNKNOWN	27	2%
UTILITY PRODUCTION, DISTRIBUTION, MAINTAINENCE	1	0%
VEHICLE OTHER THAN AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	1	0%
VESSEL OPERATION, SERVICE, MANUFACTURING, OR REPAIR	94	8%
WHOLESALE AND RETAIL GENERAL	60	5%


RESPIRATORY OBSTRUCTIVE
Age at Report
Relative Claim Count
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0.80
0.60
0.40
0.20
0.00
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35
40
45
50
55
60
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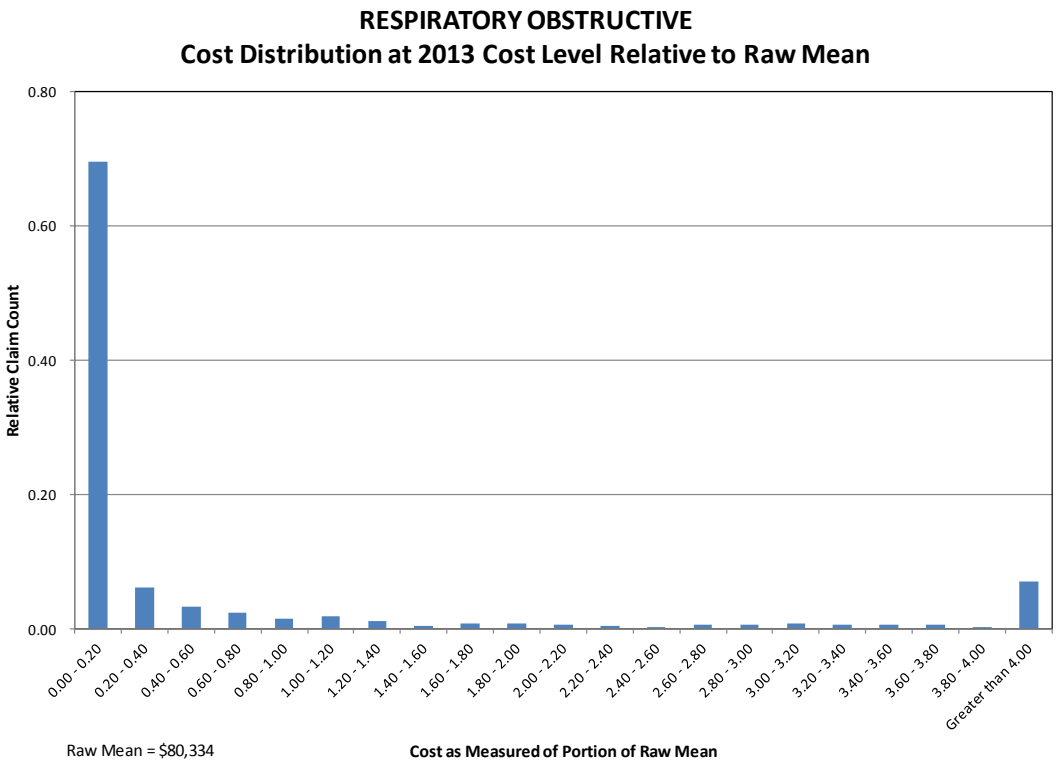
70
75
80
85
90
95
100
Age at Report


RESPIRATORY OBSTRUCTIVE
Cost Distribution at 2013 Cost Level Relative to Raw Mean
Relative Claim Count
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0.60
0.40
0.20
0.00
0.00 - 0.20
0.20 - 0.40
0.40 - 0.60
0.60 - 0.80
0.80 - 1.00
1.00 - 1.20
1.20 - 1.40
1.40 - 1.60
1.60 - 1.80
1.80 - 2.00
2.00 - 2.20
2.20 - 2.40
2.40 - 2.60
2.60 - 2.80
2.80 - 3.00
3.00 - 3.20
3.20 - 3.40
3.40 - 3.60
3.60 - 3.80
3.80 - 4.00
Greater than 4.00
Raw Mean = $80,334
Cost as Measured of Portion of Raw Mean

PNEOMOCONIOSIS ALL OTHER

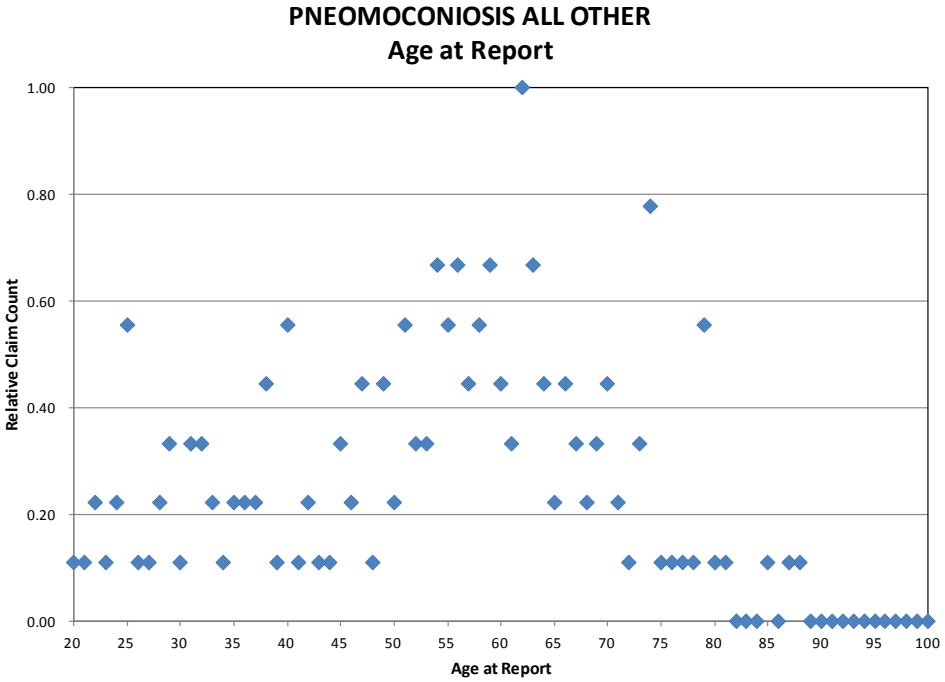
	COUNT	AVERAGE COST	AVERAGE AGE	AVERAGE LAG (DAYS)
RAW MEAN	188	205,389	54	479
CUT OFF	84	20,539		
ADJ MEAN	104	366,062	57	619
ADJ X 5 LARGEST	99	294,103	57	552
5 LARGEST	5	1,790,860	55	1,944
LARGEST	1	2,437,867	57	8,685

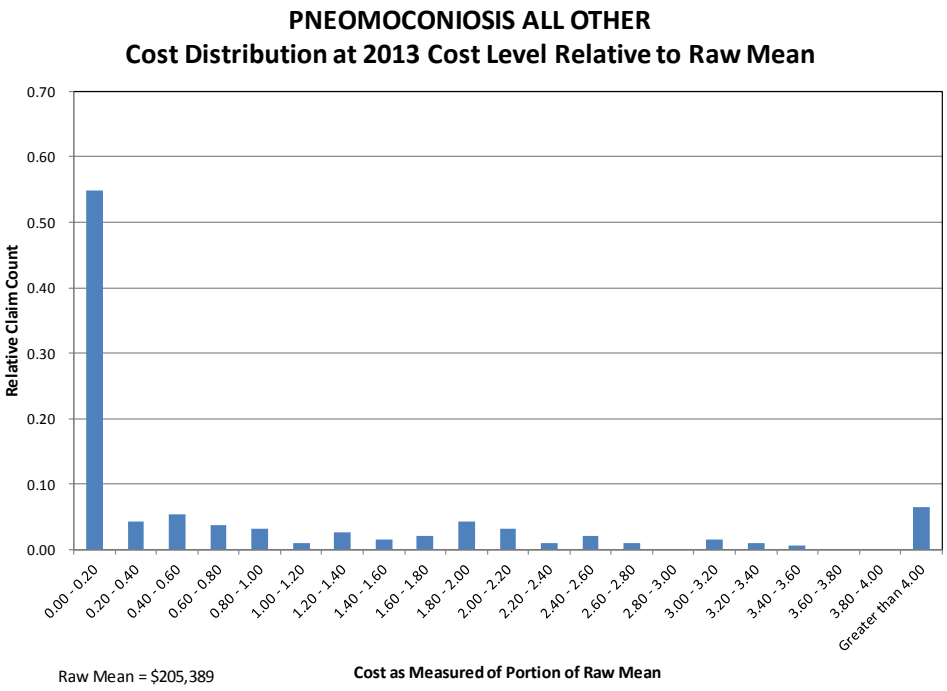
	ALL	LAG <= 2 Yrs	LAG > 2 Yrs
AVERAGE AGE	54	52	64
AVERAGE LAG (YEARS)	1.3	0.3	9.4
COUNT	180	159	21
COUNT PERCENTAGE		88%	12%

	M	F	U
GENDER	176	11	1
GENDER PERCENTAGE	94%	6%	1%

PNEUMOCONIOSIS ALL OTHER

	COUNT	PERCENTAGE
AGRICULTURE / FARMING / AQUACULTURE	2	1%
AIRCRAFT OPERATION, SERVICE, MANUFACTURING, OR REPAIR	0	0%
ANIMAL CARE, TRAINING, BREEDING, BOARDING	0	0%
AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	3	2%
BUILDING MAINTAINENCE AND OPERATIONS	1	1%
CLERICAL	0	0%
CONSTRUCTION	13	7%
CONTRACTING	16	9%
EDUCATION AND RELIGIOUS INSTITUTIONS	0	0%
FIREFIGHTER	0	0%
FOOD MANUFACTURING	15	8%
FOOD SERVICE	1	1%
GENERAL SERVICES	15	8%
GOVERNMENT	8	4%
HEALTH CARE SERVICES	3	2%
HOSPITALITY AND ENTERTAINMENT	0	0%
LANDSCAPING	0	0%
LIVESTOCK AND POULTRY FARMING	0	0%
LOGGING AND TREE SERVICE	0	0%
MANUFACTURING GENERAL	31	16%
MARINE TERMINAL OPERATION	1	1%
MOTOR VEHICLE OPERATION OTHER THAN TRUCKING	4	2%
NATURAL RESOURCE EXTRACTION, REFINING, STORAGE, TRANSPORT	28	15%
POLICE OFFICERS	1	1%
RETAIL SERVICES	0	0%
SOCIAL SERVICES	1	1%
TELECOMMUNICATION AND BROADCASTING	1	1%
TRUCKING	5	3%
UNKNOWN	22	12%
UTILITY PRODUCTION, DISTRIBUTION, MAINTAINENCE	2	1%
VEHICLE OTHER THAN AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	0	0%
VESSEL OPERATION, SERVICE, MANUFACTURING, OR REPAIR	5	3%
WHOLESALE AND RETAIL GENERAL	10	5%


PNEOMOCONIOSIS ALL OTHER
Age at Report
Relative Claim Count
1.00
0.80
0.60
0.40
0.20
0.00
20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100
Age at Report


PNEOMOCONIOSIS ALL OTHER
Cost Distribution at 2013 Cost Level Relative to Raw Mean
Relative Claim Count
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0.50
0.40
0.30
0.20
0.10
0.00
0.00 - 0.20
0.20 - 0.40
0.40 - 0.60
0.60 - 0.80
0.80 - 1.00
1.00 - 1.20
1.20 - 1.40
1.40 - 1.60
1.60 - 1.80
1.80 - 2.00
2.00 - 2.20
2.20 - 2.40
2.40 - 2.60
2.60 - 2.80
2.80 - 3.00
3.00 - 3.20
3.20 - 3.40
3.40 - 3.60
3.60 - 3.80
3.80 - 4.00
Greater than 4.00
Raw Mean = $205,389
Cost as Measured of Portion of Raw Mean

HEARING LOSS

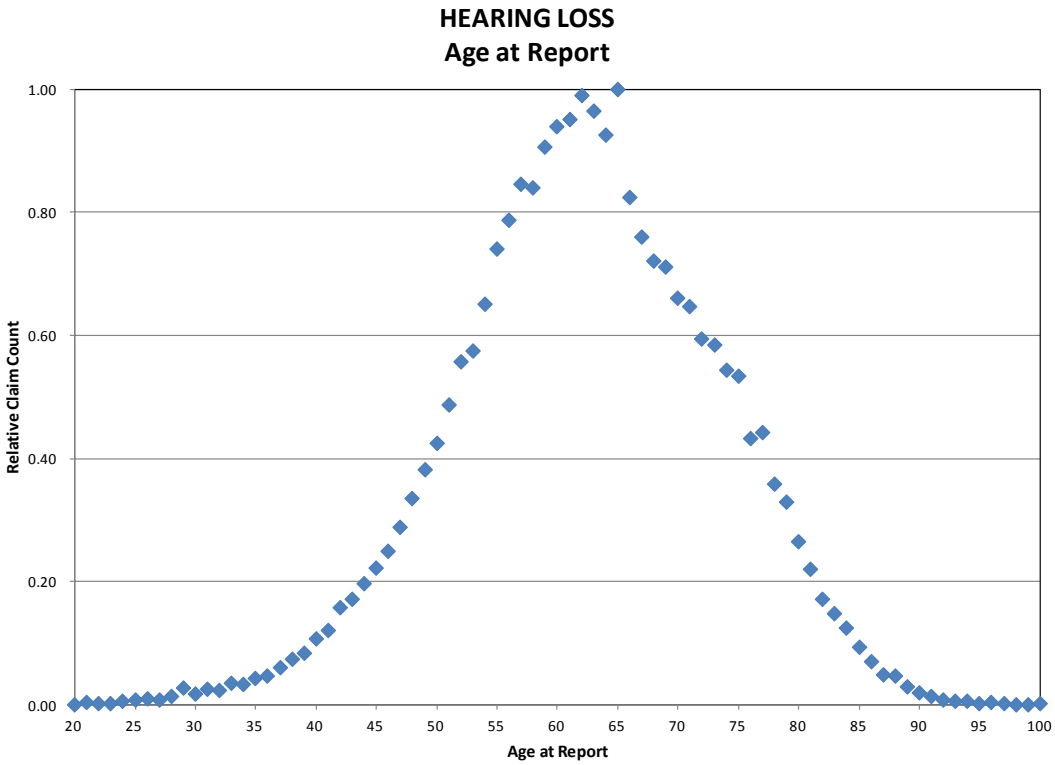
	COUNT	AVERAGE COST	AVERAGE AGE	AVERAGE LAG (DAYS)
RAW MEAN	56,628	13,950	62	267
CUT OFF	928	1,395		
ADJ MEAN	55,700	14,176	63	261
ADJ X 5 LARGEST	55,695	14,100	63	260
5 LARGEST	5	856,468	52	4,812
LARGEST	1	1,096,385	50	2,376

	ALL	LAG <= 2 Yrs	LAG > 2 Yrs
AVERAGE AGE	62	62	63
AVERAGE LAG (YEARS)	0.7	0.1	8.6
COUNT	56,121	51,897	4,224
COUNT PERCENTAGE		92%	8%

	M	F	U
GENDER	42,788	811	13,029
GENDER PERCENTAGE	76%	1%	23%

HEARING LOSS

	COUNT	PERCENTAGE
AGRICULTURE / FARMING / AQUACULTURE	456	1%
AIRCRAFT OPERATION, SERVICE, MANUFACTURING, OR REPAIR	605	1%
ANIMAL CARE, TRAINING, BREEDING, BOARDING	141	0%
AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	2,040	4%
BUILDING MAINTAINENCE AND OPERATIONS	387	1%
CLERICAL	204	0%
CONSTRUCTION	2,998	5%
CONTRACTING	6,184	11%
EDUCATION AND RELIGIOUS INSTITUTIONS	945	2%
FIREFIGHTER	72	0%
FOOD MANUFACTURING	1,197	2%
FOOD SERVICE	44	0%
GENERAL SERVICES	474	1%
GOVERNMENT	3,714	7%
HEALTH CARE SERVICES	743	1%
HOSPITALITY AND ENTERTAINMENT	395	1%
LANDSCAPING	118	0%
LIVESTOCK AND POULTRY FARMING	128	0%
LOGGING AND TREE SERVICE	2,811	5%
MANUFACTURING GENERAL	11,034	19%
MARINE TERMINAL OPERATION	1,548	3%
MOTOR VEHICLE OPERATION OTHER THAN TRUCKING	283	0%
NATURAL RESOURCE EXTRACTION, REFINING, STORAGE, TRANSPORT	5,189	9%
POLICE OFFICERS	198	0%
RETAIL SERVICES	148	0%
SOCIAL SERVICES	44	0%
TELECOMMUNICATION AND BROADCASTING	442	1%
TRUCKING	2,493	4%
UNKNOWN	461	1%
UTILITY PRODUCTION, DISTRIBUTION, MAINTAINENCE	602	1%
VEHICLE OTHER THAN AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	117	0%
VESSEL OPERATION, SERVICE, MANUFACTURING, OR REPAIR	8,484	15%
WHOLESALE AND RETAIL GENERAL	1,929	3%


HEARING LOSS
Age at Report
Relative Claim Count
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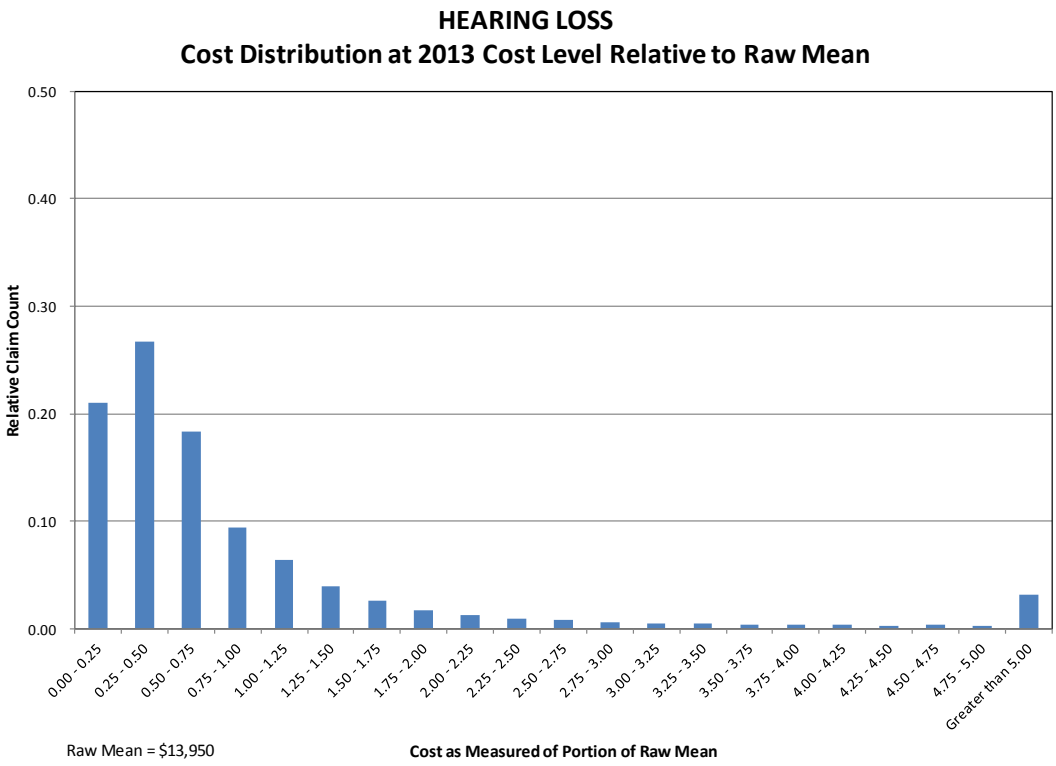
0.80
0.60
0.40
0.20
0.00
20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100
Age at Report


HEARING LOSS
Cost Distribution at 2013 Cost Level Relative to Raw Mean
Relative Claim Count
0.50
0.40
0.30
0.20
0.10
0.00
0.00 - 0.25
0.25 - 0.50
0.50 - 0.75
0.75 - 1.00
1.00 - 1.25
1.25 - 1.50
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3.00 - 3.25
3.25 - 3.50
3.50 - 3.75
3.75 - 4.00
4.00 - 4.25
4.25 - 4.50
4.50 - 4.75
4.75 - 5.00
Greater than 5.00
Raw Mean = $13,950
Cost as Measured of Portion of Raw Mean

ALL OTHER CANCER

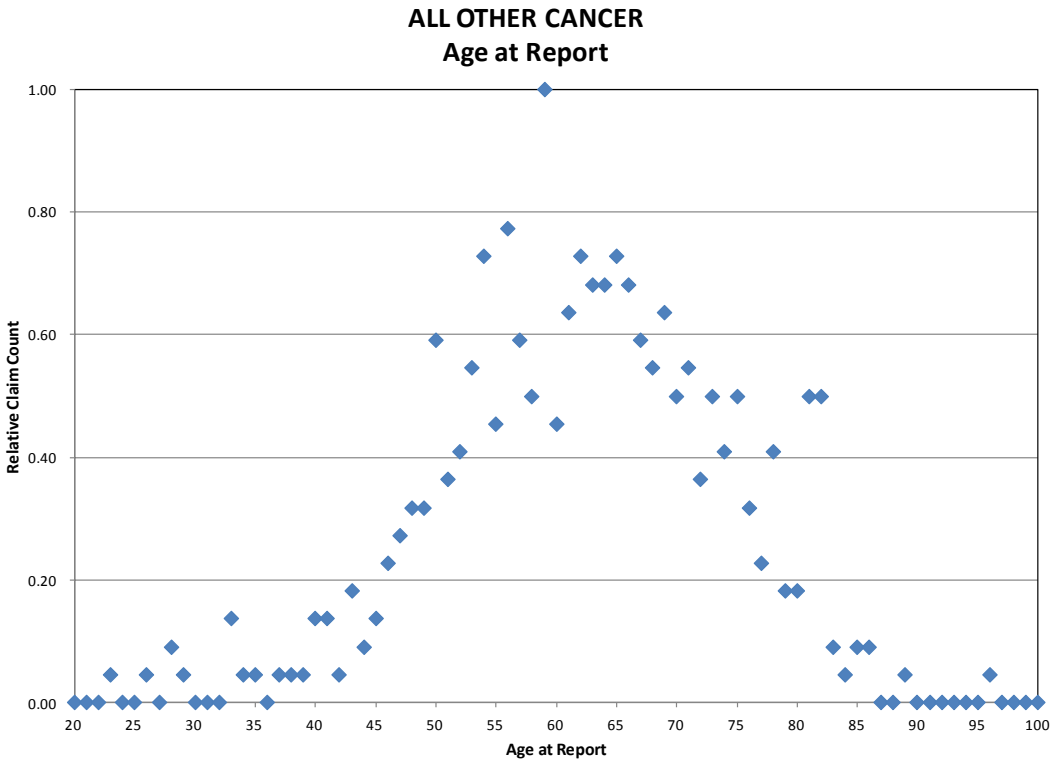
	COUNT	AVERAGE COST	AVERAGE AGE	AVERAGE LAG (DAYS)
RAW MEAN	452	200,188	62	1,364
CUT OFF	159	20,019		
ADJ MEAN	293	304,983	62	1,025
ADJ X 5 LARGEST	288	287,330	62	1,027
5 LARGEST	5	1,321,802	53	896
LARGEST	1	1,526,740	50	1,387

	ALL	LAG <= 2 Yrs	LAG > 2 Yrs
AVERAGE AGE	62	59	69
AVERAGE LAG (YEARS)	3.7	0.5	9.8
COUNT	447	290	157
COUNT PERCENTAGE		65%	35%

	M	F	U
GENDER	442	10	0
GENDER PERCENTAGE	98%	2%	0%

ALL OTHER CANCER

	COUNT	PERCENTAGE
AGRICULTURE / FARMING / AQUACULTURE	1	0%
AIRCRAFT OPERATION, SERVICE, MANUFACTURING, OR REPAIR	1	0%
ANIMAL CARE, TRAINING, BREEDING, BOARDING	0	0%
AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	11	2%
BUILDING MAINTAINENCE AND OPERATIONS	1	0%
CLERICAL	1	0%
CONSTRUCTION	11	2%
CONTRACTING	19	4%
EDUCATION AND RELIGIOUS INSTITUTIONS	1	0%
FIREFIGHTER	7	2%
FOOD MANUFACTURING	2	0%
FOOD SERVICE	0	0%
GENERAL SERVICES	22	5%
GOVERNMENT	223	49%
HEALTH CARE SERVICES	7	2%
HOSPITALITY AND ENTERTAINMENT	2	0%
LANDSCAPING	1	0%
LIVESTOCK AND POULTRY FARMING	3	1%
LOGGING AND TREE SERVICE	0	0%
MANUFACTURING GENERAL	24	5%
MARINE TERMINAL OPERATION	0	0%
MOTOR VEHICLE OPERATION OTHER THAN TRUCKING	1	0%
NATURAL RESOURCE EXTRACTION, REFINING, STORAGE, TRANSPORT	21	5%
POLICE OFFICERS	0	0%
RETAIL SERVICES	0	0%
SOCIAL SERVICES	0	0%
TELECOMMUNICATION AND BROADCASTING	1	0%
TRUCKING	1	0%
UNKNOWN	4	1%
UTILITY PRODUCTION, DISTRIBUTION, MAINTAINENCE	1	0%
VEHICLE OTHER THAN AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	1	0%
VESSEL OPERATION, SERVICE, MANUFACTURING, OR REPAIR	84	19%
WHOLESALE AND RETAIL GENERAL	1	0%


ALL OTHER CANCER
Age at Report
Relative Claim Count
1.00
0.80
0.60
0.40
0.20
0.00
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55
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75
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95
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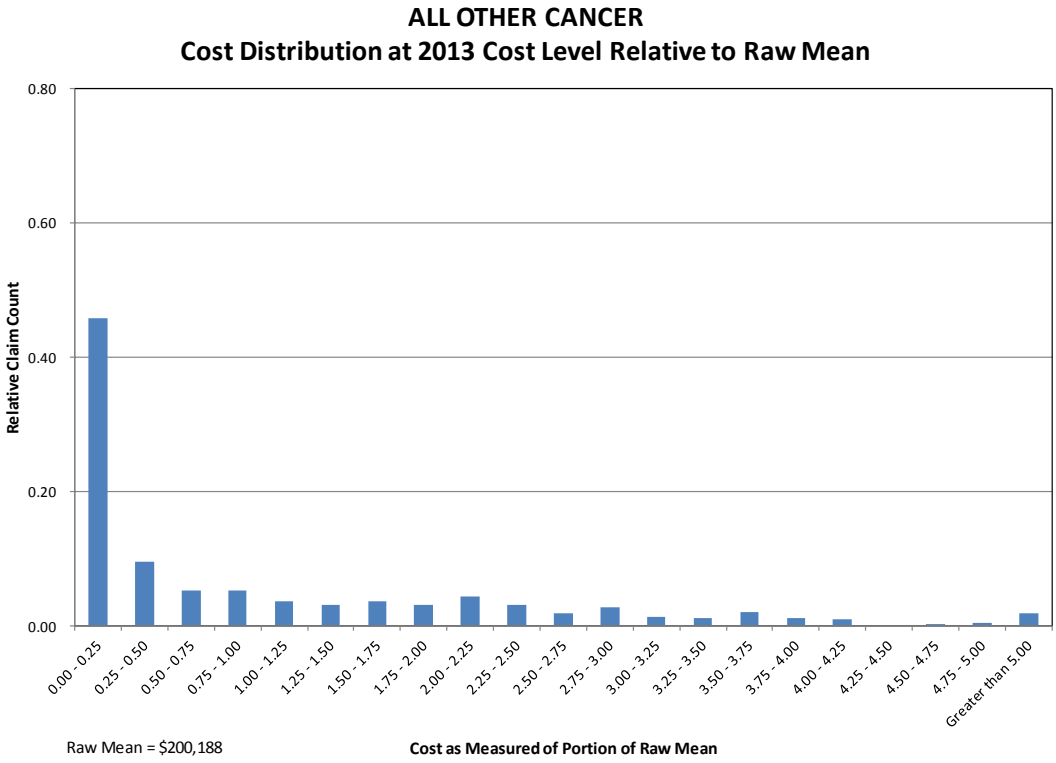
Age at Report


ALL OTHER CANCER
Cost Distribution at 2013 Cost Level Relative to Raw Mean
Relative Claim Count
0.80
0.60
0.40
0.20
0.00
0.00 - 0.25
0.25 - 0.50
0.50 - 0.75
0.75 - 1.00
1.00 - 1.25
1.25 - 1.50
1.50 - 1.75
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3.50 - 3.75
3.75 - 4.00
4.00 - 4.25
4.25 - 4.50
4.50 - 4.75
4.75 - 5.00
Greater than 5.00
Raw Mean = $200,188
Cost as Measured of Portion of Raw Mean

VASCULAR

	COUNT	AVERAGE COST	AVERAGE AGE	AVERAGE LAG (DAYS)
RAW MEAN	114	108,572	46	103
CUT OFF	66	10,857		
ADJ MEAN	48	251,878	44	130
ADJ X 5 LARGEST	43	49,161	44	114
5 LARGEST	5	1,995,237	50	265
LARGEST	1	8,440,907	31	66

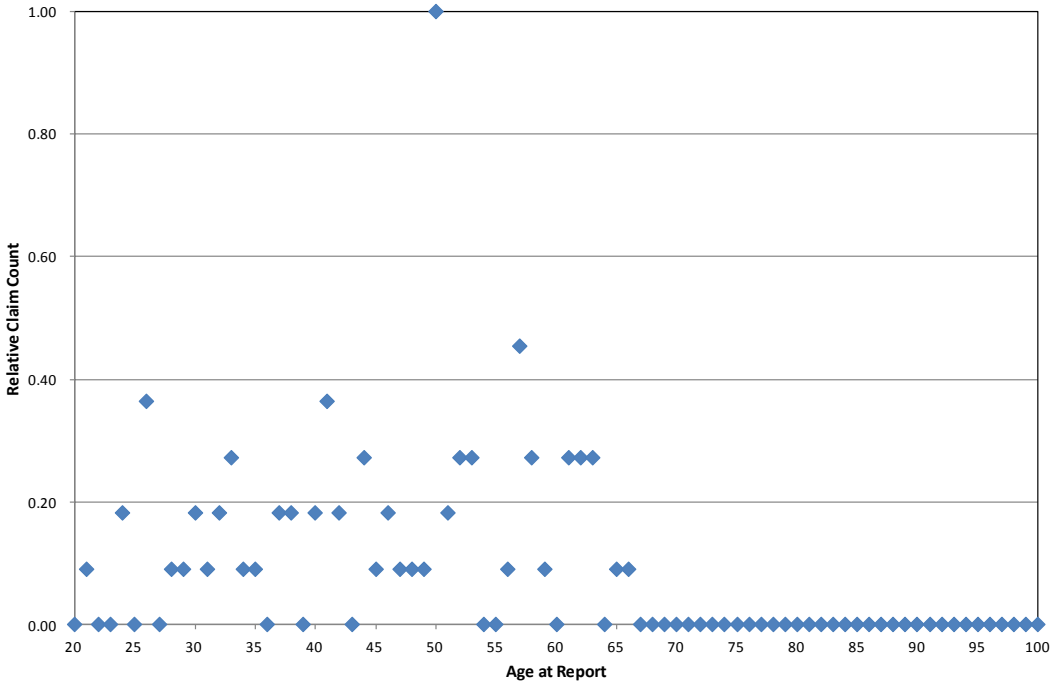
	ALL	LAG <= 2 Yrs	LAG > 2 Yrs
AVERAGE AGE	46	46	46
AVERAGE LAG (YEARS)	0.3	0.2	2.6
COUNT	80	76	4
COUNT PERCENTAGE		95%	5%

	M	F	U
GENDER	82	32	0
GENDER PERCENTAGE	72%	28%	0%

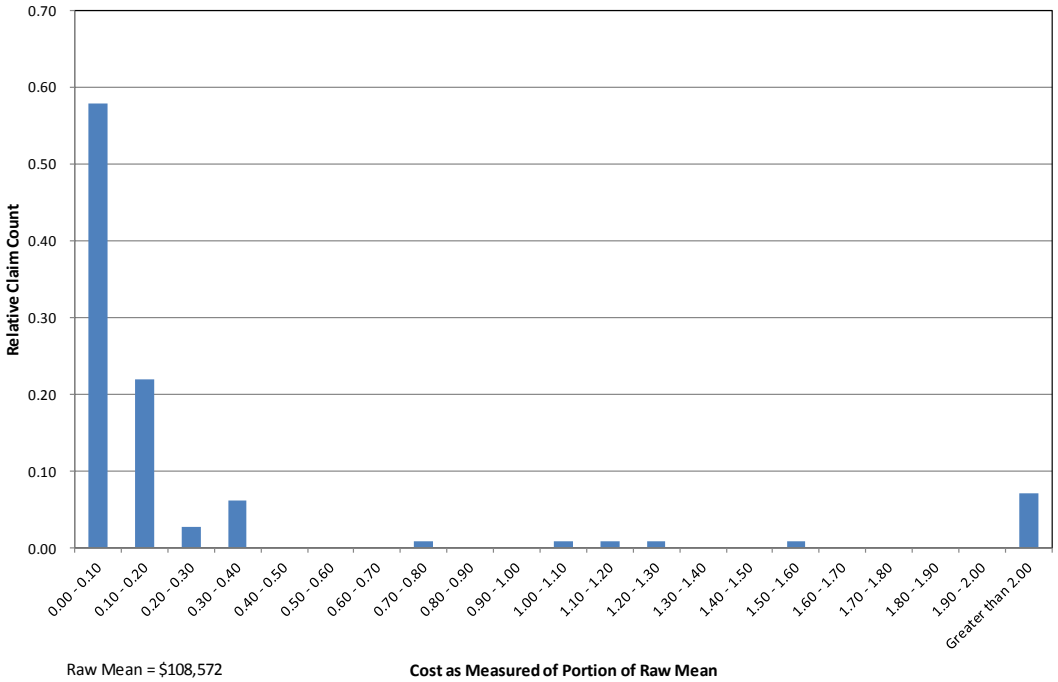
VASCULAR

	COUNT	PERCENTAGE
AGRICULTURE / FARMING / AQUACULTURE	0	0%
AIRCRAFT OPERATION, SERVICE, MANUFACTURING, OR REPAIR	0	0%
ANIMAL CARE, TRAINING, BREEDING, BOARDING	0	0%
AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	4	4%
BUILDING MAINTAINENCE AND OPERATIONS	0	0%
CLERICAL	3	3%
CONSTRUCTION	0	0%
CONTRACTING	4	4%
EDUCATION AND RELIGIOUS INSTITUTIONS	1	1%
FIREFIGHTER	0	0%
FOOD MANUFACTURING	1	1%
FOOD SERVICE	11	10%
GENERAL SERVICES	2	2%
GOVERNMENT	14	12%
HEALTH CARE SERVICES	2	2%
HOSPITALITY AND ENTERTAINMENT	5	4%
LANDSCAPING	0	0%
LIVESTOCK AND POULTRY FARMING	0	0%
LOGGING AND TREE SERVICE	2	2%
MANUFACTURING GENERAL	8	7%
MARINE TERMINAL OPERATION	0	0%
MOTOR VEHICLE OPERATION OTHER THAN TRUCKING	2	2%
NATURAL RESOURCE EXTRACTION, REFINING, STORAGE, TRANSPORT	0	0%
POLICE OFFICERS	3	3%
RETAIL SERVICES	6	5%
SOCIAL SERVICES	1	1%
TELECOMMUNICATION AND BROADCASTING	0	0%
TRUCKING	15	13%
UNKNOWN	4	4%
UTILITY PRODUCTION, DISTRIBUTION, MAINTAINENCE	0	0%
VEHICLE OTHER THAN AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	0	0%
VESSEL OPERATION, SERVICE, MANUFACTURING, OR REPAIR	16	14%
WHOLESALE AND RETAIL GENERAL	10	9%

VASCULAR
Age at Report



VASCULAR
Cost Distribution at 2013 Cost Level Relative to Raw Mean



MENTAL STRESS

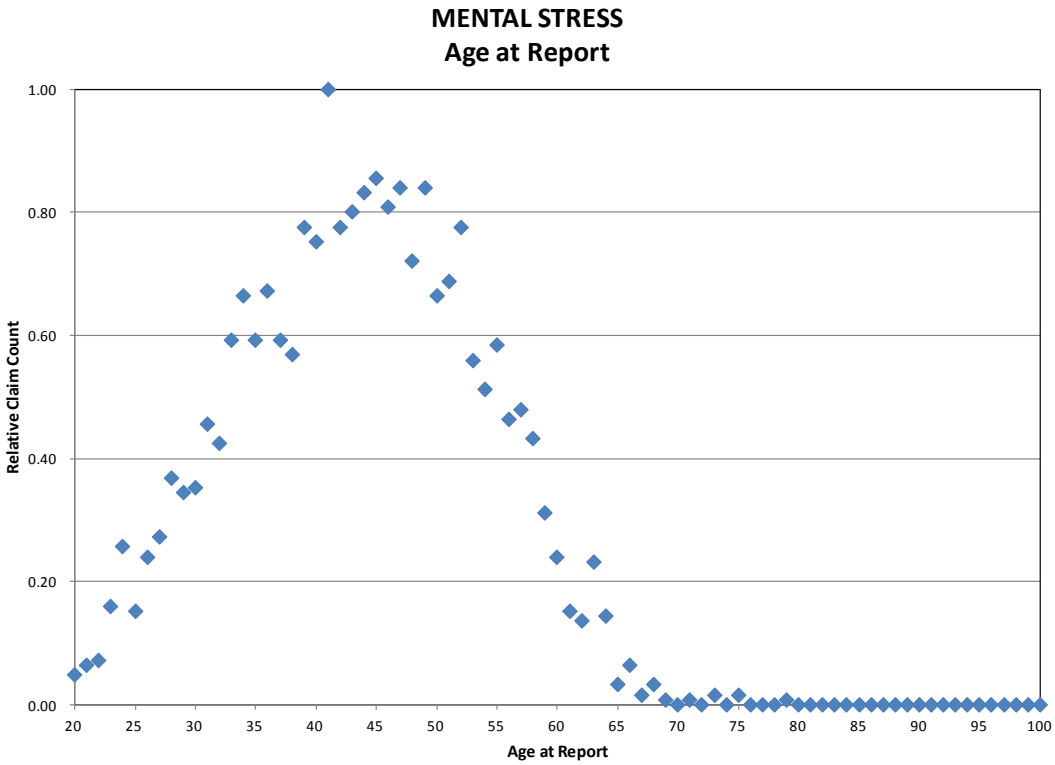
	COUNT	AVERAGE COST	AVERAGE AGE	AVERAGE LAG (DAYS)
RAW MEAN	2,990	36,817	44	82
CUT OFF	529	3,682		
ADJ MEAN	2,461	44,206	44	80
ADJ X 5 LARGEST	2,456	34,089	43	80
5 LARGEST	5	5,013,661	52	66
LARGEST	1	13,309,054	44	51

	ALL	LAG <= 2 Yrs	LAG > 2 Yrs
AVERAGE AGE	44	44	49
AVERAGE LAG (YEARS)	0.2	0.2	4.9
COUNT	2,814	2,771	43
COUNT PERCENTAGE		98%	2%

	M	F	U
GENDER	1,211	1,719	60
GENDER PERCENTAGE	41%	57%	2%

MENTAL STRESS

	COUNT	PERCENTAGE
AGRICULTURE / FARMING / AQUACULTURE	1	0%
AIRCRAFT OPERATION, SERVICE, MANUFACTURING, OR REPAIR	2	0%
ANIMAL CARE, TRAINING, BREEDING, BOARDING	7	0%
AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	95	3%
BUILDING MAINTAINENCE AND OPERATIONS	83	3%
CLERICAL	471	16%
CONSTRUCTION	18	1%
CONTRACTING	15	1%
EDUCATION AND RELIGIOUS INSTITUTIONS	128	4%
FIREFIGHTER	30	1%
FOOD MANUFACTURING	7	0%
FOOD SERVICE	62	2%
GENERAL SERVICES	10	0%
GOVERNMENT	992	33%
HEALTH CARE SERVICES	237	8%
HOSPITALITY AND ENTERTAINMENT	66	2%
LANDSCAPING	2	0%
LIVESTOCK AND POULTRY FARMING	2	0%
LOGGING AND TREE SERVICE	14	0%
MANUFACTURING GENERAL	129	4%
MARINE TERMINAL OPERATION	1	0%
MOTOR VEHICLE OPERATION OTHER THAN TRUCKING	16	1%
NATURAL RESOURCE EXTRACTION, REFINING, STORAGE, TRANSPORT	5	0%
POLICE OFFICERS	97	3%
RETAIL SERVICES	24	1%
SOCIAL SERVICES	66	2%
TELECOMMUNICATION AND BROADCASTING	7	0%
TRUCKING	52	2%
UNKNOWN	36	1%
UTILITY PRODUCTION, DISTRIBUTION, MAINTAINENCE	17	1%
VEHICLE OTHER THAN AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	3	0%
VESSEL OPERATION, SERVICE, MANUFACTURING, OR REPAIR	140	5%
WHOLESALE AND RETAIL GENERAL	155	5%


MENTAL STRESS
Age at Report
Relative Claim Count
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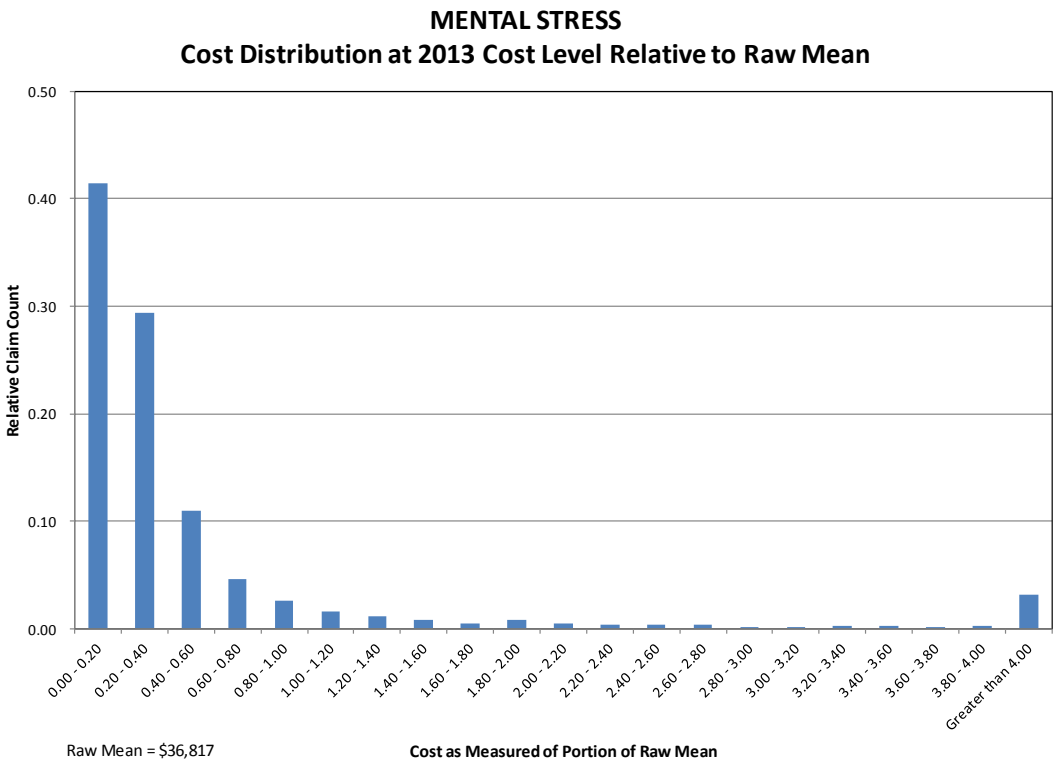
Age at Report


MENTAL STRESS
Cost Distribution at 2013 Cost Level Relative to Raw Mean
Relative Claim Count
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0.30
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1.00 - 1.20
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1.40 - 1.60
1.60 - 1.80
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2.00 - 2.20
2.20 - 2.40
2.40 - 2.60
2.60 - 2.80
2.80 - 3.00
3.00 - 3.20
3.20 - 3.40
3.40 - 3.60
3.60 - 3.80
3.80 - 4.00
Greater than 4.00
Raw Mean = $36,817
Cost as Measured of Portion of Raw Mean

CUMULATIVE NERVE DISEASE

	COUNT	AVERAGE COST	AVERAGE AGE	AVERAGE LAG (DAYS)
RAW MEAN	1,391	72,443	44	390
CUT OFF	212	7,244		
ADJ MEAN	1,179	84,667	45	407
ADJ X 5 LARGEST	1,174	79,758	45	408
5 LARGEST	5	1,237,389	40	116
LARGEST	1	2,202,907	32	9

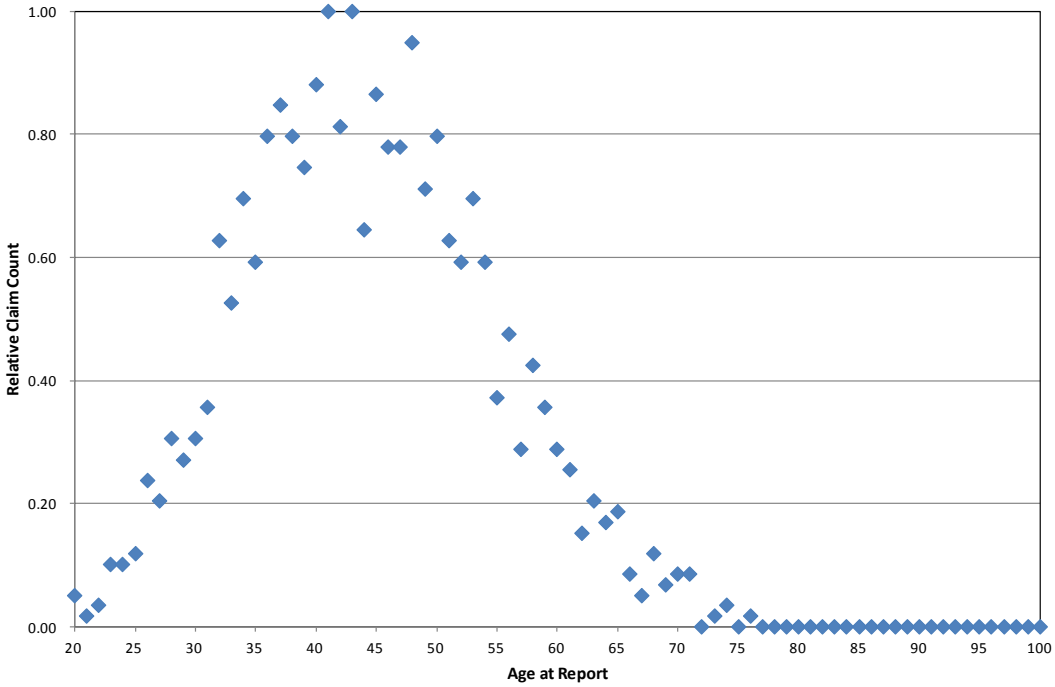
	ALL	LAG <= 2 Yrs	LAG > 2 Yrs
AVERAGE AGE	44	43	50
AVERAGE LAG (YEARS)	1.1	0.3	5.2
COUNT	1,371	1,160	211
COUNT PERCENTAGE		85%	15%

	M	F	U
GENDER	1,229	161	1
GENDER PERCENTAGE	88%	12%	0%

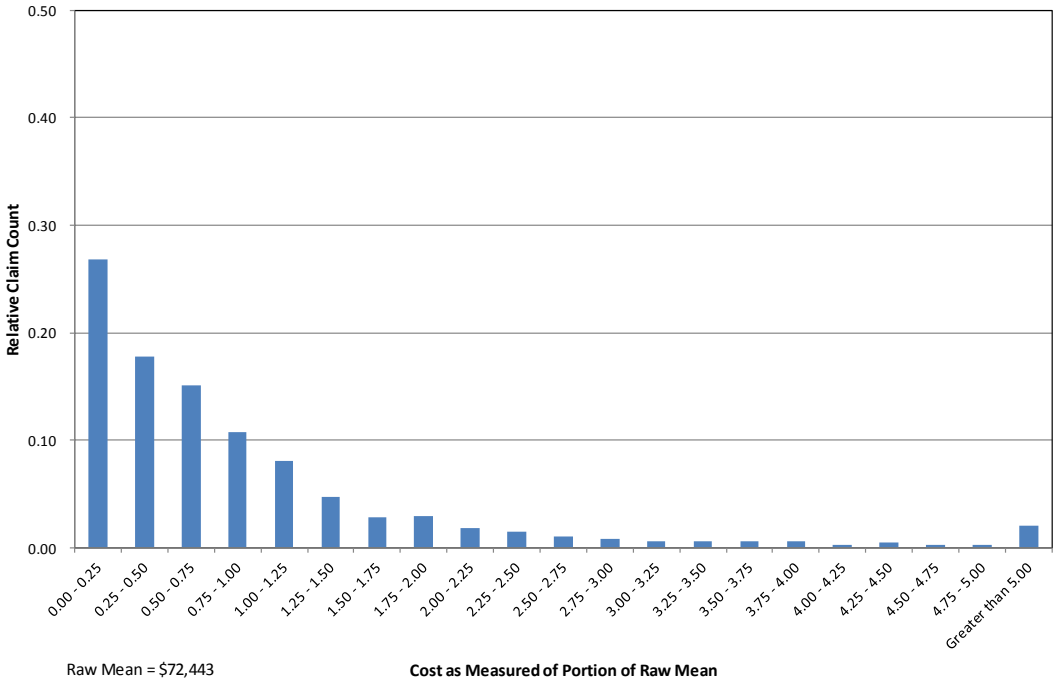
CUMULATIVE NERVE DISEASE

	COUNT	PERCENTAGE
AGRICULTURE / FARMING / AQUACULTURE	3	0%
AIRCRAFT OPERATION, SERVICE, MANUFACTURING, OR REPAIR	1	0%
ANIMAL CARE, TRAINING, BREEDING, BOARDING	0	0%
AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	48	3%
BUILDING MAINTAINENCE AND OPERATIONS	7	1%
CLERICAL	16	1%
CONSTRUCTION	21	2%
CONTRACTING	25	2%
EDUCATION AND RELIGIOUS INSTITUTIONS	10	1%
FIREFIGHTER	0	0%
FOOD MANUFACTURING	14	1%
FOOD SERVICE	16	1%
GENERAL SERVICES	6	0%
GOVERNMENT	22	2%
HEALTH CARE SERVICES	17	1%
HOSPITALITY AND ENTERTAINMENT	6	0%
LANDSCAPING	4	0%
LIVESTOCK AND POULTRY FARMING	4	0%
LOGGING AND TREE SERVICE	28	2%
MANUFACTURING GENERAL	79	6%
MARINE TERMINAL OPERATION	3	0%
MOTOR VEHICLE OPERATION OTHER THAN TRUCKING	6	0%
NATURAL RESOURCE EXTRACTION, REFINING, STORAGE, TRANSPORT	13	1%
POLICE OFFICERS	1	0%
RETAIL SERVICES	8	1%
SOCIAL SERVICES	1	0%
TELECOMMUNICATION AND BROADCASTING	1	0%
TRUCKING	8	1%
UNKNOWN	1	0%
UTILITY PRODUCTION, DISTRIBUTION, MAINTAINENCE	1	0%
VEHICLE OTHER THAN AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	2	0%
VESSEL OPERATION, SERVICE, MANUFACTURING, OR REPAIR	995	72%
WHOLESALE AND RETAIL GENERAL	24	2%

CUMULATIVE NERVE DISEASE
Age at Report



CUMULATIVE NERVE DISEASE
Cost Distribution at 2013 Cost Level Relative to Raw Mean



INFECTION

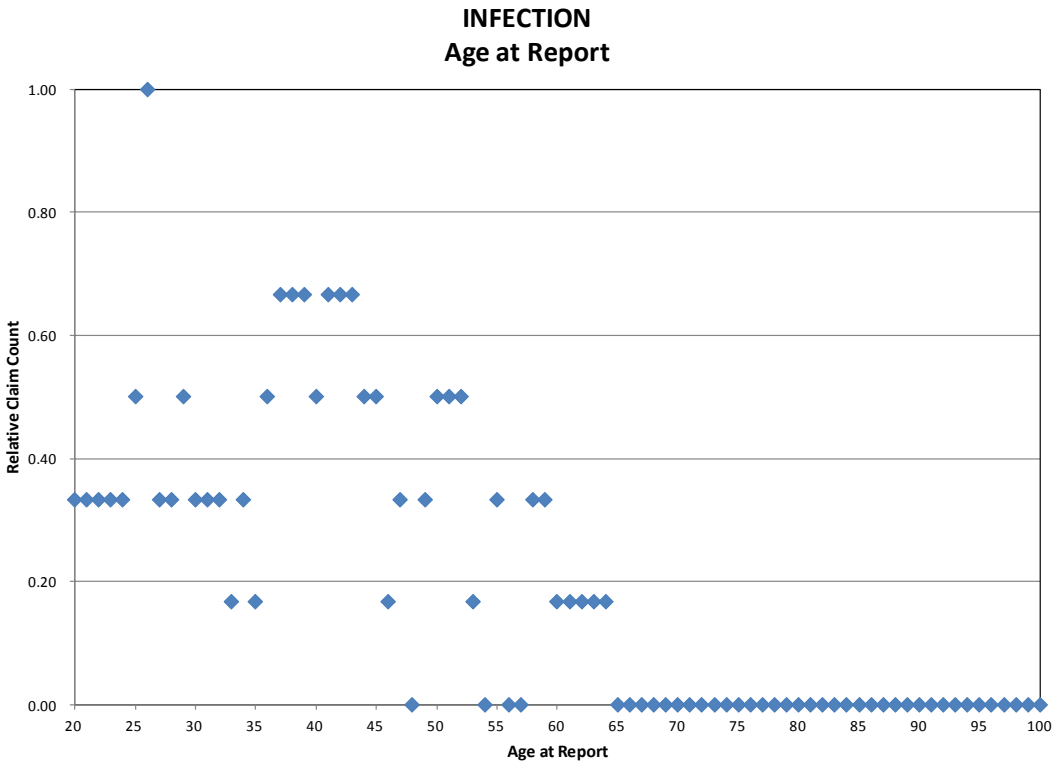
	COUNT	AVERAGE COST	AVERAGE AGE	AVERAGE LAG (DAYS)
RAW MEAN	249	28,992	39	140
CUT OFF	87	2,899		
ADJ MEAN	162	43,415	40	179
ADJ X 5 LARGEST	157	17,633	40	141
5 LARGEST	5	852,976	44	1,360
LARGEST	1	1,137,484	41	2,903

	ALL	LAG <= 2 Yrs	LAG > 2 Yrs
AVERAGE AGE	39	39	50
AVERAGE LAG (YEARS)	0.4	0.2	5.5
COUNT	98	94	4
COUNT PERCENTAGE		96%	4%

	M	F	U
GENDER	133	104	12
GENDER PERCENTAGE	53%	42%	5%

INFECTION

	COUNT	PERCENTAGE
AGRICULTURE / FARMING / AQUACULTURE	1	0%
AIRCRAFT OPERATION, SERVICE, MANUFACTURING, OR REPAIR	1	0%
ANIMAL CARE, TRAINING, BREEDING, BOARDING	0	0%
AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	3	1%
BUILDING MAINTAINENCE AND OPERATIONS	4	2%
CLERICAL	7	3%
CONSTRUCTION	6	2%
CONTRACTING	4	2%
EDUCATION AND RELIGIOUS INSTITUTIONS	9	4%
FIREFIGHTER	4	2%
FOOD MANUFACTURING	2	1%
FOOD SERVICE	28	11%
GENERAL SERVICES	3	1%
GOVERNMENT	87	35%
HEALTH CARE SERVICES	47	19%
HOSPITALITY AND ENTERTAINMENT	2	1%
LANDSCAPING	0	0%
LIVESTOCK AND POULTRY FARMING	0	0%
LOGGING AND TREE SERVICE	1	0%
MANUFACTURING GENERAL	5	2%
MARINE TERMINAL OPERATION	1	0%
MOTOR VEHICLE OPERATION OTHER THAN TRUCKING	1	0%
NATURAL RESOURCE EXTRACTION, REFINING, STORAGE, TRANSPORT	8	3%
POLICE OFFICERS	5	2%
RETAIL SERVICES	3	1%
SOCIAL SERVICES	2	1%
TELECOMMUNICATION AND BROADCASTING	0	0%
TRUCKING	0	0%
UNKNOWN	1	0%
UTILITY PRODUCTION, DISTRIBUTION, MAINTAINENCE	6	2%
VEHICLE OTHER THAN AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	0	0%
VESSEL OPERATION, SERVICE, MANUFACTURING, OR REPAIR	1	0%
WHOLESALE AND RETAIL GENERAL	7	3%


INFECTION
Age at Report
Relative Claim Count
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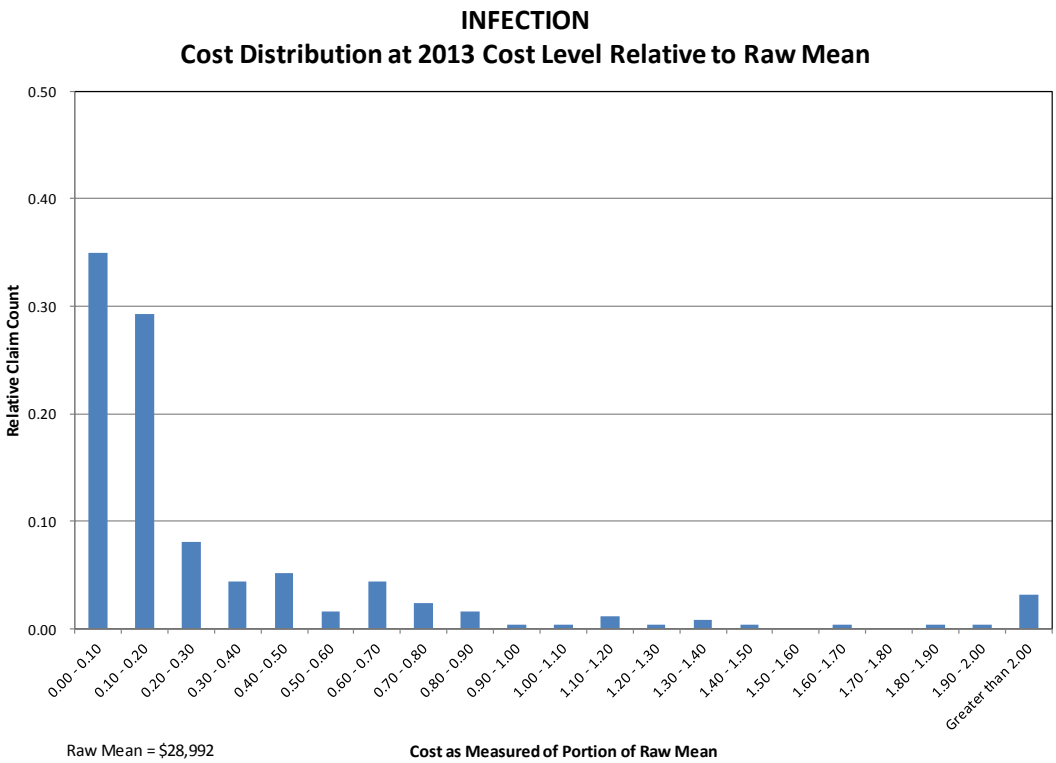
Age at Report


INFECTION
Cost Distribution at 2013 Cost Level Relative to Raw Mean
Relative Claim Count
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0.30 - 0.40
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0.50 - 0.60
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0.70 - 0.80
0.80 - 0.90
0.90 - 1.00
1.00 - 1.10
1.10 - 1.20
1.20 - 1.30
1.30 - 1.40
1.40 - 1.50
1.50 - 1.60
1.60 - 1.70
1.70 - 1.80
1.80 - 1.90
1.90 - 2.00
Greater than 2.00
Raw Mean = $28,992
Cost as Measured of Portion of Raw Mean

EYE CONDITION ALL

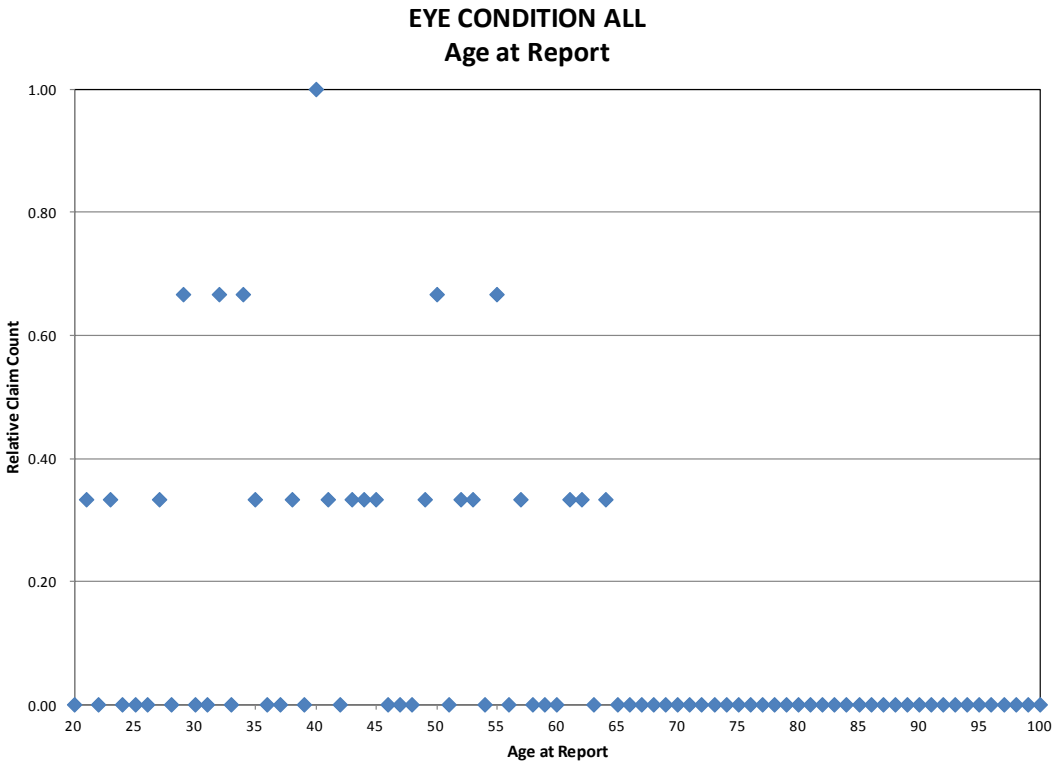
	COUNT	AVERAGE COST	AVERAGE AGE	AVERAGE LAG (DAYS)
RAW MEAN	35	12,550	43	426
CUT OFF	7	1,255		
ADJ MEAN	28	15,629	40	257
ADJ X 5 LARGEST	23	3,869	38	277
5 LARGEST	5	69,725	46	164
LARGEST	1	189,814	49	51

	ALL	LAG <= 2 Yrs	LAG > 2 Yrs
AVERAGE AGE	43	41	47
AVERAGE LAG (YEARS)	1.2	0.2	4.7
COUNT	29	23	6
COUNT PERCENTAGE		79%	21%

	M	F	U
GENDER	19	14	2
GENDER PERCENTAGE	54%	40%	6%

EYE CONDITION ALL

	COUNT	PERCENTAGE
AGRICULTURE / FARMING / AQUACULTURE	0	0%
AIRCRAFT OPERATION, SERVICE, MANUFACTURING, OR REPAIR	0	0%
ANIMAL CARE, TRAINING, BREEDING, BOARDING	0	0%
AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	2	6%
BUILDING MAINTAINENCE AND OPERATIONS	0	0%
CLERICAL	1	3%
CONSTRUCTION	0	0%
CONTRACTING	1	3%
EDUCATION AND RELIGIOUS INSTITUTIONS	2	6%
FIREFIGHTER	0	0%
FOOD MANUFACTURING	1	3%
FOOD SERVICE	1	3%
GENERAL SERVICES	0	0%
GOVERNMENT	3	9%
HEALTH CARE SERVICES	10	29%
HOSPITALITY AND ENTERTAINMENT	0	0%
LANDSCAPING	0	0%
LIVESTOCK AND POULTRY FARMING	0	0%
LOGGING AND TREE SERVICE	0	0%
MANUFACTURING GENERAL	3	9%
MARINE TERMINAL OPERATION	0	0%
MOTOR VEHICLE OPERATION OTHER THAN TRUCKING	0	0%
NATURAL RESOURCE EXTRACTION, REFINING, STORAGE, TRANSPORT	0	0%
POLICE OFFICERS	0	0%
RETAIL SERVICES	1	3%
SOCIAL SERVICES	1	3%
TELECOMMUNICATION AND BROADCASTING	0	0%
TRUCKING	0	0%
UNKNOWN	1	3%
UTILITY PRODUCTION, DISTRIBUTION, MAINTAINENCE	0	0%
VEHICLE OTHER THAN AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	0	0%
VESSEL OPERATION, SERVICE, MANUFACTURING, OR REPAIR	8	23%
WHOLESALE AND RETAIL GENERAL	0	0%


EYE CONDITION ALL
Age at Report
Relative Claim Count
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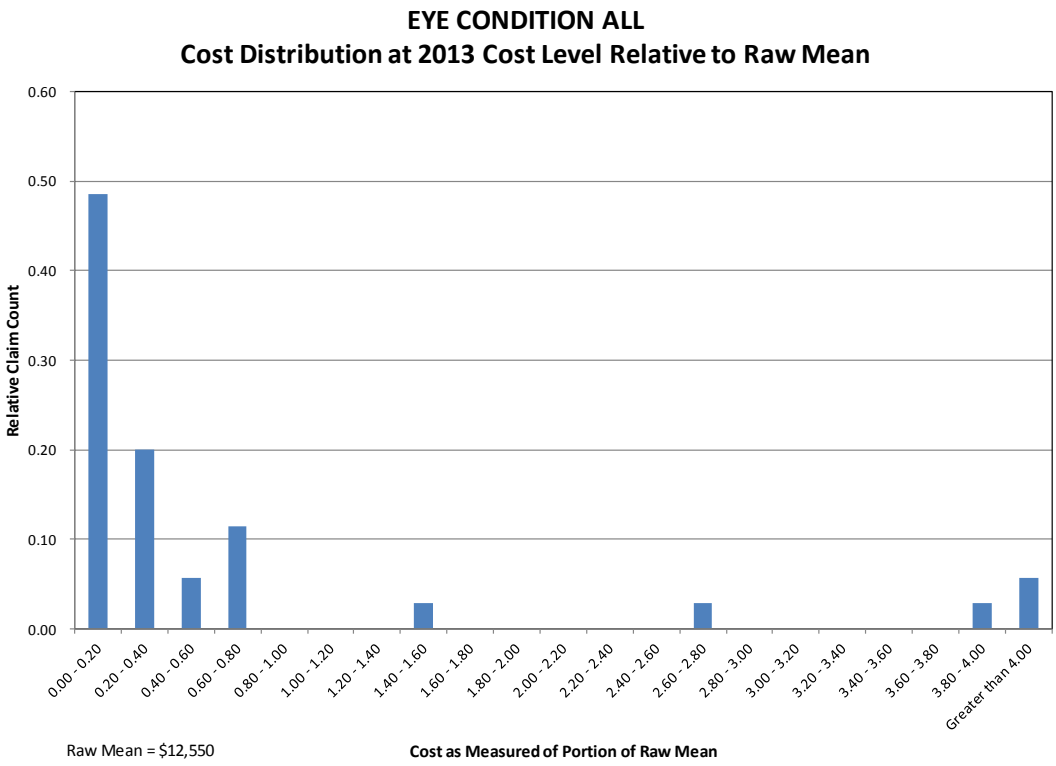
Age at Report


EYE CONDITION ALL
Cost Distribution at 2013 Cost Level Relative to Raw Mean
Relative Claim Count
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0.00 - 0.20
0.20 - 0.40
0.40 - 0.60
0.60 - 0.80
0.80 - 1.00
1.00 - 1.20
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2.40 - 2.60
2.60 - 2.80
2.80 - 3.00
3.00 - 3.20
3.20 - 3.40
3.40 - 3.60
3.60 - 3.80
3.80 - 4.00
Greater than 4.00
Raw Mean = $12,550
Cost as Measured of Portion of Raw Mean

REACTION TO FOREIGN SUBSTANCE

	COUNT	AVERAGE COST	AVERAGE AGE	AVERAGE LAG (DAYS)
RAW MEAN	1,183	43,855	39	205
CUT OFF	523	4,386		
ADJ MEAN	660	76,672	41	271
ADJ X 5 LARGEST	655	59,682	41	272
5 LARGEST	5	2,302,282	33	150
LARGEST	1	4,301,036	0	0

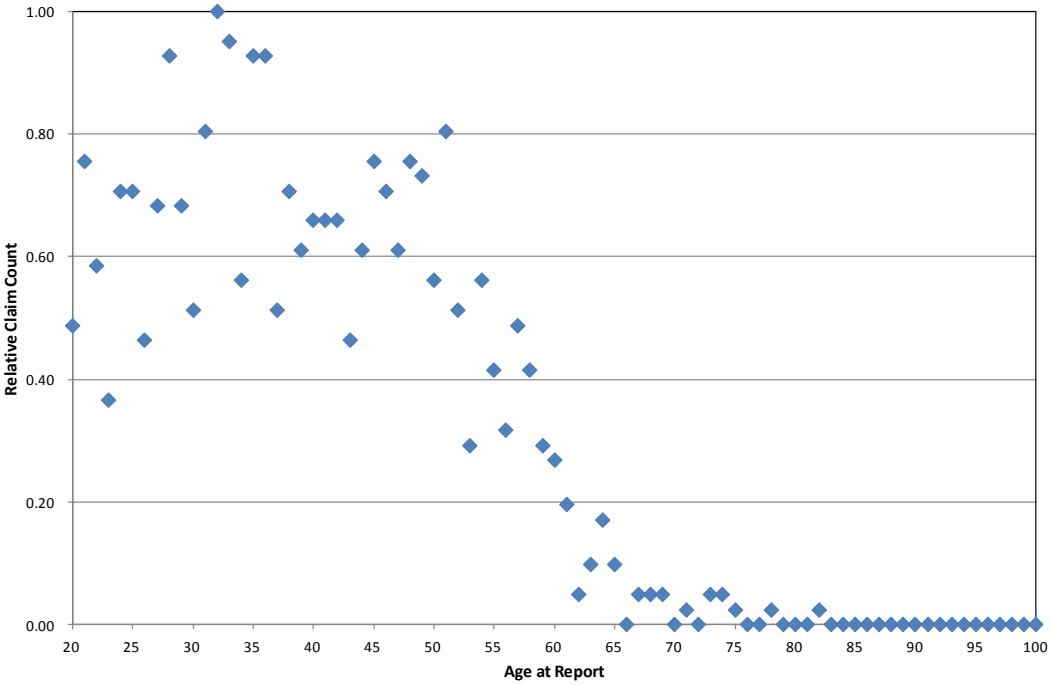
	ALL	LAG <= 2 Yrs	LAG > 2 Yrs
AVERAGE AGE	39	39	47
AVERAGE LAG (YEARS)	0.6	0.2	8.2
COUNT	1,098	1,053	45
COUNT PERCENTAGE		96%	4%

	M	F	U
GENDER	860	309	14
GENDER PERCENTAGE	73%	26%	1%

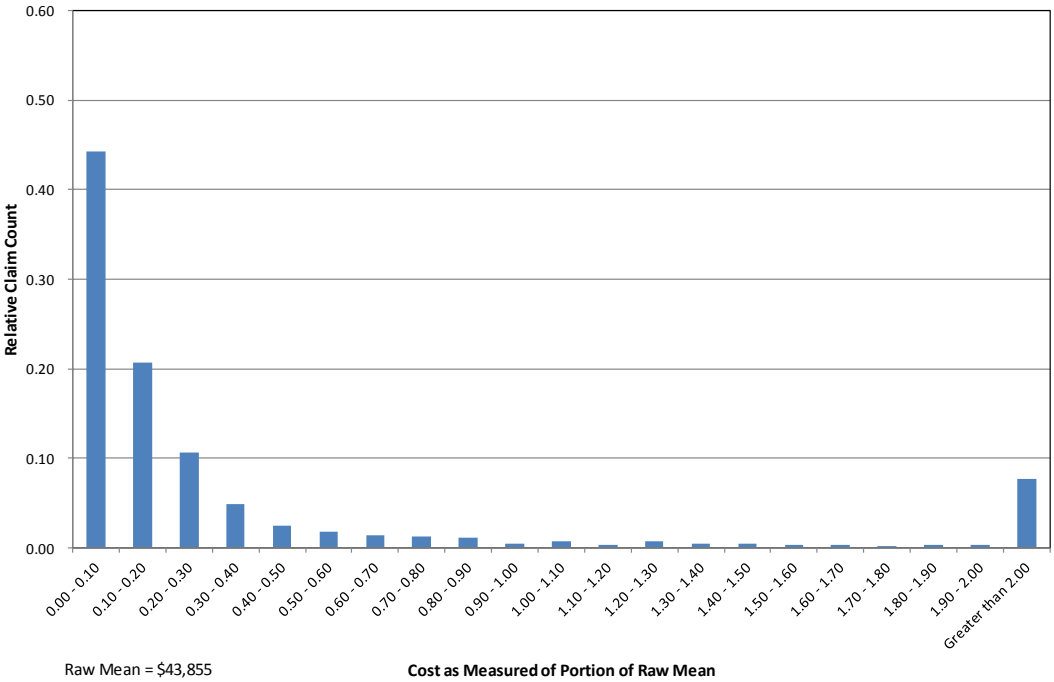
REACTION TO FOREIGN SUBSTANCE

	COUNT	PERCENTAGE
AGRICULTURE / FARMING / AQUACULTURE	12	1%
AIRCRAFT OPERATION, SERVICE, MANUFACTURING, OR REPAIR	11	1%
ANIMAL CARE, TRAINING, BREEDING, BOARDING	1	0%
AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	92	8%
BUILDING MAINTAINENCE AND OPERATIONS	25	2%
CLERICAL	19	2%
CONSTRUCTION	60	5%
CONTRACTING	86	7%
EDUCATION AND RELIGIOUS INSTITUTIONS	30	3%
FIREFIGHTER	2	0%
FOOD MANUFACTURING	63	5%
FOOD SERVICE	23	2%
GENERAL SERVICES	27	2%
GOVERNMENT	97	8%
HEALTH CARE SERVICES	98	8%
HOSPITALITY AND ENTERTAINMENT	30	3%
LANDSCAPING	4	0%
LIVESTOCK AND POULTRY FARMING	5	0%
LOGGING AND TREE SERVICE	10	1%
MANUFACTURING GENERAL	201	17%
MARINE TERMINAL OPERATION	7	1%
MOTOR VEHICLE OPERATION OTHER THAN TRUCKING	10	1%
NATURAL RESOURCE EXTRACTION, REFINING, STORAGE, TRANSPORT	59	5%
POLICE OFFICERS	5	0%
RETAIL SERVICES	41	3%
SOCIAL SERVICES	12	1%
TELECOMMUNICATION AND BROADCASTING	3	0%
TRUCKING	27	2%
UNKNOWN	36	3%
UTILITY PRODUCTION, DISTRIBUTION, MAINTAINENCE	3	0%
VEHICLE OTHER THAN AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	2	0%
VESSEL OPERATION, SERVICE, MANUFACTURING, OR REPAIR	24	2%
WHOLESALE AND RETAIL GENERAL	58	5%

REACTION TO FOREIGN SUBSTANCE
Age at Report



REACTION TO FOREIGN SUBSTANCE
Cost Distribution at 2013 Cost Level Relative to Raw Mean



PHYSICAL STRESS

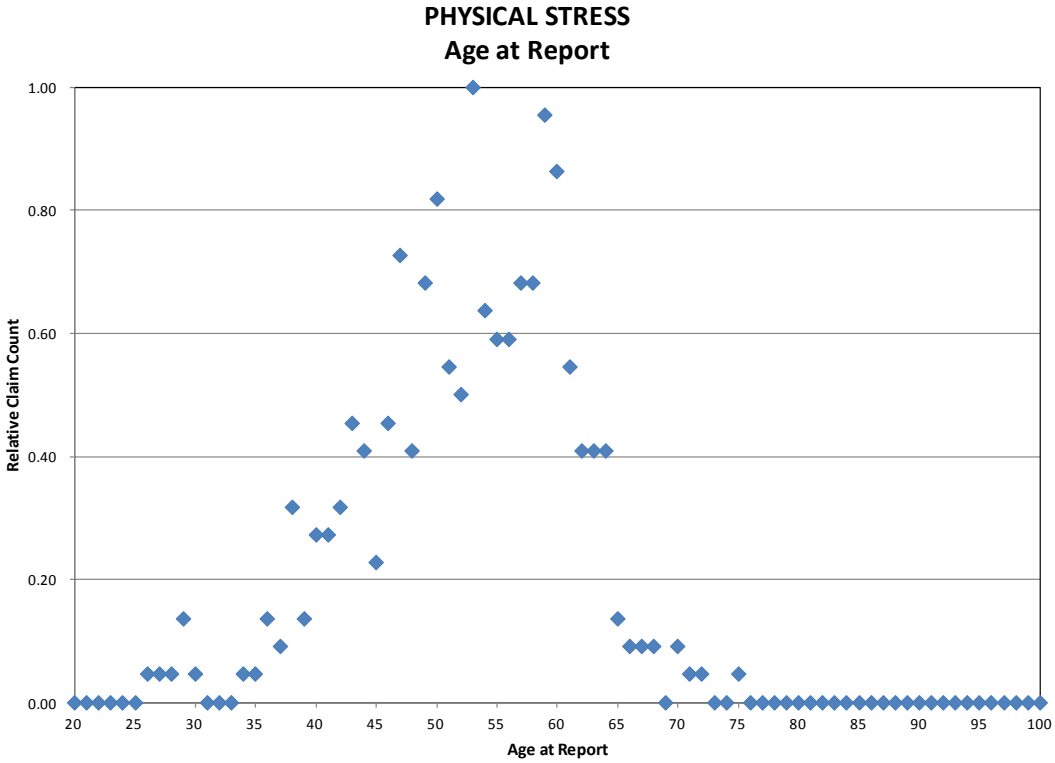
	COUNT	AVERAGE COST	AVERAGE AGE	AVERAGE LAG (DAYS)
RAW MEAN	376	144,510	52	404
CUT OFF	224	14,451		
ADJ MEAN	152	349,967	53	454
ADJ X 5 LARGEST	147	241,072	53	430
5 LARGEST	5	3,551,496	53	1,153
LARGEST	1	9,275,801	46	4,686

	ALL	LAG <= 2 Yrs	LAG > 2 Yrs
AVERAGE AGE	52	52	54
AVERAGE LAG (YEARS)	1.1	0.3	6.5
COUNT	344	297	47
COUNT PERCENTAGE		86%	14%

	M	F	U
GENDER	349	23	4
GENDER PERCENTAGE	93%	6%	1%

PHYSICAL STRESS

	COUNT	PERCENTAGE
AGRICULTURE / FARMING / AQUACULTURE	0	0%
AIRCRAFT OPERATION, SERVICE, MANUFACTURING, OR REPAIR	0	0%
ANIMAL CARE, TRAINING, BREEDING, BOARDING	0	0%
AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	6	2%
BUILDING MAINTAINENCE AND OPERATIONS	8	2%
CLERICAL	15	4%
CONSTRUCTION	10	3%
CONTRACTING	21	6%
EDUCATION AND RELIGIOUS INSTITUTIONS	4	1%
FIREFIGHTER	27	7%
FOOD MANUFACTURING	1	0%
FOOD SERVICE	5	1%
GENERAL SERVICES	0	0%
GOVERNMENT	32	9%
HEALTH CARE SERVICES	3	1%
HOSPITALITY AND ENTERTAINMENT	2	1%
LANDSCAPING	0	0%
LIVESTOCK AND POULTRY FARMING	1	0%
LOGGING AND TREE SERVICE	9	2%
MANUFACTURING GENERAL	8	2%
MARINE TERMINAL OPERATION	0	0%
MOTOR VEHICLE OPERATION OTHER THAN TRUCKING	1	0%
NATURAL RESOURCE EXTRACTION, REFINING, STORAGE, TRANSPORT	2	1%
POLICE OFFICERS	8	2%
RETAIL SERVICES	0	0%
SOCIAL SERVICES	1	0%
TELECOMMUNICATION AND BROADCASTING	0	0%
TRUCKING	26	7%
UNKNOWN	13	3%
UTILITY PRODUCTION, DISTRIBUTION, MAINTAINENCE	2	1%
VEHICLE OTHER THAN AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	0	0%
VESSEL OPERATION, SERVICE, MANUFACTURING, OR REPAIR	160	43%
WHOLESALE AND RETAIL GENERAL	11	3%


PHYSICAL STRESS
Age at Report
Relative Claim Count
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0.00
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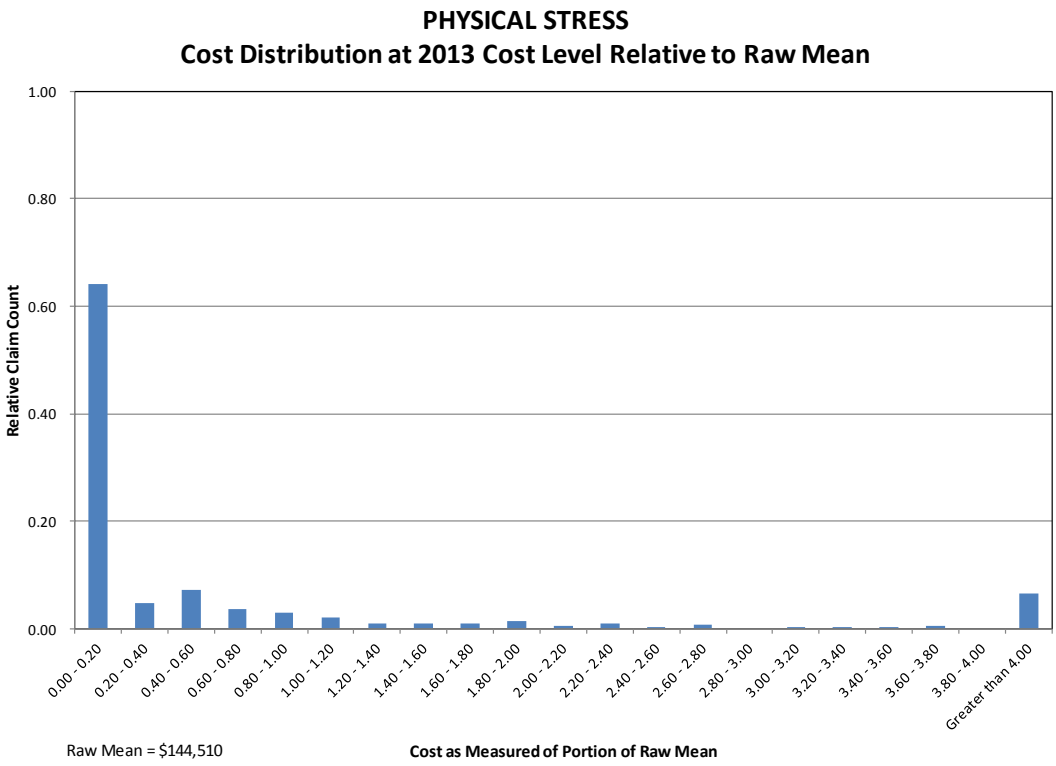
Age at Report


PHYSICAL STRESS
Cost Distribution at 2013 Cost Level Relative to Raw Mean
Relative Claim Count
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0.20 - 0.40
0.40 - 0.60
0.60 - 0.80
0.80 - 1.00
1.00 - 1.20
1.20 - 1.40
1.40 - 1.60
1.60 - 1.80
1.80 - 2.00
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2.40 - 2.60
2.60 - 2.80
2.80 - 3.00
3.00 - 3.20
3.20 - 3.40
3.40 - 3.60
3.60 - 3.80
3.80 - 4.00
Greater than 4.00
Raw Mean = $144,510
Cost as Measured of Portion of Raw Mean

Appendix C: Metrics Illustrating Latency

The following are metrics illustrating latency. These include:

Age at the 5% Level:
95% of claims are reported at ages greater than the 5% level. Age at claim report is assumed to represent age at disease emergence.

Mean Age:
Average age at report, all claim.

Age at the 95% Level:
5% of claims are reported at ages greater than the 95% level.

Average Lag, All Claims:
Lag is defined as the time between date of last exposure to loss (generally the last date worked) and the date of claim report.

Average Lag, Excluding Lowest 10%:
Average lag for 90% of claims. Measurement excludes 10% of total claims with the lowest lag.

Average Lag, Excluding Lowest 90%:
Average lag for 10% of claims. Measurement excludes 90% of total claims with the lowest lag.

AGE AT CLAIM REPORT: 5% LEVEL

	INDIVIDUAL DISEASES	RECOMMENDED COMBINATIONS
MESOTHELIOMA	51	
ASBESTOSIS	43	45
LUNG CANCER	45	
OBSTRUCTIVE RESPIRATORY	24	23
ALL OTHER RESPIRATORY	23	
ALL OTHER CANCER	43	43
PNEUMOCONIOSIS EXCEPT ASBESTOSIS	24	24
HEARING LOSS	44	44
BURSITIS	25	
EPICONDYLITIS	29	
TENDONITIS	21	
TENOSYNOVITIS	22	23
OTHER INFLAMMATION	25	
SPRAIN / STRAIN / TEAR	24	
HERNIA	27	
ALL OTHER CUMULATIVE TRAUMA	24	
CARPAL TUNNEL SYNDROME	24	24
EXCLUDED DISEASES		
INFECTION	22	22
MENTAL STRESS	26	26
PHYSICAL STRESS	37	37
NERVE DISEASE	28	28
EYE CONDITION	21	21
REACTION TO FOREIGN SUBSTANCE	21	21
VASCULAR	25	25

AGE AT CLAIM REPORT: MEAN

	INDIVIDUAL DISEASES	RECOMMENDED COMBINATIONS
MESOTHELIOMA	68	
ASBESTOSIS	64	65
LUNG CANCER	66	
OBSTRUCTIVE RESPIRATORY	44	
ALL OTHER RESPIRATORY	44	44
ALL OTHER CANCER	62	62
PNEUMOCONIOSIS EXCEPT ASBESTOSIS	54	54
HEARING LOSS	62	62
BURSITIS	43	
EPICONDYLITIS	44	
TENDONITIS	40	
TENOSYNOVITIS	41	
OTHER INFLAMMATION	44	42
SPRAIN / STRAIN / TEAR	42	
HERNIA	44	
ALL OTHER CUMULATIVE TRAUMA	42	
CARPAL TUNNEL SYNDROME	42	42
EXCLUDED DISEASES		
INFECTION	39	39
MENTAL STRESS	44	44
PHYSICAL STRESS	52	52
NERVE DISEASE	44	44
EYE CONDITION	43	43
REACTION TO FOREIGN SUBSTANCE	39	39
VASCULAR	46	46

AGE AT CLAIM REPORT: 95% LEVEL

	INDIVIDUAL DISEASES	RECOMMENDED COMBINATIONS
MESOTHELIOMA	83	82
ASBESTOSIS	81	
LUNG CANCER	81	
OBSTRUCTIVE RESPIRATORY	63	66
ALL OTHER RESPIRATORY	67	
ALL OTHER CANCER	81	81
PNEUMOCONIOSIS EXCEPT ASBESTOSIS	78	78
HEARING LOSS	79	79
BURSITIS	57	59
EPICONDYLITIS	57	
TENDONITIS	57	
TENOSYNOVITIS	59	
OTHER INFLAMMATION	60	
SPRAIN / STRAIN / TEAR	59	
HERNIA	62	
ALL OTHER CUMULATIVE TRAUMA	59	
CARPAL TUNNEL SYNDROME	59	59
EXCLUDED DISEASES		
INFECTION	59	59
MENTAL STRESS	59	59
PHYSICAL STRESS	64	64
NERVE DISEASE	62	62
EYE CONDITION	62	62
REACTION TO FOREIGN SUBSTANCE	59	59
VASCULAR	62	62

AVERAGE LAG IN YEARS: ALL CLAIMS

	INDIVIDUAL DISEASES	RECOMMENDED COMBINATIONS
MESOTHELIOMA	1.7	
ASBESTOSIS	3.9	3.6
LUNG CANCER	8.3	
OBSTRUCTIVE RESPIRATORY	0.4	1.0
ALL OTHER RESPIRATORY	1.2	
ALL OTHER CANCER	3.7	3.7
PNEUMOCONIOSIS EXCEPT ASBESTOSIS	1.3	1.3
HEARING LOSS	0.7	0.7
BURSITIS	0.1	
EPICONDYLITIS	0.2	
TENDONITIS	0.1	
TENOSYNOVITIS	0.2	0.2
OTHER INFLAMMATION	0.3	
SPRAIN / STRAIN / TEAR	0.3	
HERNIA	0.3	
ALL OTHER CUMULATIVE TRAUMA	0.3	
CARPAL TUNNEL SYNDROME	0.3	0.3
EXCLUDED DISEASES		
INFECTION	0.4	0.4
MENTAL STRESS	0.2	0.2
PHYSICAL STRESS	1.1	1.1
NERVE DISEASE	1.1	1.1
EYE CONDITION	1.2	1.2
REACTION TO FOREIGN SUBSTANCE	0.6	0.6
VASCULAR	0.3	0.3

AVERAGE LAG IN YEARS: EXCLUDING LOWEST 10%

	INDIVIDUAL DISEASES	RECOMMENDED COMBINATIONS
MESOTHELIOMA	1.9	
ASBESTOSIS	4.4	4.0
LUNG CANCER	9.3	
OBSTRUCTIVE RESPIRATORY	0.4	1.2
ALL OTHER RESPIRATORY	1.4	
ALL OTHER CANCER	4.1	4.1
PNEUMOCONIOSIS EXCEPT ASBESTOSIS	1.5	1.5
HEARING LOSS	0.8	0.8
BURSITIS	0.1	
EPICONDYLITIS	0.2	
TENDONITIS	0.1	
TENOSYNOVITIS	0.2	0.2
OTHER INFLAMMATION	0.4	
SPRAIN / STRAIN / TEAR	0.3	
HERNIA	0.3	
ALL OTHER CUMULATIVE TRAUMA	0.3	
CARPAL TUNNEL SYNDROME	0.4	0.4
EXCLUDED DISEASES		
INFECTION	0.4	0.4
MENTAL STRESS	0.3	0.3
PHYSICAL STRESS	1.2	1.2
NERVE DISEASE	1.2	1.2
EYE CONDITION	1.3	1.3
REACTION TO FOREIGN SUBSTANCE	0.6	0.6
VASCULAR	0.3	0.3

AVERAGE LAG IN YEARS: TOP 10%

	INDIVIDUAL DISEASES	RECOMMENDED COMBINATIONS
MESOTHELIOMA	13.0	22.8
ASBESTOSIS	24.7	
LUNG CANCER	26.3	
OBSTRUCTIVE RESPIRATORY	3.1	8.9
ALL OTHER RESPIRATORY	10.6	
ALL OTHER CANCER	18.0	18.0
PNEUMOCONIOSIS EXCEPT ASBESTOSIS	10.5	10.5
HEARING LOSS	6.8	6.8
BURSITIS	0.5	1.6
EPICONDYLITIS	0.9	
TENDONITIS	0.6	
TENOSYNOVITIS	1.1	
OTHER INFLAMMATION	2.3	
SPRAIN / STRAIN / TEAR	2.4	
HERNIA	1.7	
ALL OTHER CUMULATIVE TRAUMA	2.1	
CARPAL TUNNEL SYNDROME	2.3	2.3
EXCLUDED DISEASES		
INFECTION	3.0	3.0
MENTAL STRESS	1.5	1.5
PHYSICAL STRESS	7.9	7.9
NERVE DISEASE	6.6	6.6
EYE CONDITION	6.4	6.4
REACTION TO FOREIGN SUBSTANCE	4.2	4.2
VASCULAR	1.8	1.8

Appendix D: Definition of Industry Groupings

The following are the groupings used to map individual workers' compensation classifications.

AGRICULTURE/FARMING/AQUACULTURE
AIRCRAFT OPERATION, SERVICE, MANUFACTURING, OR REPAIR
ANIMAL CARE, TRAINING, BREEDING, BOARDING
AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR
BUILDING MAINTAINENCE AND OPERATIONS
CLERICAL
CONSTRUCTION
CONTRACTING
EDUCATION AND RELIGIOUS INSTITUTIONS
FIREFIGHTER
FOOD MANUFACTURING
FOOD SERVICE
GENERAL SERVICES
GOVERNMENT
HEALTH CARE SERVICES
HOSPITALITY AND ENTERTAINMENT
LANDSCAPING
LIVESTOCK AND POULTRY FARMING
LOGGING AND TREE SERVICE
MANUFACTURING GENERAL
MARINE TERMINAL OPERATION
MOTOR VEHICLE OPERATION OTHER THAN TRUCKING
NATURAL RESOURCE EXTRACTION, REFINING, STORAGE, TRANSPORT
POLICE OFFICERS
RETAIL SERVICES
SOCIAL SERVICES
TELECOMMUNICATION AND BROADCASTING
TRUCKING
UNKNOWN
UTILITY PRODUCTION, DISTRIBUTION, MAINTENANCE
VEHICLE OTHER THAN AUTOMOBILE SALES, SERVICE, MANU-FACTURING, OR REPAIR
VESSEL OPERATION, SERVICE, MANUFACTURING, OR REPAIR
WHOLESALE AND RETAIL GENERAL

The following pages display examples of individual classifications mapped into each industry group. The lists are not complete, but do provide a cross-section of the mapping process.

AGRICULTURE/FARMING/AQUACULTURE
- AGRICULTURE WORKER
- BERRY FARMING
- FARM WORKER
- FARMING OPERATIONS
- FARMS – GRAIN AND VEGETABLE
- FIN FISH FARMING
- FISH WHOLESALE
- FISHING/FISH OR FUR FARMS
- GILLNET AND TROLL FISHING
- GRAIN FARMING
- HARVESTING & BALING, CUSTOM
- HATCHERIES – COMMERCIAL
- MUSHROOM PRODUCERS/BAIT FARMS
- NURSERIES – TREE/SHRUB
- NURSERY WORKER
- ORCHARD WORKER
- ORNAMENTAL NURSERY
- TRAWL FISHING
- VEGETABLE FARMING

AIRCRAFT OPERATION, SERVICE, MANUFACTURING, OR REPAIR
- AERIAL PHOTOGRAPHY, SURVEY, ETC.
- AIR NAVIGATION SUPPORT
- AIR SERVICE – REGULAR & CHARTER
- AIR SERVICE – SCHEDULED COMMERCIAL
- AIRCRAFT – GROUND SUPPORT SERVICES
- AIRCRAFT & ENGINE OVERHAUL
- AIRCRAFT HANDLING OR FUELLING
- AIRCRAFT MAINTENANCE
- AIRPLANE MANUFACTURING
- AIRPORT
- AVIATION OR FLYING SCHOOL
- FIXED-WING IFR OPERATION
- FIXED-WING VFR OPERATION
- FLIGHT OPERATIONS – MISCELLANEOUS
- HELICOPTER AERIAL WORK
- HELICOPTER SERVICES
- PILOT

ANIMAL CARE, TRAINING, BREEDING, BOARDING
- ANIMAL HUMANE SOCIETY OR WILDLIFE REHAB
- ANIMAL SHELTERS/POUNDS
- ANIMAL TRAINING
- DOMESTIC ANIMAL BREEDING OR BOARDING
- HORSE RANCHING, RAISING, AND BREEDING
- KENNELS/PET GROOMING
- PET GROOMING
- VETERINARY
- VETERINARY HOSPITAL, VETERINARY SERVICES

AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR
- AIRCRAFT, AUTOMOBILE, OR TRUCK ASSEMBLY
- AUTO DEALERS
- AUTO GLASS SHOP
- AUTO PARTS SUPPLY
- AUTO RECYCLING
- AUTO SERVICE OR REPAIR
- AUTO SPRING OR CHAIN MANUFACTURE
- AUTO TOWING
- AUTO TRANSMISSION REPAIR SHOP
- AUTO WRECKERS
- AUTOBODY PAINTING
- AUTOBODY SHOP ALL EMPLOYEES
- AUTOMOBILE DEALERSHIP
- AUTOMOBILE PAINT SHOPS
- AUTOMOBILE PARTS AND ACCESSORIES SALES
- AUTOMOBILE REPAIR AND SERVICE
- AUTOMOTIVE MACHINE SHOP
- AUTOMOTIVE PART MANUFACTURING
- BATTERY REPAIR AUTO ELECTRIC
- BRAKE SHOPS
- CAR WASH OR AUTO DETAILING
- ELECTROPLATING AUTO PARTS
- ENGINE, CYLINDER, AUTO PART MFG, REBUILD
- GAS BAR OR SERVICE STATION
- GAS BARS/CAR WASH, RETAIL – NO SERVICING
- GASOLINE STATION AND CONVENIENCE
- HARDWARE/AUTO PARTS STORES/ETC.
- MFG OF RADIATOR CORES
- SERVICE STATION EQUIP – SALES/SERVICE
- TIRE REPAIR SHOP, VULCANIZING
- TIRES, RETREADING
- TOWING AUTO VEHICLES

BUILDING MAINTENANCE AND OPERATIONS
- BUILDING MANAGEMENT, RENTAL
- BUILDING OPERATION
- BUILDING OR HOME INSPECTION
- COMMERCIAL CLEANING, JANITORIAL SERVICES
- CUSTODIAL, GENERAL JANITOR, ENGINEER, FOOD AREA MECHANICS
- DOMESTIC CLEANING
- JANITORIAL AND MAID SERVICES

CLERICAL
- ACCOUNTING
- ACTUARIAL SERVICES
- ADVERTISING AGENCIES
- ADVERTISING OR PUBLIC RELATIONS SERVICES
- ARCHITECTS
- BANKS/FINANCIAL SERVICES
- BUSINESS CONSULTING
- BUSINESS SERVICES
- CLERICAL WORKER SUPPLY
- COMMERCIAL STOCK AUDIT
- COMPUTER CONSULTING OR PROGRAMMING
- CONSULTING
- CONSULTING ENGINEERING
- DATA PROCESSING
- ENGINEERING
- FINANCIAL SERVICES
- GEOLOGICAL AND ENVIRONMENTAL CONSULTING
- INSURANCE, ACTUARIAL, OR BONDING SERVICES
- LEGAL OFFICES ALL EMPLOYEES
- LEGAL SERVICES
- MAIL ROOM OPERATIONS
- MAILING OR ADDRESSING SERVICES
- MAP MAKING
- MEDICAL SERVICES GENERAL ACCOUNTING, MEDICAL PROFESSIONALS, ETC.
- OFFICE AND CLERICAL GENERAL
- PROFESSIONAL OR EMPLOYERS' ASSOCIATION
- PROJECT MANAGEMENT
- REAL ESTATE AGENCY
- STAFFING SERVICES – CLERICAL/PROFESSIONAL

CONSTRUCTION
- ASBESTOS ABATEMENT OR MOULD REMEDIATION
- ASBESTOS REMOVAL
- BRIDGE CONSTRUCTION
- BUILDING DEMOLITION
- BUILDING MOVER
- CAISSON OPERATIONS
- CELL, MICROWAVE, TRANSMISSION TOWER ERECT
- CONCRETE CONSTRUCTION
- CONCRETE CONSTRUCTION INCIDENTAL NOC
- CONCRETE CUTTING OR CORING
- CONCRETE PUMPING
- CONCRETE REINFORCING
- CONDUIT CONSTRUCTION FOR CABLES AND WIRES
- CONSTRUCION SITE CLEANING AND DEBRIS REMOVAL
- CONSTRUCTION
- CONSTRUCTION – INDUSTRIAL
- CONSTRUCTION MANAGEMENT
- CONSTRUCTION MANAGEMENT CONSULTING
- CONSTRUCTION TRADE SERVICES – NEC
- CONSTRUCTION, GENERAL LABOUR SUPPLY
- CRANE OPERATION
- CUT AND COVER TUNNEL CONSTRUCTION
- EARTH & ROCK STRUCTURE CONSTRUCTION
- ELELVATOR CONSTRUCTION AND REPAIR
- EQUIPMENT OPERATOR
- ERECT – PRECAST CONCRETE
- ERECT – SHEET/METAL STRUCTURES
- ERECT – STRUCTURAL STEEL
- ESCAVATION AND DRIVERS
- EXTERIOR HIGH-RISE WINDOW CLEANING
- FOUNDATION BORING
- HEAVY EQUIPMENT MAINTENANCE INCLUDING MECHANIC, FOREMAN, WELDING, YARD HEAVY EQUIPMENT OPERATOR
- HIGH PRESSURE WATER CLEANING
- HIGHWAY, ROAD, OR PARKING LOT PAINTING
- HIGHWAY, ROAD, RAILWAY CONTR
- INDUSTRIAL PIPEFITTING
- IRON WORKER
- IRRIGATION CONSTRUCTION
- IRRIGATION/DRAINAGE DISTRICT
- LOG HOME CONSTRUCTION
- MACHINERY/EQUIPMENT ERECTION AND REPAIR
- MECHANIZED TUNNEL BORING CONSTRUCTION
- PAINTING METAL STRUCTURES
- PIER, WHARF, DOCK CONSTRUCTION, REPAIR
- PILE DRIVING
- RENT/ERECT – SCAFFOLD/CRANES
- RIGGING
- ROAD CONSTRUCTION
- STEEL FRAME ERECTION, STRUCTURAL REPAIR
- STRUCTURAL
- STRUCTURAL CONCRETE FORMING
- STRUCTURAL DAM/DYKE CONSTRUCTION, REPAIR
- STRUCTURAL INSULATION
- TUNNEL CONSTRUCTION
- TUNNELING ALL OPERATIONS

CONTRACTING
- ACOUSTIC MATERIALS – SELL/INSTALL
- ALARM INSTALLATION
- APPLIANCE INSTALLATION/REPAIR/SERVICE
- AUTOMATIC DOOR, GATE INSTALL, SRV, RPR
- AUTOMATIC SPRINKLER
- BLIND OR DRAPERY TRACK INSTALLATION
- BOILER INSTALLATION AND REPAIR
- BRICK/MASONRY CONTRACTING
- CARPENTRY
- FINISHING
- CEILING INSTALLER
- COMM TANK OR BOILER INSTALL, REMOVAL
- COMMERCIAL REFRIGERATION, COMM AC WORK
- DECK, RAILING, OR FENCE INSTALLATION
- DOOR AND WINDOW INSTALLATION
- DRYWALL WORKER
- DUST SUPPRESSION SYSTEMS
- ELECTRICAL
- ELECTRICIAN
- ELEVATORS/ESCALATORS – SERVICE/INSTALL
- FENCE INSTALLATION AND BUILDING
- FILTERS, IND – SALE/SERVICE/INSTALL
- FIRE AND FLOOD RESTORATION
- FLOOR COVERING INSTALLATIONS
- GLASS SHOP, WINDOW INSTALL, GLASS RPR
- HARDWOOD FLOOR LAYING OR REFINISHING
- HAZARDOUS WASTE GENERAL
- HEATING SYSTEMS – FAB/INSTALL
- HVAC
- INDUSTRIAL BELTING – INSTALL/SERVICE
- INSTALL SWIM POOL, HOT TUB, ETC.
- INSULATION WORK OR FIREPROOFING
- LIGHT EQUIPMENT SERVICE, REPAIR, INSTALL
- LIGHT METAL PRODUCTS – ASMB/INSTALL
- LOW SLOPE ROOFING
- MASONRY
- MECHANICAL CONTRACTING
- MECHANICAL INSULATION
- OFFICE MACHINE INSTALLATION AND REPAIR
- OVERBURDEN REMOVAL
- OVERHEAD DOOR INSTALLATION
- OVERHEAD DOORS – INSTALL/REPAIR
- PAINTING
- PAINTING OR WALLPAPERING
- PAVING/SURFACING
- PEST CONTROL OR FUMIGATION
- PLASTERING
- PLUMBING
- POOL, SPA, HOT TUB INSTALL OR REPAIR
- RESIDENTIAL GENERAL CONTRACTOR
- ROOFING
- SIDING, AWNING, GUTTER INSTALL OR REPAIR
- SIDING/EAVESTROUGH – FAB./INST.
- STEAM CLEAN, SANDBLAST, PRESSURE WSH BLDGS
- STEEP SLOPE ROOFING
- TILE WORK OR TERRAZZO LAYING
- TILE/TERRAZZO – SELL/INSTALL

- UNDERGROUND SPRINKERS INSTALL
- VACUUM SYSTEMS – ASMB/INSTALL
- WINDOW, GUTTER, OR AWNING CLEANING
- WOOD WORKER

EDUCATION AND RELIGIOUS INSTITUTIONS
- CHARITABLE ASSOCIATIONS
- CHURCHES/RELIGIOUS ORDERS
- COLLEGE
- DAYCARE CENTRE, PRESCHOOL, OR PLAYSCHOOL
- DRIVING SCHOOL
- FUNDRAISING OR CHARITABLE ORGANIZATION
- INSTITUTES OF TECHNOLOGY
- KINDERGARTENS
- PLAY SCHOOLS
- PUBLIC SCHOOL DISTRICT
- RELIGIOUS ORGANIZATION
- SCHOOL BOARDS
- SCHOOL DIVISIONS
- SCHOOLS – DANCE, MUSIC, HOBBY
- SPECIALTY SCHOOLS – PROFESSIONAL/PERSONAL
- SPORTS INSTRUCTION SCHOOL
- UNIVERSITY

FIREFIGHTER
- FIREFIGHTER
- FOREST FIRE FIGHTING

FOOD MANUFACTURING
- BACKERY
- BREWERY
- BUTTER, CHEESE, OR ICE CREAM MANUFACTURE
- CANDY MANUFACTURING
- CANNERY
- COFFEE, TEA, HERB, OR SPICE PKG OR MFG
- DAIRY/FRUIT JUICE PROCESSING
- EGG GRADING
- FISH PACKING
- FLOUR MILLS
- FOOD PROCESS – MISC
- FOOD PRODUCT MANUFACTURING
- FRUIT JUICE MANUFACTURING
- FRUIT OR VEG PROCESSING OR PRODUCT MFG
- FRUIT OR VEGETABLE PACKING OR PACKAGING
- FRUIT PACKING
- GRAIN ELEVATOR OPERATIONS
- GRAIN OR FEED MILLING
- ICE CREAM MANUFACTURING
- LIQUID DAIRY PRODUCT MANUFACTURE
- LIQUOR PRODUCTION
- MEAT PACKING HOUSE
- MEAT PROCESSING
- MEAT PRODUCT MANUFACTURING
- MILK PRODUCT MANUFACTURING
- OYSTER PROCESSING
- PICKLE MANUFACTURING
- RENDERING PLANTS
- RETAIL BREWING OR WINE-MAKING SHOP

SAUSAGE OR SAUSAGE CASING MANUFACTURE
SUGAR BEETS, PROCESSING
SUGAR MANUFACTURING AND REFINING
SUGAR REFINING AND PACKAGING
VEGETABLE OILS & BEET SUGAR PROCESSING
VEGETABLE PACKING OPERATIONS
VINEYARD WORKER
WINERY

FOOD SERVICE
AIRLINE CATERING
BUTCHER
CATERING
CATERING – INDUSTRIAL CAMPS
COFFEE SHOPS OR FOOD CONCESSIONS
FOOD SERVICE, INCLUDING: WAITSTAFF, COOKING, CLERICAL, CASHIER, DIETICIAN, ETC.
INDUSTRIAL CATERING
MOBILE CATERING
RESTAURANT ALL EMPLOYEES

GENERAL SERVICES
AUDIO/VIDEO POST-PRODUCTION OR ANIMATION
BLASTING OR AVALANCHE CONTROL
CATHODIC PROTECTION SERVICE
CEMETERY WORKER
COLD STORAGE
COMMERCIAL DIVING
CONTAINER RECYCLING
COURIER OR LOCAL DELIVERY SERVICES
DOCUMENT STORAGE/EXCHANGE
FEED LOT/CORRAL CLEANING
FENCES – SELL/RENT/INSTALL
FUNERAL HOME/DIRECTOR/EMBALMER/CREMATORY/GENERAL
FUNERAL UNDERTAKING
FURNACE CLEANING SERVICES
GEOLOGICAL/GEOPHYSICAL SERVICES
HEAVY EQUIPMENT RENT WITH SERVICE
HOME & OFFICE FURNITURE MOVERS
INCINERATION
INDUSTRIAL COATING SERVICES
INTERIOR DESIGN
INVESTIGATIVE SERVICES
LAUNDRIES – COMMERCIAL
LIGHT REPAIR SHOPS
MASSAGE PARLOUR, STEAM BATH, MASSAGE SRV
MATERIALS, LIGHT EQUIP TESTING (>500LB)
MISCELLANEOUS INDUSTRIAL CODE
MOVING AND STORAGE
OUTDOOR ADVERTISING
PACKING/CRATING – CUSTOM
PARKING FACILITIES/STORAGE GARAGES
PHOTOGRAPHER
POOL, SPA, OR HOT TUB SERVICE
RECORDS STORAGE
RECYCLING DEPOT
RESEARCH SERVICES
SEPTIC TANK, SEWER, SEWAGE DISPOS SYS SRV
STEEL SERVICE CENTRE – NO SALVAGE

STORAGE EXCLUDING TRUCKING
SURVEY – ARCHAEOLOGICAL
SURVEY – LAND/GENERAL
SURVEYING
SURVEYING ALL OPERATIONS
WAREHOUSE OPERATION
WAREHOUSING – PUBLIC

GOVERNMENT
BOARDS, AGENCIES, COMM (COMPUL)
CHAMBER OF COMMERCE
CITIES
COUNTIES
DEPARTMENT OF HIGHWAYS
DEPARTMENT OF PUBLIC WORKS
FEDERAL GOVERNMENT
GARBAGE COLLECION
GARBAGE COLLECTION/DISPOSAL
GOVERNMENT EMPLOYMENT ALL ASPECTS: PUBLIC SAFETY, OFFICE, SOCIAL SERVICES HIGHWAY LABORER GENERAL
HOUSING AUTHORITIES
LIBRARY OR RESOURCE CENTRE
LOCAL GOVERNMENT AND RELATED OPERATIONS
MUNICIPAL DISTRICTS
PROVINCIAL GOVERNMENT
STREET CLEANING
STREET CLEANING/MAINTENANCE
TOLL COLLECTOR
TOWNS
TRADE UNIONS
TRAFFIC CONTROL
UNION
VILLAGES

HEALTH CARE SERVICES
ACUTE CARE
ADULT HOMES
ALTERNATIVE HEALTH CARE
AMBULANCE OR FIRST AID SERVICES
AMBULANCE SERVICES
AUXILIARY HOSPITAL
CHIROPRACTIC PRACTICE, SERVICES, OR CARE
COMMUNITY HEALTH SUPPORT SERVICES
DENTAL LABORATORY
DENTISTRY OR ANCILLARY DENTAL SERVICES
EMERGENCY HEALTH SERVICES COMMISSION
FITNESS CENTRE, GYM, OR HEALTH CENTRE
HEALTH CARE SERVICES – COVENANT HEALTH
HEALTH CARE SERVICES – OTHER PROVIDERS
HEALTH/ALLIED SERVICE – MISC
HOME HEALTH CARE
HOSPITAL PROFESSIONAL EMPLOYEES
LABORATORY TECHNICIAN
LONG-TERM CARE
MASSAGE THERAPY (LICENSED)
MEDICAL CLINIC OR MEDICAL PRACTICE
MEDICAL DIAGNOSTIC LABORATORY
MEDICAL EMPLOYEES PROFESSIONAL NOT HOSPITAL

MEDICAL TRANSPORTATION
NURSING HOME
OPHTHALMIC DISPENSING
OPTOMETRY
PARAMEDIC
PHARMACEUTICAL PREPARATION
PHYSIOTHERAPY CENTERS
PSYCHIATRIC HOSPITALS
RETIREMENT LIVING CENTRE HEALTH CARE ONLY
SHORT-TERM CARE
SUPPLEMENTARY HEALTH CARE
SURGICAL CENTRE

HOSPITALITY AND ENTERTAINMENT
AMUSEMENT PARK OPERATIONS
ARCADES
ARENAS/STADIUMS – OPERATION OF
ART GALLERIES
ARTISTS/ENTERTAINERS/PERFORMERS
AUCTIONING SERVICES
BINGO OPERATIONS
BOWLING OPERATIONS
CAMPGROUND
CASINO ALL EMPLOYEES
CIRCUS, CARNIVAL, RODEO, MECH AMUSE RIDE
COUNTRY CLUB ALL EMPLOYEES
EXHIBITION ASSOCIATIONS
FILM PRODUCTION INCLUDING PERFORMERS
GOLF CLUBS/RANGES
GUIDING/RAFTING/PACK TRAINS
HALL RENTAL
HOTEL ALL EMPLOYEES
LIVE PERFORMANCE VENUE
LIVE THEATRES/BALLET
MAID SERVICE
MOTELS & CABINS
MOTION PICTURE, COMMERCIAL, OR TELEVISION
MUSEUMS & ART GALLERIES
MUSIC SHOP
ORGANIZING, CONDUCTING SPECIAL EVENTS
OUTDOOR SPORT TOUR
OUTDOOR SPORTS AND RECREATION
PARK MAINTENANCE GENERAL ALL EMPLOYEES
PARK, CAMPGROUND, OR TRAIL MAINTENANCE
PERFORMING ARTS
PRIVATE CLUBS
PRIVATE PARK, GARDEN, OR ZOO
PROFESSIONAL SPORTS
PROPERTY MANAGEMENT/HOSTELS
PUB, BAR, NIGHT CLUB, OR LOUNGE
RIDING ACADEMIES, HORSE STABLES
SKATING/CURLING RINKS, COMM ASSN
SKI HILL OR GONDOLA RIDE
SKI INDUSTRY
SPORTS ADMINISTRATION
SPORTS AND ENTERTAINMENT FACILITY
TENNIS & SQUASH FACILITIES
THEATRE PROFESSIONAL, MUSICIAN, TECHNICIAN, ACTOR, DANCE, ETC.

- TRAVEL AGENCY OR ACCOMMODATION REGISTRY
- TRAVEL AGENCY/MOTOR ASSOCIATION
- YOUTH/RELIGIOUS CAMPS

LANDSCAPING
- BRUSH CUTTING
- BRUSHING, WEEDING, TREE THINNING, SPACING
- CHEM BCLAY, PEAT, SOIL, TOPSOIL DIGGING, PROCESS
- GARDEN OR LANDSCAPING SUPPLY
- LANDSCAPING
- LAWN MAINTENANCE
- LAWN MAINTENANCE, GARDENING, WEED CONTROL (EXPIRED JAN 1, 2010)
- PROCURING SOIL SAMPLES
- SOIL, TOPSOIL, PEAT, OTHER GARDEN MTL PKG

LIVESTOCK AND POULTRY FARMING
- DAIRY FARMING OR LIVESTOCK AUCTIONING
- EGG FARMING
- FARMS AND RANCHES – LIVESTOCK
- FARMS, POULTRY/RABBIT
- HOG FARMING
- LIVESTOCK DEALER
- LIVESTOCK STABLE AND BREEDING
- POULTRY FARMING AND RELATED SERVICES
- POULTRY PACKING PLANTS
- POULTRY PROCESSING
- RANCH HAND
- WATERFOWL PRESERVATION
- ZOOS/GAME FARMS

LOGGING AND TREE SERVICE
- CABLE OR HI-LEAD LOGGING
- INTEGRATED FOREST MANAGEMENT
- LOG HAULING
- LOG PROCESSING
- LOG SCALING
- LOG TOWING
- LOGGING
- MANUAL TREE FELLING AND BUCKING
- MECHANIZED TREE FELLING
- TIMBER MANAGEMENT
- TREE BALER
- TREE CLIMBER
- TREE PLANTER
- TREE SERVICES
- TREE TECHNICIAN
- TREE TRIMMER

MANUFACTURING GENERAL
- ACID, BASE, SALT, CHEMICAL, DYE MANUFACTURE
- ALUMINUM CANS, MFG
- ALUMINUM/METAL EXTRUSION
- ARMATURE REWIND & MOTOR REPAIR
- ARMATURE WINDING FOR SMALL MOTORS
- ART, CRAFT, OR ORNAMENT MANUFACTURE
- ARTIFICIAL STONE PRODUCTS – MFG
- ASPHALT ROOFING PRODUCTS – MFG
- AUTOMATED WOOD PROCESSING EQUIPMENT MFG

AWNING OR AWNING SIGN MANUFACTURE
BABY CARRIAGE MANUFACTURING
BATTERY OR FUEL CELL MANUFACTURE
BOOK MANUFACTURING
BRASS COPPER GOODS MANUFACTURING
BRUSH, BROOM, OR MOP MANUFACTURE
CARDBOARD OR PAPER CONTAINER MANUFACTURE
CARPET OR RUG MANUFACTURE
CEMENT MANUFACTURE
CERAMIC, TERRA COTTA TILE, CLAY BRICK MFG
CERAMIC/PORCELAIN PRODUCTS – INDUST., MFG
CHEMICAL PULP AND PAPER MILL (EXPIRED JAN 1, 2008)
CLAY PRODUCT MFG
CLOTHING MANUFACTURING
COATINGS
COMMERCIAL SIGN MANUFACTURE
COMPRESSORS/POWER UNIT – MFG
CORD, ROPE, OR NET MANUFACTURE
DIE CASTING
DRAPERY MANUFACTURE
DRUG, VITAMIN, OR PHARMACEUTICAL MFG
ELECTRICAL COMPONENTS – MFG
ELECTROPLATING
EXPLOSIVE MANUFACTURING
FIBREGLASS INSULATION – MFG
FOOTWEAR, LUGGAGE, LEATHER PROD MFG, REPAIR
FOUNDRIES, IRON & STEEL
FURNITURE REFINISHING
FURNITURE STOCK MANUFACTURING
GALVANIZE, ELECTROPLATE, PROTECTION PLATE
GALVANIZING SHOP
GLUE OR ADHESIVE MANUFACTURE
GYPSUM PRODUCT MANUFACTURE
ICE MANUFACTURE
INDUST SAW BLADE MFG, SHARPEN, SERV, REPAIR
JEWELLERY MANUFACTURING
MATTRESS MANUFACTURING
METAL RECYCLING
METAL SCRAP OPERATIONS ALL EMPLOYEES
MFG OF DRILLING MUD AGGREGATE
MFG OF GLASS PRODUCTS
MFG OF MATTRESSES
MFG OF PLYWOOD
MFG OF PREMIX CEMENT/SAND/SOIL
MFG OF RUBBER STAMPS/STENCILS/VINYL GOODS
MFG OF SHIPPING BAGS
MFG OF WOODEN TRUSSES
MFG/REPAIR ORNAMENTAL IRON, ETC.
MILL WORK FLOORING, DRESSED LUMBER, UNASSEMBLED MILLWORK
MODULAR, PREFAB BUILDING MANUFACTURE
ORIENTED STRAND BOARD MANUFACTURE
PAINT MANUFACTURING
PANELBOARD – MFG
PAPER COATING
PLASTIC PRODUCT MFG (BY BLOW MOULDING)
PLUMBERS' SUPPLIES MANUFACTURING
PORTABLE WOOD MILL
POTTERY – MFG

- POWER TRANSMISSION EQUIPMENT MANUFACTURING
- PRECISION INSTRUMENT, FISHING TACKLE MFG
- PREFABRICATED LOG HOME KIT MANUFACTURE
- PRESSED BOARD MANUFACTURE
- PRINTING
- PUBLISHING
- PULP MILLS
- PULPWOOD
- PUMP MANUFACTURING
- RADIATOR REPAIR SHOPS
- RAILROAD CAR MANUFACTURING
- SHOE MANUFACTURING
- SRAP METAL OPERATIONS
- STAFFING SERVICES – LABOUR
- STEEL PIPE MFG
- STILE AND RAIL DOOR MANUFACTURE
- STONE, MARBLE CUT, DRESS, SHAPE, PROD MFG
- SUPPLYING OF AMMONIUM NITRATE
- TANNERIES
- TOOL AND DIE MAKING
- WOOD CHIP MILL
- WOODEN TOY OR MUSICAL INSTRUMENT MFG
- WOODENWARE MANUFACTURING

MARINE TERMINAL OPERATION
- DRY DOCK OR MARINE RAILWAY (EXPIRED JAN 1, 2009)
- FREIGHT FORWARDING – OVERSEAS
- FREIGHT HANDLING FEDERAL ACT
- FREIGHT HANDLING STATE ACT
- GENERAL WHARF OPERATIONS
- LAND OR MARINE POLLUTION CONTROL
- MARINE BULK TERMINAL
- MARINE CONTAINER TERMINAL
- MARINE SHIP AGENCY AND RELATED SERVICES
- RAIL OPERATIONS
- RAILWAY
- STEVEDORING FEDERAL ACT
- STEVEDORING

MOTOR VEHICLE OPERATION OTHER THAN TRUCKING
- ARMOURED CAR SERVICE
- BAKERY ROUTE SUPERVISORS AND DRIVERS
- BOTTLING ROUTES SUPERVISORS DRIVERS
- BUS – SCHOOL
- BUS LINES
- DAIRY ROUTE SUPERVISORS AND DRIVERS
- LIMOUSINE OR CHAUFFEUR SERVICES
- STORAGE WAREHOUSE OPERATIONS AND DRIVERS
- TAXI CABS/LIMOUSINE SERVICE
- TRACTOR DRIVER
- TRANSIT MIX OPERATIONS
- TRANSPORTATION

NATURAL RESOURCE EXTRACTION, REFINING, STORAGE, TRANSPORT
- BULK PETROLEUM DEALERS
- CEMENT & LIME MFG, INCL. QUARRYING
- COAL/WOOD YARDS
- DIAMOND DRILLING

- DRILLING – OIL/GAS WELLS
- DRILLING – WATERWELL/DEEP CORE
- FUEL DELIVERY OPERATIONS
- GAS MAIN CONSTRUCTION
- HEAVY OIL/OILSANDS – R & D
- INDUSTRIAL/OILFIELD EQUIP – RENT
- MINE/REFINE – SALT
- MINER – UNDERGROUND
- NATURAL GAS DISTRIBUTION
- NATURAL GAS PROCESSING PLANTS
- OIL & GAS – UPSTREAM
- OIL FIELD MAINT/CONSTRUCTION
- OIL REFINING
- OILFIELD DOWNHOLE SERVICES
- OILSANDS OPERATIONS
- OPEN PIT COAL MINING
- PIPELINE CLEANING
- PIPELINE TRANSMISSION – OIL/GAS
- PURCHASE SALE TRANSPORT OF GAS
- QUARRY
- RECLAMATION OF WASTE COAL
- REFINING OF SAND/COAL
- SAND GRAVEL ESCAVATION
- SEISMIC & WATER WELL DRILLNG
- SMELTER
- STONE CRUSHING
- UNDERGROUND MINING
- WELL SERVICING WITH SERVICE RIGS

POLICE OFFICERS
- LAW ENFORCEMENT
- POLICE OFFICERS
- SECURITY OR PATROL SERVICES

RETAIL SERVICES
- ANALYTICAL LABORATORIES
- BEAUTY/BARBER SHOPS AND SCHOOLS
- BICYCLE SHOP OR SPORTS EQUIPMENT RENTAL
- BLACKSMITH SHOPS
- CARPET, RUG, OR UPHOLSTERY CLEANING
- COMMERCIAL LAUNDRY OR LINEN SUPPLY
- CUSTOM TAILORING
- DRY CLEANING FACILITY OR LAUNDROMAT
- EMPLOYMENT, DATING AGENCY, RELATED TESTING
- ENGRAVING
- GRAPHIC DESIGN
- HAIR/BEAUTY/SALON
- HOUSEHOLD APPLIANCE – SVC ONLY
- INVENTORY SERVICES
- JEWELLERY, EYEWEAR, CLOCK REPAIR, KEYCUT
- LOCKSMITHING
- ORNAMENTAL PLANT RENTAL, OFFICE PLANT SVC
- PACKAGED OFFICE SERVICE
- SMALL ELEC EQUIP, HOUSEHOLD APPLIANCE SRV
- TAXIDERMISTS
- UPHOLSTERING
- VENDING OPERATIONS

SOCIAL SERVICES
- ALCOHOL OR DRUG TREATMENT CENTRE
- CHILD DAY CARE
- COMMUNITY SERVICES ALL PROFESSIONALS
- CONTINUING CARE FACILITIES
- COUNSELLING OR SOCIAL SERVICES
- DAY HOMES/DAY CARE CENTRES
- HIRING OR PROVIDING DOMESTIC CHILDCARE
- REHABILITATION OF HANDICAPPED
- REHABILITATION SERVICES FOR DISABLED
- RESIDENTIAL SOCIAL SERVICE FACILITY
- RETIREMENT LIVING CENTRE
- RETIREMENT LIVING CENTRE FOOD SERVICE ONLY
- RETIREMENT OR SENIORS' HOME (ACCOM ONLY)
- SENIORS' SUPPORTIVE LIVING/LODGES

TELECOMMUNICATION AND BROADCASTING
- BROADCASTING STATION ALL EMPLOYEES ALL MEDIA
- CLOSED CIRCUIT TV/CABLEVISION
- RADIO/TV STATIONS
- SECURITY ALARM SYS, TELECOM, CABLEWIRING
- TELECOMMUNICATION LINE ALL OTHER EMPLOYEES
- TELECOMMUNICATION SYSTEMS
- TELEPHONE OPERATIONS
- TELEPHONE SYSTEM
- TELEVISION OR RADIO BROADCASTING

UNKNOWN
- NO USABLE EMPLOYEE CLASSIFICATION INFORMATION

TRUCKING
- CAR OR TRUCK RENTAL
- DUMP TRUCK OPERATION
- GENERAL TRUCKING
- LOG TRUCK DRIVER
- RENT FIRE TRUCKS WITH OPERATOR
- SAND, GRAVEL, AND DIRT TRUCKING
- TRUCK AND OTHER DRIVERS
- TRUCK MAIL PACKAGE
- TRUCKING – SPECIALIZED
- TRUCKING OF BULK PRODUCTS
- TRUCKING OF LIQUIDS BY TANKER
- TRUCKING OF LIVESTOCK
- TRUCKING OF LOGS
- TRUCKING SERVICE – GENERAL
- TRUCKING SERVICE – OILFIELD

UTILITY PRODUCTION, DISTRIBUTION, MAINTENANCE
- ELECTRIC UTILITIES
- GAS UTILITIES
- INSTALL SEWER & WATER LINES, ETC.
- LAYING BURIED TELEPHONE CABLE
- POWER LINE – CONSTRUCT/REMOVE
- POWER POLE, TRANS LINE INSTALL, SRV, RPR
- SEWAGE PLANT
- TELECOMMUNICATION LINE CONSTRUCTION
- TEST/PRESERVE – POWER POLES
- UTILITY LINEMAN AND MAINTENANCE OPERATIONS
- WATER WORKS OPERATIONS

VEHICLE OTHER THAN AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR
- BUS MAINTENANCE AND REPAIR
- INDUSTRIAL CAMP TRAILERS – RENTAL
- MFG CABS FOR TRACTORS & COMBINES
- MFG HOLIDAY TRAILERS, CAMPERS
- MOBILE HOME SALES OR INSTALLATION
- REC VEHICLE SALES, SERVICE OR RENTAL
- SPORT VEHICLES – SALE/SERVICE
- TRAILERS – SALES/RENTAL WITH SERVICE
- TRUCK BODY OR TRAILER MANUFACTURE
- TRUCK MAINTENANCE

VESSEL OPERATION, SERVICE, MANUFACTURING, OR REPAIR
- BARGE, TUG, OTHER WATER TRANSPORT OF GOODS
- BOAT MAINTENANCE
- CHARTERED BOAT TOURS
- COMMERCIAL MARINE VESSEL MFG, SERV, RPR
- DREDGING
- FERRY SERVICE
- HARBOUR COMM, PORT AUTHORITY, MARINE PILOT
- MARINA OR BOAT RENTAL
- MARINE PILOTING (EXPIRED JAN 1, 2009)
- MARINE PLEASURE CRAFT MANUFACTURE
- MARINE VESSEL SURVEYING
- MOBILE HOME OR BOAT TOWING
- PLEASURE BOAT, MOTORCYCLE, SNOWMBL SLS, SRV
- SHIP BUILDING GENERAL
- SHIP DOCKING (EXPIRED JAN 1, 2009)
- SHIPBUILDING
- SHIPFITTER
- STRUCTURAL RPR OF MARINE PLEASURE CRAFT
- WATER TAXI

WHOLESALE AND RETAIL GENERAL
- APPLIANCES – SALE & SERVICE
- BEER DEALER AND DELIVERY
- BOOK, STATIONERY STORES, ETC.
- BUILDING MATERIALS WHOLESALE
- CARD STORE CLERK
- CHEMICAL WHOLESALE
- CLOTHING AND SHOE STORES
- CLOTHING, LINEN, OTHER TEXTILE WHOLESALE
- COMMERCIAL RETAIL SIGN SHOP
- CONVENIENCE OPERATION FUEL AND FOOD
- DEPARTMENT/GENERAL STORES

DRUG STORES
DRUG, VITAMIN, OR BEAUTY AID WHOLESALE
ELECTRONIC EQUIPMENT – SELL/SERVICE
FARM IMPLEMENT DEALERS
FEED FERTILIZER GRAIN HAY DEALER
FIRE PREV EQUIP SALES, SERV, INSTL, INSPECT
FLOORING STORE
FLORISTS, WHOLESALE AND RETAIL
FOOD, BEVERAGE, TOBACCO PRODUCT WHOLESALE
FURNITURE SALES AND DISTRIBUTORS
FURRIERS
GARDEN SUPPLY CENTRE
GENERAL RETAIL
HEAVY EQUIP, MACH, PARTS SALES, RNT, SRV, RPR
HOME IMPROVEMENT CENTRES
HOME PROVISIONER/BUTCHER SHOPS
INDUSTRIAL SUPPLY STORES
JEWELLERY STORES
JUNK DEALER
LARGE MACHINE DISTRIBUTION
LARGE RETAIL STORE
LEATHER, WOOL, FABRIC DEALER
LIQUOR DISTRIBUTION BRANCH
LUMBERYARD OPERATIONS
MACHINERY DEALERS AND DRIVERS
MEDICAL EQUIPMENT – SALES/SERVICE
MEDICAL OR DENTAL SUPPLIES WHOLESALE
NEWS STAND SALES
NEWSPAPER/FLYER DISTRIBUTION
OFFICE EQUIPMENT – SALES/SERVICE
OUTSIDE SALES
PARTY SUPPLY
PHOTOGRAPHIC SUPPLIES
PIPE SHOP
PLUMBERS' SUPPLY DEALERS
PROPANE DEALERS
REFRIGERATION EQUIP – SALES/SERVICE
RETAIL BAKERY OR DELICATESSEN
RETAILERS NOC
SAFETY EQUIPMENT – SALE/RENTAL
SCRAP/SALVAGE DEALERS
SEATING, SALES/INSTALLATION
SEED DEALER
SHOE STORES
STEEL OR METAL WHOLESALE (PRIMARY FORM)
STORE – MEAT, GROCERIES, PROVISIONS COMBINED
STORES CLOTHING, APPAREL, DRY GOODS, RETAIL
STORES HARDWARE
SUPERMARKET
WHOLESALE

Appendix E: Distribution of Claims by Disease Type and Industry Group

The following three charts provide the distribution of claims by disease type and industry group for the set of recommended diseases.

First Chart: Raw Claim Count Data

Second Chart: Normalized by Industry Group
The sum of the percentages in each row will equal 100%, for each industry group.
This chart is unbiased and gives an accurate (to the extent data is credible) representation of the likelihood of a specific disease within each industry group.

Third Chart: Normalized by Disease
The sum of the percentages in each column will equal 100% for each disease.
This chart is likely biased due to over-/under-representation of each industry group in the underlying data. This is especially true for Vessel Operation, which includes data from two large U.S. shipbuilding firms.

DISTRIBUTION OF CLAIMS BY DISEASE TYPE AND INDUSTRY GROUP

	MESOTHELIOMA ASBESTOSIS & LUNG CANCER COMBINED	OBSTRUCTIVE RESPIRATORY DISEASES	ALL CUMULATIVE TRAUMA EXCEPT CARPAL TUNNEL	CARPAL TUNNEL SYNDROME	ALL OTHER CANCER	PNEUMOCONIOSIS EXCEPT ASBESTOSIS	HEARING LOSS
AGRICULTURE / FARMING / AQUACULTURE	0	19	383	146	1	2	456
AIRCRAFT OPERATION, SERVICE, MANUFACTURING, OR REPAIR	6	45	442	105	1	0	605
ANIMAL CARE, TRAINING, BREEDING, BOARDING	0	3	45	39	0	0	141
AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	38	250	1,806	1,096	11	3	2,040
BUILDING MAINTAINENCE AND OPERATIONS	69	117	843	440	1	1	387
CLERICAL	10	94	1,525	1,424	1	0	204
CONSTRUCTION	253	170	1,375	736	11	13	2,998
CONTRACTING	738	301	3,935	1,648	19	16	6,184
EDUCATION AND RELIGIOUS INSTITUTIONS	47	184	1,624	622	1	0	945
FIREFIGHTER	3	28	39	17	7	0	72
FOOD MANUFACTURING	13	133	5,347	1,473	2	15	1,197
FOOD SERVICE	3	50	1,845	1,031	0	1	44
GENERAL SERVICES	72	75	593	165	22	15	474
GOVERNMENT	101	369	3,981	1,764	223	8	3,714
HEALTH CARE SERVICES	32	342	4,407	1,360	7	3	743
HOSPITALITY AND ENTERTAINMENT	12	89	1,696	641	2	0	395
LANDSCAPING	1	6	225	98	1	0	118
LIVESTOCK AND POULTRY FARMING	0	12	228	111	3	0	128
LOGGING AND TREE SERVICE	5	32	717	285	0	0	2,811
MANUFACTURING GENERAL	372	846	7,664	3,667	24	31	11,034
MARINE TERMINAL OPERATION	54	18	205	89	0	1	1,548
MOTOR VEHICLE OPERATION OTHER THAN TRUCKING	2	24	468	162	1	4	283
NATURAL RESOURCE EXTRACTION, REFINING, STORAGE, TRANSPORT	163	218	792	458	21	28	5,189
POLICE OFFICERS	1	16	90	29	0	1	198
RETAIL SERVICES	2	56	820	406	0	0	148
SOCIAL SERVICES	2	49	868	284	0	1	44
TELECOMMUNICATION AND BROADCASTING	7	8	284	111	1	1	442
TRUCKING	25	102	853	360	1	5	2,493
UNKNOWN	154	126	330	215	4	22	461
UTILITY PRODUCTION, DISTRIBUTION, MAINTAINENCE	38	8	205	103	1	2	602
VEHICLE OTHER THAN AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	4	9	86	48	1	0	117
VESSEL OPERATION, SERVICE, MANUFACTURING, OR REPAIR	1,124	974	7,976	1,474	84	5	8,484
WHOLESALE AND RETAIL GENERAL	61	187	4,529	1,485	1	10	1,929
TOTAL	3,412	4,960	56,226	22,092	452	188	56,628

DISTRIBUTION OF CLAIMS BY DISEASE TYPE AND INDUSTRY GROUP, NORMALIZED BY INDUSTRY GROUP

	MESOTHELIOMA ASBESTOSIS & LUNG CANCER COMBINED	OBSTRUCTIVE RESPIRATORY DISEASES	ALL CUMULATIVE TRAUMA EXCEPT CARPAL TUNNEL	CARPAL TUNNEL SYNDROME	ALL OTHER CANCER	PNEUMOCONIOSIS EXCEPT ASBESTOSIS	HEARING LOSS
AGRICULTURE / FARMING / AQUACULTURE	0%	2%	38%	14%	0%	0%	45%
AIRCRAFT OPERATION, SERVICE, MANUFACTURING, OR REPAIR	0%	4%	37%	9%	0%	0%	50%
ANIMAL CARE, TRAINING, BREEDING, BOARDING	0%	1%	20%	17%	0%	0%	62%
AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	1%	5%	34%	21%	0%	0%	39%
BUILDING MAINTAINENCE AND OPERATIONS	4%	6%	45%	24%	0%	0%	21%
CLERICAL	0%	3%	47%	44%	0%	0%	6%
CONSTRUCTION	5%	3%	25%	13%	0%	0%	54%
CONTRACTING	6%	2%	31%	13%	0%	0%	48%
EDUCATION AND RELIGIOUS INSTITUTIONS	1%	5%	47%	18%	0%	0%	28%
FIREFIGHTER	2%	17%	23%	10%	4%	0%	43%
FOOD MANUFACTURING	0%	2%	65%	18%	0%	0%	15%
FOOD SERVICE	0%	2%	62%	35%	0%	0%	1%
GENERAL SERVICES	5%	5%	42%	12%	2%	1%	33%
GOVERNMENT	1%	4%	39%	17%	2%	0%	37%
HEALTH CARE SERVICES	0%	5%	64%	20%	0%	0%	11%
HOSPITALITY AND ENTERTAINMENT	0%	3%	60%	23%	0%	0%	14%
LANDSCAPING	0%	1%	50%	22%	0%	0%	26%
LIVESTOCK AND POULTRY FARMING	0%	2%	47%	23%	1%	0%	27%
LOGGING AND TREE SERVICE	0%	1%	19%	7%	0%	0%	73%
MANUFACTURING GENERAL	2%	4%	32%	16%	0%	0%	47%
MARINE TERMINAL OPERATION	3%	1%	11%	5%	0%	0%	81%
MOTOR VEHICLE OPERATION OTHER THAN TRUCKING	0%	3%	50%	17%	0%	0%	30%
NATURAL RESOURCE EXTRACTION, REFINING, STORAGE, TRANSPORT	2%	3%	12%	7%	0%	0%	76%
POLICE OFFICERS	0%	5%	27%	9%	0%	0%	59%
RETAIL SERVICES	0%	4%	57%	28%	0%	0%	10%
SOCIAL SERVICES	0%	4%	70%	23%	0%	0%	4%
TELECOMMUNICATION AND BROADCASTING	1%	1%	33%	13%	0%	0%	52%
TRUCKING	1%	3%	22%	9%	0%	0%	65%
UNKNOWN	12%	10%	25%	16%	0%	2%	35%
UTILITY PRODUCTION, DISTRIBUTION, MAINTAINENCE	4%	1%	21%	11%	0%	0%	63%
VEHICLE OTHER THAN AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	2%	3%	32%	18%	0%	0%	44%
VESSEL OPERATION, SERVICE, MANUFACTURING, OR REPAIR	6%	5%	40%	7%	0%	0%	42%
WHOLESALE AND RETAIL GENERAL	1%	2%	55%	18%	0%	0%	24%

DISTRIBUTION OF CLAIMS BY DISEASE TYPE AND INDUSTRY GROUP, NORMALIZED BY DISEASE

	MESOTHELIOMA							
	ASBESTOSIS & LUNG CANCER COMBINED	OBSTRUCTIVE RESPIRATORY DISEASES	ALL CUMULATIVE TRAUMA EXCEPT CARPAL TUNNEL	CARPAL TUNNEL SYNDROME	ALL OTHER CANCER	PNEUMOCONIOSIS EXCEPT ASBESTOSIS	HEARING LOSS
AGRICULTURE / FARMING / AQUACULTURE	0%	0%	1%	1%	0%	1%	1%
AIRCRAFT OPERATION, SERVICE, MANUFACTURING, OR REPAIR	0%	1%	1%	0%	0%	0%	1%
ANIMAL CARE, TRAINING, BREEDING, BOARDING	0%	0%	0%	0%	0%	0%	0%
AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	1%	5%	3%	5%	2%	2%	4%
BUILDING MAINTAINENCE AND OPERATIONS	2%	2%	1%	2%	0%	1%	1%
CLERICAL	0%	2%	3%	6%	0%	0%	0%
CONSTRUCTION	7%	3%	2%	3%	2%	7%	5%
CONTRACTING	22%	6%	7%	7%	4%	9%	11%
EDUCATION AND RELIGIOUS INSTITUTIONS	1%	4%	3%	3%	0%	0%	2%
FIREFIGHTER	0%	1%	0%	0%	2%	0%	0%
FOOD MANUFACTURING	0%	3%	10%	7%	0%	8%	2%
FOOD SERVICE	0%	1%	3%	5%	0%	1%	0%
GENERAL SERVICES	2%	2%	1%	1%	5%	8%	1%
GOVERNMENT	3%	7%	7%	8%	49%	4%	7%
HEALTH CARE SERVICES	1%	7%	8%	6%	2%	2%	1%
HOSPITALITY AND ENTERTAINMENT	0%	2%	3%	3%	0%	0%	1%
LANDSCAPING	0%	0%	0%	0%	0%	0%	0%
LIVESTOCK AND POULTRY FARMING	0%	0%	0%	1%	1%	0%	0%
LOGGING AND TREE SERVICE	0%	1%	1%	1%	0%	0%	5%
MANUFACTURING GENERAL	11%	17%	14%	17%	5%	16%	19%
MARINE TERMINAL OPERATION	2%	0%	0%	0%	0%	1%	3%
MOTOR VEHICLE OPERATION OTHER THAN TRUCKING	0%	0%	1%	1%	0%	2%	0%
NATURAL RESOURCE EXTRACTION, REFINING, STORAGE, TRANSPORT	5%	4%	1%	2%	5%	15%	9%
POLICE OFFICERS	0%	0%	0%	0%	0%	1%	0%
RETAIL SERVICES	0%	1%	1%	2%	0%	0%	0%
SOCIAL SERVICES	0%	1%	2%	1%	0%	1%	0%
TELECOMMUNICATION AND BROADCASTING	0%	0%	1%	1%	0%	1%	1%
TRUCKING	1%	2%	2%	2%	0%	3%	4%
UNKNOWN	5%	3%	1%	1%	1%	12%	1%
UTILITY PRODUCTION, DISTRIBUTION, MAINTAINENCE	1%	0%	0%	0%	0%	1%	1%
VEHICLE OTHER THAN AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	0%	0%	0%	0%	0%	0%	0%
VESSEL OPERATION, SERVICE, MANUFACTURING, OR REPAIR	33%	20%	14%	7%	19%	3%	15%
WHOLESALE AND RETAIL GENERAL	2%	4%	8%	7%	0%	5%	3%

Appendix F: Combined Metrics for Recommended Set of Diseases

Cumulative Trauma Except Carpal Tunnel Syndrome

Asbestosis, Mesothelioma, and Lung Cancer

Respiratory Diseases Combined

ALL CUMULATIVE TRAUMA COMBINED

	COUNT	AVERAGE COST	AVERAGE AGE	AVERAGE LAG (DAYS)
RAW MEAN	56,226	29,718	42	78
CUT OFF	8,454	2,972		
ADJ MEAN	47,772	34,544	40	24
ADJ X 5 LARGEST	47,767	34,092		
5 LARGEST	5	4,347,569		
LARGEST	1	5,717,959		

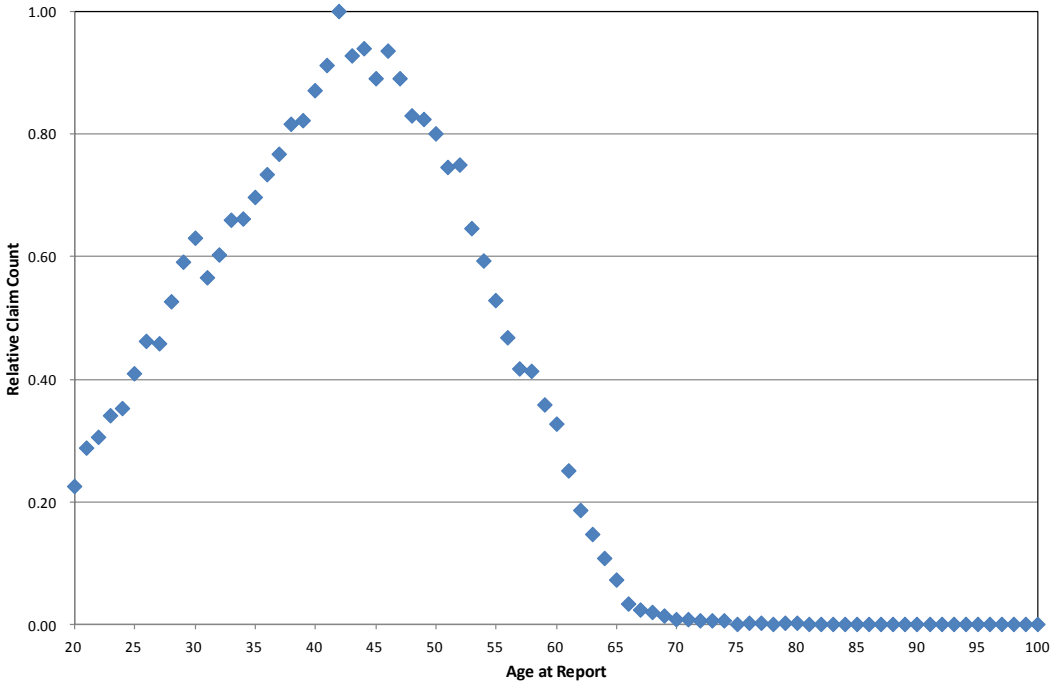
	ALL	LAG <= 2 Yrs	LAG > 2 Yrs
AVERAGE AGE	40	42	49
AVERAGE LAG (YEARS)	0.2	0.1	6.3
COUNT	53,718	52,845	873
COUNT PERCENTAGE		98%	2%

	M	F	U
GENDER	30,773	24,932	521
GENDER PERCENTAGE	55%	44%	1%

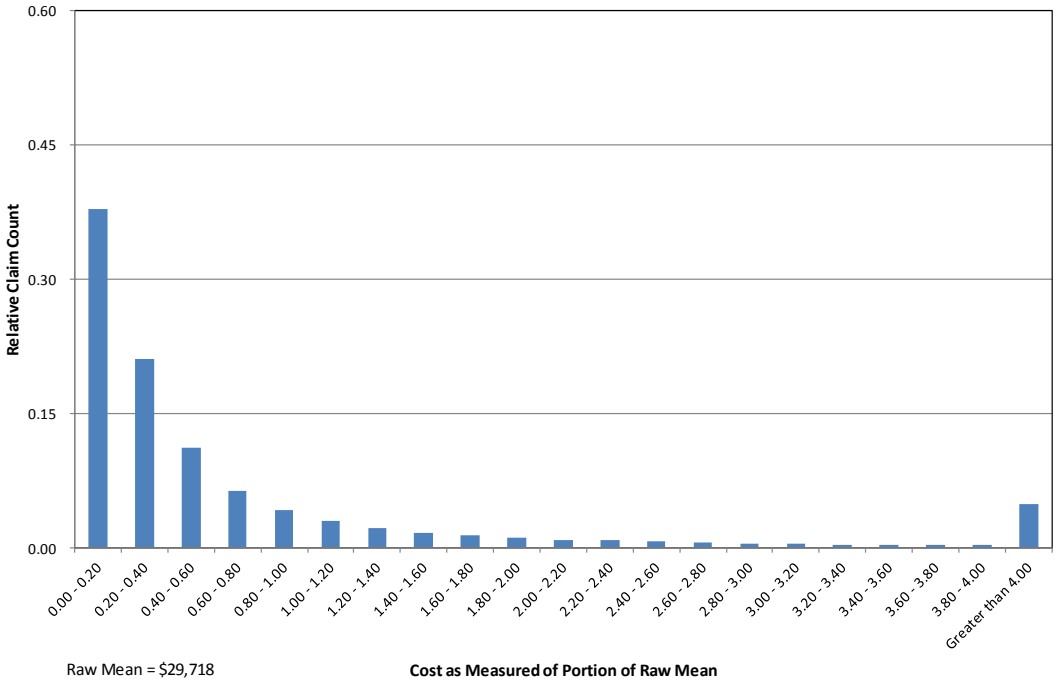
ALL CUMULATIVE TRAUMA COMBINED

	COUNT	PERCENTAGE
AGRICULTURE / FARMING / AQUACULTURE	383	1%
AIRCRAFT OPERATION, SERVICE, MANUFACTURING, OR REPAIR	442	1%
ANIMAL CARE, TRAINING, BREEDING, BOARDING	45	0%
AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	1,806	3%
BUILDING MAINTAINENCE AND OPERATIONS	843	1%
CLERICAL	1,525	3%
CONSTRUCTION	1,375	2%
CONTRACTING	3,935	7%
EDUCATION AND RELIGIOUS INSTITUTIONS	1,624	3%
FIREFIGHTER	39	0%
FOOD MANUFACTURING	5,347	10%
FOOD SERVICE	1,845	3%
GENERAL SERVICES	593	1%
GOVERNMENT	3,981	7%
HEALTH CARE SERVICES	4,407	8%
HOSPITALITY AND ENTERTAINMENT	1,696	3%
LANDSCAPING	225	0%
LIVESTOCK AND POULTRY FARMING	228	0%
LOGGING AND TREE SERVICE	717	1%
MANUFACTURING GENERAL	7,664	14%
MARINE TERMINAL OPERATION	205	0%
MOTOR VEHICLE OPERATION OTHER THAN TRUCKING	468	1%
NATURAL RESOURCE EXTRACTION, REFINING, STORAGE, TRANSPORT	792	1%
POLICE OFFICERS	90	0%
RETAIL SERVICES	820	1%
SOCIAL SERVICES	868	2%
TELECOMMUNICATION AND BROADCASTING	284	1%
TRUCKING	853	2%
UNKNOWN	330	1%
UTILITY PRODUCTION, DISTRIBUTION, MAINTAINENCE	205	0%
VEHICLE OTHER THAN AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	86	0%
VESSEL OPERATION, SERVICE, MANUFACTURING, OR REPAIR	7,976	14%
WHOLESALE AND RETAIL GENERAL	4,529	8%

ALL CUMULATIVE TRAUMA COMBINED
Age at Report



ALL CUMULATIVE TRAUMA COMBINED
Cost Distribution at 2013 Cost Level Relative to Raw Mean



ASBESTOSIS, MESOTHELIOMA, LUNG CANCER

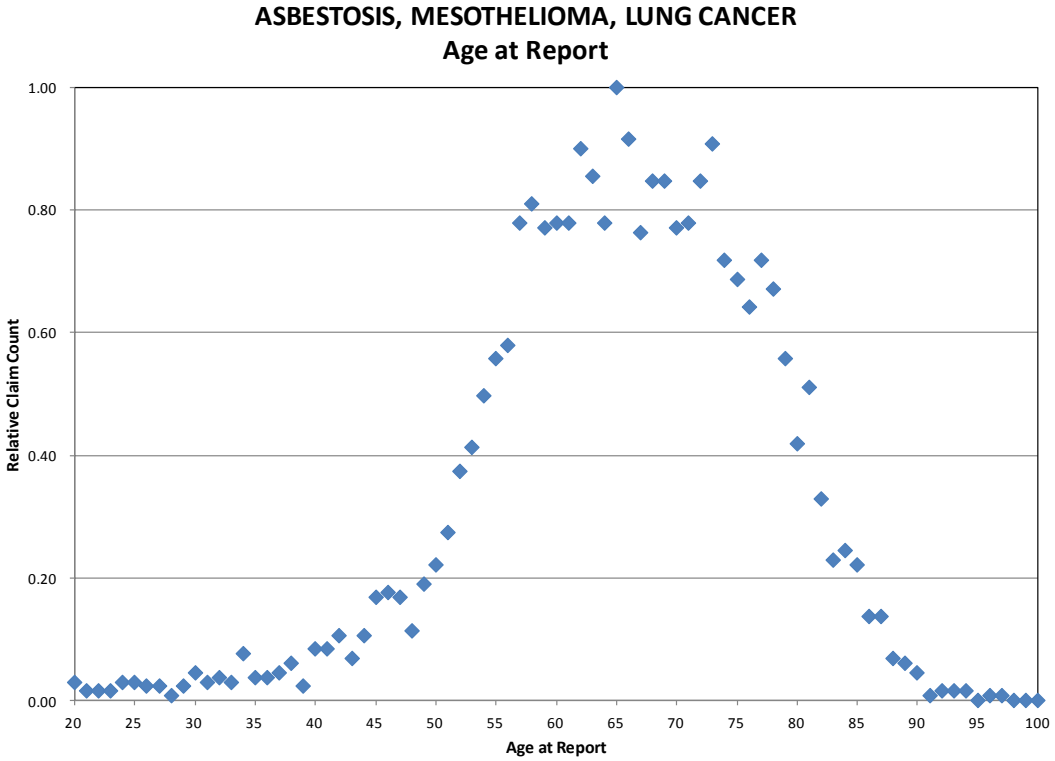
	COUNT	AVERAGE COST	AVERAGE AGE	AVERAGE LAG (DAYS)
RAW MEAN	3,412	200,898	65	1,319
CUT OFF	1,146	20,090		
ADJ MEAN	2,266	300,228	66	1,228
ADJ X 5 LARGEST	2,261	293,246	66	1,230
5 LARGEST	5	3,457,662	45	521
LARGEST	1	5,318,207	43	363

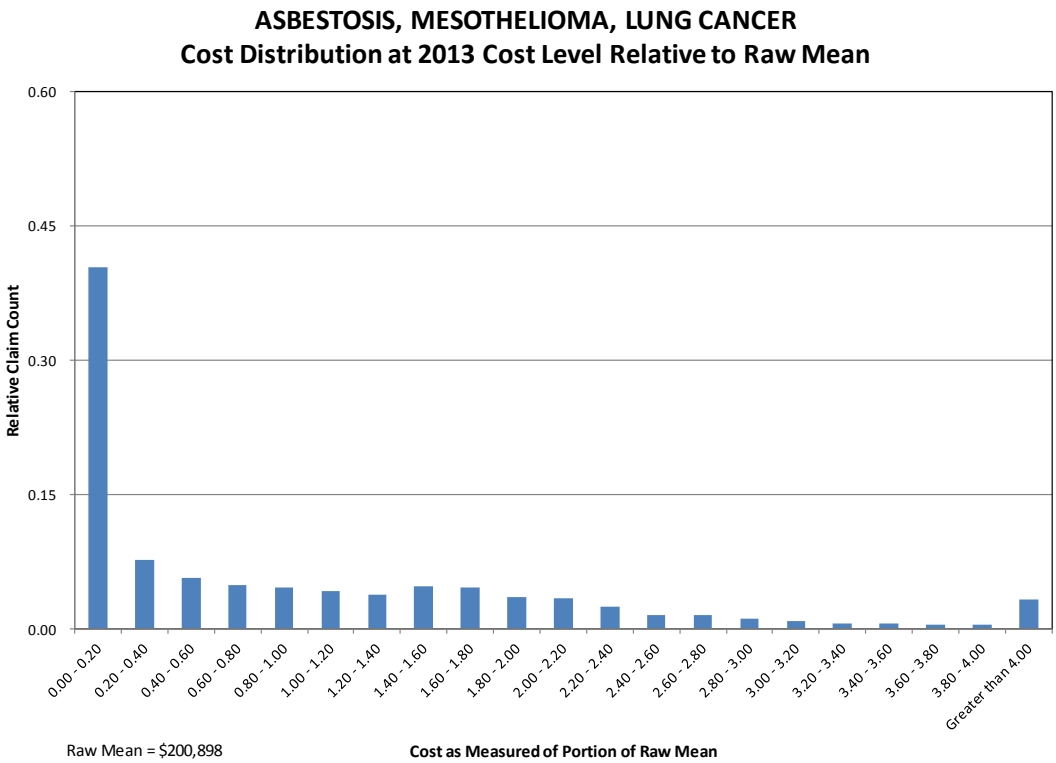
	ALL	LAG <= 2 Yrs	LAG > 2 Yrs
AVERAGE AGE	64	65	68
AVERAGE LAG (YEARS)	3.6	0.4	12.3
COUNT	3,332	2,430	902
COUNT PERCENTAGE		73%	27%

	M	F	U
GENDER	3,301	78	33
GENDER PERCENTAGE	97%	2%	1%

ASBESTOSIS, MESOTHELIOMA, LUNG CANCER

	COUNT	PERCENTAGE
AGRICULTURE / FARMING / AQUACULTURE	0	0%
AIRCRAFT OPERATION, SERVICE, MANUFACTURING, OR REPAIR	6	0%
ANIMAL CARE, TRAINING, BREEDING, BOARDING	0	0%
AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	38	1%
BUILDING MAINTAINENCE AND OPERATIONS	69	2%
CLERICAL	10	0%
CONSTRUCTION	253	7%
CONTRACTING	738	22%
EDUCATION AND RELIGIOUS INSTITUTIONS	47	1%
FIREFIGHTER	3	0%
FOOD MANUFACTURING	13	0%
FOOD SERVICE	3	0%
GENERAL SERVICES	72	2%
GOVERNMENT	101	3%
HEALTH CARE SERVICES	32	1%
HOSPITALITY AND ENTERTAINMENT	12	0%
LANDSCAPING	1	0%
LIVESTOCK AND POULTRY FARMING	0	0%
LOGGING AND TREE SERVICE	5	0%
MANUFACTURING GENERAL	372	11%
MARINE TERMINAL OPERATION	54	2%
MOTOR VEHICLE OPERATION OTHER THAN TRUCKING	2	0%
NATURAL RESOURCE EXTRACTION, REFINING, STORAGE, TRANSPORT	163	5%
POLICE OFFICERS	1	0%
RETAIL SERVICES	2	0%
SOCIAL SERVICES	2	0%
TELECOMMUNICATION AND BROADCASTING	7	0%
TRUCKING	25	1%
UNKNOWN	154	5%
UTILITY PRODUCTION, DISTRIBUTION, MAINTAINENCE	38	1%
VEHICLE OTHER THAN AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	4	0%
VESSEL OPERATION, SERVICE, MANUFACTURING, OR REPAIR	1,124	33%
WHOLESALE AND RETAIL GENERAL	61	2%


ASBESTOSIS, MESOTHELIOMA, LUNG CANCER
Age at Report
Relative Claim Count
1.00
0.80
0.60
0.40
0.20
0.00
20
25
30
35
40
45
50
55
60
65
70
75
80
85
90
95
100
Age at Report


ASBESTOSIS, MESOTHELIOMA, LUNG CANCER
Cost Distribution at 2013 Cost Level Relative to Raw Mean
Relative Claim Count
0.60
0.45
0.30
0.15
0.00
0.00 - 0.20
0.20 - 0.40
0.40 - 0.60
0.60 - 0.80
0.80 - 1.00
1.00 - 1.20
1.20 - 1.40
1.40 - 1.60
1.60 - 1.80
1.80 - 2.00
2.00 - 2.20
2.20 - 2.40
2.40 - 2.60
2.60 - 2.80
2.80 - 3.00
3.00 - 3.20
3.20 - 3.40
3.40 - 3.60
3.60 - 3.80
3.80 - 4.00
Greater than 4.00
Raw Mean = $200,898
Cost as Measured of Portion of Raw Mean

RESPIRATORY DISEASES COMBINED

	COUNT	AVERAGE COST	AVERAGE AGE	AVERAGE LAG (DAYS)
RAW MEAN	4,960	83,144	44	379
CUT OFF	2,778	8,314		
ADJ MEAN	2,182	185,561	44	475
ADJ X 5 LARGEST	2,177	174,717		
5 LARGEST	5	4,907,085		
LARGEST	1	7,187,645	55	7,316

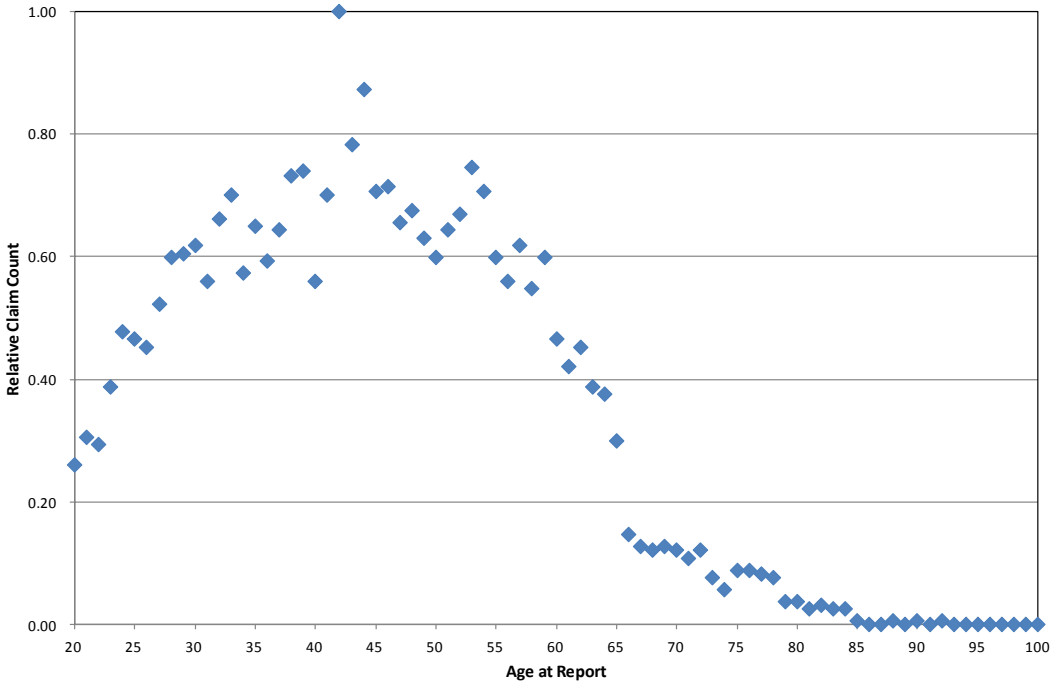
	ALL	LAG <= 2 Yrs	LAG > 2 Yrs
AVERAGE AGE	40	43	59
AVERAGE LAG (YEARS)	1.0	0.2	9.5
COUNT	4,506	4,089	417
COUNT PERCENTAGE		91%	9%

	M	F	U
GENDER	3,687	1,257	16
GENDER PERCENTAGE	74%	25%	0%

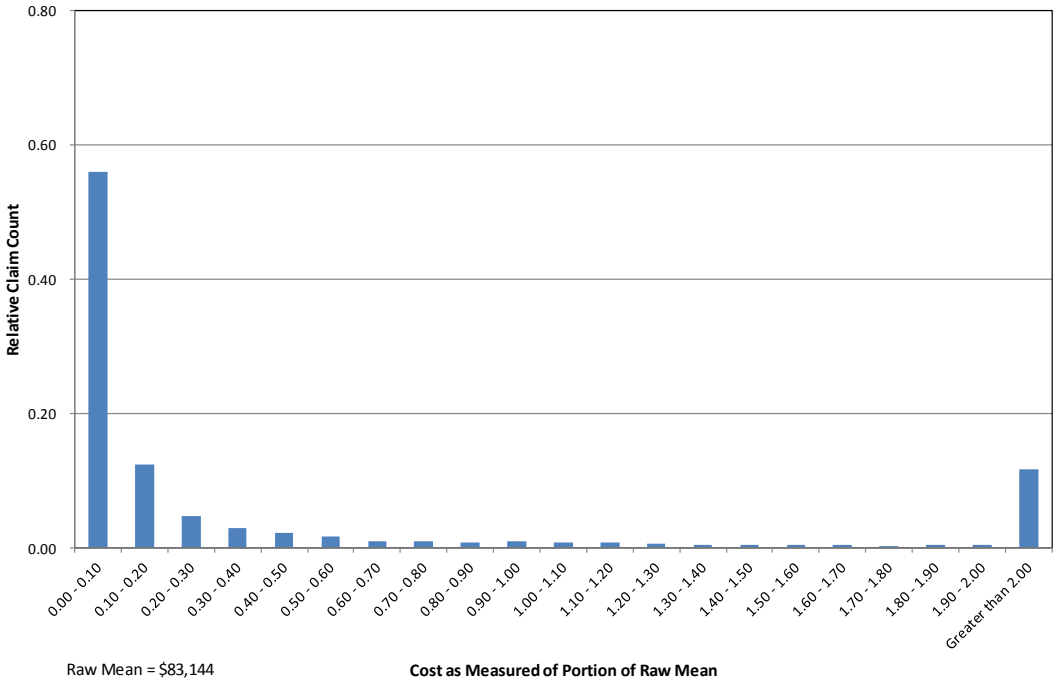
RESPIRATORY DISEASES COMBINED

	COUNT	PERCENTAGE
AGRICULTURE / FARMING / AQUACULTURE	19	0%
AIRCRAFT OPERATION, SERVICE, MANUFACTURING, OR REPAIR	45	1%
ANIMAL CARE, TRAINING, BREEDING, BOARDING	3	0%
AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	250	5%
BUILDING MAINTAINENCE AND OPERATIONS	117	2%
CLERICAL	94	2%
CONSTRUCTION	170	3%
CONTRACTING	301	6%
EDUCATION AND RELIGIOUS INSTITUTIONS	184	4%
FIREFIGHTER	28	1%
FOOD MANUFACTURING	133	3%
FOOD SERVICE	50	1%
GENERAL SERVICES	75	2%
GOVERNMENT	369	7%
HEALTH CARE SERVICES	342	7%
HOSPITALITY AND ENTERTAINMENT	89	2%
LANDSCAPING	6	0%
LIVESTOCK AND POULTRY FARMING	12	0%
LOGGING AND TREE SERVICE	32	1%
MANUFACTURING GENERAL	846	17%
MARINE TERMINAL OPERATION	18	0%
MOTOR VEHICLE OPERATION OTHER THAN TRUCKING	24	0%
NATURAL RESOURCE EXTRACTION, REFINING, STORAGE, TRANSPORT	218	4%
POLICE OFFICERS	16	0%
RETAIL SERVICES	56	1%
SOCIAL SERVICES	49	1%
TELECOMMUNICATION AND BROADCASTING	8	0%
TRUCKING	102	2%
UNKNOWN	126	3%
UTILITY PRODUCTION, DISTRIBUTION, MAINTAINENCE	8	0%
VEHICLE OTHER THAN AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	9	0%
VESSEL OPERATION, SERVICE, MANUFACTURING, OR REPAIR	974	20%
WHOLESALE AND RETAIL GENERAL	187	4%

RESPIRATORY DISEASES COMBINED
Age at Report



RESPIRATORY DISEASES COMBINED
Cost Distribution at 2013 Cost Level Relative to Raw Mean



Appendix G: Industry Group Distribution

1	MESOTHELIOMA
2	LUNG CANCER
3	ALL OTHER CANCER
4	HEARING LOSS
5	INFECTION
6	EYE CONDITION
7	MENTAL STRESS
8	PHYSICAL STRESS
9	REACTION TO FOREIGN SUBSTANCE
10	VASCULAR
11	OBSTRUCTIVE RESPIRATORY DISEASE
12	PNEUMOCONIOSIS EXCEPT ASBESTOSIS
13	ASBESTOSIS
14	ALL OTHER RESPIRATORY
15	BURSITIS
16	EPICONDYLITIS
17	TENDONITIS
18	TENOSYNOVITIS
19	OTHER INFLAMMATION
20	CARPAL TUNNEL SYNDROME
21	NERVE DISEASE
22	SPRAIN/STRAIN/TEAR
23	HERNIA
24	OTHER CUMULATIVE TRAUMA

	DISTRIBUTION OF CLAIMS BY DISEASE TYPE AND INDUSTRY GROUP																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
AGRICULTURE / FARMING / AQUACULTURE	0	0	1	456	1	0	1	0	12	0	5	2	0	14	63	2	228	2	24	146	3	56	1	7
AIRCRAFT OPERATION, SERVICE, MANUFACTURING, OR REPAIR	3	0	1	605	1	0	2	0	11	0	24	0	3	21	63	32	175	2	12	105	1	136	0	22
ANIMAL CARE, TRAINING, BREEDING, BOARDING	0	0	0	141	0	0	7	0	1	0	2	0	0	1	5	1	16	0	8	39	0	11	0	4
AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	21	1	11	2,040	3	2	95	6	92	4	44	3	16	206	182	100	341	12	204	1,096	48	805	35	127
BUILDING MAINTAINENCE AND OPERATIONS	15	0	1	387	4	0	83	8	25	0	16	1	54	101	80	29	161	5	152	440	7	340	11	65
CLERICAL	7	0	1	204	7	1	471	15	19	3	35	0	3	59	69	27	293	14	232	1,424	16	764	0	106
CONSTRUCTION	47	4	11	2,998	6	0	18	10	60	0	19	13	202	151	124	112	331	11	126	736	21	537	18	116
CONTRACTING	236	7	19	6,184	4	1	15	21	86	4	60	16	495	241	747	179	1,167	13	366	1,648	25	1,179	32	252
EDUCATION AND RELIGIOUS INSTITUTIONS	22	3	1	945	9	2	128	4	30	1	75	0	22	109	192	87	512	16	78	622	10	611	0	128
FIREFIGHTER	0	3	7	72	4	0	30	27	2	0	3	0	0	25	1	0	2	1	6	17	0	25	1	3
FOOD MANUFACTURING	6	0	2	1,197	2	1	7	1	63	1	26	15	7	107	195	290	1,546	71	258	1,473	14	2,223	4	760
FOOD SERVICE	2	1	0	44	28	1	62	5	23	11	17	1	0	33	139	113	650	23	228	1,031	16	572	14	106
GENERAL SERVICES	28	6	22	474	3	0	10	0	27	2	11	15	38	64	46	50	209	1	34	165	6	208	2	43
GOVERNMENT	29	10	223	3,714	87	3	992	32	97	14	98	8	62	271	342	205	1,053	18	398	1,764	22	1,645	17	303
HEALTH CARE SERVICES	13	1	7	743	47	10	237	3	98	2	161	3	18	181	385	196	1,413	26	310	1,360	17	1,843	5	229
HOSPITALITY AND ENTERTAINMENT	8	0	2	395	2	0	66	2	30	5	33	0	4	56	207	84	582	9	113	641	6	585	9	107
LANDSCAPING	1	0	1	118	0	0	2	0	4	0	2	0	0	4	43	8	119	1	5	98	4	41	3	5
LIVESTOCK AND POULTRY FARMING	0	0	3	128	0	0	2	1	5	0	5	0	0	7	48	0	152	0	6	111	4	16	4	2
LOGGING AND TREE SERVICE	4	0	0	2,811	1	0	14	9	10	2	9	0	1	23	129	5	344	2	64	285	28	132	8	33
MANUFACTURING GENERAL	140	11	24	11,034	5	3	129	8	201	8	258	31	221	588	853	345	2,426	56	755	3,667	79	2,726	81	422
MARINE TERMINAL OPERATION	17	0	0	1,548	1	0	1	0	7	0	3	1	37	15	29	21	77	1	9	89	3	55	0	13
MOTOR VEHICLE OPERATION OTHER THAN TRUCKING	2	0	1	283	1	0	16	1	10	2	10	4	0	14	58	17	89	0	55	162	6	217	4	28
NATURAL RESOURCE EXTRACTION, REFINING, STORAGE, TRANSPORT	66	4	21	5,189	8	0	5	2	59	0	15	28	93	203	55	68	186	7	27	458	13	380	0	69
POLICE OFFICERS	1	0	0	198	5	0	97	8	5	3	3	1	0	13	5	5	19	1	12	29	1	45	1	2
RETAIL SERVICES	2	0	0	148	3	1	24	0	41	6	13	0	0	43	66	30	325	10	89	406	8	242	2	56
SOCIAL SERVICES	1	0	0	44	2	1	66	1	12	1	24	1	1	25	48	78	210	3	49	284	1	411	1	68
TELECOMMUNICATION AND BROADCASTING	6	0	1	442	0	0	7	0	3	0	3	1	1	5	42	21	115	4	7	111	1	83	0	12
TRUCKING	16	0	1	2,493	0	0	52	26	27	15	8	5	9	94	46	58	118	5	98	360	8	429	22	77
UNKNOWN	52	0	4	461	1	1	36	13	36	4	27	22	102	99	2	6	9	0	76	215	1	201	7	29
UTILITY PRODUCTION, DISTRIBUTION, MAINTAINENCE	14	0	1	602	6	0	17	2	3	0	1	2	24	7	15	13	40	0	28	103	1	89	0	20
VEHICLE OTHER THAN AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	0	1	1	117	0	0	3	0	2	0	1	0	3	8	19	7	30	0	5	48	2	22	0	3
VESSEL OPERATION, SERVICE, MANUFACTURING, OR REPAIR	142	195	84	8,484	1	8	140	160	24	16	94	5	787	880	164	8	138	10	123	1,474	995	6,692	837	4
WHOLESALE AND RETAIL GENERAL	34	2	1	1,929	7	0	155	11	58	10	60	10	25	127	687	187	1,868	27	291	1,485	24	1,237	42	190
TOTAL	935	249	452	56,628	249	35	2,990	376	1,183	114	1,165	188	2,228	3,795	5,149	2,384	14,944	351	4,268	22,092	1,391	24,558	1,161	3,411

DISTRIBUTION OF CLAIMS BY DISEASE TYPE AND INDUSTRY GROUP, NORMALIZED BY INDUSTRY GROUP

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
AGRICULTURE / FARMING / AQUACULTURE	0%	0%	0%	45%	0%	0%	0%	0%	1%	0%	0%	0%	0%	1%	6%	0%	22%	0%	2%	14%	0%	5%	0%	1%
AIRCRAFT OPERATION, SERVICE, MANUFACTURING, OR REPAIR	0%	0%	0%	50%	0%	0%	0%	0%	1%	0%	2%	0%	0%	2%	5%	3%	14%	0%	1%	9%	0%	11%	0%	2%
ANIMAL CARE, TRAINING, BREEDING, BOARDING	0%	0%	0%	60%	0%	0%	3%	0%	0%	0%	1%	0%	0%	0%	2%	0%	7%	0%	3%	17%	0%	5%	0%	2%
AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	0%	0%	0%	37%	0%	0%	2%	0%	2%	0%	1%	0%	0%	4%	3%	2%	6%	0%	4%	20%	1%	15%	1%	2%
BUILDING MAINTAINENCE AND OPERATIONS	1%	0%	0%	19%	0%	0%	4%	0%	1%	0%	1%	0%	3%	5%	4%	1%	8%	0%	8%	22%	0%	17%	1%	3%
CLERICAL	0%	0%	0%	5%	0%	0%	12%	0%	1%	0%	1%	0%	0%	2%	2%	1%	8%	0%	7%	38%	0%	20%	0%	3%
CONSTRUCTION	1%	0%	0%	53%	0%	0%	0%	0%	1%	0%	0%	0%	4%	3%	2%	2%	6%	0%	2%	13%	0%	9%	0%	2%
CONTRACTING	2%	0%	0%	48%	0%	0%	0%	0%	1%	0%	0%	0%	4%	2%	6%	1%	9%	0%	3%	13%	0%	9%	0%	2%
EDUCATION AND RELIGIOUS INSTITUTIONS	1%	0%	0%	26%	0%	0%	4%	0%	1%	0%	2%	0%	1%	3%	5%	2%	14%	0%	2%	17%	0%	17%	0%	4%
FIREFIGHTER	0%	1%	3%	31%	2%	0%	13%	12%	1%	0%	1%	0%	0%	11%	0%	0%	1%	0%	3%	7%	0%	11%	0%	1%
FOOD MANUFACTURING	0%	0%	0%	14%	0%	0%	0%	0%	1%	0%	0%	0%	0%	1%	2%	4%	19%	1%	3%	18%	0%	27%	0%	9%
FOOD SERVICE	0%	0%	0%	1%	1%	0%	2%	0%	1%	0%	1%	0%	0%	1%	4%	4%	21%	1%	7%	33%	1%	18%	0%	3%
GENERAL SERVICES	2%	0%	2%	32%	0%	0%	1%	0%	2%	0%	1%	1%	3%	4%	3%	3%	14%	0%	2%	11%	0%	14%	0%	3%
GOVERNMENT	0%	0%	2%	33%	1%	0%	9%	0%	1%	0%	1%	0%	1%	2%	3%	2%	9%	0%	3%	15%	0%	14%	0%	3%
HEALTH CARE SERVICES	0%	0%	0%	10%	1%	0%	3%	0%	1%	0%	2%	0%	0%	2%	5%	3%	19%	0%	4%	19%	0%	25%	0%	3%
HOSPITALITY AND ENTERTAINMENT	0%	0%	0%	13%	0%	0%	2%	0%	1%	0%	1%	0%	0%	2%	7%	3%	20%	0%	4%	22%	0%	20%	0%	4%
LANDSCAPING	0%	0%	0%	26%	0%	0%	0%	0%	1%	0%	0%	0%	0%	1%	9%	2%	26%	0%	1%	21%	1%	9%	1%	1%
LIVESTOCK AND POULTRY FARMING	0%	0%	1%	26%	0%	0%	0%	0%	1%	0%	1%	0%	0%	1%	10%	0%	31%	0%	1%	22%	1%	3%	1%	0%
LOGGING AND TREE SERVICE	0%	0%	0%	72%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	3%	0%	9%	0%	2%	7%	1%	3%	0%	1%
MANUFACTURING GENERAL	1%	0%	0%	46%	0%	0%	1%	0%	1%	0%	1%	0%	1%	2%	4%	1%	10%	0%	3%	15%	0%	11%	0%	2%
MARINE TERMINAL OPERATION	1%	0%	0%	80%	0%	0%	0%	0%	0%	0%	0%	0%	2%	1%	2%	1%	4%	0%	0%	5%	0%	3%	0%	1%
MOTOR VEHICLE OPERATION OTHER THAN TRUCKING	0%	0%	0%	29%	0%	0%	2%	0%	1%	0%	1%	0%	0%	1%	6%	2%	9%	0%	6%	17%	1%	22%	0%	3%
NATURAL RESOURCE EXTRACTION, REFINING, STORAGE, TRANSPORT	1%	0%	0%	75%	0%	0%	0%	0%	1%	0%	0%	0%	1%	3%	1%	1%	3%	0%	0%	7%	0%	5%	0%	1%
POLICE OFFICERS	0%	0%	0%	44%	1%	0%	21%	2%	1%	1%	1%	0%	0%	3%	1%	1%	4%	0%	3%	6%	0%	10%	0%	0%
RETAIL SERVICES	0%	0%	0%	10%	0%	0%	2%	0%	3%	0%	1%	0%	0%	3%	4%	2%	21%	1%	6%	27%	1%	16%	0%	4%
SOCIAL SERVICES	0%	0%	0%	3%	0%	0%	5%	0%	1%	0%	2%	0%	0%	2%	4%	6%	16%	0%	4%	21%	0%	31%	0%	5%
TELECOMMUNICATION AND BROADCASTING	1%	0%	0%	51%	0%	0%	1%	0%	0%	0%	0%	0%	0%	1%	5%	2%	13%	0%	1%	13%	0%	10%	0%	1%
TRUCKING	0%	0%	0%	63%	0%	0%	1%	1%	1%	0%	0%	0%	0%	2%	1%	1%	3%	0%	2%	9%	0%	11%	1%	2%
UNKNOWN	4%	0%	0%	33%	0%	0%	3%	1%	3%	0%	2%	2%	7%	7%	0%	0%	1%	0%	5%	15%	0%	14%	0%	2%
UTILITY PRODUCTION, DISTRIBUTION, MAINTAINENCE	1%	0%	0%	61%	1%	0%	2%	0%	0%	0%	0%	0%	2%	1%	2%	1%	4%	0%	3%	10%	0%	9%	0%	2%
VEHICLE OTHER THAN AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	0%	0%	0%	43%	0%	0%	1%	0%	1%	0%	0%	0%	1%	3%	7%	3%	11%	0%	2%	18%	1%	8%	0%	1%
VESSEL OPERATION, SERVICE, MANUFACTURING, OR REPAIR	1%	1%	0%	40%	0%	0%	1%	1%	0%	0%	0%	0%	4%	4%	1%	0%	1%	0%	1%	7%	5%	31%	4%	0%
WHOLESALE AND RETAIL GENERAL	0%	0%	0%	23%	0%	0%	2%	0%	1%	0%	1%	0%	0%	1%	8%	2%	22%	0%	3%	18%	0%	15%	0%	2%

DISTRIBUTION OF COST BY DISEASE TYPE AND INDUSTRY GROUP ($000s)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
AGRICULTURE / FARMING / AQUACULTURE	0	0	287	6,430	18	0	34	0	716	0	881	588	0	2,352	2,189	575	6,296	48	729	4,695	239	2,185	18	229
AIRCRAFT OPERATION, SERVICE, MANUFACTURING, OR REPAIR	923	0	287	8,531	18	0	68	0	657	0	4,228	0	801	3,528	2,189	9,195	4,832	48	365	3,377	80	5,306	0	721
ANIMAL CARE, TRAINING, BREEDING, BOARDING	0	0	0	1,988	0	0	239	0	60	0	352	0	0	168	174	287	442	0	243	1,254	0	429	0	131
AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	6,461	295	3,161	28,765	53	8	3,238	1,446	5,491	197	7,752	882	4,273	34,613	6,323	28,733	9,416	291	6,198	35,245	3,828	31,406	619	4,161
BUILDING MAINTAINENCE AND OPERATIONS	4,615	0	287	5,457	71	0	2,829	1,929	1,492	0	2,819	294	14,423	16,970	2,779	8,333	4,446	121	4,618	14,149	558	13,265	195	2,129
CLERICAL	2,154	0	287	2,876	123	4	16,056	3,616	1,134	147	6,166	0	801	9,913	2,397	7,759	8,091	339	7,666	45,792	1,276	29,806	0	3,473
CONSTRUCTION	14,460	1,180	3,161	42,273	106	0	614	2,411	3,581	0	3,347	3,823	53,952	25,372	4,308	32,181	9,140	266	3,828	23,668	1,675	20,950	318	3,800
CONTRACTING	72,808	2,065	5,459	87,196	71	4	511	5,063	5,133	197	10,571	4,706	132,209	40,494	25,953	51,432	32,224	315	11,119	52,996	1,994	45,597	566	8,256
EDUCATION AND RELIGIOUS INSTITUTIONS	6,769	885	287	13,325	159	8	4,363	964	1,790	49	13,214	0	5,876	18,315	6,671	24,998	14,138	387	2,370	20,002	798	23,837	0	4,193
FIREFIGHTER	0	885	2,011	1,015	71	0	1,023	6,509	119	0	529	0	0	4,201	35	0	55	24	182	547	0	975	18	98
FOOD MANUFACTURING	1,846	0	575	16,878	35	4	239	241	3,760	49	4,581	4,412	1,870	17,979	6,775	83,326	42,690	1,719	7,838	47,368	1,117	86,727	71	24,899
FOOD SERVICE	615	295	0	620	494	4	2,114	1,205	1,373	541	2,995	294	0	5,545	4,829	32,468	17,948	557	6,927	33,154	1,276	22,316	248	3,473
GENERAL SERVICES	8,615	1,770	6,321	6,684	53	0	341	0	1,611	98	1,938	4,412	10,149	10,754	1,598	14,367	5,771	24	1,033	5,306	479	8,115	35	1,409
GOVERNMENT	8,922	2,949	64,075	52,368	1,534	12	33,816	7,714	5,789	688	17,266	2,353	16,559	45,534	11,882	58,903	29,077	436	12,092	56,726	1,755	64,177	301	9,927
HEALTH CARE SERVICES	4,000	295	2,011	10,477	829	39	8,079	723	5,849	98	28,365	882	4,808	30,412	13,376	56,317	39,017	629	9,418	43,734	1,356	71,902	88	7,502
HOSPITALITY AND ENTERTAINMENT	2,461	0	575	5,570	35	0	2,250	482	1,790	246	5,814	0	1,068	9,409	7,192	24,136	16,071	218	3,433	20,613	479	22,823	159	3,505
LANDSCAPING	308	0	287	1,664	0	0	68	0	239	0	352	0	0	672	1,494	2,299	3,286	24	152	3,151	319	1,600	53	164
LIVESTOCK AND POULTRY FARMING	0	0	862	1,805	0	0	68	241	298	0	881	0	0	1,176	1,668	0	4,197	0	182	3,569	319	624	71	66
LOGGING AND TREE SERVICE	1,231	0	0	39,636	18	0	477	2,170	597	98	1,586	0	267	3,865	4,482	1,437	9,499	48	1,944	9,165	2,233	5,150	142	1,081
MANUFACTURING GENERAL	43,073	3,244	6,896	155,582	88	12	4,397	1,929	11,996	393	45,455	9,117	59,027	98,798	29,635	99,129	66,989	1,356	22,938	117,922	6,301	106,351	1,433	13,825
MARINE TERMINAL OPERATION	5,230	0	0	21,827	18	0	34	0	418	0	529	294	9,882	2,520	1,008	6,034	2,126	24	273	2,862	239	2,146	0	426
MOTOR VEHICLE OPERATION OTHER THAN TRUCKING	615	0	287	3,990	18	0	545	241	597	98	1,762	1,176	0	2,352	2,015	4,885	2,458	0	1,671	5,210	479	8,466	71	917
NATURAL RESOURCE EXTRACTION, REFINING, STORAGE, TRANSPORT	20,306	1,180	6,034	73,166	141	0	170	482	3,521	0	2,643	8,235	24,839	34,109	1,911	19,538	5,136	169	820	14,728	1,037	14,825	0	2,261
POLICE OFFICERS	308	0	0	2,792	88	0	3,307	1,929	298	147	529	294	0	2,184	174	1,437	525	24	365	933	80	1,756	18	66
RETAIL SERVICES	615	0	0	2,087	53	4	818	0	2,447	295	2,290	0	0	7,225	2,293	8,620	8,974	242	2,704	13,056	638	9,441	35	1,835
SOCIAL SERVICES	308	0	0	620	35	4	2,250	241	716	49	4,228	294	267	4,201	1,668	22,412	5,799	73	1,489	9,133	80	16,035	18	2,228
TELECOMMUNICATION AND BROADCASTING	1,846	0	287	6,232	0	0	239	0	179	0	529	294	267	840	1,459	6,034	3,175	97	213	3,569	80	3,238	0	393
TRUCKING	4,923	0	287	35,152	0	0	1,773	6,268	1,611	737	1,409	1,471	2,404	15,794	1,598	16,665	3,258	121	2,977	11,577	638	16,737	389	2,523
UNKNOWN	15,998	0	1,149	6,500	18	4	1,227	3,134	2,149	197	4,757	6,470	27,243	16,634	69	1,724	249	0	2,369	6,914	80	7,842	124	950
UTILITY PRODUCTION, DISTRIBUTION, MAINTAINENCE	4,307	0	287	8,488	106	0	580	482	179	0	176	588	6,410	1,176	521	3,735	1,105	0	851	3,312	80	3,472	0	655
VEHICLE OTHER THAN AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	0	295	287	1,650	0	0	102	0	119	0	176	0	801	1,344	660	2,011	828	0	152	1,544	160	858	0	98
VESSEL OPERATION, SERVICE, MANUFACTURING, OR REPAIR	43,688	57,511	24,136	119,627	18	31	4,772	38,572	1,432	787	16,561	1,471	210,199	147,861	5,698	2,299	3,811	242	3,737	47,400	79,359	261,079	14,809	131
WHOLESALE AND RETAIL GENERAL	10,461	590	287	27,199	123	0	5,284	2,652	3,462	492	10,571	2,941	6,677	21,339	23,868	53,731	51,581	654	8,841	47,754	1,914	48,260	743	6,225
TOTAL	287,664	73,437	129,873	798,470	4,391	135	101,926	90,643	70,604	5,604	205,250	55,291	595,073	637,649	178,889	684,995	412,649	8,497	129,666	710,425	110,943	958,098	20,542	111,749

DISTRIBUTION OF COST BY DISEASE TYPE AND INDUSTRY GROUP, NORMALIZED BY INDUSTRY GROUP

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
AGRICULTURE / FARMING / AQUACULTURE	0%	0%	1%	23%	0%	0%	0%	0%	3%	0%	3%	2%	0%	8%	8%	2%	22%	0%	3%	16%	1%	8%	0%	1%
AIRCRAFT OPERATION, SERVICE, MANUFACTURING, OR REPAIR	2%	0%	1%	19%	0%	0%	0%	0%	1%	0%	9%	0%	2%	8%	5%	20%	11%	0%	1%	7%	0%	12%	0%	2%
ANIMAL CARE, TRAINING, BREEDING, BOARDING	0%	0%	0%	34%	0%	0%	4%	0%	1%	0%	6%	0%	0%	3%	3%	5%	8%	0%	4%	22%	0%	7%	0%	2%
AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	3%	0%	1%	13%	0%	0%	1%	1%	2%	0%	3%	0%	2%	16%	3%	13%	4%	0%	3%	16%	2%	14%	0%	2%
BUILDING MAINTAINENCE AND OPERATIONS	5%	0%	0%	5%	0%	0%	3%	2%	1%	0%	3%	0%	14%	17%	3%	8%	4%	0%	5%	14%	1%	13%	0%	2%
CLERICAL	1%	0%	0%	2%	0%	0%	11%	2%	1%	0%	4%	0%	1%	7%	2%	5%	5%	0%	5%	31%	1%	20%	0%	2%
CONSTRUCTION	6%	0%	1%	17%	0%	0%	0%	1%	1%	0%	1%	2%	21%	10%	2%	13%	4%	0%	2%	9%	1%	8%	0%	1%
CONTRACTING	12%	0%	1%	15%	0%	0%	0%	1%	1%	0%	2%	1%	22%	7%	4%	9%	5%	0%	2%	9%	0%	8%	0%	1%
EDUCATION AND RELIGIOUS INSTITUTIONS	4%	1%	0%	8%	0%	0%	3%	1%	1%	0%	8%	0%	4%	11%	4%	15%	9%	0%	1%	12%	0%	15%	0%	3%
FIREFIGHTER	0%	5%	11%	6%	0%	0%	6%	36%	1%	0%	3%	0%	0%	23%	0%	0%	0%	0%	1%	3%	0%	5%	0%	1%
FOOD MANUFACTURING	1%	0%	0%	5%	0%	0%	0%	0%	1%	0%	1%	1%	1%	5%	2%	23%	12%	0%	2%	13%	0%	24%	0%	7%
FOOD SERVICE	0%	0%	0%	0%	0%	0%	2%	1%	1%	0%	2%	0%	0%	4%	3%	23%	13%	0%	5%	24%	1%	16%	0%	2%
GENERAL SERVICES	9%	2%	7%	7%	0%	0%	0%	0%	2%	0%	2%	5%	11%	12%	2%	16%	6%	0%	1%	6%	1%	9%	0%	2%
GOVERNMENT	2%	1%	13%	10%	0%	0%	7%	2%	1%	0%	3%	0%	3%	9%	2%	12%	6%	0%	2%	11%	0%	13%	0%	2%
HEALTH CARE SERVICES	1%	0%	1%	3%	0%	0%	2%	0%	2%	0%	8%	0%	1%	9%	4%	17%	11%	0%	3%	13%	0%	21%	0%	3%
HOSPITALITY AND ENTERTAINMENT	2%	0%	0%	4%	0%	0%	2%	0%	1%	0%	5%	0%	1%	7%	6%	19%	13%	0%	3%	16%	0%	18%	0%	3%
LANDSCAPING	2%	0%	2%	10%	0%	0%	0%	0%	1%	0%	2%	0%	0%	4%	9%	14%	20%	0%	1%	20%	2%	10%	0%	1%
LIVESTOCK AND POULTRY FARMING	0%	0%	5%	11%	0%	0%	0%	2%	2%	0%	5%	0%	0%	7%	10%	0%	26%	0%	1%	22%	2%	4%	0%	0%
LOGGING AND TREE SERVICE	1%	0%	0%	47%	0%	0%	1%	3%	1%	0%	2%	0%	0%	5%	5%	2%	11%	0%	2%	11%	3%	6%	0%	1%
MANUFACTURING GENERAL	5%	0%	1%	17%	0%	0%	0%	0%	1%	0%	5%	1%	7%	11%	3%	11%	7%	0%	3%	13%	1%	12%	0%	2%
MARINE TERMINAL OPERATION	9%	0%	0%	39%	0%	0%	0%	0%	1%	0%	1%	1%	18%	5%	2%	11%	4%	0%	0%	5%	0%	4%	0%	1%
MOTOR VEHICLE OPERATION OTHER THAN TRUCKING	2%	0%	1%	11%	0%	0%	1%	1%	2%	0%	5%	3%	0%	6%	5%	13%	6%	0%	4%	14%	1%	22%	0%	2%
NATURAL RESOURCE EXTRACTION, REFINING, STORAGE, TRANSPORT	9%	1%	3%	31%	0%	0%	0%	0%	1%	0%	1%	4%	11%	14%	1%	8%	2%	0%	2%	5%	0%	6%	0%	1%
POLICE OFFICERS	2%	0%	0%	16%	1%	0%	19%	11%	2%	1%	3%	2%	0%	13%	1%	8%	3%	0%	2%	5%	0%	10%	0%	0%
RETAIL SERVICES	1%	0%	0%	3%	0%	0%	1%	0%	4%	0%	4%	0%	0%	11%	4%	14%	14%	0%	4%	21%	1%	15%	0%	3%
SOCIAL SERVICES	0%	0%	0%	1%	0%	0%	3%	0%	1%	0%	6%	0%	0%	6%	2%	31%	8%	0%	2%	13%	0%	22%	0%	3%
TELECOMMUNICATION AND BROADCASTING	6%	0%	1%	22%	0%	0%	1%	0%	1%	0%	2%	1%	1%	3%	5%	21%	11%	0%	1%	12%	0%	11%	0%	1%
TRUCKING	4%	0%	0%	27%	0%	0%	1%	5%	1%	1%	1%	1%	2%	12%	1%	13%	3%	0%	2%	9%	0%	13%	0%	2%
UNKNOWN	15%	0%	1%	6%	0%	0%	1%	3%	2%	0%	4%	6%	26%	16%	0%	2%	0%	0%	2%	7%	0%	7%	0%	1%
UTILITY PRODUCTION, DISTRIBUTION, MAINTAINENCE	12%	0%	1%	23%	0%	0%	2%	1%	0%	0%	0%	2%	18%	3%	1%	10%	3%	0%	2%	9%	0%	10%	0%	2%
VEHICLE OTHER THAN AUTOMOBILE SALES, SERVICE, MANUFACTURING, OR REPAIR	0%	3%	3%	15%	0%	0%	1%	0%	1%	0%	2%	0%	7%	12%	6%	18%	7%	0%	1%	14%	1%	8%	0%	1%
VESSEL OPERATION, SERVICE, MANUFACTURING, OR REPAIR	4%	5%	2%	11%	0%	0%	0%	4%	0%	0%	2%	0%	19%	14%	1%	0%	0%	0%	0%	4%	7%	24%	1%	0%
WHOLESALE AND RETAIL GENERAL	3%	0%	0%	8%	0%	0%	2%	1%	1%	0%	3%	1%	2%	6%	7%	16%	15%	0%	3%	14%	1%	14%	0%	2%

Appendix H: Summary of Metrics

The following are tabular summaries of the basic metrics presented in Appendix B. Combinations of various metrics are presented in anticipation of recommendations regarding the combination of disease types.

	MESOTHELIOMA	ASBESTOSIS	LUNG CANCER	MESOTELIOMA, ASBESTOSIS, & LUNG CANCER	OBSTRUCTIVE RESPIRATORY	ALL OTHER RESPIRATORY DISEASE	OBSTRUCTIVE & ALL OTHER COMBINED
COUNT							
Raw Mean	935	2,228	249	3,412	1,165	3,795	4,960
Cut Off	128	905	84	1,146	713	2,075	2,778
Adjusted Mean	807	1,323	165	2,266	452	1,720	2,182
AVERAGE COST							
Raw Mean	273,907	166,223	237,012	200,898	80,334	84,006	83,144
Cut Off	27,391	16,622	23,701	20,090	8,033	8,401	8,314
Adjusted Mean	316,188	277,441	354,825	300,228	204,040	181,735	185,561
Adjusted Ex 5 Largest	307,663	267,089	294,929	293,246	176,181	168,024	174,717
Five Largest	1,683,616	3,006,278	2,271,490	3,457,662	2,694,641	4,884,754	4,907,085
Largest	2,069,935	5,318,207	3,373,094	5,318,207	3,420,807	7,187,645	7,187,645
AVERAGE AGE							
Raw Mean	68	64	66	65	44	44	44
Adjusted Mean	68	66	67	66	46	48	44
Lag <= 2 Yrs	68	63	62	65	43	43	43
Lag > 2 Yrs	68	67	68	68	54	59	59
AVERAGE LAG (YEARS)							
Raw Mean	1.7	3.9	8.3	3.6	0.4	1.2	1.0
Adjusted Mean	1.2	4.2	7.2	3.4	0.8	1.6	1.3
Lag <= 2 Yrs	0.4	0.4	0.5	0.4	0.1	0.2	0.2
Lag > 2 Yrs	10.7	12.4	13.2	12.3	5.8	9.9	9.5
% Claims <= 2 Yrs	87%	71%	38%	73%	96%	89%	91%
% Claims > 2 Yrs	13%	29%	62%	27%	4%	11%	9%

	ALL OTHER CANCER	PNEUMOCONIOSIS EXCEPT ASBESTOSIS	CARPAL TUNNEL SYNDROME	HEARING LOSS	NERVE DISEASE
COUNT					
Raw Mean	452	188	22,092	56,628	1,391
Cut Off	159	84	1,912	928	212
Adjusted Mean	293	104	20,180	55,700	1,179
AVERAGE COST					
Raw Mean	200,188	205,389	29,951	13,950	72,443
Cut Off	20,019	20,539	2,995	1,395	7,244
Adjusted Mean	304,983	366,062	32,555	14,176	84,667
Adjusted Ex 5 Largest	287,330	294,103	32,158	14,100	79,758
Five Largest	1,321,802	1,790,860	1,637,173	856,468	1,237,389
Largest	1,526,740	2,437,867	2,394,022	1,096,385	2,202,907
AVERAGE AGE					
Raw Mean	62	54	42	62	44
Adjusted Mean	62	57	42	63	45
Lag <= 2 Yrs	59	52	42	62	43
Lag > 2 Yrs	69	64	47	63	50
AVERAGE LAG (YEARS)					
Raw Mean	3.7	1.3	0.3	0.7	1.1
Adjusted Mean	2.8	1.7	0.3	0.7	1.1
Lag <= 2 Yrs	0.5	0.3	0.2	0.1	0.3
Lag > 2 Yrs	9.8	9.4	5.0	8.6	5.2
% Claims <= 2 Yrs	65%	88%	97%	92%	85%
% Claims > 2 Yrs	35%	12%	3%	8%	15%

	BURSITIS	EPICONDYLITIS	TENDONITIS	TENOSYNOVITIS	OTHER INFLAMMATION	SPRAIN / STRAIN / TEAR	HERNIA	ALL OTHER CUMULATIVE TRAUMA	ALL CUMULATIVE TRAUMA
COUNT									
Raw Mean	5,149	2,384	14,944	351	4,268	24,558	1,161	3,411	56,226
Cut Off	744	238	1,490	55	584	4,618	0	569	8,454
Adjusted Mean	4,405	2,146	13,454	296	3,684	19,940	1,161	2,842	47,772
AVERAGE COST									
Raw Mean	31,182	26,287	25,517	28,215	28,386	33,022	19,917	29,689	29,718
Cut Off	3,118	2,629	2,552	2,821	2,839	3,302	1,992	2,969	2,972
Adjusted Mean	36,025	28,949	28,092	33,014	32,507	40,069	19,917	35,147	34,544
Adjusted Ex 5 Largest	34,742	27,305	27,613	24,209	30,381	39,014	17,693	32,761	34,092
Five Largest	1,164,316	732,837	1,316,688	545,484	1,597,070	4,248,385	534,013	1,388,614	4,347,569
Largest	1,478,077	1,036,253	1,686,616	955,931	3,645,086	5,717,959	1,187,016	1,813,565	5,717,959
AVERAGE AGE									
Raw Mean	43	44	40	41	44	42	44	42	42
Adjusted Mean	43	44	40	42	44	43	44	43	40
Lag <= 2 Yrs	43	44	40	41	43	42	44	42	42
Lag > 2 Yrs	46	45	48	49	49	49	44	49	49
AVERAGE LAG (YEARS)									
Raw Mean	0.1	0.2	0.1	0.2	0.3	0.3	0.3	0.3	0.2
Adjusted Mean	0.1	0.2	0.1	0.2	0.3	0.3	0.3	0.3	0.1
Lag <= 2 Yrs	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.1	0.1
Lag > 2 Yrs	3.2	4.0	3.7	3.8	5.8	7.0	4.3	6.1	6.3
% Claims <= 2 Yrs	100%	99%	100%	99%	97%	98%	98%	98%	98%
% Claims > 2 Yrs	0%	1%	0%	1%	3%	2%	2%	2%	2%

	INFECTION	MENTAL STRESS	PHYSICAL STRESS	EYE CONDITION	REACTION TO FOREIGN SUBSTANCE	VASCULAR
COUNT						
Raw Mean	249	2,990	376	35	1,183	114
Cut Off	87	529	224	7	523	66
Adjusted Mean	162	2,461	152	28	660	48
AVERAGE COST						
Raw Mean	28,992	36,817	144,510	12,550	43,855	108,572
Cut Off	2,899	3,682	14,451	1,255	4,386	10,857
Adjusted Mean	43,415	44,206	349,967	15,629	76,672	251,878
Adjusted Ex 5 Largest	17,633	34,089	241,072	3,869	59,682	49,161
Five Largest	852,976	5,013,661	3,551,496	69,725	2,302,282	1,995,237
Largest	1,137,484	13,309,054	9,275,801	189,814	4,301,036	8,440,907
AVERAGE AGE						
Raw Mean	39	44	52	43	39	46
Adjusted Mean	40	44	53	40	41	44
Lag <= 2 Yrs	39	44	52	41	39	46
Lag > 2 Yrs	50	49	54	47	47	46
AVERAGE LAG (YEARS)						
Raw Mean	0.4	0.2	1.1	1.2	0.6	0.3
Adjusted Mean	0.5	0.2	1.2	0.7	0.7	0.4
Lag <= 2 Yrs	0.2	0.2	0.3	0.2	0.2	0.2
Lag > 2 Yrs	5.5	4.9	6.5	4.7	8.2	2.6
% Claims <= 2 Yrs	96%	98%	86%	79%	96%	95%
% Claims > 2 Yrs	4%	2%	14%	21%	4%	5%

Appendix I: Standards of Practice – Public Personal Injury Compensation Plans

Workers' compensation is covered in part 5000 of the actuarial standards of practice produced by the Actuarial Standards Board (ASB), which are included herein for reference purposes. The ASB's mission is to develop, establish, and maintain standards of practice governing actuarial practice in Canada.

5000—PUBLIC PERSONAL INJURY COMPENSATION PLANS

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5100 SCOPE

.00 Part 1000 applies to work within the scope of this part 5000.

.01 The standards in this part apply to an actuary's work on the valuation of benefits liabilities of a public personal injury compensation plan, including its benefits liabilities in respect of a self-insured employer, and to any other items required under the terms of an appropriate engagement for a public personal injury compensation plan, for the purpose of its financial statements and for the purpose of providing input into its funding arrangements.

.02 The standards in this part do not apply to an actuary's work for an employer on the valuation of benefits liabilities and other related items in respect of its employees who are covered by a self-insured element of a public personal injury compensation plan, where such work is covered by the Practice-Specific Standards for Post-Employment Benefit Plans. Nevertheless, the standards in this part may provide useful guidance for such work.

5200 EXTENSION OF SCOPE

.01 The standards in this part may also provide useful guidance for other work of an actuary for a public personal injury compensation plan, such as work on the development of assessment rates or premiums, the costing of benefits or policy changes, or work on experience-rating programs.

.02 The standards in this part do not, however, provide useful guidance in the case of an entity merely because it is a monopoly, such as a monopoly of benefits that are optional or a government monopoly that is required to operate like a private sector entity.

5300 GENERAL

5310 CIRCUMSTANCES OF THE WORK

.01 *The actuary's work on the valuation of the benefits liabilities or other items for the purpose of the financial statement of a public personal injury compensation plan or for the purpose of providing input into its funding arrangements should take into account the circumstances of the work.* [Effective March 15, 2011]

.02 The circumstances of the work would include

terms of the relevant statute,

relevant accounting standards and policies, and

terms of an appropriate engagement under which the work is being performed,

and the circumstances of the work may include the funding policy of the public personal injury compensation plan.

.03 The terms of an appropriate engagement would define the role of the actuary and the purpose of the work. The work of the actuary may be limited to the valuation of the benefits liabilities, or the work may also include the provision of advice on the funding of the public personal injury compensation plan, its financial position, its financial condition and any other actuarial item required under the terms of an appropriate engagement.

.04 The terms of an appropriate engagement may specify applicable policies of the public personal injury compensation plan relevant to the work of the actuary. These policies may include a formal or informal funding policy, an accounting policy and an investment policy.

.05 Significant terms of an appropriate engagement may stipulate one or more of

use of a specified asset value or method of asset valuation, and

depending on the circumstances of the work, treatment of definitive amendments and other pending changes.

.06 Objectives of funding specified by the terms of an appropriate engagement may include, but are not limited to, a specific funding target, the security of benefits, a principle of equity among various groups of employers or various groups of individuals or among generations, or a funding approach for occupational disease claims.

5320 DATA

.01 *Where sufficient, reliable and relevant data are not available for the valuation of a specific benefit, the actuary should make appropriate assumptions or introduce appropriate methods to compensate for any perceived deficiencies in the data.* [Effective March 15, 2011]

.02 Sufficient, reliable and relevant data may not be available to the actuary in various circumstances, for example,

the relevant statute may have been amended to provide a new or revised benefit,

an applicable policy of the public personal injury compensation plan may have been revised recently,

the public personal injury compensation plan's claim adjudication practices or administration practices may have changed recently,

a recent appeal decision may be expected to have a material effect on future benefit payments, or

economic conditions or health care practices in the relevant jurisdiction may have changed, which may be expected to have a material effect on benefits.

.03 Where the data are not sufficient, not fully reliable or not sufficiently relevant to expected future experience for a specific benefit, the actuary may consider taking one or more of the following actions,

introducing appropriate assumptions regarding missing, incomplete or unreliable data, and

adjusting data and historic claim settlement patterns for the purpose of the work, as appropriate, to remove any perceived distortions, such as the effect of historical inflation or one-time benefit changes.

5400 BENEFITS LIABILITIES

5410 METHODS

.01 *The actuary should value the benefits liabilities assuming that the public personal injury compensation plan continues indefinitely as a going concern entity.*

.02 *The value of the benefits liabilities is the value, by the actuarial present value method, of cash flows after the calculation date with respect to all claims incurred before that date and not fully discharged as of that date, whether reported or not, and for calculation dates on and after December 31, 2014, the value, by the actuarial present value method, of cash flows after the calculation date with respect to workplace exposures that have occurred prior to that date. The workplace exposures should include those which may potentially lead to occupational disease claims, in accordance with the policy of the plan.*

.03 *The cash flows after the calculation date on account of all claims incurred before that date should include all expenses expected to be incurred after the calculation date which are related to those claims, including relevant administration expenses.*

.04 *The actuary's work should take into account the benefits, relevant policies and administration practices of the public personal injury compensation plan as of the calculation date, and should take into account any definitive amendment to these items that is expected to have a material effect on benefits, unless the circumstances of the work require otherwise.*

.05 *The benefits liabilities should include an amount in respect of benefits for employees of a self-insured employer, unless the exclusion of such benefits is in accordance with the circumstances of the work.*

.06 *When estimating the benefits liabilities, the actuary should consider all claims, whether reported or not, until the claims are fully discharged or closed, with no or minimal chance of re-opening.* [Effective March 15, 2011]

Occupational disease

.07 The actuary would value the benefits liabilities in respect of occupational disease claims, and would include the benefits liabilities for all occupational disease claims reported prior to the calculation date.

.08 For calculation dates on or after December 31, 2014, the actuary would also include in the benefits liabilities an appropriate allowance for all occupational disease claims expected to arise after the calculation date as a result of exposures incurred in the workplace prior to the calculation date in respect of occupational diseases with a long latency period that are recognized as such by the public personal injury compensation plan, by legislation, by regulation, or by appeal, regardless of the public personal injury compensation plan's approach to funding potential occupational disease claims. For calculation dates preceding December 31, 2014, the actuary may include in the benefits liabilities an appropriate allowance for such potential occupational disease claims.

Amendments and subsequent events

.09 The actuary's valuation of the benefits liabilities would normally reflect all definitive amendments of which the actuary is aware on the calculation date, including those amendments with an effective date after the calculation date. Where the circumstances of the work require otherwise, the actuary may exclude the effect of a known definitive amendment, but the actuary would disclose the effect of such amendment.

5420 ASSUMPTIONS

.01 *The actuary should set assumptions that reflect the expectation that the public personal injury compensation plan will continue indefinitely as a going concern entity, but may make adjustment for short-term considerations, where appropriate.*

.02 *The actuary should select either best estimate assumptions or best estimate assumptions modified to incorporate margins for adverse deviations to the extent, if any, required by law or by the circumstances of the work, and should provide the rationale for the decision made with respect to the inclusion or exclusion of margins.*

.03 *Where a public personal injury compensation plan has an established practice of providing ad hoc increases to benefits, or a periodic update to rates or tables used in the administration of the plan, the actuary should recognize such established practice when valuing the benefits liabilities by assuming the continuation of such practice, unless a definitive policy decision to discontinue such established practice has been taken by the plan.* [Effective March 15, 2011]

5430 ECONOMIC ASSUMPTIONS

.01 The needed economic assumptions include the expected rate of investment income, the expected investment expenses and, depending on the benefit being valued, one or more of

expected rate of general inflation,

expected rate of health care cost inflation,

expected rate of wage inflation,

if different, expected earnings increase specific to wage loss benefits, and

expected rate of change of any other economic factor that may be applicable.

.02 The economic assumptions that are needed would depend on the nature of the benefits that are being valued, and may vary by year.

.03 The actuary would develop and disclose separate nominal assumptions, but may prefer to complete the calculations using rates that are net of inflation, net of expenses or net of some other factor. Such calculations may, however, be approximations.

.04 When determining the best estimate assumption for the expected rate of investment income, the actuary would take into account the expected pattern of risk-free rates of return, the expected additional investment return on the assets of the public personal injury compensation plan at the calculation date (if any) and the expected investment policy after that date. The expected additional investment return would depend on one or more of

additional returns over risk-free rates expected to be earned on non-risk-free fixed income assets of the type and quality owned on the reporting date and expected to be acquired pursuant to the investment policy of the plan,

additional returns over risk-free interest rates expected to be earned on other types of investments, including publicly traded common or preferred equities, private placements, real estate and private equity, and

projected composition of the investment portfolio in future years.

In establishing the assumption for the expected rate of investment income, the actuary would assume that there would be no additional returns achieved, net of investment expenses, from an active investment management strategy compared to a passive investment management strategy except to the extent that the actuary has reason to believe, based on relevant supporting data, that such additional returns will be consistently and reliably earned over the long term.

.05 The expected investment expenses would depend on the investment policy of the plan and the types of investments held and projected to be held in future.

.06 The actuary may adopt an assumption for the expected rate of investment income that varies depending on the part of the public personal injury compensation plan being valued, and the assets backing the liabilities in that part.

.07 The assumed expected rate of investment income need not be a flat rate but may vary from period to period.

5440 NON-ECONOMIC ASSUMPTIONS

.01 When setting non-economic assumptions, the actuary would reflect all material contingencies.

.02 The actuary would recognize the effect of varying experience and settlement patterns that result from definitive or virtually definitive revisions to the plan's benefits or claims practices and would consider the relevance of historical claims experience.

.03 When setting the assumptions for wage loss, disability, pension and other benefits, the actuary would take into account all applicable material contingencies, including the possibility of recoveries, relapses, mortality improvements, changing benefit levels and the intermittence of income replacement and rehabilitation benefits throughout the lifetime of claimants. Further, the actuary would consider the potential effect on future benefit payments of factors such as changing economic conditions, employment levels, the claimant's occupation and industry and seasonal variations.

5450 MARGINS FOR ADVERSE DEVIATIONS

.01 *The actuary should not include a margin for adverse deviations when the circumstances of the work require a best estimate calculation or an unbiased calculation.*

.02 *The actuary should include margins for adverse deviations when the circumstances of the work require such margins. A non-zero margin should be sufficient, without being excessive, and should have the effect of increasing the benefits liabilities or reducing the reported value of the offsetting assets, the computation of which falls within the scope of the work of the actuary. In addition, the provision resulting from the application of all margins for adverse deviations should be appropriate in the aggregate.*

.03 *If the actuary is required by legislation, regulation, accounting standards, the accounting policy or the funding policy of the plan to use a margin for adverse deviations that is outside the range that the actuary considers appropriate, the actuary may use such imposed assumption, but the actuary should disclose that the margin is outside of the appropriate range and disclose the reason for using such margin.* [Effective March 15, 2011]

.04 Examples of situations where the circumstances of the work might require an unbiased calculation include

legislation governing the plan may require an unbiased calculation,

the relevant accounting standards or the accounting policy of the public personal injury compensation plan may require the use of best estimate assumptions, or

the plan's funding policy may recognize the monopoly nature of the plan and place a high priority on equity among generations, employers and other groups, and hence require the use of best estimate assumptions.

.05 Examples of situations where the circumstances of the work might require the inclusion of a margin for adverse deviations include

where the relevant accounting standards or the accounting policy of the plan, or its funding policy, require inclusion of a margin for adverse deviations, or

where the level of uncertainty or volatility may be high, and not considered to be sufficiently mitigated by the underlying adaptability of the plan.

.06 Where the actuary includes a margin for adverse deviations, the actuary would provide the rationale for inclusion of the margin and for the selection of the specific amount of the margin. The rationale may include considerations such as

funding policy or accounting policy of the public personal injury compensation plan,

relative importance placed on the balancing of competing interests compared to the achievement of full funding,

level of uncertainty inherent in the assumptions,

level of reliability or credibility of the data or historical information upon which the assumptions are based,

asset/liability mismatch risk,

propensity for ad hoc changes to be made to plan conditions, and

legislative or other restrictions on the ability to mitigate past losses.

5460 SENSITIVITY TESTING

.01 *The actuary should perform sensitivity testing of adverse scenarios, to illustrate and aid the understanding of the effect of adverse changes to assumptions.*

.02 *The adverse scenarios that the actuary tests should include at least*

> *a decrease of 100 basis points in the assumed rate of investment earnings in all future years,*
>
> *an increase of 100 basis points in the assumed general rate of inflation,*
>
> *a discount rate that is equal to the expected rate of return earned on a hypothetical fixed income portfolio, consisting of high-quality bonds of pertinent durations.* [Effective March 15, 2011]

.03 The actuary would consider testing other scenarios, depending on the plausible material risks to which the plan may be exposed.

.04 The actuary may also perform sensitivity testing of favourable scenarios.

.05 When selecting the assumptions and scenarios for sensitivity testing, the actuary would consider the circumstances of the work, and would select those assumptions that have a material impact on the benefits liabilities. The actuary may consider the use of testing of integrated sensitivity scenarios, for example, the effect of a deep and prolonged recession.

5500 OTHER RELATED ITEMS

.01 *The actuary should compute, separately from the benefits liabilities, the present value on the reporting date of any future assessments that have been specifically earmarked to amortize a current deficit and any future scheduled reductions to assessments that have been specifically identified to reduce a current surplus, in accordance with the circumstances of the work.* [Effective March 15, 2011]

.02 Where the public personal injury compensation plan has specifically earmarked a defined portion of specified future assessments to amortize a current deficit, the actuary would determine the actuarial present value of such earmarked assessments, and disclose such amount separately from the benefits liabilities and assets of the plan, provided that such disclosure is in accordance with the terms of the engagement.

.03 Where the public personal injury compensation plan has specifically identified reductions to future assessments to reduce a current surplus, the actuary would estimate the actuarial present value of such reductions to future assessments, and disclose such amount separately from the benefits liabilities and assets of the plan, provided that such disclosure is in accordance with the terms of the engagement.

5600 GAIN AND LOSS ANALYSIS

.01 *The actuary should conduct a gain and loss analysis, including a comparison of actual and expected experience for the period between the prior calculation date and the current calculation date.*

.02 *The actuary should also conduct a reconciliation of the surplus or deficit position of the plan, provided that such reconciliation is in accordance with the terms of the engagement.* [Effective March 15, 2011]

.03 The actuary's analysis would include all material gains and losses. At a minimum, the actuary's gain and loss analysis would consider the impact of any significant changes to the assumptions or methods used, any significant changes to the benefits or policies of the plan, gains or losses due to investment returns on the plan's assets, legislative changes, and any other areas where the difference between actual and expected experience is significant.

.04 The actuary would report a change in assumption if the current assumption differs nominally from the corresponding prior assumption, unless the change in the nominal amount results from the application of the same calculation method. For example, if certain rates used in the valuation are based on historical claims experience and calculated using the same averaging formula, the difference in assumed rates between the calculation date and the prior calculation date would not normally be considered as a change in assumptions. Nevertheless, the actuary may choose to disclose the effect of the updated rate assumption on the valuation results.

5700 REPORTING

.01 *For work pursuant to this part, the actuary should prepare a report that*

states the calculation date and the prior calculation date,

identifies the legislation or other authority under which the work is completed,

describes any significant terms of the appropriate engagement that are material to the actuary's work, including the purpose of the work,

describes the sources of data, benefit provisions and policies used in the work, and any limitations thereon,

summarizes the data used for the valuation, the data tests conducted to assess the accuracy and completeness of the data used in the work, and issues regarding insufficient or unreliable data,

describes the plan's benefits, significant policies and relevant administration practices, including the identification of any amendments made since the prior calculation date, and the effect of such amendment on the benefits liabilities,

describes any pending definitive or virtually definitive amendment, policy change or change to administration practice, confirms whether or not such amendment or change has been reflected in the benefits liabilities, and identifies the effect of such amendment or change on the benefits liabilities,

identifies any significant changes to the relevant statute, strategic direction or management policy, or any significant appeal decision that changes management policy or practice, since the prior calculation date and the consequent effect on the benefits liabilities,

summarizes the benefits liabilities,

describes the method and the assumptions used to determine the benefits liabilities,

provides the rationale for each assumption that is material to the actuary's work,

states that there is no provision for adverse deviations, where that is the case,

describes the margins for adverse deviations included with respect to each assumption where that is the case, and discloses

any imposed margins that the actuary has used in accordance with paragraph 5450.03 that, in the opinion of the actuary, are outside of the appropriate range,

the rationale for each margin, and

the aggregate provision for adverse deviations included in the benefits liabilities,

describes changes to the assumptions or methods used since the prior calculation date, and the rationale for those changes,

describes the treatment of liabilities for self-insured employers,

discloses subsequent events of which the actuary is aware, whether or not the events are taken into account in the work, or, if there are no significant events of which the actuary is aware, include a statement to that effect,

describes and quantifies the gains and losses between the prior calculation date and the current calculation date, and provides an analysis and explanation of the significant gain and loss items, and

describes the treatment of the liabilities for occupational disease claims, and states either that the amount of the benefits liabilities includes an appropriate allowance for potential occupational disease claims that are expected to arise after the calculation date as a result of exposures in the workplace prior to the calculation date or, if such is the case for calculation dates preceding December 31, 2014, that the amount of the benefits liabilities excludes such an allowance.

.02 *Depending on the terms of the engagement, the report should*

describe the sources of information on the plan's assets,

describe the plan's assets, including their market value, the methods and assumptions used to value the assets and a summary of the assets by major category,

report the financial position at the calculation date, and

report the actuarial present value of any future assessments earmarked to amortize a current deficit or of any reductions in future assessments intended to reduce a current surplus.

.03 *If the report does not include the results of the sensitivity testing that was completed, the actuary should prepare a separate report for the management of the public personal injury compensation plan that does include such sensitivity testing results.*

.04 *The report should provide the following five statements of opinion, all in the same section of the report and in the following order*

a statement regarding data, which would usually be, "In my opinion, the data on which the valuation is based are sufficient and reliable for the purpose of the valuation.",

a statement regarding assumptions, which would usually be, "In my opinion, the assumptions are appropriate for the purpose of the valuation.",

a statement regarding methods, which would usually be, "In my opinion, the methods employed in the valuation are appropriate for the purpose of the valuation.",

a statement regarding appropriateness, which would usually be "In my opinion the amount of the benefits liabilities makes appropriate provision for all personal injury compensation obligations and the financial statements fairly present the results of the valuation.", and

a statement regarding conformation, which should be, "This report has been prepared, and my opinions given, in accordance with accepted actuarial practice in Canada." [Effective March 15, 2011]

.05 The report would be sufficiently detailed to enable another actuary to examine the reasonableness of the valuation.

.06 The circumstances of the work may result in a deviation from accepted actuarial practice in Canada. For example, the applicable legislation or the terms of the engagement may require that the actuary use a margin for adverse deviations that is outside the range that the actuary considers appropriate, or require that the actuary exclude the benefits liabilities in respect of certain occupational disease claims. In such case, the actuary would disclose such deviation in the report.

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