



Occupational  
Cancer  
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Centre

# EXAMINATION OF ACCEPTED WORKPLACE FATALITY CLAIMS WITHIN ONTARIO AND CANADA

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**Towards** a cancer-free workplace

## MAIN MESSAGES

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- ❖ The trends for accepted workplace fatality claims have changed in recent years for both Ontario and Canada whereby accepted occupational cancer fatality claims have now surpassed accepted traumatic injuries and disorders fatality claims.
- ❖ Within the past five years, accepted occupational cancer fatality claims accounted for the great majority of occupational disease claims in both Ontario and Canada.
- ❖ Within the past five years, those working in manufacturing, construction, and government services have had the highest number of accepted occupational cancer fatality claims for both Ontario and Canada.
  - Accepted mesothelioma and lung cancer fatality claims accounted for the majority of claims within the manufacturing and construction industries which were attributed predominately to asbestos exposure.
  - Historically, the mining industry was the third highest industry to receive compensation for occupational cancer fatality claims but in the last 5 years this industry has been replaced by the government services industry.
    - A variety of different occupational cancers accounted for accepted fatality claims in the government services industry. This was attributed to a change in legislation aimed at better compensation for firefighters (who are categorized as part of the “government services” industry).
- ❖ The actual number of occupational cancers is grossly under-represented by accepted claims statistics, meaning that only a small fraction of the underlying burden is represented.
- ❖ These findings have various implications, such as: workers not receiving the compensation that they are entitled to; displaced costs from the compensation board and respective employers who pay into these benefits to the public health system; and a misrepresentation of the real burden resulting in the lack of stimulus required to drive prevention efforts.
- ❖ Occupational cancers can be prevented by eliminating or minimizing the risk of exposure from group 1 carcinogens in workplaces, enforcing more stringent occupational exposure limits, increasing efforts towards toxic use reduction, protecting high-risk workers, and active engagement of workers, health practitioners, decision-makers, and stakeholders.

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# I. CONTEXT

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## Introduction

In 2006, Sharpe and Hardt (1) wrote a compelling report which brought to light the rising trend of workplace fatalities in Canada. One of the most interesting observations was that accepted occupational disease fatality claims had surpassed accepted traumatic injuries and disorders fatality claims. Even more intriguing was that the change in the distribution of these accepted claims was primarily the result of an increase in the number of deaths due to occupational cancer (1). In their report, Sharpe and Hardt (1) also emphasized the importance of asbestos exposure as it related to accepted occupational disease claims. Although Sharpe and Hardt (1) addressed other objectives and elucidated other interesting results, it was these specific results which prompted the creation of this report which was envisioned as an update to their findings, with a particular emphasis on occupational cancer.

There is a need to better understand accepted occupational disease claims, and more specifically accepted occupational cancer fatality trends and the exposures which are driving these trends. Christiani (2) reiterates this by noting that toxic exposures found in both the environment and within workplaces are underestimated, resulting in a missed opportunity for risk reduction.

By identifying workers who are at highest risk for occupational cancer, the types of occupational cancers most frequently compensated, and the source(s) of these fatalities, future research can focus explicitly on these areas. This can then inform policy so that changes can occur on a macro level. These findings have serious implications for workers, various decision-makers and stakeholders, as well as the public health insurance system.

## Review of the Literature

### Workplace Fatalities

Across Canada and within Ontario, workplace fatality claims are most common amongst older males (1, 3, 4). Workplace fatalities are generally divided into two major categories: (a) those attributed to traumatic injuries and disorders and (b) those attributed to occupational disease. The former accounts for acute fatal injuries such as burns and amputations, whereas the latter accounts for fatal diseases that may not necessarily result in immediate death, such as cancer. Cancer is known for its multi-factorial etiology and long latency period, and these characteristics pose serious challenges for those who succumb to an occupationally-induced cancer and who seek compensation.

## Workplace Fatalities in Canada

The Sharpe and Hardt report (1) showed that from 1996 until 2005, the greatest increase in accepted workplace fatality claims in **Canada** was seen amongst those dying of malignant neoplasms and tumors. This was consistent with the rising trend seen for asbestos exposure claims (1). Similarly, those in **occupations** that have seen a steady increase in accepted fatality claims (both the highest number of fatalities as well as the highest number of fatalities related to occupational disease) were those in the **trades, transport and equipment operators and related** occupational categories (1). Similar trends were also reported for those in the **manufacturing** and **construction industries** (1). A likely explanation for these increasing trends may be attributed to regular exposure to asbestos, especially since workers in the construction trade as well as automotive mechanics may have had regular contact with asbestos (1, 5, 6).

## Workplace Fatalities in Ontario

The Sharpe and Hardt report (1) showed that between 1996 and 2005 **Ontario** had the highest absolute number of accepted fatality claims, *but not the highest incidence rate*, compared with any other jurisdiction. This is not surprising given that Ontario also has the highest population. However, within this timeframe, the number of accepted fatality claims in Ontario increased steadily (1).

In examining trends for all accepted occupational cancer claims within Ontario (both time-loss and fatality), Pichora and Payne (4) observed a marked increase since 1997; wherein lung cancer, the most commonly compensated cancer since the late 1960's, was surpassed by mesothelioma. This trend continued for a number of years until the period of 1999 to 2003 when rates of accepted compensated claims for these two cancers become nearly equal (4). These trends parallel others seen for exposures, occupations, and industries within Ontario from 1990 to 2003 that are related to these cancers.

The increasing trend in accepted occupational cancer fatality claims likely reflects occupational exposure within the Ontario workplace as well as changes in adjudication policies driven by new evidence linking occupational exposures to cancer (4, 7). Other factors thought to be part of the reason for the increased number of accepted occupational cancer fatality claims over time are changes in the *awareness* of the eligibility criteria and/or the association between exposure to workplace carcinogens and occupational cancer (8).

## Workplace Fatalities and Asbestos

The International Agency for Research on Cancer (IARC) evaluates and classifies carcinogens according to different groupings. Group 1 classification denotes those agents which are carcinogenic to humans. Asbestos has been classified as a Group 1 carcinogen by IARC since well-established links to mesothelioma and lung cancer has been widely and consistently reported in the literature (9-11).

Since 1996, 70% of the increase in accepted workplace fatalities in Canada was the result of exposure to asbestos (1). Carex Canada estimates that the largest number of workers exposed to asbestos in Canada today is by far those from construction-related industries where approximately 88% of all

workers exposed to asbestos are from specialty trades and building construction (12). Although the widespread use of asbestos has substantially decreased over time and safety measures have been implemented, workers today are still at risk of asbestos exposure during renovations, maintenance and demolition of buildings (1, 13).

Pichora and Payne (4) reported that in Ontario from 1990 until 2003, **asbestos** was the source responsible for 63% of all compensated cancer claims. Closely related to this, occupations and industries where workers would be exposed to asbestos were also the ones listed as having the highest percentage of accepted claims associated with them. Two of the most common industries with steadily increasing compensated claims since the 1970's until 2003 have been those from the **manufacturing and construction industries** (4). The primary occupation most commonly compensated was the **construction trades** at 30%.

### **Under-reporting and Need for Surveillance**

Aronson et al., (14) note that in the past, advances in the understanding of occupational hazards have mainly been motivated by anecdotal reports of workers at extreme risk, but that many occupational hazards remain undetected because they are not the subject of systematic study. To this extent, Aronson et al., (14) highlighted the importance of occupational surveillance within Canada in order to systematically collect, evaluate, and disseminate data relating to: workplace exposures; occupational disease; and/or worker mortality. To this extent, Aronson et al., (14) conducted a study which brought to light unsuspected associations between workplace conditions and occupational cancer deaths in Canada.

Teschke et al., (6) also recognized the value in surveillance, particularly as it related to mesothelioma and unrecognized sources of asbestos exposures. In this vein, a number of studies have been conducted across several Canadian provinces (i.e. Ontario, Alberta, and British Columbia) highlighting the importance of the surveillance of mesothelioma and the subsequent reporting of results (4, 8, 15, 16).

## Objective

The main aim of this study is to examine patterns, trends, and distributions of accepted workplace fatality *claims* in **Ontario** compared with **Canada** as a whole, particularly as it relates to occupational cancer. To this extent, the following specific objectives are outlined:

### Specific Objectives:

1. To examine accepted workplace ***fatality*** claim trends.
  - a. To determine the percentage of accepted occupational disease fatality claims which are attributed to occupational cancer.
  - b. To compare the trends for accepted traumatic injuries and disorders fatality claims and accepted occupational cancer fatality claims.
2. To determine the industries which are associated with the highest compensated occupational cancer fatality claims.
3. To determine the commonly accepted occupational cancer fatality claims and their associated exposure.

These objectives are fulfilled in Section III of this report.

## II. METHODOLOGICAL APPROACH

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In order to fulfill the objectives of this study, *accepted fatality claims* data supplied by the Association of Workers' Compensation Boards of Canada (AWCBC)<sup>1</sup> was utilized. All data supplied by the AWCBC is provided by the various workplace safety and insurance boards for each of the provinces/ jurisdictions. The main data source for this report was specialized data requests for accepted fatality claims<sup>2</sup> by *nature*<sup>3</sup>, *source*<sup>4</sup>, and *industry*<sup>4</sup> of injury/disease by jurisdiction for the years 1997 until 2010 (18).

The classifications used to distinguish between traumatic injuries and disorders and occupational diseases throughout this report is consistent with those used by Sharpe and Hardt (1). More specifically, traumatic injuries and disorders consisted of "nature of injury" codes 00-09 as defined by the AWCBC. Occupational diseases were comprised of "nature of injury" codes 10-80. There are also fatalities that have been coded as unknown or not coded – these were accounted for in the total count for nature of injury data (i.e. the total number of fatalities), but were not included as either traumatic injuries and disorders or occupational diseases. Although traumatic injuries and disorders are not made up of a series of subcategories, occupational diseases are. The subcategories which make up occupational diseases include: i) systemic diseases and disorders; ii) infectious and parasitic diseases; iii) neoplasms, tumors, and cancer; iv) symptoms, signs, and ill-defined conditions; and v) multiple diseases, conditions, or disorders. All findings pertaining to accepted occupational cancer fatality claims discussed throughout this report are in reference to AWCBC's nature of injury code 3 (category: neoplasms, tumors, and cancer).

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<sup>1</sup> Any interpretations made from the data provided by the AWCBC are those of the authors and do not necessarily reflect the views of the AWCBC or any of its member Boards or Commissions.

<sup>2</sup> The National Work Injury Statistics Program (NWISP) which is published on an annual basis (covering a three-year interval) also provides some of the more general data provided in this report. The NWISP provides data on both accepted time-loss and fatality claims within Canada. Accepted time-loss claims were not explored as it fell beyond the scope of this study.

<sup>3</sup> **Nature of injury/disease** – "The principle characteristics of an injury/disease" (e.g. neoplasms, tumors, and cancer) (17p.3).

<sup>4</sup> **Source of injury/disease** – "The object, substance, exposure, or bodily motion that directly inflicted the injury/disease" (17p.3).

<sup>4</sup> **Industry** – Boards classify businesses according to their industrial activity for administrative purposes using the Standard Industrial Classification, 1980, Statistics Canada (Catalogue 12-501).

## Data Limitations

There are several data limitations which must be considered relative to the data provided, which may have implications on the interpretation of the data. The majority of these limitations have been outlined in AWCBC's information sheets (17, 19-21) and have informed the following list:

- The data reported for a certain year does not necessarily represent the year in which the fatality actually took place, rather, it represents the year in which the claim was accepted. There may also be variations in processing times, this means that the number of accepted claims reported in any given year will ultimately be affected.
- The data available for each of the jurisdictions does not necessarily capture the entire workforce for any given year. Hence, there is yearly variation in the percentage of the workforce covered, for each of the jurisdictions. For instance, in Ontario approximately 73% of the workforce for the 2009 year was represented in the AWCBC data, compared with Quebec which represented approximately 93% of the workforce for the same year (20). Self-employed workers, small businesses, military personnel, and others who are not covered by workers compensation are also not represented in these claims.
- There are differences in the number of accepted fatality claims by each province due to wide variations in policies and legislation.
- Some jurisdictions may appear to have higher accepted fatality claim rates for certain occupations and industries. This should be interpreted with caution as certain jurisdictions may simply have a higher prevalence of specific occupations and industries.
- Since codes are refined and changed over time, making direct yearly comparisons may not necessarily provide a true representation of accepted fatality claims for certain injuries or diseases and their specific subcategories. For instance, up until 1996 *nature of injury/disease* was coded based on the Canadian Work Injury Standard (CWIS). For the year 1997 onwards, data was coded based on the Canadian Statistics Association (CSA-Z795) in order to provide a greater level of detail. As such, accepted fatality claims data beginning in the year 1997 was examined in this report.
- Although not all jurisdictions use the same coding schema, all data provided by the AWCBC is converted such that jurisdictional comparisons can be made. When AWCBC data is compared with data provided directly from any given jurisdiction, discrepancies may occur. For instance, in Ontario, claims are coded based on three categories: time-loss; fatalities; and no-time loss. However, AWCBC data categorizes claims only based on two groupings: time-loss; and fatalities.
- Exposure to asbestos and erionite are recognized causes of mesothelioma. However, exposure to erionite is far more common in countries such as Turkey. Given that asbestos exposure is the most commonly recognized cause of mesothelioma in Canada, yet not all mesotheliomas were coded as being attributed to asbestos, it is hypothesized that errors in coding have occurred over the years.

## Implications of Data Limitations on Interpretation

These limitations are noteworthy because they highlight that the number of accepted fatality claims do not necessarily provide a true reflection of the actual number of workplace fatalities amongst all workers.

It has been suggested that accepted fatality claims represent only a small fraction of the actual number of work-related cancers, and as such, they are grossly under-estimated (22, 23). There have been a number of studies which have attempted to assess the true burden of workplace cancer (22, 24). In fact, it has been noted that only 10% of claims for occupational cancer are compensated in **Canada** (3).

This is thought to be primarily the result of under-reporting (8, 15, 16), and especially for mesothelioma, not filing a claim (16) rather than the actual rejection of claims. Mesothelioma is easy to identify as a work-related cancer caused by asbestos exposure in the workplace, yet the filing rate is still quite low. In fact, a recent **Ontario** based study examining the filing rate for mesothelioma patients found a filing rate of 35% amongst this group between 1980 and 2002, and a 43% filing rate as of 2000 (8).

Nevertheless, the examination of accepted workplace fatality claims is still worthwhile to investigate since it provides some insight to noteworthy trends, groups of workers at high risk, and the possible relationships between compensated fatalities and source of exposure.

### III. RESULTS AND DISCUSSION

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This section explores the specific objectives of this study. Results are presented such that Canada is explored first, followed by findings for Ontario. Objective 1 explores the trends for accepted workplace fatality claim trends in Canada compared with Ontario. Objective 1a explores what percentage of accepted occupational disease fatality claims are attributed to occupational cancer. Objective 1b then explores how accepted occupational cancer fatality claim trends compare with accepted fatal traumatic injuries and disorders claim trends.

Objective 2 is divided into 3 parts, again first exploring findings for Canada and then comparing those results to Ontario. Part I explores the highest industries that have received compensation for *any workplace fatality*. Following from this, part II examines the highest industries that have received compensation *for occupational cancer fatalities*. Part III then examines the top three industries with the highest compensated occupational cancer fatality claims in the last 5 years.

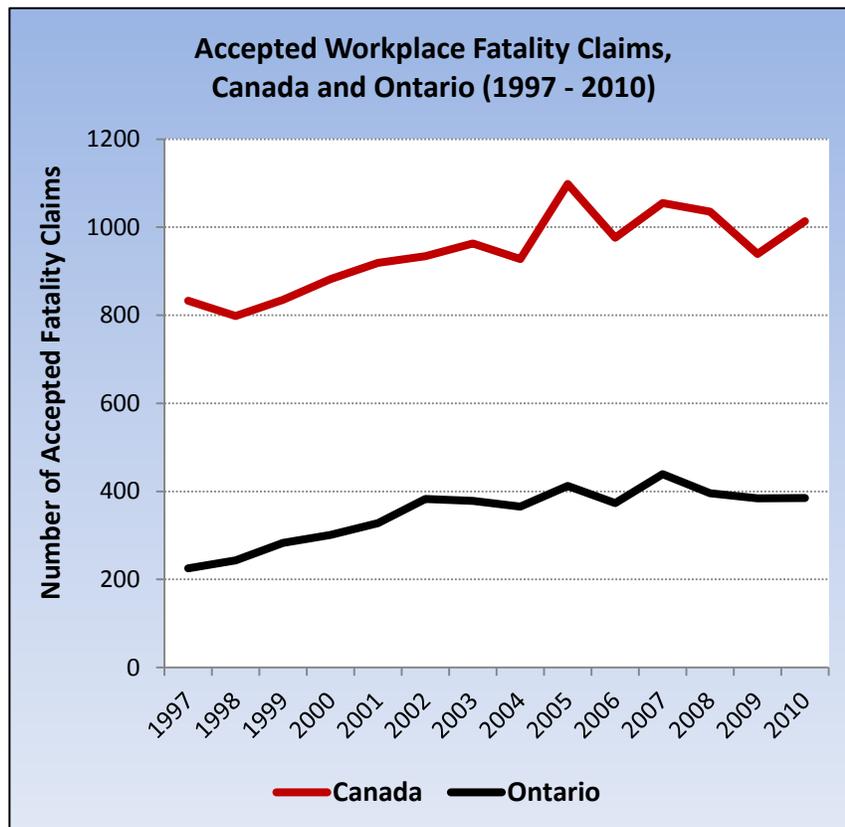
Objective 3 is comprised of 2 parts. Results for Canada are explored first, and those for Ontario follow. Part I explores the trends for compensated mesothelioma and lung cancer fatality claims over time. Part II focuses specifically on asbestos-related cancer, namely mesothelioma and lung cancer.

## **OBJECTIVE 1: Workplace Fatality Trends in Canada compared with Ontario**

At the beginning of the period, in 1997, there were 833 accepted fatality claims in Canada and 225 accepted fatality claims in Ontario. By 2010, the number of accepted fatality claims increased to 1,014 for Canada and 385 for Ontario. Based on the formula used by Sharpe and Hardt (1) this amounted to approximately four deaths a day in Canada and approximately two deaths a day in Ontario<sup>5</sup>.

Over time, a similar increasing trend can be seen for both Ontario and Canada, however the percentage change from 1997 until 2010 was higher for Ontario than it was for Canada. More specifically, the number of accepted workplace fatality claims increased from 1997 until 2010 by 71% for Ontario whereas a 22% increase was seen for the same time period in Canada. In examining the number of accepted workplace fatality claims from 1997 until 2010 (Graph 1), the number of accepted fatality claims reached its peak in 2005 for Canada at 1098, whereas the highest number of accepted fatality claims in Ontario was reported in 2007 at 439.

**GRAPH 1**



<sup>5</sup> This calculation was derived in a similar manner as calculated by Sharpe and Hardt (1). The AWCBC reported 1014 accepted fatality claims in Canada for the year 2010 and 385 accepted fatality claims in Ontario, which was divided by 230 work days per year (365 days per year with 104 weekend days, 10 statutory holidays and 20 vacation, sick, and personal days; also see Isgut, Bialas and Milway, (25:Chart 4) as noted by Sharpe and Hardt (1)).

## **A Closer Examination of the Most Commonly Accepted Fatalities**

### **CANADA**

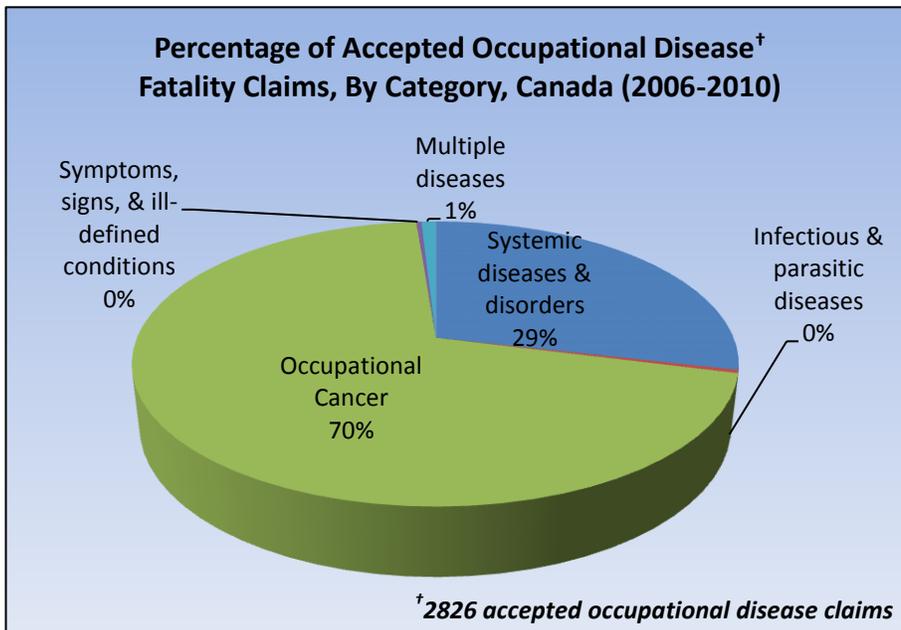
Accepted occupational disease fatality claims have been on the rise, surpassing traumatic injuries and disorders since 2003. Since then, this gap has continued to widen. There has been an approximately 12% decrease in the number of accepted traumatic injuries and disorder fatality claims from 1997 until 2010. Within the same period there has been a 97% increase in the number of accepted occupational disease fatality claims and a 332% increase in the number of accepted occupational cancer fatality claims.

### **OBJECTIVE 1 A. Occupational Disease and Occupational Cancer in Canada**

In the past, the most commonly accepted occupational disease fatality claims were systemic diseases and disorders which made up as many as 59% of accepted occupational disease fatality claims in 1997 compared with approximately 32% of occupational cancer fatality claims that same year. By 1999, accepted occupational cancer fatality claims surpassed systemic disease and disorders fatality claims whereby 53% of accepted occupational disease fatality claims were attributed to occupational cancer and approximately 42% were attributed to systemic diseases and disorders.

From 1997 until 2010, the number of accepted occupational cancer fatality claims has been increasing steadily. The latest 2010 data reveals that accepted occupational cancer fatality claims now comprise 71% of accepted occupational disease fatality claims or approximately 44% of all accepted fatality claims, in Canada. Systemic diseases and disorders now account for 28% of accepted occupational disease fatality claims.

### **GRAPH 2**



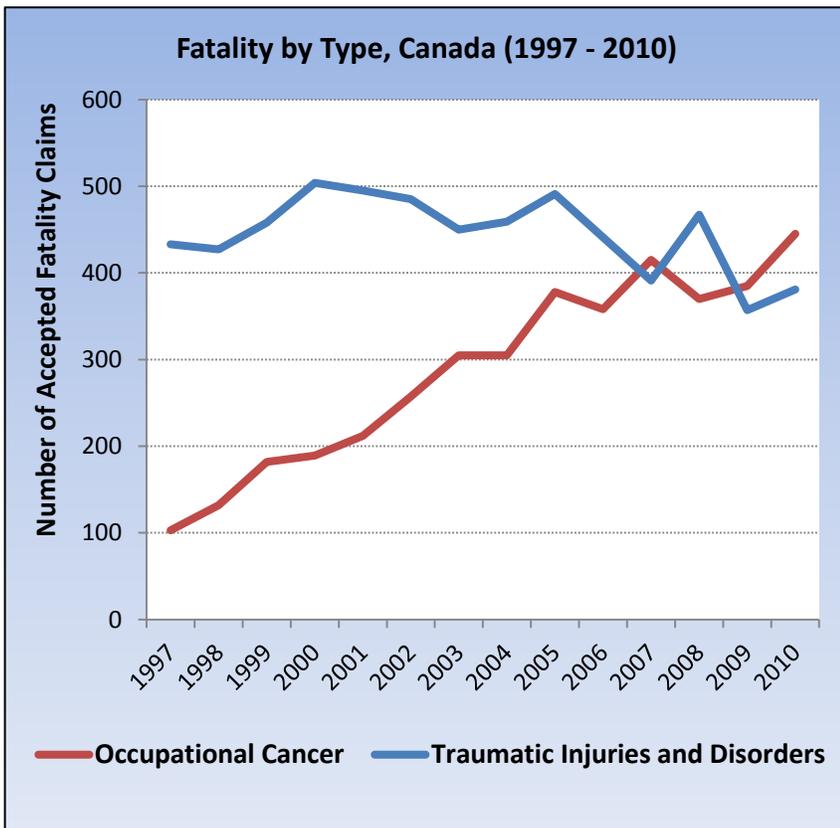
Occupational cancer has continued to be the most commonly accepted occupational disease fatality claim. In the last five years, between 2006 and 2010, accepted occupational cancer fatality claims were the highest of all compensated occupational disease fatality claims, making up approximately 70%, as shown in Graph 2.

## **OBJECTIVE 1 B. Traumatic Injuries and Disorders vs. Occupational Cancer in Canada**

There has been a marked change in the types of accepted fatality claims over the years. In 1997, traumatic injuries and disorders accounted for approximately 52% of all workplace fatality claims, compared with approximately 38% in 2010. In contrast, accepted occupational cancer fatality claims accounted for approximately 12% of all accepted workplace fatality claims in 1997, compared with approximately 43% in 2010. Overall, from 1997 to 2010 there has been an increasing trend in accepted occupational cancer fatality claims for Canada.

The change in this trend has been seen in three points in time, as depicted in Graph 3. In 2007, the number of accepted occupational cancer fatality claims, documented at 415 accepted claims, surpassed traumatic injuries and disorders fatalities reported at 391 accepted claims. In 2008, accepted traumatic injuries and disorders fatalities exceeded the number of occupational cancer fatality claims but in both 2009 and 2010, accepted occupational cancer fatality claims surpassed the number of traumatic injury and disorder claims, depicting a possible reversal in trends.

**GRAPH 3**



When comparing the trends of accepted fatalities for traumatic injuries and disorders claims with those of occupational cancer over the years, the highest number of fatality claims for traumatic injuries and disorders occurred in 2000 at 504, and for occupational cancer, 445 deaths occurred in 2010. Overall, the number of fatalities due to traumatic injuries and disorders has generally remained between 400 and 500 deaths per year with peaks close to 500 deaths in 2000, 2001, and 2005. On the other hand, the number of compensated occupational cancer fatality claims has been increasing steadily from 103 in 1997 to 212 in 2001 to 378 in 2005.

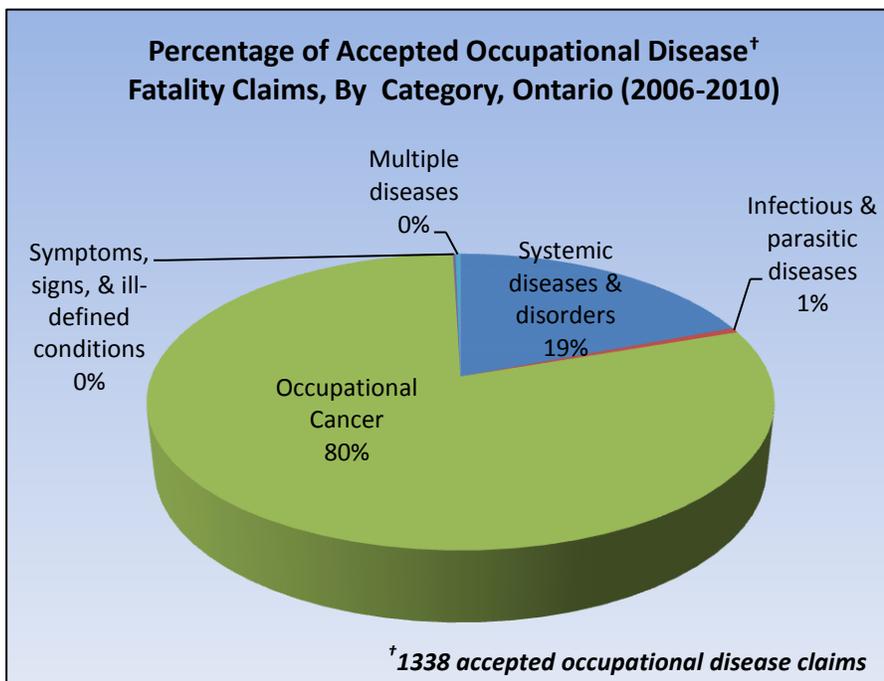
## **ONTARIO**

In Ontario, accepted occupational disease fatality claims surpassed accepted traumatic injuries and disorders fatality claims in 2001; earlier than evidenced for Canada as a whole (recall, this was seen in 2003). Moreover, just as was seen for Canada, the gap has continued to widen in recent years, especially between 2005 and 2010. From 1997 until 2010, Ontario has seen an approximately 22% decrease in the number of accepted traumatic injuries and disorders fatality claims and a rise of approximately 169% of accepted occupational disease fatality claims, as well as a 264% increase in the number of accepted occupational cancer fatality claims.

### **OBJECTIVE 1 A. Occupational Disease and Occupational Cancer in Ontario**

Unlike what was seen for Canada, in examining the period between 1997 and 2010 for Ontario, occupational cancer has always been the predominantly accepted occupational disease fatality claim. The percentage of accepted occupational disease fatality claims that have been attributed to occupational cancer has nevertheless also risen over the years.

#### **GRAPH 4**



In 1997, occupational cancer comprised approximately 61% of all accepted occupational disease fatality claims. This trend has continued to rise steadily whereby 2010 figures revealed that occupational cancer claims accounted for approximately 82% of all accepted occupational disease fatality claims in Ontario. In the last five years, between 2006 and 2010, accepted occupational cancer claims were the highest compensated occupational disease fatality claims, making up approximately 80%, as depicted in Graph 4.

## **OBJECTIVE 1 B. Traumatic Injuries and Disorders vs. Occupational Cancer in Ontario**

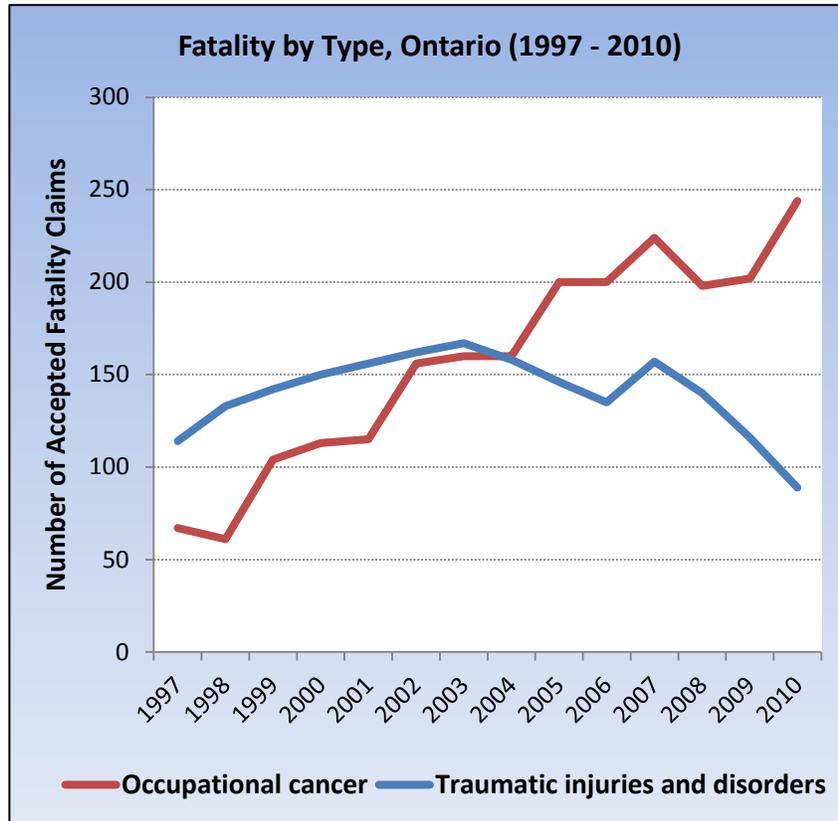
The predominant accepted fatality claim that is compensated in Ontario has changed in recent years. Historically, traumatic injuries and disorders were the most widely accepted fatality claim. In 1997, traumatic injuries and disorders comprised approximately 51% of all accepted workplace fatality claims and occupational cancer accounted for approximately 30%. As of 2010, traumatic injuries and disorders accounted for approximately 23% of all accepted workplace fatality claims whereas occupational cancers accounted for approximately 63%.

The change in this trend was seen in 2004, when accepted occupational cancer fatality claims surpassed the number of accepted traumatic injuries and disorder fatality claims from 160 in 2004 to 244 in 2010. In comparison, the number of accepted traumatic injuries and disorders fatality claims has decreased from 158 in 2004 to its lowest number of accepted fatal claims in this thirteen year period at 89 in 2010. This all-time low could in part be attributed to the fact that pre-1990 100% permanent disability pensions fatality claims were no longer taken into account. In the past, fatality claims data for Ontario provided to the AWCBC from the Workplace Safety and Insurance Board of Ontario (WSIB) included pre-1990 100% permanent disability pensions. The great majority of these claims were classified as traumatic injuries and disorders, potentially inflating the number of these accepted claims over the years. In previous years, pre-1990 100% permanent disability pensions accounted for as much as 30% of the total number of compensated fatality claims in Ontario as was the case in 1997 (26). Over the years, this percentage has declined (26, 27). In 2010, these data were excluded from the number of compensated fatality claims provided to the AWCBC. Even though compensated fatality claims attributed to pre-1990 100% permanent disability pensions made up 11% of all compensated claims in 2010 (27), this may in part explain the lower number of accepted fatal traumatic injuries and disorders claims for 2010.

Given the increasing trend in accepted occupational cancer fatality claims, and the decreasing trend for accepted traumatic injuries and disorders fatality claims (as depicted in Graph 5), there is an indication that future trends for Canada may have begun to mimic those seen for Ontario. However, as demonstrated in graph 3, the changing trends for Canada are not as drastic.

The highest number of accepted fatality claims for traumatic injuries and disorders occurred in 2003 at 167. In comparison, the highest number of accepted occupational cancer fatality claims occurred in 2010 at 244 deaths. Overall, the number of compensated fatality claims due to traumatic injuries and disorders has remained between about 100 to 160 deaths with a decline in recent years (2009 and 2010). On the contrary, the number of compensated occupational cancer fatality claims has increased steadily over the years.

**GRAPH 5**



There are some factors which can possibly explain the trends depicted in Graph 5. For accepted occupational cancer fatality claims within Ontario, it is hypothesized that when increased awareness and media attention occurs within specific workplaces, an increase in the number of claims submitted and compensated can be observed as a result, especially if there is involvement from other stakeholders to help drive these efforts forward. This was seen to be the case for former Holmes Foundry employees and their families in Sarnia, Ontario many of whom applied for and received compensation for occupational cancers up to several decades after diagnosis and/or death. These occupational cancers would have otherwise gone unrecognized and may not have ever been filed for compensation (28).

For accepted traumatic injury and disorder fatality claims some hypotheses have been put forward to explain the observed decreasing trend which has also been seen for time-loss claims may be relevant. For instance, some factors which may be at play include: changes in workforce demographic composition; sectoral shifts in the distribution of employment; de-industrialization; business cycle effects; structural changes within industries; changes in government regulatory practices; improvement in safety management; and increased prevention efforts and strategies (29-32).

## **OBJECTIVE 2: Industries with highest accepted Fatality Claims in Canada compared with Ontario**

### **CANADA**

#### **Part I: Industries with the Highest Accepted Workplace Fatality Claims in Canada**

Within Canada, the top three industries that had the highest number of **all accepted fatalities** from 1997 until 2005 were (1) manufacturing; (2) construction; and (3) transportation and storage, respectively. In examining the industries with the highest number of all accepted fatality claims in Canada for the last five years (2006-2010), it was found that although these industries were still the most predominant, the highest number of accepted fatalities claims were found amongst those in the **construction industry** at 1,123 accepted fatality claims, followed by the manufacturing and transportation and storage industries at 1,089 and 578 accepted fatality claims respectively. The ranking of these industries for the 2006-2010 period still held true for the most recent 2010 figures.

#### **Part II: Industries with the Highest Accepted Occupational Cancer Fatality Claims in Canada**

Overall, the percent of accepted industry-related fatality claims pertaining to occupational cancer has increased steadily over the years. In 1997, approximately 12% of accepted industry-related fatality claims were the result of occupational cancer. By 2010, approximately 44% of all accepted industry-related fatalities were the result of occupational cancer.

A closer examination of the 1997-2010 period, specifically as it relates to accepted occupational cancer claims revealed that from 1997 until 2003, the three industries with the highest accepted occupational cancer fatality claims were predominantly from the (1) manufacturing, (2) construction, and (3) mining, quarrying and oil wells industries (with the exception of the number of compensated claims provided for 2001). In 2001, government services exceeded the number of accepted claims from the mining, quarrying and oil wells industry, but only by one case.

From 2004 until 2010, the trend for the top third industry with the highest accepted occupational cancer fatality claims changed from mining, quarrying and oil wells to government services, with the exception of the 2005 year when the former industry prevailed. Manufacturing and construction industries continued to be the two leading industries with accepted occupational cancer fatality claims. Since 2006, government services has seen a steady increase in accepted occupational cancer fatality claims from 48 cases in 2006 to 78 cases in 2010.

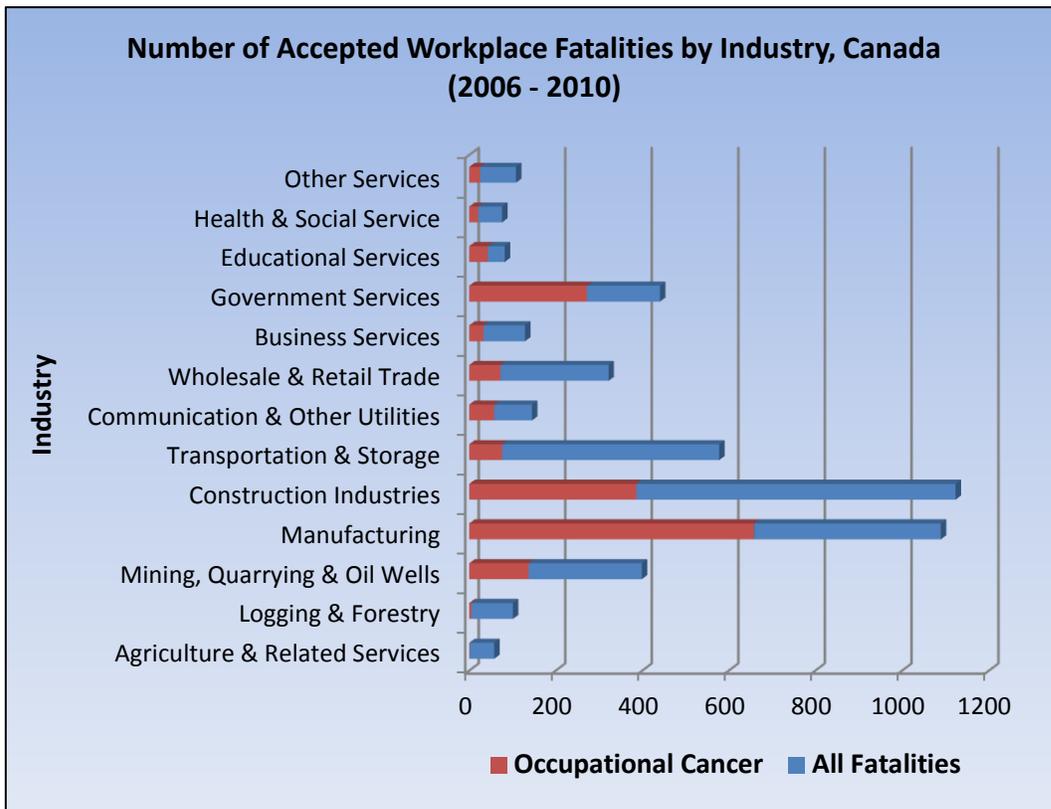
Graph 6 depicts the number of accepted occupational cancer fatality claims by industry<sup>6</sup> within the **last five years**. The total number of compensated occupational cancer fatality claims within the last five

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<sup>6</sup> Industries categorized as unspecified/undefined and not coded have not been included. Also, accepted fatalities either as a result of traumatic injuries and disorders or occupational cancer with counts less than 40 are not displayed; this includes: i) fishing and trapping; ii) finance and insurance; iii) real estate operator and insurance agent; and iv) accommodation, food and beverage services. The industry categories “wholesale” and “retail” trade have been combined.

years in the top three industries was 658 claims within the manufacturing industry, 386 claims within the construction industry, and 272 claims within government services.

**GRAPH 6**



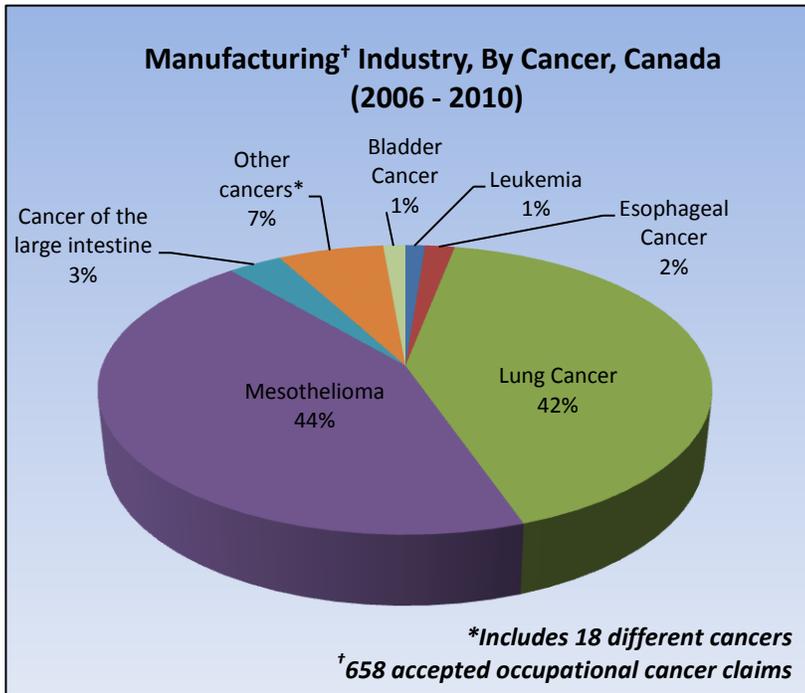
Both construction and manufacturing industries have a history of heavy asbestos use, which is thought to be the explanation for the high rates reported. The increase in accepted occupational cancer fatality claims in government services is thought to be attributed mainly to the introduction of new legislation in Ontario.

In 2007, Bill 221 was amended to provide better compensation to full-time firefighters in Ontario (33). In 2009, this Bill was expanded to include volunteer and part-time firefighters and fire investigators (21, 34). This is important because firefighters are captured under the “government services” industry. Prior to the amendment in legislation in 2006, Ontario made up approximately 46% of accepted occupational cancer fatality claims within government services for all of Canada. In 2007, after this legislation came into effect, approximately 68% of accepted occupational cancer fatality claims within this industry from Canada were compensated in Ontario. By 2010, 73% of accepted occupational cancer fatality claims reported for Canada were from Ontario. Similarly, in examining the past five years, consistently, well over half of accepted occupational cancer fatality claims within the manufacturing and construction industries were comprised of accepted occupational cancer fatality claims from Ontario.

**Part III:**

**Top 3 Industries with the Highest Compensated Occupational Cancer Fatality Claims in Canada in the last 5 years**

**GRAPH 7**



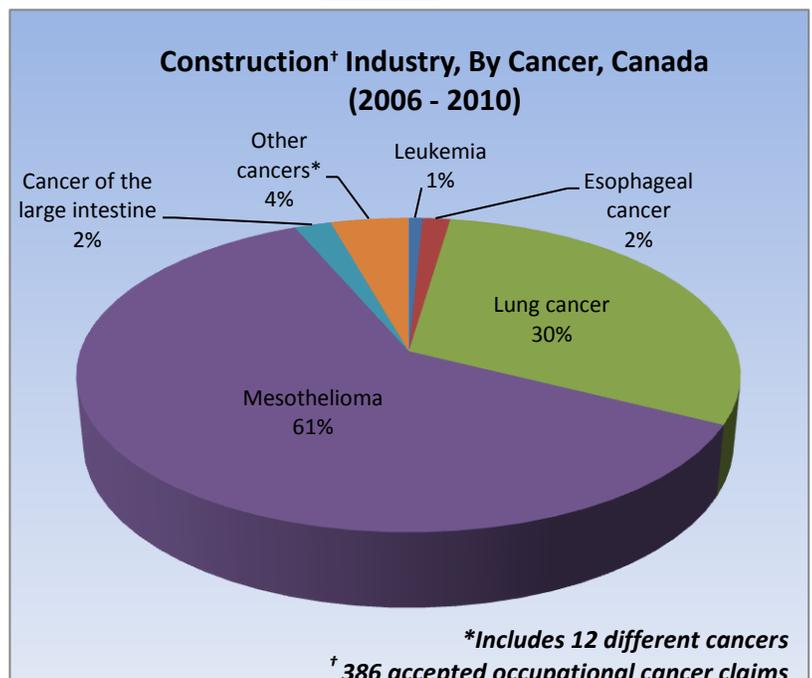
As depicted in Graph 7, within the manufacturing industry for the whole of Canada over the last five years (2006-2010), 86% of accepted occupational cancer fatality claims were also attributed to mesothelioma and lung cancer (combined). The remaining 14% of accepted occupational cancer fatalities were comprised of twenty-two different cancers.

The percentage of accepted mesothelioma and lung cancer fatality claims from Canada within the last five years that were the result of accepted fatality claims from Ontario within the manufacturing industry were 54% and 80% respectively.

Similarly, as shown in Graph 8, between 2006 and 2010, 91% of compensated occupational cancer fatality claims within the construction industry for Canada, were the result of mesothelioma and lung cancer (combined). The remaining 9% of accepted occupational cancer fatality claims were comprised of the fifteen different cancers.

In examining which province accounted for the majority of these claims, the predominately compensated fatality claims within the construction industry in the last five years accounting for approximately 53% of accepted mesothelioma fatality claims and 74% of accepted lung cancer claims were from Ontario.

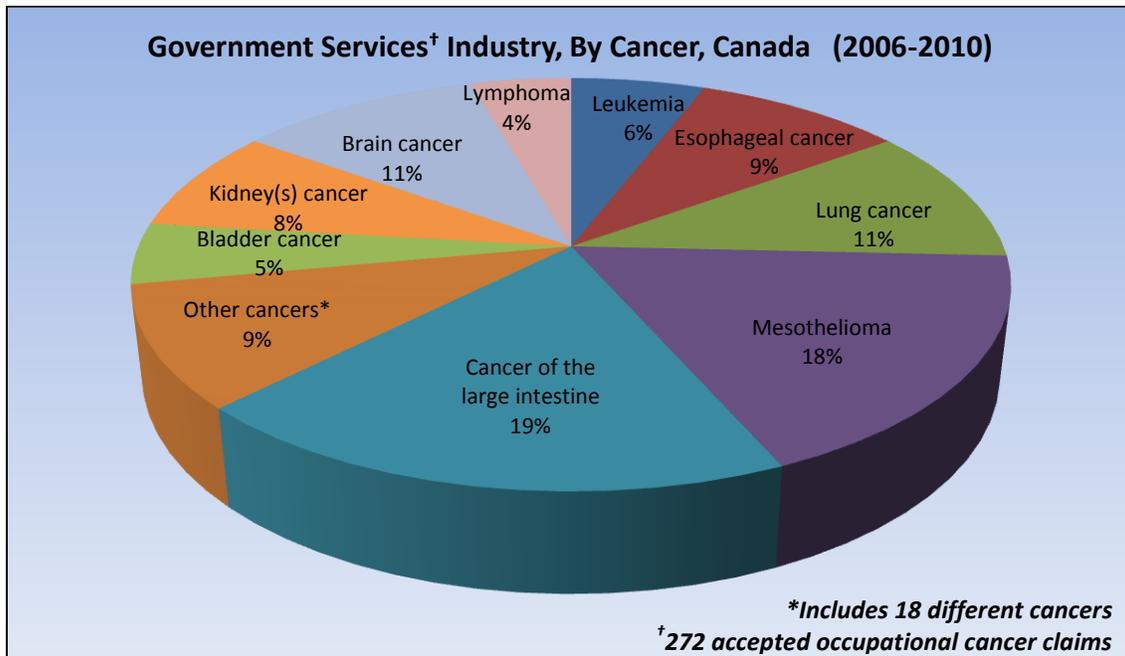
**GRAPH 8**



The patterns of compensated occupational cancer fatality claims were very different for the government services industry. As depicted in Graph 9, 29% of all accepted occupational cancer fatality claims were the result of mesothelioma and lung cancer combined – a notable difference in distribution when compared with the construction and manufacturing industries.

In fact, cancer of the large intestine<sup>7</sup> was the most compensated occupational cancer fatality claim within the government services industry, at 19%. The remaining 52% of compensated occupational cancer fatalities were made up of twenty-four other cancers as demonstrated in Graph 9.

**GRAPH 9**



<sup>7</sup> For all Graphs, cancer of the large intestine includes: the colon, rectum, rectosigmoid junction, and anal canal.

## **ONTARIO**

### **Part I: Industries with the Highest Accepted Workplace Fatality Claims in Ontario**

For the years 1997 until 2005, the industries with the highest accepted ***fatalities overall*** were in (1) manufacturing; (2) construction; and (3) transportation and storage. For the 2006-2010 period, the top three industries were slightly different whereby (1) manufacturing; (2) construction; and (3) government services were consistently ranked the first, second, and third top industries with the highest number of overall accepted workplace fatality claims at 629, 462, and 220 respectively. This ranking also held true for the most recent 2010 Ontario figures. The change in trends from transportation and storage to government services occurred in 2006 and has carried through to present year statistics.

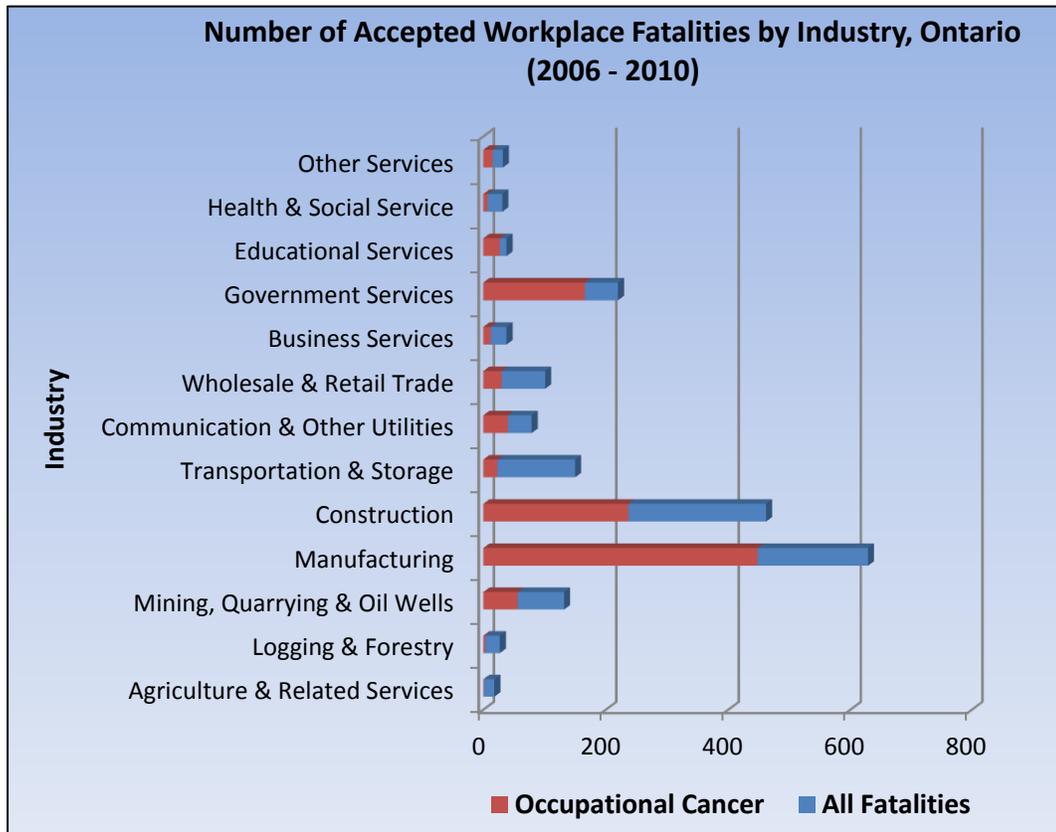
### **Part II: Industries with the Highest Accepted Occupational Cancer Fatality Claims in Ontario**

Across all industries, the percent of accepted occupational cancer fatality claims has increased steadily over the years. In 1997, approximately 30% of accepted industry-related fatality claims were the result of occupational cancer. By 2010, approximately 63% of all accepted industry-related fatalities were the result of occupational cancer.

From 1997 until 2010, the industries with the highest number of compensated occupational cancer fatality claims overall have been (1) manufacturing; (2) construction; and (3) government services. From 1997 until 2010, the industry with the highest number of accepted occupational cancer fatality claims has consistently been manufacturing. In earlier years, higher numbers of occupational cancer fatality claims were also found in the mining, quarrying and oil wells industry, just as was seen for Canada. More specifically, from 1997 until 2000, as well as in the years 2002, 2003, and 2005 this industry ranked amongst the second or third highest industry which compensated occupational cancer fatality claims. In 2006, this trend changed whereby government services ranked as the top third industry with accepted occupational cancer fatality claims; this trend continued until 2009. In 2010, government services outranked the construction industry, accepting ten more occupational cancer fatality claims, making it the second highest industry with compensated occupational cancer claims.

Graph 10 depicts the number of compensated occupational cancer fatality claims by industry<sup>8</sup> within the *last five years*. The top three industries with the highest number of compensated occupational cancer fatalities were: 448 claims within the manufacturing industry; 237 claims within the construction industry; and 166 claims within government services. As noted previously, the vast majority of compensated occupational cancer fatality claims came from Ontario, with the top three industries being attributed to asbestos exposure. A change in legislation in recent years has led to an increase in the number of compensated claims amongst firefighters (who are categorized under the “government services” industry).

**GRAPH 10**



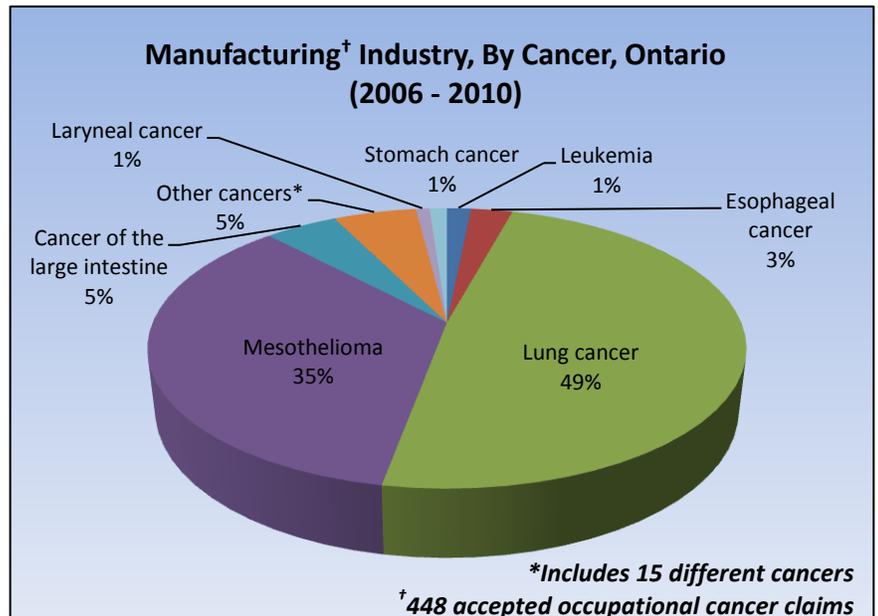
<sup>8</sup> Industries categorized as unspecified/undefined and not coded have not been included. Also, accepted fatalities either as a result of traumatic injuries and disorders or occupational cancer with counts less than 11 are not displayed; this includes: i) fishing and trapping; ii) finance and insurance; iii) real estate operator and insurance agent; and iv) accommodation, food and beverage services. Also, industry categories for wholesale and retail trade have been combined.

**Part III:**

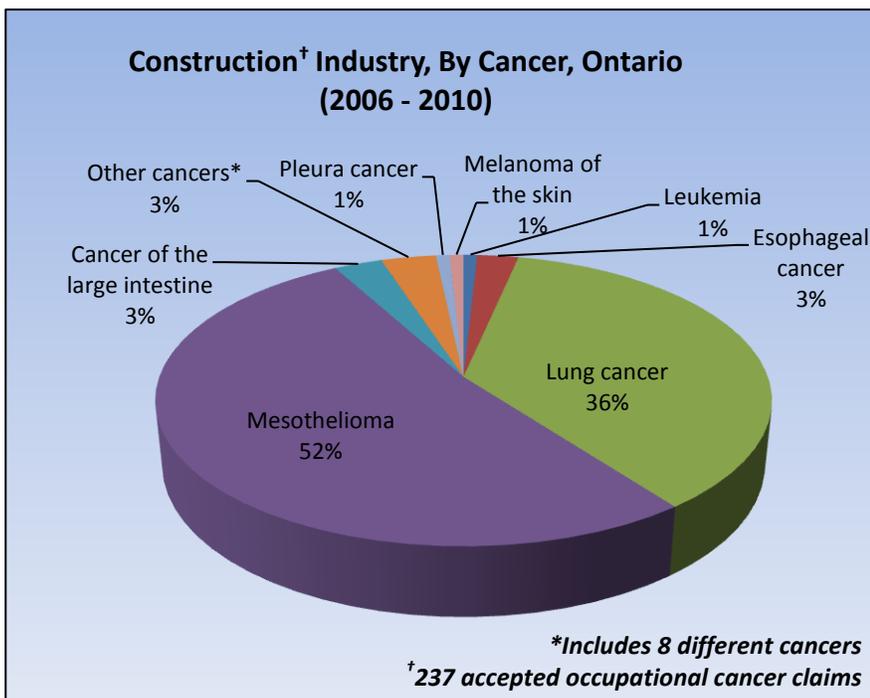
**Top 3 Industries with the Highest Compensated Occupational Cancer Fatality Claims in Ontario in the last 5 years**

**GRAPH 11**

As depicted in Graph 11, in the manufacturing industry, 84% of 448 compensated occupational cancer fatality claims within the last five years in Ontario were attributed to mesothelioma and lung cancer (where the former made up 35% and the latter made up 49%). The remaining 16% of compensated occupational cancer fatality claims were the result of twenty different cancers.



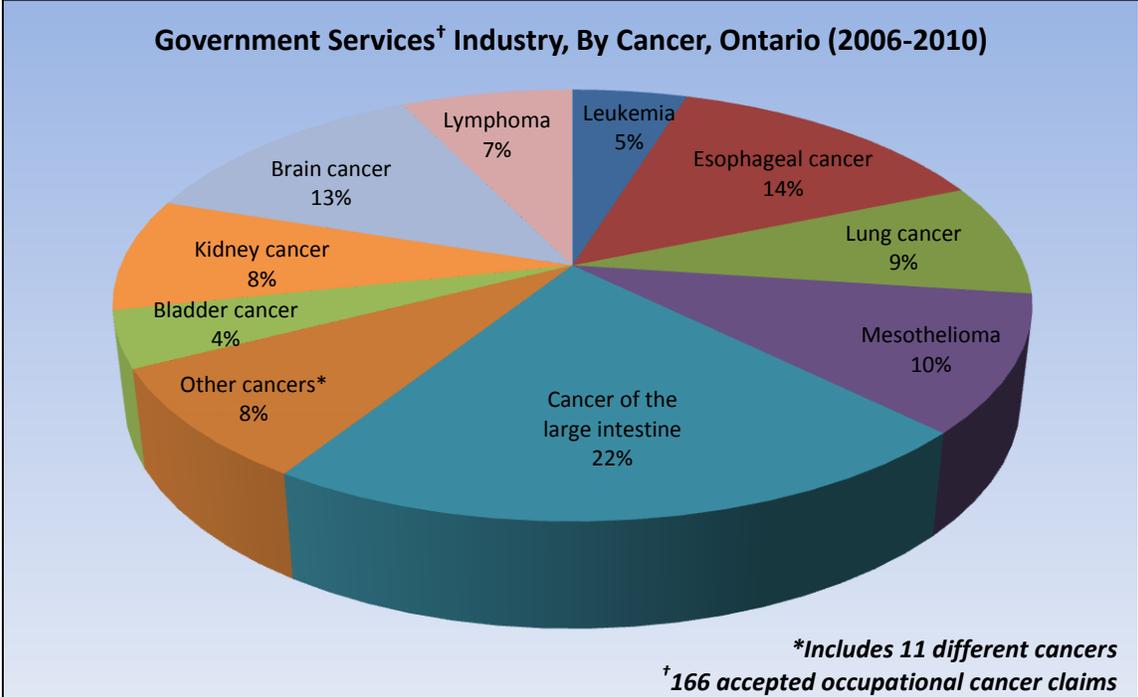
**GRAPH 12**



In Ontario, an examination of the construction industry revealed that the vast majority of accepted occupational cancer fatality claims were also attributed to mesothelioma and lung cancer, just as was seen for the manufacturing industry. These two cancers accounted for 88% of all compensated occupational cancer fatality claims (52% were attributed to mesothelioma claims and 36% were the result of lung cancer), as shown in Graph 12. The remaining 12% of compensated occupational cancer fatality claims were divided amongst thirteen cancers.

As was seen for the government services industry for Canada as a whole, cancer of the large intestine was the highest compensated occupational cancer fatality claim at 22%, as depicted in Graph 13. In Ontario, mesothelioma and lung cancer claims made up an even smaller percentage than what was seen for Canada, at 19% combined. The remaining 59% of compensated occupational cancer fatality claims were attributed to a combination of seventeen other cancers, as shown in graph 13.

**GRAPH 13**



### **OBJECTIVE 3: Occupational Cancers and Specific Exposures**

Based on the findings presented for objective 2, it appears that accepted mesothelioma and lung cancer fatality claims, at least for the top two industries in the last five years (manufacturing and construction industries) for both Canada and Ontario made up the vast majority of accepted occupational cancer fatality claims. As such, it is worthwhile to examine the trends of these two predominantly compensated occupational cancers relative to specific exposures. However, prior to further examining the role of asbestos for these cancers, it is worthwhile to first examine the trends of compensated fatality claims for both mesothelioma and lung cancer in relation to overall occupational cancer fatality claims.

#### **CANADA**

##### **Part I: Compensated Mesothelioma and Lung Cancer Fatality Claims Over Time In Canada**

From 1997 until 2010, an overall increasing trend is seen for both compensated mesothelioma and lung cancer fatality claims. Within this time period there has been a 216% increase in the number of compensated mesothelioma fatality claims and a 575% increase in the number of accepted lung cancer fatality claims. Over the years, mesothelioma and lung cancer combined have made up anywhere from approximately 76% of compensated cancer fatality claims, as in 2000, to approximately 87%, as in 2009. Compared against each other, from 1997 to 2010 inclusive, fatalities resulting from mesothelioma have consistently shown to be compensated more than lung cancer.

In examining compensated mesothelioma and lung cancer claims from 1997 to 2010, the highest number of accepted fatality claims for mesothelioma occurred in 2010 at 212 deaths. The highest number of accepted lung cancer fatality claims occurred in 2009 at 146 deaths. On the contrary, the lowest number of accepted fatality claims for these cancers were 67 deaths for mesothelioma in 1997 and 12 deaths for lung cancer in 1998.

##### **Part II: Asbestos-Related Cancer: Special Focus on Mesothelioma and Lung Cancer In Canada**

Sharpe and Hardt (1) reported that In Canada, during the period between 1996 until 2005, the greatest increase in the number of deaths was seen amongst workers dying of cancer. This increasing trend was found to be consistent with the number of accepted workplace fatalities claims resulting from exposure to non-metallic minerals except fuel, a category which primarily consists of exposure to asbestos (1). Data from 2006 until 2010, for Canada, have shown that these increasing trends continued to mimic one another.

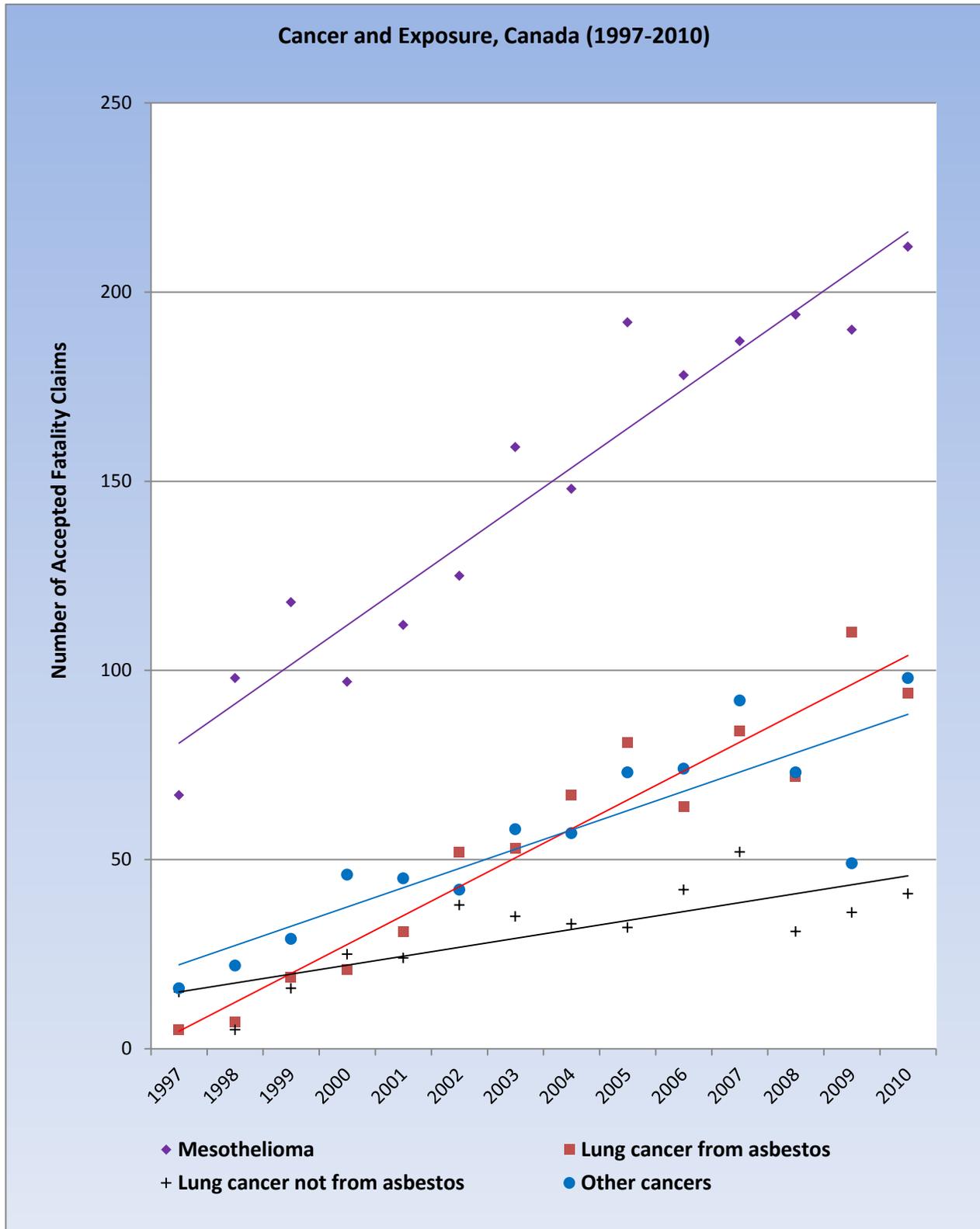
In Canada, from 1997 until 2010, there were 4,036 accepted cancer fatality claims. Of these, 2,859 or approximately 71% were the result of exposure to asbestos. In examining the last five years (2006-2010) of the 1,973 accepted occupational cancer fatality claims, 1,441 were attributed to asbestos exposure, accounting for approximately 73% of these accepted claims. Further examination of these compensated cancer-asbestos exposure related claims within the last five years revealed that 916 (or

approximately 64%) of these claims were attributed to mesothelioma-asbestos related fatalities and 424 (or 29%) were attributed to lung cancer-asbestos related fatalities. This means that in the last five years, approximately 93% of all asbestos-related fatality claims that were compensated were either attributed to mesothelioma or lung cancer.

Accepted lung cancer fatality claims that were attributed to asbestos exposure have been increasing steadily over time, as depicted in Graph 14. In 1997 compensated lung cancer claims resulting from asbestos exposure made up 25% of all accepted lung cancer fatality claims. In 2009, accepted lung cancer fatalities resulting from asbestos exposure reached an ultimate high accounting for approximately 75% of all compensated lung cancer fatalities. In comparison, the trend line for accepted fatality claims for lung cancer not attributed to asbestos exposure was much flatter (as shown in graph 14).

The number of accepted fatality claims attributed to “other” occupational cancers has been steadily increasing from 1997 until 2007. From 1997 until 2010 there has been a 513% increase in the number of “other” occupational cancer fatality claims compensated for Canada as a whole.

**GRAPH 14**



## **ONTARIO**

### **Part I: Compensated Mesothelioma and Lung Cancer Fatality Claims Over Time In Ontario**

Between 1997 and 2010, there were increasing trends seen for compensated fatalities in Ontario for both mesothelioma and lung cancer, with some years showing that accepted fatality claims for lung cancer exceeded those for mesothelioma. This observation is unique to Ontario compared with trends for Canada as a whole where accepted fatality claims were always higher for mesothelioma.

Between 1997 and 2010, there was a 98% increase in the number of compensated mesothelioma deaths and a 383% increase in the number of compensated lung cancer deaths. Over the years, accepted mesothelioma and lung cancer fatality claims (combined) comprised as much as 98% of accepted occupational cancer fatality claims as seen in 1998 and 71% of all occupational cancer claims as seen in 2010.

In examining compensated mesothelioma and lung cancer claims from 1997 to 2010, the highest number of accepted fatality claims for mesothelioma occurred in 2008 at 88 deaths. In comparison, the highest number of accepted lung cancer fatality claims occurred in 2010 at 87 deaths. On the contrary, the lowest number of accepted fatality claims for these cancers were 44 deaths for mesothelioma in 1997 and 6 deaths for lung cancer in 1998.

### **Part II: Asbestos-Related Cancer: Special Focus on Mesothelioma and Lung Cancer In Ontario**

Just as was seen for Canada, in Ontario, for the period between 1997 and 2010, the trends relating to nonmetallic minerals except fuel and the number of accepted fatality claims relating to occupational cancer revealed that these increasing trends very closely mimicked each other. Further examination revealed that this category was predominately made up of claims relating to asbestos exposure.

In Ontario, from 1997 until 2010, there were 2,204 accepted occupational cancer fatality claims. Of these, 1,555 or approximately 71% were the result of exposure to asbestos – the same percentage that was seen for Canada. Further, there were 1,068 compensated cancer fatality claims in the past five years. Of these, 767 cases or approximately 72% were attributed to asbestos exposure, very similar to the percentage seen for Canada. In examining compensated occupational cancer fatality claims that were attributed to asbestos exposures more closely, it was found that in the last five years, 393 (or approximately 51%) of these compensated claims were related to mesothelioma-asbestos related fatalities and 287 (or approximately 37%) were attributed to lung cancer-asbestos related fatalities. Combined, this amounts to approximately 89% of all asbestos-related compensated claims being attributed to either mesothelioma or lung cancer<sup>9</sup>.

As was revealed for Canada, in Ontario for the period between 1997 and 2010, the percentage of compensated lung cancer fatality claims that were attributed to asbestos exposure has increased

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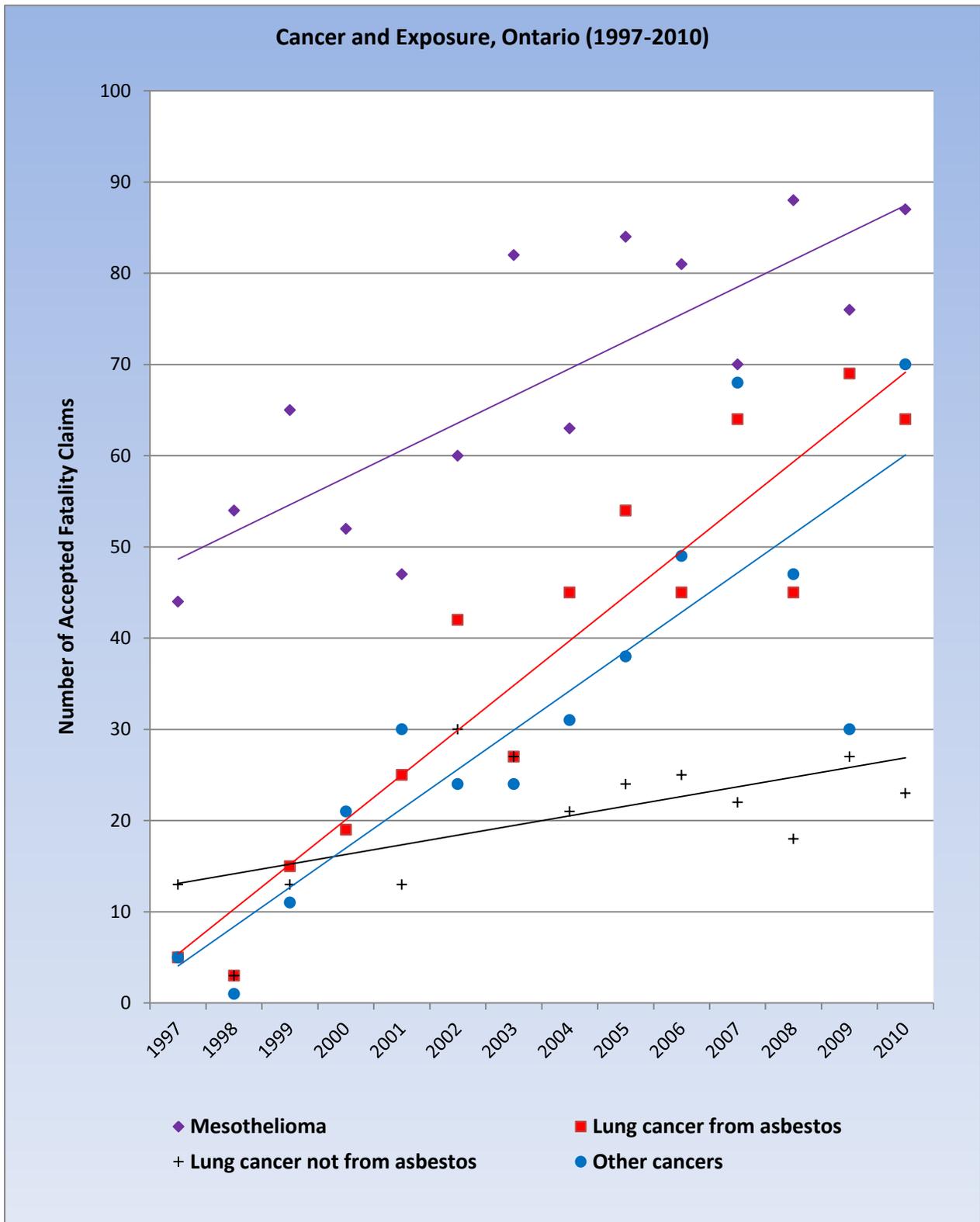
<sup>9</sup> When actual percentages are used, amounts to 88.7% which was rounded to 89%.

markedly over the years. In comparison, a rather flat trend was seen for those lung cancer fatality claims that were not attributed to asbestos exposure.

In 1997, the percentage of all compensated lung cancer fatality claims that were not attributed to asbestos exposures accounted for approximately 72% of these claims. Approximately 28% of all accepted lung cancer fatality claims were attributed to asbestos exposure. However, since 2003, the percentage of asbestos-related compensated lung cancer fatality claims have continued to account for a large percentage of all lung cancer claims. The highest percentage of accepted asbestos-related lung cancer claims was seen in 2007 and 2010 when these claims accounted for approximately 74% of all compensated lung cancer fatalities, for both years.

Overall, the number of accepted fatality claims attributed to “other” occupational cancers has been steadily increasing from 1997 until 2007. In Ontario a 1300% increase in the number of other occupational cancer fatality claims compensated was seen for the 1997-2010 period.

**GRAPH 15**



## IV. IMPLICATIONS

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Since the findings for Canada as a whole and Ontario were similar in many regards, results are summarized here together. Compensated occupational cancer fatality claims have been on the rise in recent years, surpassing accepted fatality claims for traumatic injuries and disorders. These trends are most apparent for Ontario but are also relevant for Canada as a whole. Historical data show that the top three industries compensating occupational cancer fatality claims in Canada and Ontario came from the manufacturing, construction, and mining industries. However, in recent years, the number of compensated occupational cancer claims by industry type has changed for both Ontario and Canada. In 2007, the amendment of Bill 221 (firefighter legislation) meant that a surge of various occupational cancer fatality claims were compensated in the government services industry over the past five years. Also, the government services industry replaced the mining industry as the third top highest industry which compensated occupational cancer fatality claims. For both Ontario and Canada, mesothelioma and lung cancer made up the vast majority of compensated occupational cancer fatality claims within the manufacturing and construction industries; these were mainly attributed to a history of asbestos exposure. Further, these distributions for both Ontario and Canada closely mimic each other because the majority of these accepted fatality claims are from Ontario.

The **economic costs** for occupational cancer claims are steep, as evidenced in a report written by the WSIB (35). In Ontario, occupational **cancer** had the highest lifetime costs<sup>10</sup> compared to all other occupational diseases identified. Mesothelioma had the highest lifetime cost calculated at \$532,844 per person whereas lung cancer had the fourth highest lifetime cost claim per person, calculated at \$497,826 (35).

Nevertheless, accepted fatal occupational cancer **claims represent only a small fraction of the underlying burden**. This is thought to be primarily be the result of **under-reporting** (8, 16), and especially for mesothelioma, **not filing a claim** (16). Although mesothelioma and lung cancer are generally recognized as compensable when a history of asbestos exposure can be documented, and exposure thresholds meet the duration and latency requirements outlined by compensation boards (13), still, on average only approximately half of mesotheliomas are compensated in Ontario and approximately 43% are actually compensated in Canada<sup>11</sup>.

It appears that a large percentage of occupational lung cancers are also not being compensated. To estimate the underlying burden of occupational lung cancer, Rushton et al.,'s (37) estimates were applied to lung cancer rates for Canada and Ontario in the year 2010<sup>12</sup>. Consistent with the results

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<sup>10</sup> Includes costs relating to healthcare; labour market re-entry; loss of earnings; non-economic loss; and survivor benefits.

<sup>11</sup> These percentages are based on the comparison of compensated mesothelioma fatality claims between 2005 and 2009 with the number of mesothelioma cases provided by the tumour registry(36), for both Ontario and Canada.

<sup>12</sup> There have been no studies to date that have attempted to estimate the total number of work-related cancers in Canada. Some attempts have been made to summarize the existing literature (22) and to provide an estimate range of the burden based on the literature (24), but unlike the United Kingdom, Canada currently does not have a context-specific percentage that it can use to predict burden (37). Hence, estimates were calculated using Rushton et al.'s (37) predictions. The **estimated** number of lung cancer deaths for the years 2006 until 2010 were drawn from various published Canadian Cancer Statistics (38-43). Based on these estimates, in Canada from 2006 until 2010, approximately 14,038 lung cancer cases

presented, it was found that Ontario is doing a better job at compensating lung cancer fatality claims compared with the national average. In Canada, in 2010, only 4.7% of work-related lung cancer fatalities were actually compensated. Ontario fared better than Canada as a whole, compensating 9.3% of all occupational lung cancer fatality claims in 2010.

Howse et al., (44) provided a report to the WSIB highlighting the findings of their study which called attention to several implications which arise when claims are not filed. These include:

- i) workers do not receive the compensation they are entitled to
- ii) public health insurance carries the displaced costs from the worker's compensation board and the respective employers who pay into these benefits, and
- iii) workers' compensation statistics become misrepresentative of the real burden, this in turn results in the lack of stimulus that is required to drive prevention efforts.

This lack of stimulus to drive prevention efforts poses a real problem because in order to reduce the number of occupational cancer fatalities, a reduction or elimination of carcinogens must be a priority. Unlike fatal traumatic injuries and disorders where the cause can be more easily pinpointed and follow-up is almost always immediate, this is not necessarily the case for occupational cancer which may occur over thirty years after exposure.

There are many industries where workers are still at risk of asbestos-related occupational disease and/or cancer. A common misconception exists that asbestos has been banned from products or processes used and/or applied in workplaces, however, this is not necessarily the case (45, 46). Since most compensated occupational cancer fatality claims were attributed to past asbestos exposure that means that there are many other group 1 carcinogens in workplaces that are also still occurring and are not being captured in claims statistics. For instance, this would include exposure to carcinogens such as: benzene (47); polycyclic aromatic hydrocarbons (48, 49); formaldehyde (50-53); diesel exhaust (54-59); wood dust (60-62); and radon (63) which have all been shown to be associated with a wide range of occupational cancers, yet are not still reflected in claims statistics.

When claims are not filed, statistics are grossly misrepresented and the urgency for the adoption of the precautionary principle related to the use of Group 1 carcinogens becomes masked. As such, the cycle continues whereby workers continue to be exposed to cancer-causing agents, often unknowingly, and will continue to die from cancer that is preventable for decades to come.

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should have been compensated as occupational cancer compared to the 626 lung cancer fatalities that were actually compensated in this period. This means that 4.5% of work-related lung cancer fatalities were actually compensated in the past five years in Canada. The actual burden represented for Ontario in the last five years fares a little better in comparison, with approximately 4,614 lung cancer fatalities which should have been compensated as occupational cancers compared with the 402 cases which actually were, representing 8.7% of the actual burden of work-related lung cancer fatalities. The calculations derived within the last 5 years for both Canada and Ontario are very similar to those calculated for 2010 (for both Ontario and Canada).

## V. CONCLUDING REMARKS AND RECOMMENDATIONS

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Accepted workplace fatality claim trends for Ontario are very similar to those for Canada as a whole. Even though accepted claims statistics represent only a small fraction of the underlying burden, the increasing trend of accepted occupational cancer fatality claims points to the need for investing in preventative measures that will aid in decreasing occupational cancers from occurring in the first place. This can be accomplished by eliminating or minimizing the risk of exposure to group 1 carcinogens (e.g. asbestos) from workplaces; increasing efforts towards toxic use reduction; and enforcing more stringent occupational exposure limits. Also, protecting workers in high-risk industries is essential to assist in this endeavor. Through the active engagement of workers, health practitioners, as well as various decision-makers and stakeholders, a better system can be implemented to ensure that workers who suffer from occupational diseases and cancers are fairly compensated and that future occupational exposures and related cancers are prevented.

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