

Chronic Obstructive Pulmonary Disease (COPD):  
The Impact of Occupational Hazards in the Minerals Industry

by

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A thesis submitted in partial fulfillment  
of the requirements for the degree of  
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## Abstract

This study aimed to explore the psychosocial, occupational, financial, and physical impact of chronic obstructive pulmonary disease on underground workers in the minerals industry in Northeastern Ontario, describe their experiences with the Ontario workers' compensation claim process. This study also aimed to communicate experiences of physicians and union workers with underground mineral workers diagnosed with COPD as an occupational illness and the Ontario workers' compensation claim process experience. Data were collected via semi-structured telephone interviews with 16 underground mineral workers with occupational COPD, four union compensation representatives and four physicians (two primary care and two specialists). Interviews were transcribed verbatim, and a thematic analysis was completed. Examples of themes that arose from the findings of the underground mineral workers' COPD group included: 1) COPD affects quality of life, 2) I smoked; I did not think I could get compensation, 3) the compensation process is a joke, 4) doctors do not know anything, and 5) working in the mine is a dirty job – we did not know any better. Themes from the union compensation representatives and physicians included: 1) additional support resources required, 2) smoking cessation is essential, 3) the compensation claim process is challenging, 4) occupational diseases are challenging to prove, and 5) occupational COPD is costly. These results suggested that advocacy is critical to ensuring underground workers receive the support they need to obtain approval of a compensation claim. The results also illustrated the need for further education about the ability to document and support an occupational illness for physicians and worker's compensation caseworkers involved in caring for an underground mineral worker diagnosed with occupational COPD. Continued research about occupational diseases and the compensation claim process for those with COPD is required to address the barriers and challenges experienced.

**Keywords:** Qualitative, narrative, COPD, workers compensation, underground mineral workers, physicians, union compensation representatives, Northeastern Ontario

## Co Authorship Statement

The project was conceptualized in consultation with Dr. Lightfoot, Dr. Donato, and Dr. Eger. S. Mongeau conducted data analyses with feedback provided by Dr. Lightfoot. S. Mongeau completed the associated literature review and wrote the complete first draft of papers 1, 2, 3, and 4. Dr. Lightfoot, Dr. Donato, and Dr. Eger provided feedback and editorial guidance for all the writing.

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## Chapter 1

### 1.0 Introduction

Chronic Obstructive Pulmonary Disease (COPD) includes chronic lung diseases that can limit airflow into the lungs and is characterized as progressive and debilitating (Statistics Canada, 2020; WHO, 2019). COPD is considered an umbrella term that describes a group of chronic lung diseases such as emphysema, asthma, and bronchitis (WHO, 2019).

Throughout the literature, varied definitions of COPD are used interchangeably. Terms such as chronic obstructive lung disease (COLD) and chronic obstructive airway disease (COAD) are often found when describing obstructive lung diseases. According to Stoppler (2021), COLD is defined as any disorder that persistently obstructs bronchial airflow. COLD mainly involves two related conditions, including chronic bronchitis and emphysema. Both cause chronic obstruction of air flowing through the airways and in and out of the lungs.

In comparison, COAD is defined as a long-term progressive lung disease that has in the past also been known as chronic bronchitis or emphysema (Dhatariya, 2019). Spann (1983) indicated that COAD is constitutes a spectrum of clinical diseases that includes the triad of asthma, chronic bronchitis, and emphysema. The author further noted that the diseases classified as COAD have overlapping clinical features. Spann (1983) reported that as a result, the terms are often confused in the literature and are frequently misused by physicians in daily clinical practice. Because these diseases often coexist, diagnostic differentiation becomes difficult.

Therefore, given the interchangeable nature of all of these terms, it is easy to see how they may be seen as the same because individuals are aware of cigarette-induced emphysema. Still, they do not understand how specific it can be at the level of the lung tissue. If you were to ask a clinician, specifically a primary care physician, they would use the term COPD because to them, it is a disease caused by cigarette smoking. However, if you were to speak to a physiologist or a

pathologist, you would hear about a biomedical understanding of airway obstruction.

For the purpose of this thesis, the term COPD was used throughout to ensure the language fit with the participants and the agencies referenced throughout.

In Canada, COPD primarily affects individuals aged 35 and older (Public Health Agency of Canada, 2018). COPD is accompanied by respiratory symptoms, including dyspnea, cough, and sputum production (Rycroft et al., 2012; Public Health Agency of Canada, 2018).

According to Statistics Canada (2020), in 2019, approximately 900,000 Canadians were living with COPD, which is anticipated to increase as the population ages. In 2019, some 310,000 persons in Ontario lived with COPD (Statistics Canada, 2020). The lifetime risk of developing COPD is greater than one in four (27.6%) and higher in males (29.7%) compared to females (25.6%; Public Health Agency of Canada, 2018).

The incidence of chronic disease in Canada has increased significantly within the last few years (Davy et al., 2015; Yeoh et al., 2018). For example, the number of individuals with chronic obstructive pulmonary disease (COPD) has almost doubled from 2000 to 2001 (Public Health Agency of Canada, 2019). COPD is responsible for the greatest number of hospital admissions due to chronic illness in Canada (Benady, 2010).

COPD is a complex and heterogeneous disease associated with high morbidity and mortality (Soriano et al., 2017; Vos et al., 2012). According to the latest update of the Global Burden of Disease Study, the prevalence of COPD in 2017 was 174 million people worldwide, and it was estimated that it became the third most common cause of death globally since 2012, after ischemic heart disease and cerebrovascular disease (Soriano et al., 2017).

The primary cause of COPD in Canada and other developed nations includes long-term exposure to

lung irritants, and the primary irritant is tobacco smoke (Public Health Agency Canada, 2018).

In 2002, COPD was considered one of the top five leading causes of death worldwide, especially in developed countries, and estimates revealed that COPD would become the third leading cause of death by 2030 (WHO, 2019; Buist et al., 2007; O'Donnell et al., 2007). According to the WHO, in 2014, more than 210 million people were suffering from COPD globally, including 80 million afflicted by its moderate or severe form. Despite the high prevalence in the general population, several authors noted that COPD remains under-diagnosed globally (Hill et al. 2010; Huchon et al., 2002; Schirnhofner et al., 2007; Zielinski et al., 2006). As of 2019, COPD has become the third leading cause of non-communicable deaths worldwide and is associated with the sixth-highest global burden of disease (Global Burden of Disease, 2020).

Afonso et al. (2011) indicated that COPD's risk factors include smoking history, gender, and increased age. Recent studies also showed that occupational exposures (i.e., organic and inorganic dusts, chemical agents, fumes, and respirable quartz) are also associated with COPD development (Vlahovich & Sood, 2021; Viegi et al., 2020; Mohner et al., 2013). Caillaud et al. (2012) noted that the population attributable risk (PAR) for COPD associated with occupational exposure was estimated at 20% for smokers and 31% for nonsmokers. Blanc et al. (2009) noted that some findings suggest that prior occupational exposures may be associated with COPD development and carry a greater risk of disease. Studies found that other COPD risk factors include poor social conditions, atopy, malnutrition, a history of pulmonary tuberculosis, repeated respiratory infections, passive smoking during childhood, and genetic predisposition (Behrendt, 2005; Viegi et al., 2007). Blanc et al. (2009) found that occupational factors among people with COPD are correlated with reduced quality of life, an increased risk of restricted activity, and increased healthcare utilization.

With an expected increase in COPD cases, the disease is expected to become an economic burden on the healthcare system (e.g., hospital admissions, home care therapy, and home oxygen) across Canada (Government of Canada, 2019) and is associated with economic burden, hospitalizations, work absences, and disability (Rehman et al., 2020; Rycroft et al., 2012). Mittman et al. (2008) found that in Canada, moderate to severe exacerbations in COPD have a significant impact on the public healthcare system, estimated to exceed direct costs of \$646 million annually. In 2010, the Government of Canada Economic Burden of Illness in Canada 2010 report found that the direct costs increased to over \$770 million annually (Government of Canada, 2021).

COPD remains the sixth most burdensome disease despite the decrease in the prevalence of cigarette smoking worldwide, further underscoring the important role of other factors (e.g., occupational exposures, comorbid conditions, genetic predispositions) in the development of COPD (Global Burden of Disease, 2020). Unfortunately, COPD cannot be cured, but it can be managed through smoking cessation, medication, exercise, education, and supplemental oxygen (Canadian Lung Association, 2019). Patients with COPD often have an additional disability due to frailty and struggle with managing their disease, leading to a higher rehospitalization rate than any other chronic condition (Benady, 2010). Studies have found that understanding the risk factors that lead to COPD development is key in prevention, thereby reducing the substantial personal and societal burden associated with this disease (Blanc et al., 2019; GOLD Science Committee Report, 2021).

## 1.1 Background

### 1.1.1 COPD - Epidemiology

Epidemiological studies help improve our knowledge of occupational risk factors, and the literature reflects studies that identify various workplace risk factors associated with COPD.

Research has shown that COPD is a preventable and treatable disease with some significant extra-

pulmonary effects that could contribute to the severity in individual patients (Viegi et al., 2020; Viegi et al., 2007). The pulmonary component of COPD is characterized by airflow limitation that is not entirely reversible, is usually progressive (e.g., mild, moderate, severe, and very severe), and could be associated with an abnormal inflammatory reaction of the lung to toxic gases or particles (Viegi et al., 2020; Viegi et al., 2007).

#### *Natural History of COPD*

Viegi et al. (2007) found that pathogenic processes that contribute to COPD can happen at any time of life, and COPD natural histories are viewed in the context of overall lung health.

Viegi et al. (2007) reported that COPD has a variable natural history, and not all individuals follow the same clinical course over time. The authors indicated that chronic cough and phlegm could predominate in some COPD patients, whereas others may only report effort shortness of breath. The authors also found that some individuals show a rapidly accelerated lung function decline, while others show a slow, progressive, and roughly stable decline. Viegi et al. (2007) further noted that not all patients complain of all symptoms, even in the advanced stages of COPD. Viegi et al. (2007) also noted that while an almost irreversible airway obstruction is usually observed, some COPD patients may observe a partially reversible airflow limitation. The authors indicated that stopping exposure to toxic agents related to COPD could slow the disease progression. Regular treatment (e.g., exercise, smoking cessation, and everyday use of medications) might manage symptoms and improve quality of life; however, once COPD develops, it cannot be cured.

#### *COPD and Age*

Viegi et al. (2007) noted that COPD is considered a disease of those over 50. However, according to de Marco et al. (2004), the disease can be present at the age of 20 to 45. According to the Public Health Agency of Canada (2018), a diagnosis of COPD at a younger age was due to higher smoking rates. However, for those aged 35 to 44, the rate of COPD diagnosis between 2011 and

2012 remained stable, which could signal a decrease in smoking rates.

#### *COPD and Gender*

Siafakas et al. (1995) stated that COPD is traditionally regarded as a disease of males. However, in 2000, COPD deaths in the USA in females overtook that of males (59,936 versus 59,118). In addition, the authors found that COPD was diagnosed more frequently between 1990 and 1996 in females aged 20 to 44 years of age.

A study conducted by Perez et al. (2020) revealed that women diagnosed with COPD were younger than males, smoked less, had better lung function, but experienced more dyspnea and exacerbations (i.e., periods of acute worsening of respiratory symptoms). Despite the evidence, the authors reported that COPD is still considered mainly a men's disease by some clinicians, associated with a diagnostic bias that contributes to under-diagnosis in women. In addition, the authors found that spirometry testing and referral to a pulmonologist were less common for women who, therefore, suffered a significant delay in a COPD diagnosis, explainable by the voluntary delay of access to a consultation with specialists or in some patients by the occurrence of symptoms of tiredness or depression that suggests a different type of treatment (e.g., referral to a psychologist or psychiatrist). However, the authors reported that long-term survival appeared better in female COPD patients versus men (5-year survival was higher in COPD females (86.9%) than in males (76.3%),  $p < 0.001$ ). The study's findings highlighted the existence of significant gender-related differences in COPD risks and outcomes, supporting the importance of a better multidimensional healthcare approach to COPD in women.

#### 1.1.2 COPD – The Primary Care Physician Role

Banerjee and Kushner (2005) indicated that occupational lung diseases are costly and prevalent. Accordingly, they constitute a significant public health problem. The authors reported that these diseases are also of particular interest at the patient-provider level because early recognition of

work-associated illness could improve health outcomes. Delayed treatment and intervention can result in substantial economic consequences for both workers and employers.

Banerjee and Kushner (2005) indicated that although workers' compensation is an aspect of an occupational disease that is often overlooked or avoided, the primary care physician (PCP) plays an essential, well-defined role in this system. The authors further stated that the initial function of the primary care physician is to treat the patient. However, as a matter of course, this role expands in the case of occupational lung disease in which the physician initially identifies the patient's condition as work-related and, therefore, potentially compensable. In addition, Banerjee and Kushner (2005) indicated that the primary care physician often informs the worker that the condition is compensable and ensures that the employer knows about the illness. Therefore, the authors found that an occupational history is essential, including identifying the disease, preventing disease, and determining compensation. The authors further reported that to diagnose occupational lung disease, the healthcare provider must first suspect an association between work and disease based on the patient's symptoms and occupation. Therefore, as Banerjee and Kushner (2005) outlined, this suspicion requires completing an occupational pulmonary history that includes job-related questions.

### 1.1.3 COPD, Smoking, and WSIB

Lippel (2010) stated that workers' compensation is primarily under provincial and territorial jurisdiction in Canada. The author noted that workers' compensation boards exist in each province and territory, and occupational lung disease (OLD) is almost always compensable through workers' compensation or a civil lawsuit. For this reason, a diagnosis could come under scrutiny, especially when workers' compensation is the main issue. Martin (1998) outlined many pitfalls associated with a diagnosis that could lead to a denied workers' compensation claim. Martin (1998) found that some pitfalls include making an unsupported claim and misinterpretation of diagnostic testing.

Therefore, as Martin (1998) outlined, physicians must ensure an in-depth and focused history is taken, appropriate diagnostic testing is ordered, interpretation of tests is accurate, and a thorough occupational history is taken from the patient.

Studies indicated that cigarette smoking is the most common cause of the obstructive pattern; however, a history of smoking should not preclude careful investigation into occupational exposures as contributing, if not causal factors for physiological impairment (Speizer & Tager, 1979; Croft et al., 2020). In fact, any abnormality in lung function is often attributed to cigarettes to the exclusion of other potential agents. While the impairment in persons with lung disease may be due to smoking, it could also be caused by occupational exposures (Speizer & Tager, 1979; Croft et al., 2020). Smokers are usually diagnosed with chronic obstructive respiratory diseases when the level of airflow limitation interferes with activities they otherwise would perform (Speizer & Tager, 1979; Croft et al., 2020).

According to Guidotti (2002), workers' compensation systems will attempt to assess claims for occupational diseases on an individual basis using guidelines that are available to them. The author noted that this might be difficult when more than one risk factor is associated with the outcome, such as asbestos and cigarette smoking. The occupational exposures are not clearly responsible for the disease. Guidotti (2002) reported that apportionment is defined as an approach that involves the assessment of the relative contribution of work-related exposures to the risk of the disease or to the final impairment that arises for the disease.

According to the Ontario Workplace Safety and Insurance Board (WSIB), there are four components that they rely on concerning pulmonary function tests (PFTs) in determining lung impairment (WSIB, 2021). The components of forced expiratory maneuvers (simple spirometry) include forced vital capacity (FVC), forced expiratory volume (FEV1), and FVC/FEV1 ratio (i.e.,

is a calculated ratio used in the diagnosis of obstructive and restrictive lung disease. It represents the proportion of a person's vital capacity that they can expire in the first second of forced expiration to the full, forced vital capacity) expressed as a percentage. The fourth component is the diffusing capacity of carbon monoxide (DLCO). There are four classifications of impairment including Class 1 (0%, no impairment), Class 2 (10 – 25%, mild impairment), Class 3 (30 – 45%, moderate impairment), and Class 4 (50 – 100%, severe impairment) (WSIB, 2021). Smoking history is considered when establishing the percentage relationship to permanent disability (WSIB, 2021). The percentage of disability that the WSIB accepts is 40% for a non-smoker (i.e., an individual who never smoked, even occasionally), 30% for an ex-smoker (i.e., an individual who smoked but who has not smoked for the previous ten or more years, and 20% for a smoker (i.e., a person who currently smokes, or who has ceased smoking for less than the previous ten years) (WSIB, 2021). If a non-economic loss (NEL) benefit is awarded, but the individual is a smoker, the WSIB offsets the NEL by 50%. However, as of September 1, 2020, the WSIB temporarily suspended the practice of offsetting a non-economic loss for people with COPD who also have a smoking history. Presently there is no update on whether this approach will continue (WSIB, 2021).

Banerjee and Kushner (2005) indicated that the pathway to diagnose and treat occupational COPD requires multiple resources to establish a link between exposure and disease, including physical examination, chest radiography, pulmonary function tests, disability evaluation, notification to the employer, and appropriate health organizations. They noted that if the cause of the respiratory disease is unexplained, a pulmonologist's referral is recommended.

#### 1.1.4 COPD – Stages of Illness

According to Statistics Canada (2019), COPD can advance over four stages (grades), from mild to very severe and is diagnosed by GOLD (Global Initiative for Chronic Obstructive Lung Disease)

using spirometry measures.

Physicians use stages of COPD to describe the severity of COPD with each patient. Table 2 shows stages and the symptoms associated with each stage or grade.

Table 1 - *COPD Stages and Symptoms (Lung Health Institute, 2018)*

COPD Stage	Symptoms
MILD	Shortness of breath from COPD when hurrying on the level or walking up a slight hill.
MODERATE	Shortness of breath from COPD, causing the patient to stop after walking approximately 100 m (or after a few minutes) on the level.
SEVERE	Shortness of breath from COPD, resulting in the patient being too breathless to leave the house, breathless when dressing or undressing, or the presence of chronic respiratory failure or clinical signs of right heart failure.

Table 2 - COPD Stages based on FEV-1 scores (Lung Health Institute, 2018)

<b>COPD Stage</b>	<b>Spirometry</b>
MILD – Stage 1	FEV1 > 80%, predicted. FEV1/FVC < 70
MODERATE – Stage 2	50% < FEV1 < 80% Predicted. FEV1/FVC < 70
SEVERE – Stage 3	30% < FEV1 < 50% Predicted. FEV1/FVC < 70
VERY SEVERE – Stage 4	FEV1 < 30% Predicted. FEV1/FVC < 70
<b>Grade</b>	<b>Description</b>
1	Not troubled by breathlessness except with strenuous exercise.
2	Troubled by shortness of breath when hurrying on the level or walking up a slight hill.
3	Walks slower than people of the same age because of breathlessness or stops for breath when walking at their own pace.
4	Stops for breath after walking about 100 yards or after a few minutes on the level.
5	Too breathless to leave the house or breathless when dressing or undressing.

Physicians use stages, grading, exacerbation risks, and other health problems to best match patients with the appropriate treatment (Global Initiative for Chronic Obstructive Lung Disease, 2021). The GOLD system for Grading COPD bases the stage of COPD on symptoms, COPD exacerbation, hospital admissions, and spirometry testing results (Lung Health Institute, 2018). COPD exacerbations can result in additional therapy and are classified as mild (i.e., treated with short-acting bronchodilators (SABDs) only), moderate (i.e., treated with SABDs plus an antibiotic), or severe (i.e., individual requires hospitalization or visits to the emergency room) (Global Initiative for Chronic Obstructive Lung Disease, 2021).

#### 1.1.5 COPD and Comorbidities

According to Feinstein (1970), the term *comorbidity* has historically been defined as “any distinct additional clinical entity that has existed, or that may occur during the clinical course of a patient who has the index disease under study.”

Agusti et al. (2010) reported that comorbidities in COPD could be expected at any disease stage. Divo et al. (2012) indicated that comorbidities are important determinants of outcomes and have enormous economic consequences. Menzin et al. (2008) noted that disease management strategies fail to provide clear recommendations on how comorbidities should be identified, assessed, and managed in the presence of COPD and comorbidities are abundant among COPD patients (Decramer & Janssens, 2013; McDonald et al., 2013; Global Initiative for Chronic Obstructive Lung Disease, 2021). Divo et al. (2012) reported that the most common comorbidities that accompany COPD include cardiovascular disease (CVD), metabolic disorders, osteoporosis, skeletal muscle dysfunction, anxiety and depression, cognitive impairment, gastrointestinal (GI) diseases, obstructive sleep apnea, and respiratory conditions such as asthma, bronchiectasis, pulmonary fibrosis, and lung cancer. In fact, as found by Decramer and Janssens (2013), a considerable amount of healthcare costs (i.e., hospital visits, home care therapy, and home oxygen)

associated with COPD are due to comorbid conditions.

### 1.1.6 Chronic Disease Management

Bodenheimer et al. (2002) reported that the use of primary care resources when managing chronic diseases had become a successful part of patient care since its inception, and they have become a standard for chronic disease patient care around the world. Many different organizations have attempted to implement chronic disease management programs; some have been successful, and others have failed to execute programs on an ongoing basis (Garland-Baird & Fraser, 2018). In 2009, worldwide chronic disease management models were used successfully in over 1,500 physician practices (Coleman et al., 2009).

### 1.1.7 Prevention Hierarchy of Work-Related Chronic Obstructive Pulmonary Disease

#### *1.1.7.1 Primary Prevention*

Disease prevention is divided into three classifications: primary, secondary, and tertiary prevention (Quint et al., 2008; Rennard & Drummond, 2015). Quint et al. (2008) found that in the context of work-related chronic obstructive pulmonary disease, primary prevention includes moderating or removing the specific respiratory triggers (e.g., workplace sensitizers) to avoid the development of work-related COPD. Although perhaps not as effective as complete removal of the respiratory triggers, reducing the agent's potency and using protective equipment to diminish the likelihood of developing work-related COPD is also helpful (Quint et al., 2008; Rennard & Drummond, 2015).

#### *1.1.7.2 Secondary Prevention*

Secondary prevention of work-related COPD aims to identify the disease at a pre-clinical or clinical phase when management can slow the disease (Laitinen & Koskela, 1999; Rennard & Drummond, 2015). Research studies have found that early recognition of the condition is pivotal in improving health outcomes. Screening and medical surveillance are essential in preventing chronic obstructive pulmonary disease from worsening (Laitinen & Koskela, 1999; Rennard & Drummond, 2015). Also, if a patient takes the initiative to be assessed as soon as symptoms commence, they

can achieve better health outcomes using interventions to slow or effectively stop the disease (Laitinen & Koskela, 1999; Rennard & Drummond, 2015). A secondary preventive approach may include smoking cessation, avoidance of work involving risk of exposures, early diagnosis, proper initial treatment and guidance, and improved indoor or outdoor air quality (Laitinen & Koskela, 1999; Rennard & Drummond, 2015). Smoking cessation has the most significant ability to influence the natural history of COPD, and long-term quit success rates can be achieved with effective resources (e.g., nicotine replacement therapy, pharmacological products, intervention programs, and counselling) (Global Initiative for Chronic Obstructive Lung Disease Report, 2021).

#### *1.1.7.3 Tertiary Prevention*

Tertiary prevention of chronic obstructive pulmonary disease is intended to further reduce medical impairment in those with an established diagnosis (Tarlo & Liss, 2005; Laitinen & Koskela, 1999; Montuschi et al., 2014; Rennard & Drummond, 2015). Tertiary preventive measures include pharmacological treatments such as inhaled corticosteroids (e.g., Flovent and Pulmicort) and bronchodilators (e.g., Salbutamol), avoidance of further exposures to the agent(s), and ongoing medical monitoring (Tarlo & Liss, 2005; Laitinen & Koskela, 1999; Montuschi et al., 2014; Rennard & Drummond, 2015). Also, workers' compensation (in Ontario from the Ontario WSIB) could be considered a conjunctive tertiary approach to compensate for lost work time and cover costs of specific drug treatments (Tarlo & Liss, 2005; Laitinen & Koskela, 1999; Rennard & Drummond, 2015).

#### *1.1.8 Occupational Exposures*

Tarlo (2020) indicated that the 2019 Global Strategy for Diagnosis, Management, and Prevention of COPD report included occupational dusts, organic and inorganic, to be among the risk factors for COPD development. The author reported that there are no specific diagnostic tests to distinguish occupational COPD from COPD due to smoking. Furthermore, the author stated that although the relative risk of COPD is higher among workers who smoke and have occupational

exposure to vapours, dusts, irritant gases, and fumes, it is difficult to diagnose and quantify the role of such workplace exposures among patients who have also smoked. Therefore, Tarlo (2020) revealed that COPD is likely under-diagnosed and under-compensated. It remains essential that an occupational history be taken for all patients assessed for respiratory diseases. Cullen and Cherniack (1989) found that primary care physicians underdiagnose environmentally and occupationally related disorders from a clinical perspective and often enter them into a differential diagnosis. Cullen and Cherniack (1989) revealed that more than 80% of occupational or environmental disease diagnoses are not correctly recognized before evaluation in an occupational medicine clinic, even though most patients had consulted one or more physicians.

Heederik and Mannino (2018) reported that the current knowledge about occupational exposures in COPD development is not without controversy and is under debate in various national occupational compensation systems (e.g., Australia, New Zealand, United States, and Canada). The authors noted that until recently, the dominant and plausible cause associated with COPD was tobacco smoke. According to the authors, in the 1980s, non-malignant lung disease became more prevalent in major heavy industries such as mining and factories than farming or agriculture. Therefore, they suggested that occupational exposure to dusts, fumes, pesticides, and gases requires further investigation as potential causes of COPD.

#### 1.1.9 Occupational Dust Control and Reduction of Disease

According to the WHO (1999), airborne dust is concerning because of its association with widespread occupational lung disease. As outlined in the WHO Hazard Prevention and Control in the Work Environment: Airborne Dust report (1999), there is a risk of occupational disease when people inhale airborne dust at work.

The WHO (1999) defined *dust* as a solid particle that ranges in size from below 1 micron ( $\mu\text{m}$ ) up to around 100  $\mu\text{m}$ , which may be or become airborne, depending on the origin, physical

characteristics, and ambient conditions. As outlined by the WHO (1999), examples of hazardous dusts in the workplace include mineral dust from the removal and the processing of minerals (these often contain silica, which is particularly dangerous), metallic dusts (e.g., lead, nickel, and cadmium); chemical dusts (e.g., bulk chemicals and pesticides), vegetable dusts (e.g., harvesting, storage, and processing of grains), moulds, and spores.

The WHO (1999) defined *dust particle size* in terms of the aerodynamic diameter (i.e., the diameter of a hypothetical sphere of density 1 g/cm<sup>3</sup> having the same terminal settling velocity in calm air as the particle in question, regardless of its geometric size, shape and true density), which is considered a measure of a particle's aerodynamic properties. Therefore, inhalation of a particle depends on aerodynamic diameter, the surrounding air's velocity, and a person's breathing rate. Consequently, depending on the aerodynamic particle diameter, the airway dimensions and the breathing pattern, particles would proceed through the respiratory tract to different regions of the lungs where they might deposit. Therefore, the smaller the aerodynamic diameter, the higher the probability that a particle will penetrate deep into the respiratory tract (WHO, 1999). The WHO Hazard Prevention and Control in the Work Environment: Airborne Dust report (1999) outlined varied work processes that could generate dusts (e.g., mining, quarrying, tunnelling, stone masonry, construction, and any process which breaks or separates solid material).

The surface and systemic uptake of chemicals from inhaled air depend on their physical and chemical properties and the anatomy and pattern of respiration within the respiratory airways (Croft et al., 2020).

The American Conference of Governmental Industrial Hygienists (ACGIH) is a not-for-profit, private, non-governmental corporation with several committees and members, including industrial hygienists and other occupational health and safety professionals who promote health and safety at

the workplace (ACGIH, 2020). The ACGIH publishes Threshold Limit Values (TLVs) guidelines that help inform decisions about safe levels of contact to various chemical and physical substances (e.g., respirable quartz and dusts) found in the workplace. The ACGIH (2020) reported that the respirable dusts that cause the greatest hazards include quartz, dust containing free crystalline silica, and other hard metal dusts produced by grinding and masonry drill bits.

In 2000, the ACGIH revised its TLV for respirable crystalline silica (quartz/dust) to 50 µg/m and has since further lowered its TLV to 25 µg/m (Mine Safety and Health Administration (MSHA), 2019). The ACGIH (2020) indicated that crystalline silica is a chemical compound, silicon dioxide (SiO<sub>2</sub>), most commonly found in nature as quartz. The ACGIH (MSHA, 2019) further reported that quartz accounts for an overwhelming majority of naturally occurring crystalline silica in varying amounts in almost every type of mineral and is found in granite, sandstone, limestone, and shale. Therefore, as outlined by the ACGIH (MSHA, 2019), mining, milling, and processing crystalline silica-containing substances can create airborne respirable particles, and some mining activities can generate more respirable dusts than others (e.g., from cutting, sanding, drilling, crushing, grinding, milling, sawing, scraping, jackhammering, and excavating).

The Mine Safety and Health Administration (2019) indicated that controlling exposures to occupational hazards is the primary way to protect workers. There is a hierarchy of controls to implement feasible and effective control solutions, which are generally considered acceptable industry hygiene principles (MSHA, 2019). As outlined by the MSHA (2019), the hierarchy of controls begins with eliminating and substituting hazards. The MSHA (2019) reported that elimination and substitution are most effective at reducing risks; however, eliminating and substituting hazards cannot reduce exposures to respirable crystalline quartz in mining. The controls relevant to mining include engineering controls, administrative controls, and personal protective equipment (PPE; MSHA, 2019).

Within the mining industry, engineering or environmental controls are used to control levels of respirable dusts by reducing dust generation (e.g., machine parameters) through suppression (e.g., by using water sprays, wetting agents, foams, and water infusion), dilution (e.g., by ventilation), capturing dusts (e.g., using dust collectors), or diverting dusts (e.g., by using a shearer clearer and passive barriers; MSHA, 2019).

Administrative controls help reduce miners' daily exposure to respirable dust hazards by altering how work is performed (MSHA, 2019). Administrative controls can include rotating underground mineral workers to areas with lower dust concentrations, rescheduling tasks, and modifying work activities (MSHA, 2019). The effectiveness of administrative controls requires oversight to ensure that miners adhere to the controls, such as time restrictions in an area or switching duties (MSHA, 2019). Additionally, administrative controls require a sufficient number of qualified miners to perform specific tasks (MSHA, 2019).

#### 1.1.10 Impact (psychosocial, occupational, financial, and physical)

Lax and Klein (2008) reported that the financial impact of an occupational illness or injury could burden an injured worker due to costs directly related to medical care and coping with ongoing general expenses on a reduced income. The authors further revealed that injured workers often have to deplete savings, borrow money, take out retirement funds, and declare bankruptcy to cope. Furthermore, the authors found that workers with an occupational illness or injured workers almost universally reported that their diagnoses were connected with anxiety, depression, and loss of identity and self-worth from an emotional perspective.

According to Kupryś-Lipińska and Kuna (2014), COPD causes physical and mental suffering, impairs patients' quality of life, limits their functions within the family, and influences the whole family's functioning. The authors found that a significant element in COPD patients' management is the disease severity, which influences the patient's prognosis, quality of life, and limitations of

life activities.

#### 1.1.11 Workers' Compensation

In Ontario, thousands of cases of occupational injuries and illnesses occur annually (National Work Injury, Disease and Fatality Statistics, 2015-2017). According to the WSIB By the Numbers Statistical Report (2018), Ontario workers diagnosed with chronic obstructive pulmonary disease may be eligible for compensation from workers' compensation, depending on the magnitude of work-related hazards that impacted the worsening of their condition. As outlined in the WSIB By the Numbers Statistical Report (2018), chronic obstructive pulmonary disease is classified as an occupational disease included in long latency illness claims (i.e., symptoms that may not show up until many years after being exposed to a disease-causing agent). Long latency illnesses develop over a long period, and chronic obstructive respiratory disease currently represents 8% of all allowed occupational claims with workers' compensation between 2009 and 2018 (WSIB: By the Number Statistical Report, 2018). Potential benefits from workers' compensation include, but are not limited to, a benefit for loss of earnings, healthcare benefits, healthcare equipment, and benefits for future economic loss (WSIB: By the Number Statistical Report, 2018).

In 2020, the Association of Workers' Compensation Boards of Canada reported that in 2017 there were four fatalities, and in 2018, there were six fatalities reported that were related to metallic particulates, trace elements, dusts, powders, and fumes in the mining industry (National Work Injury, Disease and Fatality Statistics, 2017- 2019). One of the controversial aspects of COPD deaths is the impact of smoking instead of occupational exposure (National Work Injury Disease and Fatality Statistics, 2015-2017). As outlined in the Global Initiative for Chronic Lung Obstructive Disease Report (2020), occupational exposures, including organic and inorganic dusts, chemical agents, and fumes are under-appreciated risks for COPD.

Demers et al. (2019) reported that workers' compensation claims are one source of data for

occupational diseases in Ontario and Canada and are used to monitor and track hazardous exposures in workers exposed to high hazard occupations such as mining. However, the authors found that many cases go unrecognized, inhibiting the collection of accurate information necessary to help support prevention and benefits administration from workers' compensation programs.

Croft et al. (2020) reported that a physician could become entangled in legal questions about the causation of disease and compensation. The clinician's approach to assessing exposure in microenvironments such as the home, workplace, and transportation environments primarily involves interviewing the patient. Standardized instruments for collecting information on environmental and occupational exposures have been published (Occupational and Environmental Health Committee, 1983), but clinicians generally take exposure histories in idiosyncratic ways where the completeness of the history reflects the clinician's training, knowledge, and familiarity with the environments of concern to specific patients. The clinical history of exposures may focus on a few widely known hazards, for example, asbestos, but rarely an inventory of duties for specific jobs, the materials handled, or the use of respiratory protection (Croft et al., 2020; Alaguney et al., 2020). Furthermore, most physicians have limited knowledge about the exposures associated with specific occupations (Croft et al., 2020; Alaguney et al., 2020). The routine history taken by a primary care provider classically addresses only tobacco smoking and current or typical employment (Croft et al., 2020; Alaguney et al., 2020).

Physicians' barriers in diagnosing and reporting workplace exposures include incomplete and inadequate work exposure histories due to time constraints within the office (Holness et al., 2007; Alaguney et al., 2020; Tarlo, 2020). Another barrier can be the physicians' lack of knowledge about the link between occupations, work-related exposures, and occupational lung diseases (Holness et al., 2007; Alaguney et al., 2020; Tarlo, 2020). Finally, a further barrier identified is the complexity (e.g., complicated forms, unfamiliar terminology on forms, and lack of knowledge on

how to complete forms) of the compensation system, including how to initiate a claim (Holness et al., 2007; Alaguney et al., 2020; Tarlo, 2020).

Health Quality Ontario (2021) indicated that personnel that may be involved in the management of the patient might include respiratory and occupational physicians, primary care physicians (e.g., general practitioners), respiratory therapists, occupational hygienists, return to-work-coordinators, and mental health professionals (e.g., psychiatrists and psychologists).

Croft et al. (2020) found that a physician trained in environmental or occupational medicine routinely obtains more detailed and disease-relevant information. This type of physician should be consulted in cases involving possible effects of complex environmental exposures. The author noted that physicians trained in pulmonary medicine might also have specialized expertise related to environmental lung disease, and allergists with pulmonary education may also be appropriate for addressing workplace-related allergic disorders.

Baur et al. (2019) suggested that a lung disorder diagnosis should always include a detailed occupational history that considers various occupational exposures that could contribute to the diagnosis.

Health Quality Ontario (2021) reported that healthcare professionals managing patients with COPD in Ontario might employ multiple approaches to address patient's healthcare and workplace needs, including conventional treatments (e.g., COPD medications), education (e.g., educating patients to avoid occupational triggers), workplace interventions (e.g., discussion with WSIB or employer to modify the workplace environment), and other referrals (e.g., to mental health professionals), when appropriate. According to Health Quality Ontario (2021), a multiple approach management style addresses the illness's multifaceted nature, including psychological and socioeconomic effects.

Vandenplas et al. (2003) indicated that leaving the workplace source of occupational triggers is

often suggested for COPD patients. However, the authors found undesirable consequences that may stem from leaving work, such as poor outcomes for the worker through reduced income, loss of accompanying benefits, and a loss of possible advancement within the place of employment. Lavoie et al. (2009) also found that reactive psychological distress may manifest from a diagnosis of COPD or employment loss. Knoeller et al. (2011) found that psychological symptoms are associated with poor COPD control and may negatively affect treatment adherence.

Boschetto et al. (2006) indicated that individuals with COPD might need workplace modifications such as protective equipment (e.g., respirators) introduced into their work environment or be relocated to another area under the same employer to avoid the presence of occupational triggers. Ultimately, as suggested by the authors, individuals may need to leave their place of employment, which could place them at risk for economic strain, family and social strain, increased psychological distress such as depression or anxiety, ultimately impacting their overall well-being. Finally, the authors suggested that individual assessment and modification of the work environment could be facilitated by the employer or the workers' compensation office.

Croft et al. (2020) found that to address the effects of exposures on populations, the approach must extend beyond merely evaluating individuals to provide measures of impact on groups. The author found that epidemiological studies, typically cross-sectional surveys, are often conducted to assess potential adverse respiratory or other effects. According to the WHO (2021), it is also important to raise awareness about the global epidemic of non-communicable diseases, create healthier environments, increase the importance of smoking cessation, and improve healthcare access.

In conclusion, COPD is a complex respiratory system disease that causes serious physical, financial, and emotional burdens. Early research showed that cigarette smoking is a major determining factor of the disease; however, new research has suggested that occupational hazards

can significantly contribute to a diagnosis of COPD in both smoking and non-smoking individuals. Furthermore, workers in mining and factory work are at an increased risk for exposure to particulates of dusts and fumes capable of causing COPD.

#### 1.1.12 COPD – The Present Situation

For decades, researchers have dedicated various resources and efforts to mitigate COPD's physical, emotional, psychological, and financial burdens for individuals and populations (Begum et al., 2015; Eisner et al., 2011). According to the WHO (2019), COPD's financial burden (e.g., depleted savings, borrowing money, drawing retirement funds, and declaring bankruptcy) affects individuals and families and significantly burdens developed countries' healthcare infrastructure.

Crighton et al. (2015) reported that in Ontario, COPD prevalence increased by almost 65% between 1996 and 2007, and individuals with COPD accounted for one-fifth to one-third of all healthcare services used. Due to reduced productivity and increased demands on the healthcare system, the impact on individuals and society is substantial (Gershon et al., 2010; Gershon et al., 2013). Crighton et al. (2015) noted that 722,494 individuals in Ontario were identified as having COPD over the 2002 to 2011 period. Comparative morbidity figures were determined and analyzed for local clusters of high and low rates of COPD health and health service use outcomes.

Crighton et al. (2015) examined the patterns of physician-diagnosed COPD incidence, prevalence, and mortality and COPD-specific healthcare service use (e.g., hospitalizations, emergency department visits not resulting in hospitalization, and physician visits) aggregated over ten years (April 2002 to March 2012) for individuals over the age of 35 by gender and age group. Individuals with COPD were identified using Ontario health administrative records at the Institute for Clinical Evaluative Sciences (ICES), an independent, not-for-profit research institute. This study revealed considerable geographic variability in COPD health outcomes. Groups of high rates ( $> 1.4$ ;  $p < 0.01$ ) were most consistently identified in northern, industrial, and rural agricultural areas; groups

of low rates (< 0.75) were limited to the province's major urban and suburban areas. The study findings pointed to the influence of a complex set of environmental, occupational, socioeconomic, and healthcare-related issues in determining COPD morbidity, mortality, and health service use.

#### 1.1.13 Summary

A chronic disease, COPD is characterized by shortness of breath, cough, and phlegm production. The disease is progressive and debilitating and primarily affects individuals aged 35 years and older. Long-term exposure to various lung irritants is the primary cause of COPD. In Canada and other industrialized nations, tobacco smoke is the primary irritant that causes COPD. However, cross-sectional and longitudinal studies have shown a relationship between hard rock miners exposed to silica dust and COPD development, especially in gold miners (Hnizdo & Vallyathan, 2003).

The Canadian Centre for Occupational Health and Safety (CCOHS) (2020) reported that underground workers in the mining industry are exposed to complex exposure combinations including silica, diesel engine exhaust (DEE), arsenic, nickel, chromium, and cobalt. The CCOHS (2020) indicated that many of these exposures are associated with lung cancer and chronic respiratory diseases (e.g., COPD).

Canadians work their whole adult lives assuming that they will be taken care of if they become sick because of their work. The reality is very different for the thousands of people who develop an occupational disease each year. According to Mercer (2020), it can sometimes take years of navigating a government appeals process to have an occupational disease claim accepted by a compensation system in Canada. Furthermore, according to the author, family doctors and healthcare providers in Canada often overlook occupational disease signs. They regularly do not ask enough questions about a patient's work history, and they fail to identify links to potential workplace exposures. Often work-related diseases are not correctly identified until it is too late,

causing problems ranging from prevention to treatment to compensation.

## **1.2 Literature Review**

### **1.2.1 Introduction**

A comprehensive review of the literature was conducted to examine how occupational hazards in the minerals industry could contribute to chronic obstructive pulmonary disease (COPD) development. A literature review helped examine how an occupational illness could result in financial, social, and psychological impacts. The literature review also examined how the workers' compensation claim process could compound the economic and non-economic impacts on an underground worker in the minerals industry diagnosed with occupational COPD.

As part of the literature review, the following themes were addressed: COPD An Occupational Burden; COPD Occupational Risk Factors; COPD The Minerals Industry; COPD and Quality of Life; COPD and Socioeconomic Effects; COPD and Smoking; COPD and Mental Health; COPD and Health Information; Workplace Safety and Insurance Board Claim Filing Process; and Worker Challenges with the Compensation Claim Process.

### **1.2.2 COPD – An Occupational Burden**

Blanc et al. (2019) found that workplace exposures contribute to the burden of illness across a range of non-malignant lung conditions in adults (in addition to the 100% burden for classic occupational pneumoconiosis). The authors stated that this burden has important clinical, research, and policy implications. Blanc et al. (2019) indicated that occupational exposures are important, frequently overlooked, and modifiable contributors to respiratory disease burden. They found that inhalation of vapours, gases, dusts, or fumes (VGDF) in the workplace is common worldwide, and occupation is an important global contributor to respiratory disease burden.

Vlahovich and Sood (2021) found that workplace exposures contribute to the burden of chronic respiratory diseases, including COPD. The authors found that occupational lung diseases are often misattributed to non-occupation causes, leading to patients' delayed or improper medical

management.

### 1.2.3 COPD – Occupational Risk Factors

Mohner et al. (2013) conducted a prospective cohort study to examine the long-term effects of occupational exposure to respirable quartz on chronic obstructive pulmonary disease. The sample included 1,421 males employed with a uranium company in Saxony, Germany. The results of this study demonstrated a strong relationship (OR 1.81, 95% CI 0.9 to 2 per 1 mg/m<sup>3</sup>-year) between inhalation of respirable quartz and chronic obstructive pulmonary disease. The results also revealed that the risk for COPD increased with cumulative exposure to quartz dust in the mining industry. A strength of this study was the ability to monitor the participants from a young age as most of the study population (89%) began employment with the company under the age of 25. A limitation of the study was the inability to obtain a reliable estimate of tobacco consumption intensity.

The following table outlines occupations at increased risk for developing occupational COPD (Fishwick, Sen, Barber et al., 2015; Rushton, 2007).

Table 3 - *Occupations at Increased Risk of COPD*

Category of exposure	Occupations
Minerals (coal mine dust, silica, asbestos, refractory ceramic fibres)	Miners Highway and tunnel workers Cement-exposed workers Pottery workers Food products manufacturing
Chemicals (welding fumes, isocyanates, polycyclic aromatic hydrocarbons)	Railroad workers Coke-oven workers Mechanic and repair jobs Spray painting and welding The armed forces Repair services/gas station workers Rubber, plastics, and leather manufacturing workers Cleaners Records processing and distribution clerks

Organic dust (agricultural dust, dust from cotton and wood)	Construction and trade workers Textile-mill products manufacturing Farming and agriculture workers Woodworkers
Mixed	Freight, stock, and material handlers Iron, steel, and ferrochrome workers Machine operators Transportation and trucking Silicon carbide smelter workers Welders

#### 1.2.4 COPD - The Minerals Industry

Arrandale et al. (2017) surveyed workplace air quality samples in a core processing facility in

Northern Ontario, Canada. The assessment was conducted to explore occupational exposures to respirable dust during the exploration phase of mining. The study took place at a small gold mining company in Northern Ontario, Canada, where rock can have high silica content. Air samples were collected during one workweek, and all workers in the gold mining company were invited to participate. However, only eight workers participated in the study. This study's main results revealed that workers were exposed to higher ( $0.63 \text{ mg-m}^{-3}$ ) respirable dust and respirable silica levels during the mining exploration phase than expected, but these levels did not exceed the Ontario occupational exposure limits ( $3 \text{ mg-m}^{-3}$ ).

Dawson et al. (1998) conducted a quantitative case study that included 102 surface and underground miners in Trinidad, Colorado, and Ranton, New Mexico. This study was conducted to understand the perceptions of working conditions and health before and after enacting the Federal Coal Mine Health and Safety Act of 1969 (Dawson et al., 1998). This study sought to identify the extent of respiratory problems among underground miners and the overall effect on their quality of life. Participants were asked open-ended and closed-ended questions. The results revealed that the participants believed that mining industry exposures, such as fumes and dusts, could increase the possibility of developing lung diseases. A limitation of this study was the inability to separate the

risk of occupational exposures from cigarette smoking.

Cherrie et al. (2013) reviewed the adverse toxic effects of crystalline silica inhalation on stonemasons, miners, and similar British and US workers groups. In the past, exposure to dust with low crystalline silica was not linked to toxicity and was instead considered a “nuisance” (i.e., less than 1% quartz) dust. Low-toxicity specks of dust include all poorly soluble, non-fibrous particles of dust that, at low levels of exposure, have an insignificant toxic effect on the body but, if inhaled in sufficient quantity, can accumulate and cause injury in the terminal airways and proximal alveoli, which could lead to inflammation with subsequent development of COPD. While the authors noted that the highest risk of developing COPD is attributed to cigarette smoking, further studies revealed that COPD could be caused or made worse by dusts, fumes, and irritating gases. Work-related COPD was connected to hundreds of deaths, suffering, and economic loss. Evidence suggested that COPD or another lung injury could occur at levels of exposure below present-day occupational exposure limits. The authors noted that until regulators agree to a safe occupational exposure limit for low-toxicity dust, health and safety specialists should consider 1 mg/3 of respirable dust as a more suitable recommendation than the value of 4 mg m<sup>3</sup>, helping to ensure safe working conditions.

Bailey et al. (2009) conducted a secondary retrospective narrative analysis to understand illness stories by individuals living with COPD in Canada. Participants included 25 individuals (10 women, 15 men) between the ages of 59 and 88, diagnosed with COPD and who had experienced one hospitalization due to an acute exacerbation (i.e., period of acute worsening of respiratory symptoms) of their COPD. Participants were recruited from a northern Canadian mining company and a large farming community in western Canada. Participant occupations included printing, beauty salons, mining, restaurants, and manufacturing institutions. Retrospective interview data were examined, and the analysis was completed using a straightforward narrative approach

involving examining causation story elements. The study's main findings found that participants wanted to be defined by more than just their smoking behaviour. Participants believed that healthcare professionals only focused on smoking causation and did not consider other risk factors such as occupational exposures in COPD development. The study results revealed a need for a broader perspective on COPD development beyond smoking. A study limitation is the small sample size, limiting the findings' transferability.

#### 1.2.5 COPD and Quality of Life

Kuprys-Lipinska and Kuna (2014) conducted a cross-sectional, observational, non-interventional, multi-centre, and nationwide study in Poland. The study was conducted at the centres of outpatient primary healthcare (53.7% of respondents) and specialized centres of lung and allergic diseases (46.3% of respondents). Participants in the study were over 35 years of age, diagnosed with COPD, smokers, and outpatients. The study revealed that COPD significantly affected the quality of life of the individuals who have it, often infringing on their lifestyles. The results also showed that individuals diagnosed with this disease felt restricted in their recreational, professional, and daily activities. They often had no choice but to cease doing activities such as sports due to their compromised lung functions during physical exertion.

Interestingly, physicians are typically guided by their perceived sense of the patient's illness severity, which includes COPD symptoms and pulmonary function test (PFT) findings, but these clinical measures may be inadequate to fully appreciate other aspects of the patient's illness, such as quality of life (Storms et al., 1995; Katz et al., 1999). Felce and Perry (1995) indicated that an individual's quality of life refers to the patient's overall well-being and may consider several different life domains, including physical and emotional well-being, activity, and development. Bahadori et al. (2009) found that quality of life and perceived quality of life in patients with COPD may impact their overall clinical outcomes. The authors further reported that the morbidity

accompanying COPD might be due to COPD exacerbations, resulting in a higher number of hospitalizations and ER visits, declines in overall lung function, and death. Malo et al. (1993) found that patients experiencing a more severe form of COPD are burdened with higher healthcare costs, morbidity, and reduced quality of life. The authors noted that patients diagnosed with work-related COPD could expect permanent impairment in some aspects of their lives and health status, even following exposure cessation and appropriate self-management of their condition. Malo et al. (1993) also indicated that those diagnosed with work-related COPD might need to leave their present workplace and seek alternative career opportunities. Forced departure from the workplace may require further career training or, among some patients, resort to long-term disability or premature retirement. The authors found that these are considered risk factors associated with worse quality of life among patients with work-related COPD.

#### 1.2.6 COPD and Socioeconomic Effects

Chronic obstructive pulmonary disease's socioeconomic implications are becoming more significant, with an ever-increasing population diagnosed with chronic obstructive pulmonary disease (Vandenplas et al., 2003; Vandenplas, 2008). Individuals with chronic obstructive pulmonary disease may experience significant socioeconomic struggles due to their reduced workplace involvement, changes in duties, which are sometimes accompanied by reduced income, and overall diminished work productivity and morale (Vandenplas et al., 2003; Vandenplas, 2008). COPD is also associated with significant socioeconomic challenges and has been considered one of the most commonly compensated occupational lung diseases (Vandenplas et al., 2003; Vandenplas, 2008).

Knoeller et al. (2011) reported that COPD severity is a significant factor associated with reduced employment rates among the work-related chronic obstructive pulmonary disease population. The authors also indicated that, on average, work-related COPD patients have poorer management of

their illness, a higher number of COPD exacerbations and urgent treatments, more frequent episodes of symptoms, and more emergency room visits than those with non-work-related COPD. Legiest and Nemery (2012) suggested that to recover adequately, the cessation of further exposures to the sensitizing agent is necessary. However, the authors also indicated that the trade-off to exposure cessation increases the likelihood of becoming unemployed and losing income. As a result, some individuals choose to remain exposed to occupational triggers to avoid an economic burden, especially those with significant financial commitments. Moscato et al. (1999) found that other factors that play a role in individuals remaining in the same workplace include longer tenure with the company, older age, and advanced education.

Kuprys-Lipinska and Kuna (2014) indicated that COPD significantly affects the quality of life of the individuals who have it, often infringing on their lifestyle. Individuals diagnosed with this disease feel restricted in recreational, professional, and daily activities. Research has shown that continuing working becomes increasingly difficult, and many are forced to discontinue their careers (Seamark et al., 2004; Hernandez et al., 2009). Kuprys-Lipinska and Kuna (2014) indicated that feeling restricted, those with COPD often have no choice but to cease doing their favourite recreational activities such as sports. Furthermore, many individuals have been restricted in completing household chores, resulting in becoming increasingly dependent on their spouse (Seamark et al., 2004; Guthrie et al., 2001).

Kuprys-Lipinska and Kuna (2014) found that the inability to contribute to the household often leaves those with COPD experiencing feelings of being a nuisance or decreasing their role within the family. Similarly, Halding et al. (2011) found that some individuals with COPD do not feel as if they belong in, or are a part of, “the world of the healthy.” This detachment often brings feelings of isolation, loneliness, stigmatization, and rejection (Guthrie et al., 2001; Halding et al., 2011). Also, individuals who experience feelings of judgment and fear from others often do not participate

in previously attended activities and events such as family functions or shopping, further isolating themselves from the world (Guthrie et al., 2001; Kuprys-Lipinska & Kuna, 2014).

### 1.2.7 COPD and Smoking

Hansen et al. (2007) conducted a qualitative descriptive study in Australia to better understand how people diagnosed with COPD viewed the relationship between COPD and smoking. Nineteen participants (6 males, 13 females) with varying degrees of COPD were recruited from two local physician offices in Australia. Semi-structured interviews were conducted in the participant's homes. Widespread skepticism was revealed by participants about medical professionals' attempts to explain their illnesses as a disease caused by smoking. The results also showed that participants who believed their illness was associated with workplace exposures viewed COPD development as out of their control and felt that smoking only played a minor role in disease development. This study captured in-person perspectives of COPD and smoking qualitatively.

Parry et al. (2001) conducted a qualitative study in Britain to understand the life-course influences on persistent smoking patterns in those diagnosed with smoking-related illnesses such as lung disease or cardiovascular disease. Seventy participants were recruited from an Edinburgh Artery Study conducted in Brittan. Qualitative interviews took place in the participant's homes and lasted approximately one hour. This study's findings revealed that the accounts of quitting provided by the participants were constructed as health-related crises allowing the identity transformation from smoker to non-smoker. Furthermore, the study revealed that given the older age of the participants, they received less advice from medical practitioners about the health hazards of smoking than younger smokers. Studies found that clinicians are less likely to advise older individuals to quit than younger adults because they felt older smokers could not quit (Orleans, 1991; Maguire et al., 2000).

Schofield et al. (2007) conducted a qualitative descriptive study in Scotland to understand further

the health-related smoking beliefs of older individuals with COPD. Participants included 22 current and former (15 women and seven men/median age 68) smokers diagnosed with COPD. Semi-structured interviews were conducted in the participant's homes. This study's findings revealed that almost two-thirds of the participants continued to smoke even though they recognized the continued threat to their health due to smoking. According to Baron (2003), 70% of individuals diagnosed with COPD continue to smoke. The study found that smokers cited various barriers to smoking; however, they had all attempted smoking cessation, and disease severity did not act as a significant contributor to trying to quit smoking. The authors suggested that future studies should emphasize the need for frontline healthcare workers to provide sustained encouragement and support towards smoking cessation and relapse prevention for individuals diagnosed with COPD. A strength of this study was using a qualitative study design to collect stories to help eliminate the gap of knowledge in this area. A limitation of this study was the perceptions of the participants, therefore, limiting the possible credibility of the study.

#### 1.2.8 COPD and Mental Health

Courtney (2015) indicated that depression is a mental condition characterized by feelings of severe despondency, dejection, and guilt that can affect an individual's thoughts, behaviours, and sense of safety. The author found that psychiatric conditions such as depression, anxiety syndromes, and post-traumatic stress disorders frequently follow incidents such as severe infections, traumatic brain injuries, and workplace injuries. According to the World Health Organization (2021), more than 350 million people of all ages suffer from depression globally. Courtney (2015) found that few published studies have examined the relationship between depression and adverse respiratory outcomes associated with COPD. Psychological factors and mental illnesses are often overlooked when managing the patient's work-related COPD. However, an association between psychological factors and COPD has been evident in medical practice for hundreds of years (Di Marco et al., 2011; Ellassal et al., 2014). Ellassal et al. (2014) indicated that although it is clear that COPD is a

complex illness with diverse etiologies and risk factors, the impact that psychological distress and mental illness have on the condition should not be understated. The authors found that COPD sufferers often find themselves in a vicious cycle of shortness of breath and a limited ability to exercise, leading to restricted mobility that contributes to social isolation.

A cross-sectional study was conducted by Elassal et al. (2014) to determine if the symptoms of depression and anxiety in patients with COPD correlated with COPD severity. One hundred and sixty patients (80 diagnosed with COPD and 80 healthy into controls) from the inpatient and outpatient wards at the university hospital in Egypt were selected. Patients with severe or very severe COPD displayed significantly higher depression and anxiety scores than those with less severe COPD ( $p \leq 0.001$ ). Age, gender, and length of illness did not impact depression or anxiety symptoms. A study strength was the ability to demonstrate further that the severity of COPD correlated to increased depression and anxiety symptoms. The lack of consideration of results by gender was considered a limitation.

Ng et al. (2007) conducted a prospective cohort study to assess how depression and anxiety symptoms in individuals with COPD correlated with COPD severity. The study was conducted in two big tertiary hospitals in Singapore. There were 376 participants in the study, and the inclusion criteria included hospitalization for COPD exacerbation. The authors concluded that depressive symptoms in COPD patients were associated with lower survival and extended hospitalization stay. Multivariate analyses showed that depression was significantly associated with mortality (hazard ratio (HR), 1.93, CI: 95%), longer index stay (mean, 1.1 more days;  $p=0.02$ ), and total stay (mean, 3.0 more days;  $p=0.047$ ). The study confirmed the strong association between depression and COPD and the impact on social functioning. A limitation of this study was the lack of participants who met the criteria for a major depressive disorder.

Studies found that psychological symptoms that develop in work-related chronic obstructive pulmonary disease patients are associated with significantly more adverse outcomes, poorer symptom control, sometimes due to lack of adherence to treatments, impaired quality of life, and an overall increase in healthcare utilization compared to those without psychological disorders (Lavoie et al., 2009; Ellassal et al., 2014). Moscato et al. (1999) found that work-related COPD was found to have higher psychiatric comorbidities than non-work-related COPD. The authors reported that although it was anticipated that leaving work could improve the patient's clinical outcome, the psychological repercussions may interfere with the remedial effect of this approach. Bradshaw et al. (2006) indicated that there are certainly psychological benefits of remaining in the same workplace, including avoiding financial burden, potential advancement of the patient's career in the future, and the social network acquired while at work. The authors found that removing this familiar environment may impact the patient's self-esteem, relationships, and personality identity. Also, patients may be reluctant to confide the extent of their symptoms to their physician and refuse to file workers' compensation claims to avoid the negative socioeconomic consequences, which may further worsen their outcome.

#### 1.2.9 Workplace Safety and Insurance Board Claim Filing Process

When a worker sustains a workplace injury or illness, several steps are involved with reporting the injury or disease. A diagram outlining these steps is provided (Appendix 1). As outlined by the Workplace Safety and Insurance Board (WSIB) (2021), the initial step is to seek medical attention if a worker suffers from an injury or illness. Then, depending on the extent of the injury or illness, a worker is evaluated at the worksite by a primary care physician or in the emergency department. Immediate reporting of an injury or illness to a supervisor occurs so that an investigation and documentation of an injury or an illness can occur. Next, the injured worker completes and submits Form 6 (Appendix 2) to the WSIB. Form 6 includes worker information, employer information; accident/illness information; healthcare information; employment information; and return-to-work

information (WSIB, 2021). Next, the employer submits Form 7 directly to the WSIB in three days of the injury. Form 7 contains information about the employee, the employer, the date and particulars of the accident/illness, and the employee's wage and employment information. Finally, a duplicate of this report is provided to the worker. The healthcare professional must complete Form 8 (Appendix 3) when a worker presents with a workplace injury or illness (WSIB, 2021). Form 8 includes employee and employer information, incident dates and details, clinical information, and a treatment plan. Additionally, healthcare professionals can be requested to complete the functional abilities document (FAF) to provide further data to assist in a return-to-work plan and help identify the tasks that a worker can or cannot do safely (WSIB, 2021).

Once all the initial information has been submitted to the WSIB, the employee should receive a positive acceptance of their claim or denial by a letter received in the mail. If a claim is not approved, several steps are involved with objecting to the decision. It then becomes the worker's responsibility to complete the intent to object form, and once a decision is reached, it is delivered to the worker within 14 business days (WSIB, 2021). If the claim's original denial stands, the worker is given a duplicate of the claim file, an appeals readiness form, and an instruction sheet to complete the form (WSIB, 2021). If a denial of the claim continues, the worker can start the formal appeal process, register the appeal, and proceed with an oral hearing. At the oral hearing, an Appeals Resolution Officer (ARO) hears the case and becomes responsible for deciding based on the facts presented along with previous case file information (WSIB, 2021). Unfortunately, decisions are not made at the oral hearing, and the worker has to wait another 30 days for a decision from the Appeals Resolution Officer; a decision made by the Appeals Resolution Officer is final. However, if the worker disagrees with the result, the worker can continue with a petition to the Workplace Safety and Insurance Appeals Tribunal (WSIAT). The WSIAT is external to the WSIB and is considered the worker's final appeal level. The WSIAT decisions are final, and no

further steps can be taken (Workplace Safety and Insurance Appeals Tribunal - Ontario, 2018).

#### 1.2.10 Worker Challenges with the Compensation Claim Process

Trief and Donelson (1995) indicated that when workers submitted a compensation claim, they typically sought two key results when accessing the compensation program, including timely treatment by physicians and financial protection by the compensation system. However, the authors indicated that both of these expectations were subject to various potential barriers that included establishing COPD as an occupational disease, delays in payment due to incorrect completion of forms, and disputes over the compensation payment amount. These barriers could further exacerbate psychosocial, financial, and physical symptoms in workers with an injury or an illness.

Tarasuk and Eakin (1995) indicated that many workers who submitted a compensation claim struggled to legitimize their injury or illness with employers, co-workers, the compensation board, and healthcare professionals. Trief and Donelson (1995) found that the complicated compensation process, slow financial payments, and increased fear within a worker could lead to inaccurate claim reporting and slow physical improvement. Furthermore, Friesen et al. (2001) indicated that these fears led to increased financial stress, specifically when the worker identified as the sole family provider and found themselves in a financially vulnerable situation.

Case managers and administrators involved with the compensation process play a vital role in reviewing and processing claims. Beales et al. (2016) conducted a single-arm intervention study that included 32 insurance workers employed with the Australian workers' compensation system. Some of the workers underwent two one-and-half-hour educational sessions to improve their understanding of the barriers associated with an injured worker who suffered from musculoskeletal conditions. The authors found that informed education could positively affect the insurance workers' behaviour, thus enhancing a worker's experience and the compensation claim process. Beales et al. (2016) noted that while the employees at the compensation board were only one aspect

of a worker's journey, providing education that enhanced communication between workers and other stakeholders involved with the compensation claim could positively impact return-to-work outcomes and decrease claims costs. It should be noted, however, in contrast to Beales et al. (2016), according to Guidotti (2002), the Australian system is noncompliant to expert opinion and slow to accept occupational disease. The author indicates that the Australian system functions more by relying on the health insurance program to provide needed services based on severity rather than the cause of the condition.

#### 1.2.11 Summary

Several studies, such as cross-sectional and longitudinal, revealed a relationship between miners exposed to silica dust and COPD development. These scholarly works helped build a foundation for answering the intended objectives of this research study. Despite the abundance of quantitative evidence regarding the causal relationship between smoking and COPD, limited research provided an emic understanding of how COPD impacts underground mineral workers as an occupational illness. Furthermore, no studies specifically focused on the impacts of COPD as an occupational illness in the mining industry in Northeastern Ontario. However, there is valuable information that can be drawn from the current literature and adapted to show that the targeted population could have associated mental health issues such as anxiety or depression, endure financial strain, and have overall impacts on their quality of life due to a diagnosis of COPD as an occupational illness.

#### 1.2.12 Literature Critique

After reviewing the literature, the results further solidified that occupations with high exposure to hazardous particulates correlated with an increased incidence of COPD (Mohner et al., 2013; Dawson et al., 1998). One study indicated that long-term exposure to hazardous particulates could increase COPD risk (Mohner et al., 2013). There was limited research that addressed the difficulty of discerning the risk of smoking and inhaled particles in developing COPD in the mining industry (Dawson et al., 1998). Also, the challenges workers faced when obtaining compensation for work-

related lung illnesses were rarely mentioned. Dawson et al. (1998) suggested that further studies are required to comprehend the barriers associated with obtaining workers' compensation benefits for an occupational lung illness. Limited studies evaluated smoking cessation programs for mineral workers to improve lung function and Dawson et al. (1998) identified that this is an important area in which labour and management could work together. While many studies addressed the correlation between COPD and mental health issues (e.g., depression and anxiety), few studies focused on COPD as an occupational hazard and mental health issues with underground workers (Ng et al., 2007).

### 1.3 Research Objectives

This study's first research objective was to understand further the impact (i.e., psychosocial, occupational, financial, and physical) of chronic obstructive pulmonary disease on some underground workers in the minerals industry in Northeastern Ontario. The second research objective was to describe the underground mineral workers' experiences with the Ontario compensation claim process. Finally, the third research objective was to describe primary care/lung specialists' and union representatives' experiences with underground mineral workers diagnosed with COPD as an occupational illness and the Ontario workers' compensation claim process.

### 1.4 Researcher Reflexivity

*Reflexivity, like hypnotherapy, has various levels. Some dabble near the surface, dipping into reflexive moments, flirting with the images evoked in the reflection before returning to the safety of the mundane. Others attempt to confront the fear of the monster lurking in the abyss by descending into the deeper realms of reflexivity. It is those who confront the beast who will truly know what is there, in the dark beyond. . . (MacMillan, 1996)*

Berger (2013) stated that reflexivity acts as a self-appraisal process in conducting research and can help turn the researcher's lens back onto the researcher. Therefore, the researcher can appropriately

recognize and take responsibility for one's situatedness within the research and the effect that it could have on the study population, the data collected, and its interpretation.

Finlay (2020) reported that most qualitative researchers attempt to be aware of their co-role in constructing knowledge. Finlay (2020) found that researchers will try to explain how intersubjective elements impact data collection and analysis to enhance their research's trustworthiness, transparency, and accountability.

My interest in COPD started with my partner, who indirectly worked in the minerals industry as a surface driller and was diagnosed with COPD several years ago. When he was diagnosed with COPD, I had a vague understanding of what COPD was but no awareness of the future impact on all aspects of his life and what it would be like for him to live with this condition. The next opportunity to learn more about the disease as an occupational illness came about when discussing the occupational impact of COPD in the minerals industry with a union compensation officer who advocated for further study. As I read the literature on COPD, from the perspective of an occupational illness in the minerals industry, I discovered that underground workers were more susceptible to being diagnosed with COPD due to their occupational exposures and struggled to obtain compensation for this illness from the Ontario workers' compensation system. Witnessing my partner's experiences has made me acutely aware of the emotional, physical, occupational, and social factors that affect my partner and our entire family.

Born and raised in Sudbury, a Northern Ontario mining community, I have witnessed the healthcare challenges many underground mineral workers face, including my father, who suffered from a lower back injury sustained underground. Therefore, I am aware that Northern Ontario's limited resources and geographically low population density make healthcare challenging to deliver at the right time, at the right place, to those who need it.

As a researcher, I aim to explore and share these experiences further and contribute to a better societal understanding of the impacts of COPD and the challenges faced by underground mineral workers in Northeastern Ontario when submitting a compensation claim.

### **1.5 Theoretical Framework**

The theoretical framework incorporated into this research study is social constructionism/interpretivism with an ontological relativist approach. Crotty (1998) indicated that this approach considers how individuals understand the world in which they live and work. Furthermore, Crotty (1998) indicated that a social constructionist theoretical framework allows participants to validate their lived and similar experiences.

In order to answer the proposed research questions, participants had to be empowered to share the essential features of the phenomenon being studied, revealing aspects of their unexpected experiences that led to suggestions for future studies. An interpretive methodology enabled underground mineral workers with COPD, who are often disempowered, to voice their particular concerns, which may be otherwise ignored, overlooked, or undetected.

Crotty (1998) indicated that qualitative research seeks to explore and understand participant views rather than explain, which constitutes the underpinnings of the interpretivist theoretical framework. Unlike a positivist theoretical framework that aims to secure confidence intervals of a population's studied variables, an interpretivist framework relies on a sample of participants with intimate and first-hand knowledge of the phenomenon being studied. Therefore, an interpretivist framework will not aim for the generalizability of a specific relationship but instead provide a thorough description of the participants' characteristics so that the results could be transferred to similar participants. Finally, an interpretivist theoretical framework is distinguished by its strong emphasis on inclusion rather than exclusion; thus, to answer the research questions in this research study, soliciting in-depth stories about the economic and non-economic impacts of COPD as an occupational illness

and the compensation claim process experiences from underground mineral workers in Northeastern Ontario is critical.

### 1.5.1 Social Constructionism

Hazelrigg (1986) indicated that social constructionism suggests that individuals construct reality with each other, that knowledge is relational, and that it may be revealed by examining interactions and meaning-making between and among individuals. Van Kham (2013) indicated that, in general, social constructionism is connected to interpretive disciplines such as sociology, anthropology, and psychology. Burr and Ebrary (1995) stated that social constructionism asserts that we take a critical stance towards our usual understanding of the world, including ourselves. According to Van Kham (2013), social constructionists believe that each person has an individual view of the world in line with their perception and description of themselves and their reality; therefore, the application of social constructionism has been used widely in the fields of disability, mental health, gender, race, and ethnicity.

### 1.5.2 Interpretivism

Crotty (1998) stated that interpretivism, as a theoretical framework, attempts to understand and explain human and social reality. Crotty (1998) further reported that interpretivism aims to bring forward the social world that individuals understand by bringing hidden social forces and structures into consciousness. Savin-Baden and Major (2013) indicated that interpretivism has many meanings among different qualitative researchers, and researchers have used the term interpretivist research to mean all forms of qualitative research because the researcher acts as an interpreter of the social world. Savin-Baden and Howell (2013) reported that others might view interpretivism as a select group of philosophies such as pragmatism, phenomenology, hermeneutics, and post-critical/post-structuralism.

According to Flick (2014), interpretivism has its roots in anthropology; however, it opposes

positivism, sometimes known as anti-positivism. Flick (2014) stated that interpretivism argues that truth and knowledge are subjective, culturally, and historically situated and constructed by people's experiences and understanding. Flick (2014) also indicated that researchers could never be wholly separated from their values and beliefs, which would inevitably inform how they collected, interpreted, and analyzed data.

Flick (2014) outlined that interpretivism has its origins in the 18th century with the philosopher Giambattista Vico, who opposed Descartes. Flick (2014) stated that Vico argued that there is a distinction between the natural and social world and, more importantly, social organization and social experiences form our perceptions of reality and truth.

Ritchie and Lewis (2013) stated that interpretivism has a relativist, ontological perspective. Ritchie and Lewis (2013) outlined that relativists propose that reality is only understandable through socially constructed meanings and that there is no solitary shared reality. Therefore, Krauss (2005) noted that there are multiple realities because of individuals' different perceptions or meanings.

Interpretivists believe reality is subjective and socially constructed (Guba & Lincoln, 1994; Krauss, 2005). Therefore, truth and reality are created, not discovered. Flick (2014) stated that perception could not be seen as a passive-receptive process of representation but as an active constructive process of production; therefore, individuals interact with other individuals and society and assign meaning and names to different social phenomena.

### 1.5.3 Interpretivism – The Researcher

Thanh and Thanh (2015) found a close connection between the interpretivist paradigm and a qualitative methodology. Thanh and Thanh (2015) further noted that researchers who use an interpretivist paradigm and qualitative methods seek individuals' experiences, understandings, and perceptions for their data to uncover reality rather than rely on numbers or statistics. Thanh and Thanh (2015) reported that an interpretivist paradigm allows a researcher to view the world

through the participants' observations and experiences. Therefore, according to Thanh and Thanh (2015), in seeking the answers for research, a researcher who follows the interpretivist paradigm uses those experiences to construct and interpret the understanding from gathered data. Thomas (2003) stated that interpretivist researchers do not seek the answers for their studies in rigid ways but instead approaches reality from subjects, typically from people who own their experiences and are of a particular group or culture. Thomas (2003) maintained that interpretivists usually support qualitative methods since the interpretivist paradigm depicts a world where reality is socially constructed, complex, and ever-changing. McQueen (2002) noted that interpretivist researchers seek methods that enable them to understand the in-depth relationship of human beings to their environment. Therefore, as McQueen (2002) outlined, interpretivists do not prefer using methods that offer objective or precise information but instead view the world through a series of individual eyes. McQueen (2002) stated that interpretivists choose participants who have their interpretations of reality; therefore, quantitative methods would not be the preferred mode of interpretivism. McQueen (2002) indicated that in the interpretive paradigm, the researcher's essential purpose was to get insight and in-depth information; therefore, quantitative research, which describes the world in numbers and measures instead of words, would not likely be productive.

According to Grix (2004), researchers are a close part of the researched social reality, and they are not detached from the subject they are studying. Grix (2004) further stated that interpretive research is not meant to discover the universal context and value-free knowledge and truth but instead to understand social phenomena' interpretations.

Tuli (2010) stated that an interpretivist researcher describes objects, humans, or events and deeply understands them in a social context. Also, Tuli (2010) identified that interpretivist researchers research in a natural setting, providing more authentic information about the object of research. Finally, Wellington and Szczerbiniski (2007) stated that employing an interpretivist theoretical

framework enables the researcher to investigate and prompt participants using additional probes that could evoke further insight into a participant's thoughts, values, prejudices, perceptions, views, feelings, and perspectives. Therefore, valuable data collected could provide researchers with better insights necessary for future research studies.

#### 1.5.4 Interpretivism – Why it was Selected

An interpretivist theoretical framework was selected for the proposed research study because it allowed the participant's passionate voice to be heard (Thanh & Thanh, 2015). Interpretivism reaches beyond the biomedical model and shifts the researcher's power onto the participant (Thanh & Thanh, 2015). As part of my proposed research study, while I collected some data that spoke to the participants' physical limitations, I sought to collect impacts beyond the biomedical model. If I had been looking for physical limitations, I would have used another framework that collects data and numbers about the physical limitations attributed to COPD, such as a positivist theoretical framework that seeks objective empirical data. However, I attempted to obtain verbal accounts of the participants involved with my study and tried to understand COPD's impacts in the minerals industry. In this manner, an interpretive framework allowed considerations of the systemic or holistic nature of the participants' overall well-being within this research study.

Thanh and Thanh (2015) indicated that interpretivism requires a passionate researcher who aims to find answers only human beings can provide. While human subjects are part of a positivist framework, the subjects are viewed from an outside perspective. A framework was required to answer the research questions that allowed the ability to ask open-ended questions, not use a survey to collect data. The use of questionnaires would not stimulate the elaboration level required to answer the research questions. In order to obtain thick and rich data, additional probes were used that evoked more in-depth information from the participants.

Thanh and Thanh (2015) indicated that an interpretivist theoretical framework fosters in-depth

face-to-face interviews with participants. The authors further noted that it fosters self-reflexivity and forces the researcher to be mindful that research can never be objectively observed from the outside; instead, it must be observed from the inside through the participants' direct experiences.

As a qualitative researcher, I sought to explore and understand through participant views rather than explain, which constitutes the underpinnings of the interpretivist theoretical framework. It was also unlikely that I would gather depth and insight via statistics frequently used in quantitative methods. Unlike a positivist theoretical framework that aims to secure confidence intervals of studied variables of a population, I tried to gather a sample of participants with intimate and first-hand knowledge of the phenomenon being studied. Therefore, an interpretivist framework did not aim to generalize a specific relationship but instead gained a thorough specification of the characteristics of the participants so that the results could be used to transfer to similar participants. Finally, according to Thanh and Thanh (2015), an interpretivist theoretical framework is distinguished by its strong emphasis on inclusion rather than exclusion; thus, in this research study soliciting stories from underground mineral workers diagnosed with COPD, physicians, and union compensation officers was critical for gathering information to answer the research questions.

Thanh and Thanh (2015) reported that interpretivism fosters acceptance while seeking numerous perspectives, being open to change, practicing iterative and emergent data collection techniques, promoting participatory and holistic research, and going beyond the deductive approach.

As a researcher with a background in interdisciplinary health, my research approach reflected the interpretivist stance. I believe that individuals' interpretations of their lived experiences are essential factors in how they behave. Consequently, as Thanh and Thanh (2015) outlined, an interpretivist paradigm requires responses to different questions than those within a positivist paradigm, and therefore, a different type of data is required.

## **1.6 Research Questions**

Using social constructionism and interpretivism as the theoretical underpinning, the purpose of the present study was to explore the economic and non-economic impacts of COPD in the minerals industry. This study aimed to move beyond the biomedical model of COPD and instead explore a more in-depth understanding of the individual experiences of underground mineral workers diagnosed with occupational COPD and involved with the WSIB claim process experience.

The central objectives that guided this research study were:

1. To explore the impact (i.e., psychosocial, occupational, financial, and physical) of chronic obstructive pulmonary disease on some underground workers in the minerals industry in Northeastern Ontario.
2. To describe underground mineral workers' experiences with the Ontario workers' compensation claim process.
3. To describe physician and union compensation representative experiences working with underground mineral workers diagnosed with COPD as an occupational illness and their experiences with the Ontario workers' compensation claim process.

## **1.7 Methods**

### **1.7.1 Study Design - Narratives**

A narrative inquiry approach is most appropriate to understanding the experiences, actions, motivations, and life journeys of individuals who are challenged by health, disability, trauma, change, adaptation, loss, or other significant life challenges (Clandinin & Raymond 2006; Holloway, 2007; Ennals & Howie, 2017). Narrative inquiry can contribute significantly to knowledge within the health and social sciences disciplines through its capacity to give voice to individuals whose voices have often been discounted (Clandinin & Raymond 2006; Holloway, 2007). In the context of health, social sciences, and education, narrative research is a data gathering and an interpretive or analytical framework (Connelly & Clandinin, 1990).

Connelly and Clandinin (1990) are among the early supporters of narrative research who proposed to put the person back to the center of research inquiry, ensuring that people's voices were not lost in translation. Chase (2011) noted that narrative researchers, similar to qualitative researchers, see their work as having the potential to create positive change and address injustices. Chase (2011) further stated that many researchers collect, present, and disseminate stories to encourage change. Outlined by Clandinin and Raymond (2006), narrative inquiries are particularly relevant within the health and social sciences, where they can inform positive changes to practice, policy, education, and theory. Recommendations for change can be made based on the life experiences of people directly impacted by practices and policies (Clandinin & Raymond 2006).

Chase (2011) noted that narrative researchers, similar to other qualitative researchers, view their work as having the potential to produce positive change and address injustices. Clandinin and Raymond (2006) outlined that narrative inquiries are particularly relevant within the health and social sciences to inform positive changes to practice, policy, education, and theory. The authors noted that recommendations for change could be made based on people's life experiences directly impacted by practices and policies.

Frost (2011) indicated that narratives are viewed as vehicles through which individuals talk about their lives and do not merely express some independent, individual reality. Instead, they help construct the reality within relationships between the narrator and the external world. Frost (2011) further reported that narratives are produced in social interactions between individuals and are not privately created. Frost (2011) stated that narratives occur within specific places or situations. The primary method of gathering stories is through rich data collected during in-depth and in-person interviews in which themes are generated. As outlined by Creswell (2013), there are different approaches when using narrative studies, including biography, autoethnography, a life history, and oral history.

Creswell (2013) stated that narratives are powerful forms of giving meaning to experience and enable a collection of stories from individuals about their lived experiences. Frost (2011) indicated that narratives are viewed as the vehicle through which individuals talk about their lives and do not merely express some independent, individual reality; instead, they help construct the reality within relationships between the narrator and the external world. Frost (2011) further reported that narratives are produced in social interactions between individuals; they are not privately created.

An advantage of using a narrative study design is that it allows collaboration throughout the process with individuals who are sharing their stories (Creswell, 2013). Therefore, participants are actively involved in the story's unfolding and creation (Creswell, 2013). A narrative approach can tap into the participants' emotional and intellectual experiences and help promote education about a topic or phenomenon being studied, possibly leading to policy changes (Creswell, 2013). Frost (2011) indicated that the stories given by the participants could help to engage an audience and personalize the experiences that are being described. A narrative approach can also tap into emotional experiences and the intellectual experiences of the participants and helps promote education about a topic or phenomenon being studied, possibly leading to policy changes (Creswell, 2013).

A disadvantage of using a narrative study design is the possibility of participant recall bias (Creswell, 2013). The stories shared by the participants are primarily individual constructs of human experience; therefore, they may limit the objectivity of the research (Creswell, 2013).

Another disadvantage of this study design is the time it takes to collect and transcribe the data (Creswell, 2013). Finally, Frost (2011) noted that this type of research is criticized for being soft and lacking in the ability to be transferable.

### 1.7.2 Defining Northern, Urban, and Rural

As outlined in the Ontario government's Rural and Northern Healthcare Framework (2010), rural communities in Ontario have a population of less than 30,000 and are greater than 30 minutes away in travel distance from a community with a population of more than 30,000. Therefore, communities with more than 30,000 residents typically have a broader scope of healthcare services than smaller communities. The larger communities of 30,000 residents or more usually have a wider range of specialty and sub-specialty inpatient hospital services, expanded community-based programs and often serve as hubs for regional programs (Rural and Northern Healthcare Framework, 2010).

Northeastern Ontario is approximately 400,000 square kilometres and has a population of 565,000 (NELHIN, 2016). This area equates to 44% of Ontario's landmass and is broken into five sub-regions: Algoma, Cochrane, Sudbury/Manitoulin/Parry Sound, Nipissing/Temiskaming, and James Bay and the Hudson Bay Coast (NELHIN, 2016). Northeastern Ontario has a large Francophone population (23%) and a large Indigenous population (11%; NELHIN, 2016). Northeastern Ontario communities were selected for this study due to their proximity to mineral industries and because of the increased rates of several chronic diseases in Northeastern Ontario compared to the rest of the province (NELHIN, 2016).

### 1.7.3 Study Setting

The study settings for the research study included Sudbury, Timmins, Matachewan, and Kirkland Lake. These communities are considered northern, urban (large and small), and rural (Rural and Northern Healthcare Framework, 2010). Outlined in the Rural and Northern Healthcare Framework (2010), Sudbury is classified as a large urban community (population, 169,164), Timmins is a small urban community (population, 41,788), and Matachewan (population, 225) and Kirkland Lake (population, 6,305) are considered to be rural communities. Due to their proximity to active mineral operations, these communities were selected and were recommended by a Local 6500

union compensation officer. The recommendation was based on the Local 6500 Union compensation officers' connection with the communities, the ability to access the mining operations within these communities and the ability to reach data saturation. Finally, these communities were chosen because of the challenges that the populations of these northern communities face when accessing healthcare services compared to those in southern Ontario (Rural and Northern Healthcare Framework, 2010).

#### 1.7.4 Participants

Purposeful sampling was used as it is consistent with the narrative study design and was most suited for this research (Creswell, 2013; Frost, 2011). The strength of the purposeful sampling technique lies in selecting information-rich cases for in-depth study, and these information-rich cases are individuals or events or settings from which researchers can learn extensively about issues they wish to examine (Creswell, 2013; Frost, 2011). Purposeful sampling also has some limitations, including researcher bias; however, this can be minimized when an appropriate theoretical framework is in place (Creswell, 2013; Frost, 2011). Another limitation of this type of sampling is participant bias found when participants hope to influence the research outcomes (Creswell, 2013; Frost, 2011).

The participants for this study included underground mineral workers clinically diagnosed with COPD as an occupational illness, primary care physicians and lung specialists involved with underground mineral workers diagnosed with COPD as an occupational illness, and the workers' compensation claim process and union representatives who are or were involved with the compensation claim process for underground mineral workers diagnosed with COPD as an occupational illness.

Free and informed written consent was obtained from participants before commencing research. Participants who could not give verbal or written consent were excluded from the sample due to a

lack of cognitive abilities. Participants were advised that they could withdraw from the study at any time, for any reason, and without consequences. To thank participants for their time, they were provided with a twenty-dollar gift card sent by email at the beginning of the interview.

#### *1.7.4.1 Underground Mineral Workers*

Targeted, English-speaking participants included underground workers in the minerals industry in Northeastern Ontario diagnosed with COPD within the last ten years (to reduce recall bias) and are, or had been, involved with the Ontario Workplace Safety and Insurance Board. English-speaking participants were only selected because the primary researcher is unilingual. Age, gender, formal occupation, or other defining variables were not predetermined. The sample size was estimated to be 15 to 20 participants and was acquired across four locations.

Participants were selected to participate in the research study with the Local 6500 union compensation officers' assistance using the existing union database that houses information about employees employed at different mines in the Northeastern Ontario region (Appendix 17). The union compensation officer only accessed this database. The Local 6500 union provided a letter of support for this study (Appendix 13). A participation letter was developed and was provided to a union compensation officer for dissemination via mail or email to potential participants who fulfilled the study criteria (Appendix 5). Participants who met the inclusion criteria received the participation letter in the mail or via email. Participants were provided with the primary researcher's phone number and email address. The union compensation officer was unaware of who opted to participate or not participate in the research study.

Participants were also recruited with the support of the Sudbury clinic of the Occupational Health Clinics for Ontario Workers (OHCOW). According to OHCOW Sudbury, the 39 potential participant pool encompassed those miners who registered with OHCOW for the McIntyre Powder-exposed group, where WSIB claims for COPD were filed either by the Office of the

Worker Advisor or through an expedited claims process at OHCOW, and the miner was still alive. There were an additional 25 COPD claimants among the McIntyre Powder group at OHCOW who are deceased, and several of them were alive when the COPD claim was initially filed. These individuals arose from a pool of about 500 miners, providing an idea of the scope of the COPD issue among the miners. OHCOW mailed letters (Appendix 12) to the 39 participants who met the study criteria.

#### *1.7.4.2 Primary Care Physicians and Lung Specialists*

Physician recruitment included advertising for participation in the Northern Ontario School of Medicine Clinical Sciences Newsletter (Approval received by the Associate Dean of Faculty Affairs) (Appendix 14). The newsletter was sent via email to all clinical faculty of NOSM throughout Northern Ontario. A paragraph in the newsletter outlined the research study briefly and included the primary researcher's contact number and email address should physicians wish to participate in the research study.

Additionally, the *Doctor Search* engine on The College of Physicians and Surgeons of Ontario website was conducted to generate a list of physicians with an active primary care or lung specialist practice in Sudbury, Timmins, Kirkland Lake, and Matachewan. Once a list was generated, letters were mailed to the physicians.

Finally, physician recruitment also took place with the support of OHCOW. Physicians involved with the McIntyre Powder project were emailed to recruit participants for this study.

There were some difficulties with the physician participants' recruitment process, resulting in a small participant group. One challenge was non-response to the participant's letter. Some possibilities for a large non-response rate include time constraints due to a busy practice, COVID, and the possibility that physicians would not want to engage in a research study that looks at work-related exposures contributing to COPD; most physicians only see smoking as the cause of COPD.

#### *1.7.4.3 Union Compensation Officers*

Recruitment of the union compensation officers included a letter sent by the primary researcher to the union compensation representative at the Local 6500 Union of Sudbury via email, who provided the participation letter to all union compensation officers of the Local USW 6500 union.

There were limited union compensation representative participants due to the specialized skills involved with dealing with complex compensation claims. Union compensation representatives require years of experience to understand the complexities of dealing with an underground worker diagnosed with COPD and going through the compensation claim process. There are limited human resources with unions which compounds the workload for those qualified to assist with the compensation claims.

#### *1.7.5 Questions/Instruments/Measures*

Frost (2011) stated that narrative interviews prioritize participants' stories with minimum involvement from interviewers. An interview guide with semi-structured questions was developed to help facilitate the interview process (Appendix 8, 9, 10). Within this study, interviews were conducted using telephone calls. The duration of the interviews was approximately 60 to 90 minutes; however, the length was determined by the extent of sharing by each participant. Acting in a supportive manner allowed the participants to feel comfortable sharing their stories. With a recognition that the interviews could evoke emotional responses in the participants, a document with contact information for local mental health support agencies and the union EAP services was provided to the underground mineral workers (Appendix 11). Finally, if participants were upset or short of breath due to their COPD diagnosis, they were advised that they could take a break, reschedule or resume the interview, or withdraw from the study at any time without any consequences.

#### *1.7.6 Data Collection*

Originally, in-person interviews were going to be conducted. However, due to the COVID

pandemic, conducting all interviews by telephone became necessary.

Sturges (2014) indicated that telephone interviews in qualitative research are uncommon, mainly due to concerns about whether telephone interviews are best suited to the task. Research studies have shown that qualitative researchers generally rely on face-to-face interviewing when conducting semi-structured and in-depth interviews and conducting an interview by telephone typically is seen as appropriate only for short, structured interviews or in very specific situations (Harvey, 1988; Fontana & Frey, 1994; Rubin & Rubin, 1995). However, Fenig and Levav (1993) noted that respondents who agree to be interviewed about sensitive topics might prefer the relative anonymity of telephone versus face-to-face interaction with the researcher. Creswell (1998) found that respondent reluctance is a well-known fact of interview studies. Miller (1995) reported that telephone interviewing might provide an opportunity to acquire data from potential participants who are hesitant to participate in face-to-face interviews or from groups who are otherwise difficult to access in person. Miller (1995) further noted that in these cases, using the telephone could make it possible to acquire data from people who would not otherwise have their views represented.

Telephone interviews are a cost-effective method of data collection, particularly when compared to face-to-face interviews located in the respondent's normal environment (Tausig & Freeman, 1988; Aquilino, 1992; Miller, 1995). Creswell (1998) noted that using a telephone deprives the researcher of seeing the respondents' informal, nonverbal communication but notes that it is appropriate when they do not otherwise have access to the respondent. Sobin et al. (1993) found that researchers who compared telephone interviewing with field interviewing concluded that telephone interviewing was an acceptable and valuable data collection method and successfully obtained completed interviews. Miller (1995) concluded that telephone interviews are not better or worse than face-to-face interviews.

Furthermore, using the telephone is an effective means to gather sensitive data even when

compared with direct questioning (Babbie, 1986; Tausig & Freeman, 1988). Fenig and Levav (1993) stated that the advantage of telephone interviewing is that it provides access to potential participants who are resistant to face-to-face interviews. Tausig and Freeman (1998) reported that respondents provide verbal cues such as hesitation and sighs, indicating that a probe or follow-up question is in order. However, the authors noted that even though telephone interviews prevented probing the participants based on visual cues, the ability to probe participants was still possible. Furthermore, Tausig and Freeman (1998) indicated that the interviewer could take notes without distracting interviewees when conducting telephone interviews. Finally, research studies have found that telephone interviews can yield valuable quality data with maximized response rates and can effectively collect data (Tausig & Freeman, 1988; Harvey, 1988).

Research studies have shown that some disadvantages of telephone interviews include limiting the interviewer's options to reassure respondents who become emotional during the interview. They may also limit the interviewer's ability to anticipate such a reaction due to a lack of visual cues of respondent distress (Tausig & Freeman, 1988; Harvey, 1988).

The primary data collection method was in-depth, semi-structured telephone call interviews; however, reflexive journaling was also recorded throughout the study. According to Frost (2011), listening to participants' responses is key in narrative interviewing. Frost (2011) stated that a very open-ended question might not help produce narratives. Therefore, questions that encouraged the participant to unpack the story's layers could be asked during interviews. Frost (2011) revealed that empowering respondents through restructuring is an essential part of the interview design leading to participants finding and speaking their voices. The author further noted that restructuring interviews could be achieved through less restrictive open-ended questions and attentive interviewers, helping to shift the balance of power between interviewers and interviewees.

All interviews were audio-recorded and subsequently transcribed verbatim to ensure accuracy with the participants' approval.

Throughout the study, reflexive journaling was used to detail the researcher's biases, beliefs, presuppositions, and unforeseen turns or challenges to ensure honesty and transparency (Tracy, 2010). As part of the reflexive process, and as the interviewer, I remained aware that participants had their own agendas and understanding of the interview interaction and allowed them to tell their stories in their own way and express their views (Frost, 2011). As the primary researcher and interviewer, it was essential to focus on non-judgmental validation of the participants' stories (Frost, 2011). This validation respected the participants' ways of telling stories and encouraged participants to collaborate in interviews. Frost (2011) stated that narrative interviewing could help to provide a space for researchers to use the idea of co-construction of the meaning creatively.

#### 1.7.7 Data Management

All interview data were digitally audio-recorded, collected, housed, and locked at both the primary researcher's home and Laurentian University, at Dr. Nancy Lightfoot's office, ensuring the privacy and confidentiality of the participant information. Physical safeguards for the data included locked filing cabinets only accessible by the primary researcher and a computer containing the research data that were located away from public areas. Computer passwords, firewalls, and anti-virus software were used to protect the data from unauthorized viewers. All the data stored on computers and laptops during the research were locked at the researcher's home and were further stored in Dr. N. Lightfoot's office at Laurentian's School of Rural and Northern Health upon completion of the research.

The primary researcher transcribed verbatim from the digital audio recordings and journal notes and de-identified participants at the time of transcription by removing any participant identifiers.

### 1.7.8 Data Analysis

For this study, a social constructionist/interpretivist epistemological stance informed the methodology (narrative), which informed the choice of the analytic model for this research study. Polkinghorne's (1995) analysis of narratives was conducted categorically (i.e., by looking for categories and themes within the narratives and analyzing themes across all narratives) and focused on the content of what was being shared by the participants. Braun and Clarke's (2006, 2012, 2013, 2019) six-step thematic analysis was used to analyze the data and allowed themes to emerge as it is a recommended method of data analysis by Polkinghorne (1995).

Data analysis was conducted using an inductive approach aligning this process with the research study's theoretical framework (Braun & Clarke, 2006, 2012, 2013, 2019).

Polkinghorne (1995) made an important distinction between two categories of narrative analysis. He based the two types of analysis, narrative analysis and analysis of narratives (inductive and deductive), and narrative cognition and paradigmatic cognition, two different but complementary and equally valid ways of understanding the world. Polkinghorne (1995) noted that paradigmatic and narrative cognition generate valuable and valid knowledge. Polkinghorne (1995) further stated that paradigmatic knowledge focuses on what is common among actions, and narrative knowledge focuses on each action's specific and unique characteristics.

Inductive analysis of narratives refers to deriving categories and themes directly from the data using such processes as a constant comparison. Deductive analysis of narratives is an analysis that explores data for examples of theoretical concepts or pre-existing knowledge relevant to the aims of the research study. Inductive analysis was chosen for this study because it was expected to provide the most robust identification of commonalities among participants' experiences.

#### *1.7.8.1 Inductive Paradigmatic Analysis*

Polkinghorne (1995) stated that inductive paradigmatic analysis is a method of making

comparisons that allow incidents within the data to be compared to other incidents to group them into categories according to similarities and differences. Polkinghorne (1995) noted that some of the questions a researcher can ask of the data to help guide comparisons include “Did other participants have a similar experience?” “Did others report different experiences?” and “What seems to be influencing the differences in the experience?”.

Polkinghorne (1995) indicated that a thematic analysis technique described by Braun and Clarke (2006, 2012, 2013, 2019) is another example of an approach used to allow themes to arise inductively from data.

#### 1.7.8.1.1 Braun and Clarke

Braun and Clarke’s (2006, 2012, 2013, 2019) thematic analysis is considered a reflexive thematic analysis approach. Reflexive thematic analysis is conceptualized as an entirely qualitative approach that includes data collection and analysis techniques underpinned by a qualitative philosophy or paradigm. A reflexive thematic analysis emphasizes the researcher’s active role in the knowledge production process (Braun & Clarke, 2006, 2012, 2013, 2019).

Braun and Clarke’s (2006, 2012, 2013, 2019) thematic analysis consists of six phases 1) familiarizing yourself with the data, 2) generating initial codes, 3) searching for themes, 4) reviewing potential themes, 5) defining and naming themes, and finally, 6) producing the report.

Braun and Clarke (2006, 2012, 2013, 2019) defined *thematic analysis* (TA) as a method for identifying themes and patterns of meaning across a dataset in relation to a research question.

Thematic analysis is a method of data analysis and can be used to answer many research questions.

Thematic analysis can be applied to data differently, from experiential to critical. It can be used to develop a detailed descriptive account of a phenomenon or some aspect of a phenomenon.

Braun and Clarke (2006, 2012, 2013, 2019) introduced the six stages necessary for data analysis.

Each stage is further described.

#### Stage 1 - Familiarizing Yourself with the Data

Braun and Clarke (2006, 2012, 2013, 2019) stated that this phase allows the researcher to become intimately familiar with the dataset's content and notice things relevant to the research question. For textual data, this process involves reading and re-reading each data item. During this process, areas of interest will emerge, and these areas might provide overall impressions of the data, a conceptual idea about the data, or more concrete and specific issues.

Braun and Clarke (2006, 2012, 2013, 2019) noted that familiarization is not a passive process of simply understanding the words (or images); it is about starting to read data as data and reading data as data means not merely absorbing the surface meaning of the words, or images, but reading the words actively, analytically, and critically thinking about what the data mean.

#### Stage 2 – Coding

Braun and Clarke (2006, 2012, 2013, 2019) reported that coding is a process of identifying aspects of the data related to your research question. There are two main approaches to coding in pattern-based forms of qualitative analysis, including *selective coding* and *complete coding*.

*Selective Coding* involves identifying several instances of the phenomenon that the researcher is interested in and then selecting them. The purpose of selective coding is data reduction.

*Complete Coding* is a different process. Instead of looking for particular instances, the researcher aims to locate anything of interest or relevance to answering the research question within the entire dataset. This means that rather than selecting out a particular quantity of instances that are then analyzed, coding all the data relevant to your research question is done. It is only later in the analytic process that the researcher becomes more selective. In complete coding, codes identify and provide a label for a feature of the potentially relevant data for answering the research question.

A code is a brief-phrase or a word that captures the crux of why a particular bit of data may be helpful. Codes provide the building blocks of analysis. In broad terms, codes can either reflect the data's semantic content (data-derived or semantic codes) or more conceptual or theoretical interpretations of the data (researcher-derived or latent codes). Different approaches have different labels for these types of codes.

#### Data Derived or Semantic Codes

Data-derived codes provide a concise summary of the data's explicit content; they are semantic codes because they are based on the semantic meaning in the data. When coding participant-generated data, they mirror the participant's language and concepts.

#### Researcher Derived or Latent Codes

Researcher-derived codes go beyond the data's explicit content; they are latent codes that invoke the researcher's conceptual and theoretical frameworks to identify implicit meanings within the data. Implicit meanings are the assumptions and frameworks that underpin what is said in the data.

#### Complete Coding

Complete coding begins with the first data item. Then a systematic process of working through the whole item by looking for chunks of data that potentially addresses the research question is undertaken. Coding can be done in large chunks (i.e., 20 lines of data), small chunks (i.e., a single line of data), and anything in between, as needed. Data that do not contain anything relevant to the research question is not coded.

#### Step 3 – Searching for Themes

Braun and Clarke (2006, 2012, 2013, 2019) stated that a pattern-based analysis allows you to identify and report the data's salient features systematically. The pattern-based analysis rests on the presumption that ideas that recur across a dataset capture something psychologically or socially meaningful. In working out which patterns are relevant and vital about the research question, it is not just a question that is the most frequent. While frequency is an essential factor, it is also about

capturing the different elements that are most meaningful for answering the research question. Therefore, it is about meanings rather than numbers. New Zealand health researcher Stephen Buetow (2010) developed an approach based on but extending thematic analysis called saliency analysis, which captures the point that something in data can be significant without frequently appearing.

A theme captures something important about the research data in relation to the research study questions. A theme has a central organizing concept, which tells us something about the content of the meaningful data and how that concept appears in the data; it tells us something meaningful about the research question. A theme has a central organizing concept but will contain many different ideas or aspects related to the central organizing concept (each of those might be a code).

Taylor and Ussher (2001) indicated that developing themes from coded data is an active process. The researcher examines the codes and coded data and creates potential patterns; they do not discover them. The themes identified are provisional; they are candidate themes and are revised or refined through the developing analysis. Determining the importance of a theme is not about counting (i.e., frequency overall, frequency within each data item); it determines whether this pattern tells us something meaningful and essential for answering the research question.

#### Stage 4 – Reviewing Themes

Braun and Clarke (2006, 2012, 2013, 2019) suggested that this phase is essentially one of quality control in relation to developing the analysis. The authors stated that after the researcher has revised the themes around the coded data extracts and has a set of coherent candidate themes that are distinctive, work together, and, importantly, relate to the research question in some way, the researcher further reviews the candidate themes by going back to the entire dataset.

#### Stage 5 - Defining and Naming Themes

Braun and Clarke (2006, 2012, 2013, 2019) indicated that the researcher clearly defines the themes

and indicates distinctive and specific themes in working towards a final analysis. The authors suggested that writing theme definitions is a valuable discipline to engage in because it forces the researcher to define the themes' focus and boundaries and distil an essence of what each theme is about.

#### Stage 6 – Producing the Report

Braun and Clarke (2006, 2012, 2013, 2019) stated that from all the coded and collated data for each candidate theme, the selection of the extracts is conducted to indicate how each theme's different facets will be used and then write a narrative around those extracts, which tells the reader the story of each theme. Foster and Parker (1995) stated that the analysis presented is described as a deliberate and self-consciously artful creation by the researcher to persuade the reader of an argument's plausibility. Braun and Clarke (2006, 2012, 2013, 2019) indicated that ideally, the researcher wants vivid extracts and compellingly illustrates about the data.

Braun and Clarke (2006, 2012, 2013, 2019) found two main ways data extracts can be treated in qualitative analysis. One is to treat the extracts as illustrative examples; the other is to analyze their content. The authors noted that this distinction is essential.

Braun and Clarke (2006, 2012, 2013, 2019) indicated that in an illustrative approach, the analytic narrative provides a rich and detailed description and interpretation of the theme, and data quotations inserted throughout are used as examples of the analytic points being claimed. The authors noted that if the data extracts from the narrative were removed, it would still make sense to a reader and would still be a thorough and coherent description.

Braun and Clarke (2006, 2012, 2013, 2019) stated that in the treating extracts analytically approach, the analysis would not make sense if the extracts were removed, as the analytic narrative is closely tied to the content of the extracts presented. The researcher would make specific interpretative claims about the particular extracts presented in the analytic narrative and make more

general descriptive or interpretative comments about the data patterns overall.

Braun and Clarke (2006, 2012, 2013, 2019) indicated that the analysis interprets the data, connects it to the research question, and ties the data and analysis into the existing scholarly literature.

Linking the analysis to the literature is a vital part of any analysis (qualitative or not); it is about locating the analysis related to what already exists, showing how your analysis contributes to, develops further, or challenges what we already know about a topic.

Finally, Braun and Clarke (2006, 2012, 2013, 2019) outlined a narrative summary of the data analysis is completed. Like all academic texts, writing a thematic analysis requires an introduction to establish the research question, aims, and approach.

Braun and Clarke (2006, 2012, 2013, 2019) noted that the researcher should also include a methodology section describing how the data was collected (i.e., through semi-structured interviews or open-ended survey questions) and explain how the thematic analysis was conducted. The results or findings section usually addresses each theme in turn. Finally, as outlined by the authors, the conclusion explains the main takeaways and shows how the analysis answered the research question.

In this proposed research study, familiarization with the data occurred by transcribing verbatim and reading and re-reading the transcriptions. The data was transcribed to an appropriate level of detail, and the transcripts were checked against the audiotapes for accuracy. Once familiarization took place, an initial list of ideas was created. The codes were organized into meaningful groups.

Coding was done manually by working systematically through the entire data set. After the initial interview was coded, Dr. Nancy Lightfoot also coded the interview. Each data item were given equal attention in the coding process. Themes were not produced from a few vivid examples, but instead, the coding process was thorough, inclusive, and comprehensive. All significant extracts for

each theme were organized using Doc Tools for Microsoft Word (Version 2) (Microsoft Word, 2022). Extracts were compared against each individual participant extracted themes. Transcripts were read line-by-line, and initial codes were placed in a column alongside the transcripts. These codes were refined and added to as interviews were revisited over time. Themes were checked against each other and then back to the original data set. Upon completion of coding, I looked for larger patterns across the dataset and grouped the codes into potential themes. Themes and subthemes were identified for significance, and reviewing the themes in the next stage helped determine if there was enough data to support themes. I found it helpful to think of the theme titles as spoken in the first person, and imagined participants saying them, to check whether they reflected the dataset and participants' meanings. I created a large directory of themes and smaller sub-themes, with the relevant participant quotations filed under each theme or sub-theme heading. This helped me adjust theme titles, boundaries, and position which meant that I could check that themes were faithful to the data at a glance and was of practical help when writing the analysis. The process of coding and developing themes was intended to have both descriptive and interpretive elements.

The analysis told a convincing and well-organized story about the data and topic. A good balance between analytic narrative and illustrative extracts was provided. Enough time was allocated to complete all analysis phases adequately, without rushing a phase or giving it a once-over-lightly. The fifth stage involved defining and naming themes by identifying the essence of each theme. Naming themes involved coming up with a succinct and easily understandable name for each theme. The themes were reviewed as a quality checking method, and this was accomplished by checking themes that arose against the entire data set, ensuring the themes worked with the research question. Finally, in the sixth step, the report was produced. The assumptions and specific approaches to thematic analysis were explained. The concepts and language used in the report were

consistent with the epistemological position of the analysis.

### **1.8 Study Validations**

Colorafi and Evans (2016) indicated that trustworthiness, credibility, dependability, transferability, and application of the findings across all transcripts could be accomplished by reading and re-reading. Berger (2015) indicated that reflexivity and addressing biases could enhance a research study's trustworthiness and objectivity. Colorafi and Evans (2016) noted that dependability is achieved by using consistent procedures across all participant interviews, such as consistency in data collection (i.e., using the same interview questions in the same order) and clearly describing the researcher's role within the study. Credibility is achieved by providing thick and rich data that are believable from the participants' perspective. Additionally, transferability is accomplished by thoroughly describing the participants' characteristics to compare with other groups (Colorafi & Evans, 2016).

Lincoln and Guba (1985) described transferability as the extent to which (aspects of) qualitative results can be transferred to other groups of people and contexts. The key to enhancing the study's transferability is to describe the specific contexts, participants, settings, and circumstances of the study in detail, so the reader can evaluate the potential for applying the results to other contexts or participants.

Seale (1999) noted that member checking refers to the practice of checking your analysis with your participants. It typically involves presenting a draft written or oral report of the research, or just of the analysis, to some or all participants and asking them to comment on the trustworthiness or authenticity of what has been produced. Researchers choose to do this for several reasons, including a concern to avoid misrepresenting the views of their participants or, if they are aiming to give voice to participants' experiences, ensuring a good fit between their interpretations and representation of their participants' experiences and the participants' understandings of their

experiences. Lincoln and Guba (1985) presented member checking as a type of credibility check. It could be regarded as a qualitative version of reliability and aims to determine that the results are credible and dependable from the participants' perspective.

Smith (1996) noted that triangulation traditionally refers to a process whereby two or more data collection methods or data sources are used to examine the same phenomenon, intending to get as close as possible to the object of the study's truth. Smith (1996) argued that some qualitative researchers use triangulation to strengthen analytic claims and get a richer or fuller story rather than a more accurate one. Silverman (1993) reported that triangulation becomes a way of capturing the multiple voices or truths that relate to the topic, rather than being understood as a way to access the one right result.

### **1.9 Strengths and Limitations**

This study was the first to explore the experiences of underground mineral workers diagnosed with COPD as an occupational illness across Northeastern Ontario. The data collected from the participants involved in this study could help eliminate the gap in information about underground mineral workers' experiences with COPD and their experiences with the compensation claim process. Another strength of the study was capturing in-depth perspectives from underground mineral workers diagnosed with COPD who had direct experiences with the compensation claim process, physicians involved with the underground worker's care and their compensation claim, and union compensation officers involved with the compensation claim process. This study's limitations include the possibility of participant selection bias, participant recall bias, authentication of the stories, and researcher bias. Furthermore, the study outcomes might not be transferable to similar populations outside of Northeastern Ontario due to the small participant sample.

### **1.10 Ethical Considerations**

An expedited research ethics application was submitted to the Laurentian Ethics Review Board and

approved (Appendix 16). An ethical examination of my role as the primary researcher allowed respectful relationships with the participants. Considerations were made to ensure participant voices were acknowledged and a reflexive position was described and written into the study (Creswell, 2013).

### **1.11 Overview of Thesis Outline**

This thesis consists of six chapters. Chapter 1 includes an introduction, background, reflexivity, literature review, theoretical framework, and a brief discussion about the methods used for this study. Chapters 2, 3, 4, and 5 consists of four papers discussing the study's outcomes. Chapter 6 includes a summary of literature findings, the theoretical framework, the study strengths and limitations, implications for the future, and finally, concluding thoughts.

## **Chapter 2: COPD and Compensation Claims: Every Miner has their Story (Part 1)**

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## ABSTRACT

Chronic obstructive pulmonary disease (COPD) causes many deaths in the world. Cigarettes are the main cause of this disease. However, workplace exposures, including those in the mining industry, may also lead to COPD. Some of these exposures include dusts and fumes that can be higher for workers in the mining industry who work in small areas. As a result, workers in the mining industry may submit compensation claims. Sadly, work-related COPD is under-compensated and not well recognized by the Ontario Workplace Safety and Insurance Board (WSIB). Underground miners who have work-related COPD can struggle to complete forms and have their claims approved, and because of this, they can struggle with money, family, and mental health problems. This qualitative narrative study used in-depth telephone interviews to collect information. The information collected from the underground miners was analyzed to understand their perspectives and experiences about the compensation claim process and work-related COPD. This is the first study to examine how COPD could affect underground mining workers in Northeastern Ontario. This study could help to improve services and support for workers with occupational illnesses.

Keywords: COPD, mining, underground worker, compensation, qualitative, narrative

## Introduction

Chronic Obstructive Pulmonary Disease (COPD) includes chronic lung diseases that can limit airflow into the lungs and is characterized as progressive and debilitating (Statistics Canada, 2020; WHO, 2019). COPD is considered an umbrella term that describes a group of chronic lung diseases such as emphysema, asthma, and bronchitis (WHO, 2019). In Canada, COPD primarily affects individuals aged 35 and older (Public Health Agency of Canada, 2018). COPD is accompanied by respiratory symptoms, including dyspnea, cough, and sputum production (Rycroft et al., 2012; Public Health Agency of Canada, 2018).

COPD is a complex and heterogeneous disease associated with high morbidity and mortality (Soriano et al., 2017; Vos et al., 2012). According to the latest update of the Global Burden of Disease Study, the prevalence of COPD in 2017 was 174 million people worldwide, and it was estimated that it became the third most common cause of death globally since 2012, after ischemic heart disease and cerebrovascular disease (Soriano et al., 2017). The Global Burden of Disease Study also indicated that there were 3.2 million deaths due to COPD (Viegi et al., 2020).

The primary cause of COPD in Canada and other developed nations includes long-term exposure to lung irritants, and the primary irritant is tobacco smoke (Public Health Agency Canada, 2018).

Occupational exposures to organic and inorganic dusts and chemical fumes (e.g., diesel engine exhaust, silica and benzene) are known risks for developing COPD (Centers for Disease Control and Prevention, 2012). For example, exposures to organic and inorganic dusts and chemical fumes are seen in coal and hard rock miners and workers manufacturing concrete (Wise & Tashkin, 2007; Centers for Disease Control and Prevention, 2012).

Afonso et al. (2011) indicated that risk factors for COPD include smoking history, gender, and increased age. Recent studies also showed that occupational exposures (i.e., organic and inorganic dusts, chemical agents, fumes, and respirable quartz) are also associated with COPD development (Vlahovich & Sood, 2021; Viegi et al., 2020; Mohner et al., 2013). Caillaud et al. (2012) noted that the population attributable risk (PAR) for COPD associated with occupational exposure was estimated at 20% for smokers and 31% for nonsmokers. Blanc et al. (2009) found that some findings suggest that prior occupational exposures may be associated with COPD development and carries a greater risk for the disease. In addition, Blanc et al. (2009) found that occupational factors among people with COPD are correlated with a reduced quality of life, an increased risk of restricted activities, and increased healthcare utilization.

Falter et al. (2003) indicated that COPD is characterized by the slow progression of worsening and disabling symptoms, including breathlessness, fatigue, and cough. The progression of symptoms creates difficulties in performing daily living activities. The authors also found that COPD significantly affects the individuals' quality of life, often infringing on their lifestyle, restricting their recreational, professional, and daily activities. For example, according to Kuprys-Lipinska and Kuna (2014), the inability to contribute to the household often left those with COPD experiencing feelings of being a nuisance or decreasing their role within the family. The authors further noted that those with COPD often have no choice but to cease doing their favourite recreational activities such as sports, as it exerts them. Research studies have also shown that many individuals have reported being restricted in their ability to complete household chores resulting in becoming increasingly dependent on their spouse (Seamark et al., 2004; Guthrie et al., 2001). There is no cure for COPD; however, it can be controlled by education, smoking cessation, medication (e.g., bronchodilators (Atrovent, Spiriva, & Ventolin), anti-inflammatories, antibiotics, and supplemental oxygen (The Lung Association, 2019).

Bakerly et al. (2011) noted that environmental factors, such as the weather, can affect the quality of life and living experiences of individuals diagnosed with COPD. The authors also found an association between the decrease in environmental temperatures and the increase in COPD exacerbations among patients. The authors found that COPD patients often have increased exacerbations and a decline in their lung function during the winter or coldest periods of the year, which has been linked to an increase in winter mortality rates among COPD patients and hospital admissions. Therefore, similar to Thorpe et al. (2014), individuals with COPD have noted that the weather is often described as a barrier that prevents them from going outside and participating in physical activities or pulmonary rehabilitation. The Hartman et al. (2013) study reported similar results, where low physical activity levels and increased symptoms were reported among

individuals with COPD due to poor weather.

A social constructionist approach was used as the theoretical framework for this study. This framework allowed the participants to provide meaningful insights into their situations (Crotty, 2015). This study used a social constructionist framework to help elicit the rich data gathered and validate participants' lived, shared experiences (Crotty, 2015). Additionally, this approach allowed the use of broad and general questions enabling the participants to construct the meaning of their situation (Crotty, 2015).

This study aimed to explore the impacts (i.e., psychosocial, occupational, financial, and physical) of chronic obstructive pulmonary disease on some underground workers in the minerals industry in Northeastern Ontario and describe underground mineral workers' experiences with the Ontario workers' compensation claim process.

#### Methods

A qualitative narrative study design allowed a flexible approach to understanding the experiences of the participants involved with this study. A narrative inquiry approach is most appropriate to understanding the experiences, actions, motivations, and life journeys of individuals who are challenged by health, disability, trauma, change, adaptation, loss, or other significant life challenges (Clandinin & Raymond 2006; Holloway, 2007; Ennals & Howie, 2017).

Sixteen individual, in-depth, semi-structured telephone interviews were conducted with underground mineral workers in Northeastern Ontario (Sudbury, Timmins, Kirkland Lake, and Matachewan), Canada, who were diagnosed with occupational COPD and were involved with the Ontario compensation system.

Participants provided informed consent and received twenty dollars via electronic bank transfer at the interview commencement.

The Laurentian Research Ethics Board, Sudbury, Ontario, Canada, approved an ethics application for this study according to the Canadian Tri-Council Recommendations for Research with Human Participants (REB #6020884).

### Sample and Setting

The recruitment strategy used for this study was purposeful sampling (Sandelowski, 2000).

Sandelowski (2000) indicated that this sampling method allows for participant recruitment that provides information-rich data for the purpose of saturating the data for the study. When using purposeful sampling, participants are selected because they possess particular characteristics or experiences necessary to answer the research question (Wright-St Clair, 2015).

Targeted, English-speaking participants included underground workers in the minerals industry in Northeastern Ontario who were diagnosed with COPD within the last ten years (to reduce recall bias) and are or were involved with the Ontario Workplace Safety and Insurance Board. English-speaking participants were only selected because the primary researcher is unilingual. Age, gender, formal occupation, or other defining variables were not predetermined. The sample size was estimated to be 15 to 20 participants, based on data saturation, and was acquired across four locations.

Participants were selected to participate in the research study with the United Steelworkers Local 6500 union compensation officers' assistance using the existing union database that houses information about employees employed at different mines in the Northeastern Ontario region. The union compensation officer only accessed this database. The Local 6500 union provided a letter of support for this study. A participation letter was developed and was provided to a union compensation officer for dissemination via mail or email to potential participants who fulfilled the study criteria. Participants who met the inclusion criteria received the participation letter in the mail or via email. In addition, participants were provided with the primary researcher's phone number

and email address. The union compensation officer was unaware of who opted to participate or not participate in the research study.

Participants were also recruited with the support of the Sudbury clinic of the Occupational Health Clinics for Ontario Workers (OHCOW). According to OHCOW, the potential participant pool (39 individuals) included miners who registered with OHCOW for the McIntyre Powder-exposed group (i.e., The McIntyre Powder Project is a voluntary registry to document health issues (particularly neurological) in miners or other workers who were exposed to McIntyre Powder aluminum dust in their workplaces (Martel, 2013) and completed compensation claims for COPD). The compensation claims were filed by the Office of the Worker Advisor or through an expedited claims process at OHCOW. An additional 25 COPD claimants among the McIntyre Powder group at OHCOW are deceased, and several of them were alive when the COPD claim was initially filed. The participants arose from a pool of approximately 500 miners (providing an idea of the scope of the COPD issue among the miners). OHCOW mailed letters to the 39 participants who met the study criteria.

Recruitment also took place with the use of social media. A recruitment message was posted on Twitter. Furthermore, two separate media sources interviewed the primary researcher (Northern Ontario Business.com & The Daily Press Timmins). Finally, two other media sources picked up the original recruitment message (Elliot Lake Today & Timmins Today).

Free and informed written consent was obtained from participants before commencing research. Participants who could not give written or verbal consent were excluded from the sample due to a lack of cognitive abilities. Participants were advised that they could withdraw from the study at any time, for any reason, and without penalty.

#### Data Collection and Analysis

Originally, in-person interviews were planned. However, due to the COVID-19 pandemic,

conducting all interviews by telephone became necessary. Sturges (2004) indicated that telephone interviews in qualitative research are uncommon mainly due to concern about whether telephone interviews are well suited to the task. Research studies have shown that qualitative researchers generally rely on face-to-face interviewing when conducting semi-structured, in-depth interviews; whereas interviewing by telephone typically is seen as appropriate only for short, structured interviews or in very specific situations (Harvey, 1988; Fontana & Frey, 1994; Rubin & Rubin, 1995). However, Fenig and Levav (1993) noted that respondents who agree to be interviewed about sensitive topics might prefer the relative anonymity of telephone versus face-to-face interaction with the researcher. Crotty (1998) found that respondent reluctance is a well-known fact of interview studies. Miller (1995) reported that telephone interviewing might provide an opportunity to obtain data from potential participants who are reluctant to participate in face-to-face interviews or from groups who are otherwise difficult to access in person. Telephone interviewing is a cost-effective method of data collection, particularly when compared to face-to-face interviews conducted in the participant's home environment (Tausig & Freeman, 1988; Aquilino, 1992; Miller, 1995). Miller (1995) concluded that telephone interviews are not better or worse than face-to-face interviews. Finally, research studies have found that telephone interviews can yield valuable quality data with maximized response rates and can effectively collect data (Tausig & Freeman, 1988; Harvey, 1988).

Research studies have shown that some disadvantages of telephone interviews include limiting the interviewer's options to comfort respondents who become emotional during the interview. They may also limit the interviewer's ability to anticipate such a reaction due to a lack of visual cues of participant distress (Tausig & Freeman, 1988; Harvey, 1988).

Participants who consented to participate in the study were asked semi-structured and open-ended interview questions with additional probes when required; however, reflexive journaling was also

recorded throughout the study. In addition, with the participants' approval, all interviews were audio-recorded and subsequently transcribed verbatim to ensure accuracy.

Qualitative interviews with underground mineral workers asked about: what it was like to work in the minerals industry; how they were diagnosed with COPD; the experiences of the compensation system; what is like living with COPD; what advice could be given to others who are trying to submit a compensation claim; how the compensation process could be improved; and suggestions for other underground workers with COPD. The interviews were conducted by telephone and lasted about 60 to 90 minutes. The timing of the interviews was determined by the extent of sharing by each participant. All interviews were recorded, transcribed verbatim, and anonymized at the time of transcription. Data analysis was conducted using an inductive approach aligning this process with the research study's theoretical framework (Braun & Clarke, 2006, 2012, 2013, 2019). The steps include 1) intimately familiarizing with the dataset's content and noticing things relevant to the research question, 2) coding using a process of identifying aspects of the data related to the research question and generating initial codes, 3) searching for themes, 4) reviewing potential themes as a phase of quality control in relation to developing the analysis, 5) clearly defined the themes and indicating distinctive and specific themes, and 6) working towards a final analysis. Two research team members achieved consensus using samples of coding.

In order to ensure the trustworthiness, credibility, dependability, transferability, and application of the findings, all transcripts were read and re-read (Colorafi & Evans, 2016). Berger (2015) indicated that reflexivity and addressing biases enhance a research study's trustworthiness and objectivity. Colorafi and Evans (2016) showed that trustworthiness, credibility, dependability, transferability, and application of the findings across all transcripts could be accomplished by reading and re-reading. Colorafi and Evans (2016) noted that dependability is achieved by using consistent procedures across all participant interviews, such as consistency in data collection (i.e.,

using the same interview questions in the same order) and clearly describing the researcher's role within the study. Credibility was achieved by providing thick and rich data that is believable from the participants' perspectives. Additionally, transferability was accomplished by thoroughly describing the participants' characteristics to make comparisons with other groups (Colorafi & Evans, 2016).

## Results

Participants in this study were underground mineral workers previously employed at various mines across Northeastern Ontario.

Participants in this study were between 65 and 83 years of age (mean of 71.5), had a mean average of 28.5 years of employment in the mineral industry and had levels of education that ranged between grades 7 to some college (median grade 9). Of the 16 participants interviewed, fifteen spoke about their smoking history; only one participant had never smoked. Some reported starting to smoke in their teenage years. It is interesting to note that none of the participants mentioned receiving help with smoking cessation from healthcare professionals. All underground mineral workers in this study were either on a long-term disability or retired.

Participants described in-depth the implications of being diagnosed with occupational COPD and their experiences with the compensation claim process, which revealed overarching themes that include 1) COPD is exhausting, 2) I cannot breathe, 3) you learn to live with it, 4) I smoked, I did not think I could get compensation, 5) the compensation claim process is a joke, 6) we need people to fight for us, 7) we did not know any better, and 8) doctors do not know anything. Themes were identified using an inductive approach to data collection and repetitions and similarities found in the transcriptions. Finally, interrater reliability added to the validity of the themes.

**COPD is exhausting:** During the interviews, the participants in this study shared several stories about how they were physically limited due to illness. Specifically, they spoke about their

decreased functional capacity. The participants talked about several activities they could no longer do or took much longer to complete. For example, participant 1 recounted, “You cannot work with COPD because you are out of breath.” Also, participant 3 said, “my quality of life is horrible; I cannot do anything.” Several participants also spoke about difficulties performing “normal” daily activities, which now took enormous work due to COPD. Participant 11 stated:

“I go shovel some snow, and I have to stop. I hold the shovel, and I look around, and people think I am just looking around, but I have to stop because I cannot breathe.”

Furthermore, participant 14 said:

“I just cannot anymore. I just do not have the strength; even right now, I am having a tough time with my breathing.”

Many participants shared stories about feeling isolated due to COPD symptoms, and they no longer had the strength to leave the house and became socially withdrawn. Participant 13 recounted, “It is tough to just go for a drive; I am constantly tired.”

Participants also spoke about struggling to care for themselves. Participant 9 indicated:

“Just having a shower takes my breath away, and I have to sit down for 15 to 20 minutes just to catch my breath.”

Many participants described a gradual decline in their physical capacity due to the disease progression. They described their inability to no longer partake in activities that brought them joy. For example, participants spoke about not participating in leisure activities such as fishing, hunting, or riding ATVs. Participant 4 stated, “I stopped hunting and fishing. I stopped doing everything because I could not breathe, I could not get enough air,” and participant 2 said:

“It has been getting harder to breathe, like I cannot bend over like to tie my boots; if I bend down and stand back up, I feel like I ran two miles. I used to be a walker, I walked all the time, but now I have a hard time going downstairs and coming back up. If I go for a walk on the flat surface, I am okay, but if I have to go up a hill, I am beat when I get to the top of the hill, I am finished, I am beat.”

During the interviews, it was apparent that the effects of COPD took a toll. Participants felt that the fatigue and shortness of breath associated with COPD halted their ability to live life. Participant 3 said, “COPD chokes the life out of you; your life almost comes to a standstill.”

**I cannot breathe:** Many participants were short of breath during the interviews and had difficulty catching their breath while sharing their stories. Participant 5 said:

“I do not have enough air. When I am talking to you, I have to take deep breaths just to talk to you. I run out of breath easily. Breathing is the hardest thing; I just have a hard time breathing. Being out of breath all the time, you cannot breathe; it is like having an elephant on your chest.”

Participants spoke about many misunderstandings about COPD. Some participants talked about explaining to others how difficult it was to catch your breath when you have COPD. Participant 7 stated:

“It is not easy, and it is not fun. No one understands it unless you are going through it. Other people do not understand it because they do not feel my struggle to breathe. Someone who does not go through lung issues, well they just breathe and breathe, and they do not understand.”

Participants felt that they were fighting for their lives during COPD exacerbations, sustained fear of death, and panicked while trying to catch their breath. Participant 13 indicated:

“Like you have no strength when you have no oxygen, trust me, it is not a fun thing; everything is a pain in the ass; it is not a fun disease.”

Furthermore, participant 8 stated:

“You cough you cough you cough; eventually you get cramps in your lungs, it hurts, and you keep coughing, and eventually you start to see stars and when you see that you know you have trouble to get a breath in.”

Similarly, participant 14 recounted:

“I really lose my breath, and I am afraid I am going to die. It is scary; when it gets really bad, it is very scary.”

Participants also shared stories of thick and increased phlegm production that inhibited their ability to catch their breath. Participant 8 indicated:

“You are short of breath, you cough and spit, the phlegm is like a paste; it is really thick and seems to plug your airways inside your lungs until you bring it up.”

The participants in this study also spoke about how the climate would cause an inability to catch their breath, and the hot and cold weather impeded their ability to get air into their lungs.

Participant 9 said:

“If I go out in the cold or the heat, I cough, cough, and cough. I cannot do it because it hurts my lungs, and I cannot get air into my lungs.”

**You learn to live with it:** Participants in this study all knew that they had difficulty breathing for years. Being diagnosed with COPD was not unexpected news. They recognized the slow progression of the changes in their abilities over the years. Participant 10 said, “Like I learn to live

with it and do what I can.”

Participants also recognized that they could do nothing to change the diagnosis and felt they were coping the best they could. Participant 4 said:

“It was just okay because I finally knew why I had been having trouble. The doctor gave it a name; I knew already I could not breathe.”

However, some participants were angry that they had COPD because they believed they got it from working underground. Participant 2 stated, “Someone should be held accountable for the diseases that the mines caused.”

**I smoked; I did not think I could get compensation:** All participants who had previously smoked admitted that smoking was a significant risk factor in developing COPD. However, the participants in this study also spoke about the exposures (e.g., dusts and fumes) they had while working underground. Nevertheless, because smoking is a risk factor, they did not think they could submit a compensation claim for their COPD. In fact, some participants were told that smoking was the cause of their COPD even though they described the working environment to a healthcare worker. All participants talked of repeatedly being asked questions about smoking, such as ‘How much do you smoke?’ and ‘Are you still smoking?’

Participant 10 said, “The doctor wants to blame everything on smoking,” and participant 13 stated, “cigarettes were the answer, and there was no going either way; cigarettes were the problem.”

Furthermore, participant 14 said:

“The doctor asked what kind of work I did, and she said, oh you work lots with diesel equipment, and I told her yes, and she said that it did not help and she asked if I smoked, and I said yes, and she said well your smoking did not help, and that is your number one

contributor to your lung disease.”

Most participants were unaware that they could submit a compensation claim and only submitted one on someone else’s advice even though they recalled in detail the exposures they had while working in the mining industry. Participant 1 stated:

“I submitted my compensation claim after I heard about it from a lady on television, and I believe I should get the claim because it was through the work because of all the dust I was breathing.”

Also, participant 3 recounted:

“I was not even thinking about compensation for my COPD. When I told my NP that I was going to submit it, she said that was fantastic. It had never come up in conversation with my doctor about submitting a claim to compensation.”

Furthermore, participant 6 said:

“I pretty much have been told that the damage was done and compensation would not have anything to do with that, so unless someone had told me that I could submit for compensation, I would not have known.”

**The compensation process is a joke:** Many participants were frustrated by the compensation claim process. It was time-consuming, challenging to complete forms, and many participants were either denied or had their compensation payment cut in half because they were smokers. Participant 1 said:

“The process was more of a waiting game, compensation would contact me and ask me different questions, and that is all there was to it. Because I was a smoker, they cut down

what I was supposed to receive, so they only gave me half of it because of my smoking.”

Also, participant 2 indicated:

“As far as I am concerned, it is a farce; it is a joke. I had a hard time getting my claim approved because doctors did not want anything to do with compensation, and if you did get a doctor to complete the form, you went through a lot of bull. I just get pissed off thinking about it. It is not easy for anybody. It seems that if you have something legit, it does not work, but if you are a phony and know the ropes, you get approved.”

Additionally, participant 4 said:

“When you are going against compensation, you are going against some real sharks, not minnows; I am talking about people that have lawyers who are just waiting to rip you apart; they have all the technology at their disposal. These guys are so good at what they do, and they can rip you apart from stem to stern in no time flat. It is tough to get any man any justification; they are very good at what they do.”

Participant 8 indicated:

“You better document everything you have, dates and everything that is if they do not make a mistake on your file, which is what they did with me. Meanwhile, you are waiting and wondering what the hell is going on. It needs to be right to the letter; otherwise, you will have to start over and you end up with a file about an inch thick. It is hard to understand; you need to be a doctor.”

Similarly, participant 9 stated:

“It took two years for compensation to deny me. They took a long time to get all my

records, and I kept calling my case administrator every two or three months to see what was happening.”

Furthermore, Participant 10 said:

“Shortly after I put the appeal in, I got a thick pile of papers from the compensation office that I guess they were basing my case on, and it scared the living shit out of me. You had to be either a lawyer or a doctor or someone with a lot more education than I did to understand it.”

Moreover, participant 12 said:

“They are saying I was not exposed enough; well how exposed do you have to be? I worked for 22 years in the mine. Do you have to die in order to be compensated?”

**We need people to fight for us:** Many participants in this study discussed how they had to fight with physicians and the compensation office to have a compensation claim approved. Participants also indicated that physicians did not want anything to do with the compensation system, and participant 4 stated:

“I went to my doctor’s office, I asked him, you know doc can I ask you a question and I said do you know what silicosis is and he said yeah, and I said if I came here with a paper would you sign saying that. The doctor said, just between you and me, I would never sign this because then I would be signing my life away. He told me that if any doctor in Canada put their name on compensation papers the board would take all of their credentials away, and they would take them to the cleaners. He said no doctor in Canada would put their name on a paper for silicosis.”

Furthermore, participant 3 said:

“You do not dare fight the big companies; they have better lawyers than you do; you would not dare fight.”

Likewise, participant 4 said:

“If you do not have a doctor who protects you, you are a dead fish out of water. You will not have a leg to stand on. If you have a good representative, then they will fight for you. You have to find a good doctor who will acknowledge your position; otherwise, you will not stand a chance. Everything needs to be documented. If your doctor is on your side, it makes a big difference; they are willing to fight for you.”

**We did not know any better:** The participants in this study spoke about the risks of working underground but felt that they often had no choice but to take the job. They talked about the need to simply go to work to put food on the table and put a roof over the family’s head. The participants explained their understanding and belief about the impact of occupational risk factors on their lung health by presenting detailed accounts of their personal experiences. Participant 1 stated:

“I guess the mines did not know any better; we did not know any better either, so we were often in the dust in the dry, and you would get home and be spitting black stuff. The mine told us that the black stuff prevented silica from sticking to your lungs, and that was not true. So, you cannot work with COPD because you are out of breath; you should go after compensation right away.”

Some participants asserted that working underground in the mining industry was an equally probable causation factor for their COPD. Participant 3 indicated:

“If I had known what I know now, I would have pursued compensation sooner. I never missed a day of work, but it takes its toll when you work underground breathing in that shit;

it is hard.”

Also, participant 4 said:

“When you come up from underground, your eyes are all red and bloodshot. So they told me, if you do not like it, you should find another job, but you have to work when you have a wife and five kids. So that is how it was; if you do not like it, you can find another job; it is as simple as that.”

Participant 5 recounted:

“Mining is a tough job, it is not for everybody, it is a dangerous job, but when you have no education, and you have kids and a mortgage over your head, you have no choice.”

**Doctors do not know anything:** Many participants were upset that their healthcare practitioners were unaware of the dangers of working underground. They felt that if they knew what the environment was like, they would not have questioned their work-related COPD. Participant 2 said:

“When you talk to a doctor they do not know anything about working underground; they do not know what it was like to breathe in that stuff, so the doctor does not support me.”

Furthermore, participant 6 said, “What I have seen from doctors nowadays they would not even understand what it was like to work underground,” and participant 7 stated:

“What I have noticed is that doctors do not want to be involved with compensation because it is overwhelming for them. It is hard to do when you are busy taking care of many people and dealing with compensation. The less they have to do with compensation, the better they are, so you feel left out.”

Similarly, participant 19 indicated:

“I was having difficulties, so I went to see a lung doctor, and he said you have COPD. So I said, well, that has to be due to when I worked in the mines because I was breathing a lot of diesel and dust, and he said, are you a smoker, and I said, well I used to be a smoker, but I quit; no doctor would say that it was due to the mines.”

#### Discussion

The themes that were identified from this study echoed previous research studies. Borge et al. (2010) found that the most prominent symptom of COPD is breathlessness. In addition, individuals experience further symptoms such as cough, poor exercise tolerance, depression, anxiety, fatigue, sleeping difficulties, and pain. Living with COPD is a burden for most individuals as their daily activities and previous hobbies become increasingly limited. This study has demonstrated the impacts of COPD on almost every aspect of the lives of an underground mineral worker. Many of the participants in this study reported respiratory symptoms such as breathlessness, coughing, spitting up phlegm, and clearing the throat as the main struggles of having COPD.

Thorpe et al. (2014) found that individuals with COPD have noted that the weather is often described as a barrier that prevents them from going outside and participating in physical activities or pulmonary rehabilitation. It was apparent from the participant’s stories that the weather limited their abilities to go outside, whether it was hot or cold.

The status of COPD has risen considerably in recent years, making it currently the fourth leading cause of death (WHO, 2021). Eighty to ninety percent of COPD cases are due to smoking; however, other factors include exposure to indoor and outdoor pollutants and occupational hazards (WHO, 2021). The participants in this study understood that smoking was a significant contributor to COPD; however, they emphatically expressed that they believed working in the mining industry and being exposed to dusts and fumes contributed to their COPD, leading them to think that they were entitled to compensation for this occupational illness.

Verger et al. (2007) found that aside from barriers to filing occupational disease claims at the patient level, there are multiple but little-studied barriers at the physician level. Some of these barriers include physicians' attitudes to lifestyle factors, especially smoking, their perception of their role in occupational health, and workload. Verger et al. (2007) reported that smoking status reduced the number of referrals for compensation made by general practitioners resulting from a lack of understanding that the combination of cigarette smoking and occupational exposures greatly enhanced the risk for occupational respiratory illnesses. The authors noted that physicians might underestimate the influence of environmental factors and attribute these diseases to factors such as behaviour (e.g., cigarette smoking).

Bailey et al. (2009) explored the narratives of people with COPD and found a variation in their explanations for the perceived cause of their illness. The authors noted that some of the participants believed that the cause of their illness was more complex than simply having been a cigarette smoker. The authors concluded that there was a need for healthcare workers to consider these individual perceptions of causality rather than concentrating on the fact that COPD is caused by cigarette smoking. The participants in this study had similar experiences. They believed that their healthcare providers were only focused on the fact that they previously smoked and would not consider occupational exposures as a confounding factor for developing COPD. Participants in this study strongly felt that underground workers with COPD should quit smoking for their own well-being. However, participants did not indicate that they were provided support, education, or pharmacological options for smoking cessation.

The majority of the participants knew that something was wrong with their health before receiving their diagnosis. As a result, it did not come as an initial shock when they were diagnosed with COPD. All participants stated that increased shortness of breath had been ongoing for years.

Many participants in this study initially faced denial of their claim by the compensation office. At the time of this interview, many were still awaiting a decision from the compensation office. The process was felt to be challenging, frustrating, and unfair. The participants specifically spoke about being punished by compensation because they were smokers. They did not feel it was fair to cut their compensation payment in half because they were smokers. Roberts-Yates (2003) noted that the compensation claim process lacked a personal touch. The compensation adjudicators were not upfront with relevant information that would allow a worker to make informed choices.

It should be noted that while completing this study, the Ontario Workplace Safety and Insurance Board changed its process of compensating underground mineral workers diagnosed with occupational COPD.

*The WSIB will no longer reduce non-economic loss and permanent disability benefits for most people with claims for chronic obstructive pulmonary disease (COPD), who also have a smoking history. (WSIB, 2021).*

#### Limitations

This study was limited by the restrictions of (1) the probability of selection bias from participants who were faced with negative encounters with the compensation process, (2) collecting data from male participants only; female underground mineral workers could enhance the data by providing another perspective (3) possible limitation of transferability of the findings due to the specific nature of this research study set in Northeastern Ontario. At the same time, this study was the first to explore the experiences of underground mineral workers diagnosed with occupational COPD and involved with the compensation claim process in Northeastern Ontario; most other studies focused on quantitative measures of COPD. This study gathered in-depth perspectives of underground mineral workers diagnosed with occupational COPD and involved with the compensation claim process. This study adds value to previous research on COPD as an

occupational illness in the minerals industry and the compensation claim process. Finally, the participants who consented to be involved with this study wanted to share their stories so that other individuals could learn from their challenges.

### Conclusions and Implications

The findings in this study draw attention to several areas that revealed challenges and barriers for underground mineral workers diagnosed with occupational COPD and the compensation claim process. Ideally, participants in this study wanted improved compensation claim processes to make it easier for them to maneuver through the compensation system. They also felt it was important for physicians to understand better the minerals industry and how occupational exposures could contribute to occupational illnesses. Improved education for those supporting underground mineral workers with an occupational illness is imperative.

The participant's viewpoints elicited and presented in this thesis expand the pool of evidence for researchers gathering data about occupational illnesses in the minerals industry and the compensation claim process.

This study focused on the experiences of underground mineral workers diagnosed with occupational COPD in Northeastern Ontario. In addition, it also explored their experiences with the compensation claim process. Despite there being an increase in research studies that focus on underground mineral workers and COPD, there is a significant gap in the literature regarding the lived experiences of these participants. Therefore, it is recommended that further research on the impact of COPD in underground mineral workers in Northeastern Ontario be conducted.

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## **Chapter 3: COPD in the Minerals Industry: Miners' Coping Experiences (Part 2)**

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## ABSTRACT

The mining industry can be unsafe and cause workplace injuries and diseases like chronic obstructive pulmonary disease (COPD). Chronic obstructive pulmonary disease causes many deaths in the world. Cigarettes are the main cause of this disease. However, dangerous workplace exposures, including those in the mining industry, may also lead to COPD. Some of these exposures include dust and fumes that can be higher for workers in the mining industry who work in small areas. As a result, workers in the mining industry may submit compensation claims. Sadly, work-related COPD is not compensated or recognized well by the Ontario Workplace Safety and Insurance Board (WSIB). This qualitative narrative study used in-depth telephone interviews to collect information about COPD in relation to the workplace environment, coping with COPD, and challenges and frustration with the compensation system. The information collected from the underground miners was analyzed to understand their perspectives and experiences when dealing with COPD. This is the first study to look at how COPD could affect underground mineral workers in Northeastern Ontario. This study could help to improve services and supports for workers suffering from workplace illnesses.

Keywords: COPD, mining, safety, qualitative, narrative

## Introduction

Hamrin (1980) indicated that mining broadly relates to the extraction of naturally occurring minerals through processes such as underground mining, open-cut extraction methods, quarrying, operation of wells, evaporation pans, dredging, or recovering from ore dumps or tailings.

In Ontario, mining and mineral processing is a leading industry that provides individuals with the opportunity to gain access to employment opportunities that contribute to economic sustainability (Economic Contribution, 2019). In Ontario, the minerals industry, directly and indirectly, has created over 78,000 employment opportunities since 2015 (Economic Contribution, 2019).

Veiga et al. (2001) reported that mining plays an essential role in Canada's development and is considered more responsible for developing frontier areas than any other resource activity. Across Canada, there are several provinces and territories with active mineral regions, and there are 1840 established (producing) mining projects (Canadian Mineral Exploration Bulletin, 2019). In 2019, the mineral industry directly and indirectly (smelting, refining, and manufacturing) accounted for 719,000 positions throughout the country in rural, urban, and remote regions (Canadian Mineral Exploration Bulletin, 2019). The minerals industry is also an important employer of Indigenous peoples, providing jobs to over 16,500 individuals. Indigenous people account for 12% of mining's labour force, amongst the highest representation by industry (Natural Resources Canada, 2020).

Bray and Thompson (1992) indicated that in 1968, unions, the public, and the press noted the poor safety record of the mining industry compared with other resource sectors. The authors reported that the industry attempted to explain the phenomenon as being due to the inherently dangerous nature of mining. From as early as 1958, union officials were aware of the potential health hazards to which uranium mine workers were being exposed and consequently sought to undertake measures that would reduce workers' exposure to radiation and silica dust.

The World Health Organization (WHO) (2021) defined an *occupational disease* as a "health condition or disorder caused by the work setting or related activities." The WHO (2021) reported that occupational diseases could be disruptive, disabling, and sometimes fatal. The WHO (2021) provided examples of occupational diseases, including hearing loss, asthma, chronic obstructive pulmonary disease, and some cancers. According to the WHO (2021), occupational diseases can develop over many months or years, depending on exposure intensity and conditions. For example, cancer resulting from inhalation of asbestos fibres generally takes 20 years to develop, and when it develops, it becomes difficult or impossible to identify the exact cause (WHO, 2020). Occupational diseases often resemble other medical conditions, and for these reasons, most occupational diseases

can be overlooked, misdiagnosed, and undercounted in statistical reports (WHO, 2020).

In 2016, The Association of Workers' Compensation Boards of Canada (AWCBC) reported 592 occupational disease deaths in Canada versus 312 traumatic fatalities, and the rate is increasing in most jurisdictions. Occupational diseases (e.g., cancer, musculoskeletal disorders, and respiratory diseases) are caused by workers being exposed to chemical, biological, and physical agents and continue to be a leading cause of illness and death to workers in the minerals industry (Canadian Centre for Occupational Health and Safety (CCOHS), 2020). The CCOHS (2020) reported that about half of all occupational diseases include skin disorders, followed by eye conditions, lung illnesses, poisonings (e.g., lead, mercury, or pesticides), and other conditions such as disorders of the heart, nervous system, and musculoskeletal system.

The predominant occupational illnesses associated with mining include asbestosis, mesothelioma, silicosis, cancers (e.g., lung, nasal, and gastrointestinal), chronic obstructive pulmonary disease (COPD), asthma, emphysema, skin diseases, and hearing loss (noise-induced hearing loss) (CCOHS, 2020).

The CCOHS (2020) reported that occupational illnesses in the mining industry are attributed to exposure to blasting gases (i.e., carbon dioxide, carbon monoxide, oxides of nitrogen, ammonia, and sulphur dioxide); diesel emissions (i.e., including elemental/organic carbon, carbon monoxide, nitrogen dioxide, sulphur dioxide); drilling, mucking, rock breaking; silica, general dust; and refining including metals, sulphur dioxide, dust, and chemical reagents.

According to the WHO (1999), airborne dust is concerning because of its association with widespread occupational lung disease. As outlined in the WHO Hazard Prevention and Control in the Work Environment: Airborne Dust report (1999), there is a risk of occupational diseases when people inhale airborne dust at work.

Vlahovich and Sood (2021) indicated that occupational lung diseases (OLDs) are caused, aggravated or exacerbated by exposures at the workplace. The authors noted that occupational lung diseases encompass many respiratory diseases, including COPD and pulmonary fibrosis. The authors also found that occupational lung diseases are often misattributed to non-occupational causes, leading to delayed or improper medical management. They also indicated that occupational lung illnesses are described as occupational if caused, aggravated or exacerbated by exposure in the workplace. These exposures might include respirable dusts (e.g., coal mine dust and silica), fumes, vapours, and gases. Inhalational hazards remain common in workplaces throughout the world, but they are largely avoidable. Vlahovich and Sood (2021) found that OLDs are commonly diagnosed work-related illnesses. Still, in the absence of an occupational history, they are indistinguishable from similarly named diseases that occur in the general population.

Between 2010 and 2019 in Ontario, the Workplace Safety and Insurance Board (WSIB) allowed approximately 136,000 occupational disease claims, contributing to over \$910 million in benefit costs (WSIB, 2019). The WSIB (2019) groups occupational disease claims into four major categories: long latency illnesses, noise-induced hearing loss, chronic exposures and effects, and acute exposures and effects.

In 1886, the first Workmen's Compensation for Injuries Act in Canada was established as a mechanism for a worker to take legal action against an employer for a workplace injury (Ontario Ministry of Labour, 2019). Following the creation of this Act, several acts exclusive to the mining industry were created and included both the Mining Operations Act (1890) and the Mining Act (1912) (Ontario Ministry of Labour, 2019). The occupational health and safety system is comprised of several organizations such as the Workplace Safety and Insurance Appeals Tribunal (WSIAT) and Workplace Safety and Insurance Board (WSIB), who act as the major contributors (Ontario Ministry of Labour, 2019).

Chronic Obstructive Pulmonary Disease (COPD) includes chronic lung diseases that can limit airflow into the lungs and is characterized as progressive and debilitating (Statistics Canada, 2020; WHO, 2019). COPD is considered an umbrella term that describes a group of chronic lung diseases such as emphysema, asthma, and bronchitis (WHO, 2019). In Canada, COPD primarily affects individuals aged 35 and older (Public Health Agency of Canada, 2018). COPD is accompanied by respiratory symptoms, including dyspnea, cough, and sputum production (Rycroft et al., 2012; Public Health Agency of Canada, 2018).

Research studies found that COPD is a complex and heterogeneous disease associated with high morbidity and mortality (Soriano et al., 2017; Vos et al., 2012). Soriano et al. (2017) indicated that according to the latest update of the Global Burden of Disease Study, the prevalence of COPD in 2017 was 174 million people worldwide, and it was estimated that it became the third most common cause of death globally since 2012, after ischemic heart disease and cerebrovascular disease.

The primary cause of COPD in Canada and other developed nations includes long-term exposure to lung irritants, and the primary irritant is tobacco smoke (Public Health Agency Canada, 2018).

Studies have shown that COPD was the fifth leading cause of death worldwide at the turn of the century. It is predicted to rank third after cancer and heart disease by 2030 (Mannino & Buist, 2007; Parker et al., 2014). This ranking is primarily based on data from high and middle-income countries. According to Dilektasli et al. (2016), if not for the underreporting and underdiagnosing of COPD due to lack of healthcare access and other factors, COPD might rank even higher.

The study's theoretical framework used a social constructionist approach, allowing participants to provide meaningful insights into their situations (Crotty, 2015). This study used a social constructionist framework that helped elicit the rich data gathered and validate participants' lived,

shared experiences (Crotty, 2015). Additionally, this approach allowed the use of broad and general questions enabling the participants to construct the meaning of their situation (Crotty, 2015).

This study aimed to explore the impact (i.e., psychosocial, occupational, financial, and physical) of chronic obstructive pulmonary disease on some underground workers' in the minerals industry in Northeastern Ontario and describe underground mineral workers' experiences with the Ontario workers' compensation claim process.

#### Methods

The Laurentian Research Ethics Board, Sudbury, Ontario, Canada, approved an ethics application according to the Canadian Tri-Council Recommendations for Research with Human Participants (REB #6020884).

A qualitative narrative study design allowed a flexible approach to understanding the experiences of the participants involved with this study. A narrative inquiry approach is most appropriate to understanding the experiences, actions, motivations, and life journeys of individuals who are challenged by health, disability, trauma, change, adaptation, loss, or other significant life challenges (Clandinin & Raymond 2006; Holloway, 2007; Ennals & Howie, 2017).

Participants in this study were underground mineral workers who were employed at various mines across Northeastern Ontario.

Participants in this study were between 65 and 83 years of age (mean of 71.5), had a mean average of 28.5 years of employment in the mining industry and had levels of education that ranged between grades 7 to some college (median grade 9). Of the 16 participants interviewed, fifteen spoke about their smoking history; only one participant had never smoked. Some reported starting to smoke in their teenage years. Participants provided informed consent and received twenty

dollars via bank e-transfer at the interview commencement. This study was conducted in Northeastern Ontario (Sudbury, Timmins, Kirkland Lake, and Matachewan).

### Sample and Setting

The recruitment strategy used for this study was purposeful sampling (Sandelowski, 2000).

Sandelowski (2000) indicated that this sampling method allows for participant recruitment that provides information-rich data for the purpose of saturating the data for the study. When using purposeful sampling, participants are selected because they possess particular characteristics or experiences necessary to answer the research question (Wright-St Clair, 2015).

Targeted, English-speaking participants included underground workers in the minerals industry in Northeastern Ontario diagnosed with COPD within the last ten years (to reduce recall bias) and are or were involved with the Ontario Workplace Safety and Insurance Board. English-speaking participants were only selected because the primary researcher is unilingual. Age, gender, formal occupation, or other defining variables were not predetermined. The sample size was estimated to be 15 to 20 participants and was acquired across four geographic locations (Timmins, Sudbury, Matachewan, and Kirkland Lake).

Participants were selected to participate in the research study with the Local 6500 union compensation officers' assistance using the existing union database that houses information about employees employed at different mines in the Northeastern Ontario region. The union compensation officer only accessed this database. The Local 6500 union provided a letter of support for this study. A participation letter was developed and was provided to a union compensation officer for dissemination via mail or email to potential participants who fulfilled the study criteria. Participants who met the inclusion criteria received the participation letter in the mail or via email. In addition, participants were provided with the primary researcher's phone number and email address. The union compensation officer was unaware of who opted to participate or not

participate in the research study.

Participants were also recruited with the support of the Sudbury clinic of the Occupational Health Clinics for Ontario Workers (OHCOW). According to OHCOW, the potential participant pool (39 individuals) included miners who registered with OHCOW for the McIntyre Powder-exposed group (i.e., The McIntyre Powder Project is a voluntary registry to document health issues (particularly neurological) in miners or other workers who were exposed to McIntyre Powder aluminum dust in their workplaces; (Martel, 2013) and completed compensation claims for COPD). The compensation claims were filed by the Office of the Worker Advisor or through an expedited claims process at OHCOW. There were an additional 25 COPD claimants among the McIntyre Powder group at OHCOW who passed away; several were alive when the COPD claim was initially filed. The participants arose from a pool of about 500 miners (providing an idea of the scope of the COPD issue among the miners). OHCOW mailed letters to the 39 participants who met the study criteria.

Recruitment also took place with the use of social media. A recruitment message was posted on Twitter. Furthermore, two separate media sources interviewed the primary researcher (Northern Ontario Business.com & The Daily Press Timmins). Finally, two other media sources picked up the original recruitment message (Elliot Lake Today & Timmins Today).

Free and informed written consent was obtained from participants before commencing research. Participants who could not give written or verbal consent were excluded from the sample due to a lack of cognitive abilities. Participants were advised that they could withdraw from the study at any time, for any reason, and without penalty.

#### Data Collection and Analysis

Originally, in-person interviews were planned. However, due to the COVID-19 pandemic, conducting all interviews by telephone became necessary. Sturges (2004) indicated that telephone

interviews in qualitative research are uncommon, mainly due to concern about whether telephone interviews are well suited to the task. Research studies have shown that qualitative researchers generally rely on face-to-face interviewing when conducting semi-structured and in-depth interviews. Conducting a telephone interview is typically seen as appropriate only for short, structured interviews or in very specific situations (Harvey, 1988; Fontana & Frey, 1994; Rubin & Rubin, 1995). However, Fenig and Levav (1993) noted that respondents who agree to be interviewed about sensitive topics might prefer the relative anonymity of telephone versus face-to-face interaction with the researcher. Crotty (1998) found that respondent reluctance is a well-known fact of interview studies. Miller (1995) reported that telephone interviewing might provide an opportunity to obtain data from potential participants who are reluctant to participate in face-to-face interviews or from groups who are otherwise difficult to access in person. Telephone interviewing is a cost-effective method of data collection, particularly when compared to face-to-face interviews located in the respondent's normal environment (Tausig & Freeman, 1988; Aquilino, 1992; Miller, 1995). Miller (1995) concluded that telephone interviews are not better or worse than face-to-face interviews. Finally, research studies have found that telephone interviews can yield valuable quality data with maximized response rates and can effectively collect data (Tausig & Freeman, 1988; Harvey, 1988).

Research studies have shown that some disadvantages of telephone interviews include limiting the interviewer's options to comfort respondents who become emotional during the interview. They may also limit the interviewer's ability to anticipate such a reaction due to a lack of visual cues of respondent distress (Tausig & Freeman, 1988; Harvey, 1988).

Participants who consented to participate in the study were asked semi-structured and open-ended interview questions with additional probes when required; however, reflexive journaling was also recorded throughout the study. In addition, with the participants' approval, all interviews were

audio-recorded and subsequently transcribed verbatim to ensure accuracy.

Qualitative interviews with underground mineral workers inquired about: what it was like to work in the mineral industry; how they were diagnosed with COPD; the experiences of the compensation system; what is like living with COPD; what advice could be given to others who are trying to submit a compensation claim; how the compensation process could be improved; and suggestions for other underground workers with COPD. The interviews were conducted by telephone and lasted about 60 to 90 minutes. The timing of the interviews was determined by the extent of sharing by each participant. All interviews were recorded, transcribed verbatim, and anonymized at the time of transcription. Data analysis was conducted using an inductive approach aligning this process with the research study's theoretical framework (Braun & Clarke, 2006, 2012, 2013, 2019). The steps include 1) intimately familiarizing with the dataset's content and noticing things relevant to the research question, 2) coding using a process of identifying aspects of the data related to the research question and generating initial codes, 3) searching for themes, 4) reviewing potential themes as a phase of quality control in relation to developing the analysis, 5) clearly defining the themes, and 6) working towards a final analysis. Two research team members achieved consensus using samples of coding.

To ensure the trustworthiness, credibility, dependability, transferability, and application of the findings, all transcripts were read and re-read (Colorafi & Evans, 2016). Berger (2015) indicated that reflexivity and addressing biases enhance a research study's trustworthiness and objectivity. Colorafi and Evans (2016) indicated that trustworthiness, credibility, dependability, transferability, and application of the findings across all transcripts could be accomplished by reading and re-reading. Colorafi and Evans (2016) noted that dependability is achieved by using consistent procedures across all participant interviews, such as consistency in data collection (i.e., using the same interview questions in the same order) and clearly describing the researcher's role within the

study. Credibility was achieved by providing thick and rich data that is believable from the participants' perspectives. Additionally, transferability was accomplished by thoroughly describing the participants' characteristics to make comparisons with other groups (Colorafi & Evans, 2016).

## Results

Participants in this study were underground mineral workers who were employed at various mines across Northeastern Ontario.

Participants in this study were between 65 and 83 years of age (mean of 71.5), had a mean average of 28.5 years of employment in the mining industry and had levels of education that ranged between grades 7 to some college (median grade 9). Of the 16 participants interviewed, fifteen spoke about their smoking history; only one participant had never smoked. Some reported starting to smoke in their teenage years. It is interesting to note that none of the participants spoke about receiving help with smoking cessation from healthcare professionals. All underground mineral workers in this study were either on a long-term disability or retired.

Participants described in-depth the implications of working as an underground mineral worker diagnosed with occupational COPD and their experiences with the compensation claim process, which revealed overarching themes that include 1) working in the mine is a dirty job, 2) you did what you had to do, 3) COPD is the price you paid, 4) compensation is hard to get, 5) everyone needs an advocate, and 6) do not go underground without safety equipment. Themes arose using an inductive approach to data collection and repetitions and similarities found in the transcriptions. Finally, interrater reliability added to the validity of the themes.

**Working in the mine is a dirty job:** Participants within this study spoke about the perceived influence of occupational exposures underground as the major contributing factors in developing their COPD. They shared detailed stories of dark, dusty, and dirty environments that produced fumes that were inhaled daily. Mining's health hazards include mining, processing and handling

mine products, post-mine closing exposures, and waste management. Health outcomes are contingent upon the type of minerals mined, the duration and level of exposure, mineworkers' background health status, and workplace occupational, safety and health standards implemented.

Participant 2 recounted:

“Working in the mine is a dirty job, especially the diesel fumes; in one mine, we had to breath in that powder. It was a little different in another mine, it was wet all the time, and you had your rubber boots on all the time. It was a dangerous place and was not the best place in the world to work.”

Furthermore, participant 14 said:

“It was a dusty, dirty hole. When you came up from underground, you would blow the crap out of your nose for two days afterward. It was dark, dismal and very dusty, and you could smell the diesel fumes all the time. Underground was a hell hole; it was dusty and when you went home blew your nose, it was always black.”

All the participants recalled that working in the mining environment was not easy. The biggest concern they expressed was the environment underground. They indicated that it was damp, dark, dirty, dusty, and the air quality was poor. Participant 3 stated:

“It was kind of tough; the air quality was bad. It was pretty dusty down there; you had to breathe what you had. There was so much dust underground and you had to breathe it in all day. The air was blue with diesel fumes and there was no ventilation. I was on the ground in hydraulic fluid and it was damp and cold, and when I came home, I blew my nose; there was black stuff, and I coughed up black stuff.”

Similarly, participant 7 said:

“I remember working in the crushing plant where there was so much dust you could not see your hands in front of you.”

Many participants spoke about the unsafe environment underground. They would be in small, confined spaces or areas where rocks would fall because of recent blasting. Participant 10 said:

“When we had unsafe hang-ups, they would pay us danger pay. We would use long blasting poles to put the charge up, and if that ever let go, we would have been dead. They knew it was dangerous, and to entice us to do the job, they would pay us extra money.”

Some participants talked about the physical toll that the dust and dirt took on their bodies.

Participant 11 said:

“They told us they had dust masks, but they were thick and you could not breathe from them. When I took the mask off, I looked like a black guy with a white face. The dust was so bad underground that you would have it in your armpits, groin, and butt. The grit would get in there and almost scald you like sandpaper. It would get so bad you would bleed.”

**You did what you had to do:** Despite knowing the dangerous conditions of working underground, all participants felt the financial pressure of raising a family. They spoke about supporting their family and the wages they made given the lack of education they had meant that they could put food on the table and a roof over their heads. Participant 1 recounted:

“Working underground was okay. I guess I did not enjoy it really, but I needed a job, and I stayed there; it was a steady job, and I had a family, so I stayed there.”

Some participants felt pressured to work overtime because many people stood in line for a good-paying job. Participant 3 indicated:

“I could not find other work, so when they asked if you wanted to work overtime, you just said yes, and if you did not, they got someone else.”

Similarly, participant 4 said:

“They tell you if you do not like it, you should find another job, but when you have a wife and five kids, you have to work. So that is the way it was, if you do not like it, you can find another job, it is as simple as it.”

Even though all the participants knew that mining was unsafe and worried about getting injured, they continued working underground. Participant 5 said:

“The old miners we know, we know what we faced, mining is a tough job, and this job was not for everybody; it is a dangerous job. However, when you have no education, and you have kids and a mortgage over your head, you have no choice.”

Some participants indicated that their physicians had told them that their lungs were already affected by the exposures underground. Even though they received these warnings, they still felt they had no choice but to continue to work to support their family. Participant 9 said:

“My doctor told me to get the hell out of there because I did not have the lungs to work there. I said where else am I going to work? I need to support myself and support my family; like you did what you had to do, I needed the money.”

**COPD is the price you paid:** Many participants said they brought up the unsafe environment to their safety representatives and union representatives because they knew they would get sick from inhaling all the dust and fumes. Participant 4 said:

“There were tough times; the company made a lot of money; we made a little. We had to do

what we had to do, but the company would not listen to a whole lot of advice for the miners, and we would say someday we are going to pay dearly for what we are doing.”

Similarly, participant 7 indicated:

“I cannot understand why they did not just stop it; now I am paying for it. We knew that miners would have lung difficulties and breathing problems, and let us face it, we knew it was dangerous.”

Participants reflected that they did not think twice about working underground. They expressed that no one told them that they would suffer for the work they did every day. Participant 8 stated:

“But you pay the price. I was young and a bit innocent, but you are just 18 or 19 and do not know any better. It never fized on me what was going on at the time. The dust would settle on the benches and if you passed your hand on the bench, it was black. I used to come home and spit black gobs.”

Furthermore, participant 9 said:

“You do not think of things; you are there to work; it did not phase on me. I did not give a hell; I just went to work, dust, no dust, it did not matter, but I could not breathe at the end of my time at the mine. In those years, you never thought about getting sick; you just went to work to do your job and get a paycheque.”

Some participants were upset that the mining companies did not tell them how dangerous it was.

They believed that the company was only concerned about making money. Participant 12 said:

“They never told us how dangerous everything was, but now they tell people you are working in a dangerous place. In those days, you went to work, did your job and went home

and they did not care as long as you did the work. I am concerned that we were abused in those days because the company just wanted production. I knew that inhaling all that shit would eventually cause problems, the dust, but you had no choice. If you say I am not going to work there today because there is too much dust, they said, look, 25 guys are waiting for your job, so I had to go because I had a family to feed.”

Similarly, participant 16 indicated:

“I am sure it is because of the exposures underground, and I put a lot of the blame on the mines. They looked the other way when they saw people having problems with their health because that was their problem. It was not the company’s problem. As far as they were concerned, the production needed to continue.”

**Compensation is hard to get:** The common sentiment expressed by the participants in this study was that an unjust and complex compensation system disillusioned them. Participant 2 reported:

“I do not want to say the way I would say it. As far as I am concerned, it is a farce; compensation is a joke. I had a hard time getting my claim approved because doctors did not want anything to do with compensation, and if you did get a doctor to complete the form, you went through a lot of bull. I just get pissed off thinking about it. It is not easy for anybody, and it seems that if you have something legit, it does not work, but if you are a phony and know the ropes, then you get your claim approved.”

The compensation system is meant to be a shared responsibility system; unfortunately, the participants in this study felt that the system burdened the individual worker with producing all documentation required to have their claim approved. Many participants indicated that they had invested much energy into getting their claim approved. Participant 12 indicated:

“I fought for my compensation claim; I was rejected. I told the case lady at compensation I did not care. I have good people who will help me and every time I have been rejected, I have fought it and I won and I will beat you too. I am not letting this go. They scare people off with their tactics, so they do not have to deal with them. Sadly, it has to come down to that. Compensation says I was not exposed enough; well how exposed do you have to be? I worked for 22 years in the mine; do you have to die in order to be compensated?”

Furthermore, participant 14 said:

“I had gotten ahold of compensation way back in the 1980s, and I was totally denied. I went through my union to apply again for compensation. There were letters back and forth, and it took a couple of years to get my first denial. I went through the tribunal and that did not work either. I have a great big box of letters from back and forth and everything that happened along the way. Compensation sent another letter saying they denied the claim again because there was insufficient evidence to support it even though I had all the test results. I never received anything from them, no money; it was a flat denial. I put at least 20 years into getting a claim approved.”

Even when participants received some compensation, they felt it was not enough. Participant 8 said:

“I applied for compensation quite a while back and the only thing they approved was paying for my oxygen tank and my puffers. They first said no, so I appealed the claim three or four times, and I am still waiting for their response.”

Several participants felt that the compensation system was unfair. Participants felt they had to jump through hoops to prove that they had an occupational illness to be adequately compensated.

Participant 15 recounted:

“I went for PFTs and struggled to give them the results they wanted; they want the best results so they did not have to pay. I felt like I was mistreated. They did not care if I failed 30 times as long as I passed it once. I feel like the system is against me. The money they have does not come from the sky; that money comes out of my wallet, that is my money and they are playing with my money. They do not want to give it out; they want to keep it no matter what condition you are in. It is always no no no.”

The participants also spoke about their difficulties when completing the compensation forms. Again, they felt that the system was too difficult to maneuver through, and compensation made it too complicated for them to fill out the forms correctly to get their claim approved. Participant 5 stated:

“It needs to be right to the letter; otherwise, you will have to start over and you end up with a file about an inch thick. Also, the forms are hard to understand; you need to be a doctor.”

Participants in this study were frustrated by the length of the compensation process. Participant 6 indicated:

“It took two years for compensation to deny me. Compensation took a long time to get all my records and I kept calling my claim adjudicator every two or three months to see what the progression was.”

Similarly, participant 11 said:

“I keep detailed notes and compensation does not like it. I have my complete work history and it still took about ten years of fighting with compensation before they sent me a cheque for my lungs.”

Many participants felt it was challenging to reach their claim adjudicator, making it impossible to

get the answers necessary to complete the compensation forms. Participant 13 said:

“Compensation sends you a questionnaire to fill out, but you cannot fill it out because you never really got an answer from them. My son tried to get in touch with them for me but he could not get a hold of them. When you finally reach them, they just make excuses, and they cannot tell you anything. They make a big story out of it. As far as I am concerned, I am entitled, but they seem to ignore things. I do not have any information because I cannot talk to them.”

**Everyone needs an advocate:** All the participants in this study felt it was necessary to provide enhanced support for any worker who suffered from an occupational illness. They thought they needed more advocacy from physicians, union representatives, and the compensation office. They all believed that a compensation claim would be denied if someone did not advocate for them. For example, participant 2 stated, “If you have somebody on your side and have somebody to stand up for you, then it is okay. I am glad there are people out there trying to help.” Similarly, participant 4 indicated:

“Find yourself a good representative, find a good guy that could talk for you, a doctor or lawyer or somebody. You need to have a good physician who can back your case because if you do not have a doctor who protects you, you are dead fish out of water, and you will not have a leg to stand on. You need to have a good representative who will fight for you and acknowledge your position; otherwise, you do not stand a chance.”

Participants expressed concerns about their healthcare worker not wanting to support their COPD as an occupational illness. They felt that physicians could not think about the possibility that their COPD was due to their mining exposure. Their ability to hear an alternative reason was impeded by what they already knew about the relationship between smoking and COPD. Participant 3

indicated:

“I do not think that physicians are educated enough on occupational diseases and workplace exposures because if they were, then that would be something they would discuss with their patients.”

Participants felt that a large burden of proof was forced upon the worker by compensation to provide substantial evidence to support their claim. They felt powerless, and many participants believed their claims would be denied without the union’s help. Participant 10 stated:

“I tried to do this by myself, but compensation blamed everything on smoking, so I went to the union, and they took care of everything. It took two years, but I have been approved. Go to your union; if you do not have a union, do not try to do it yourself, they make it so hard; once you have a union, their tune changes. Get the union involved. If you do not have a union, you are in trouble. It should not be like that because not everyone belongs to a union.”

**Do not go underground without safety equipment:** Safety underground is vital to ensuring the miners return home every day safely. All the participants in this study reported minimal to no safety equipment while working underground. It should be noted that the participants in this study worked in the mining industry during the late 1960s and 1970s. Participant 3 said:

“I did not wear any protective equipment because they did not have that then. When I came home, I would always spit up black stuff.”

Participants also stated that safety was not a priority for them. Participant 1 stated, “I never wore protective equipment underground,” and participant 4 said, “We never wore protective equipment. Sometimes we were asked to wear earmuffs or earplugs.”

Participants spoke about the bare minimum protective equipment provided to them by their employer. Participant 6 said:

“All we had was a very basic dust mask, but by the time I finished at the mine we had a mask that had two filters on each side of your face that you changed daily.”

Similarly, participant 8 stated:

“I started in 1974, and they did not force you to wear a mask. If you did not wear a mask, it was up to you; they did not care, but when you get older, you realize that was not a good idea because all that stuff that goes into your lungs is overwhelming. Later on, I started wearing a mask because I told myself that if I do not try to take care of myself, I will die here.”

Furthermore, participant 14 said:

“At that time, it was pretty tough, and nobody ever wore masks or a hearing apparatus. It was pretty tough; safety was not like what it is today; we did not wear any equipment. The only thing we had was a hard hat with a light and work boots. When we worked, we had nothing and we did not even wear glasses when we were drilling. I saw guys working without safety boots back in that day. The company just said, do your work. If you wanted to go underground naked, you went naked. They did not care. In those days, we had no safety. There was no such thing as safety.”

The participants spoke emphatically about their feelings about not wearing safety protection and said it was necessary to wear safety equipment to protect themselves. Participant 5 said, “protect yourself, use your common sense and protect yourself from the chemicals and dust,” and participant 7 stated, “definitely use your dust mask where you are supposed to.”

Participants wanted to share that it was imperative to wear a mask in particular. They felt that a mask would protect any underground worker from dusts and fumes if worn correctly. Participant 9 indicated:

“Wearing a mask is the key. You need to wear a mask as much as you can and the best mask you can find. Less dust will go into your lungs if you have a good mask, but masks do not stop diesel fumes. Do not let anything in your lungs. It would help if you had the right mask for the right situation. They have better ventilation underground than they used to, but it is still not healthy underground, and no matter what mining people tell you, how good they are now, it still is not good. Make sure you wear the proper protection; if it is going in your lungs, it is harmful; wear the proper mask.”

Participants also stated that they would not recommend going into mining because health is more important than money. Participant 12 said:

“Get out of the mines, get your health back as fast as you can. Unfortunately, that is not an option for some folks in Northern Ontario because there are not many jobs for people without education.”

#### Discussion

The identified themes from this study echoed previous research studies (Soriano et al., 2017; Vos et al., 2012; Vlahovich & Sood, 2021). The participants in this study shared emotional stories about their experiences as an underground mineral worker diagnosed with COPD as an occupational illness and their challenges with the compensation claim process. The stories they shared were filled with anger, sadness, regret, fear, hurt, frustration, confusion, disbelief, and skepticism. These emotions targeted the mining industry, the compensation office, and healthcare providers.

Participants felt let down and unsupported.

Bray and Thompson (1992) reported that in Ontario, uranium mining and milling operations were conducted from 1955 to 1996. During this period, approximately 28,500 workers would have been exposed to radiation, silica, dusts, and diesel exhaust. The study participants were employed in the mining industry in Ontario between 1955 and 1996; therefore, their COPD could have been attributed to their underground exposures. Donoghue (2001, 2004) indicated that mining has long been recognized as gruelling and prone to injury and disease. The author also reported that some hazardous disease combinations could arise from mining and mineral processing, such as lung cancer in nickel refineries and silicosis and respiratory illnesses associated with dust exposure. Donoghue (2001, 2004) also reported that coal dust is a serious hazard in mining, causing COPD. It was evident that the participants within this study believed that their COPD was not caused solely by smoking but also because of all the years of underground exposure to dusts, fumes, and toxins. Unfortunately, the participants found themselves torn between wanting a decent job for their family and tolerating unsafe conditions to make a decent living.

Some of the systemic issues experienced by the underground mineral workers in this study are the flawed nature of the compensation system. Therefore, improvement to communication strategies with workers and education and awareness should be undertaken by the WSIB to alleviate the struggles faced by a worker submitting a compensation claim.

Fishwick et al. (2015) indicated that it is possible to assess the occupational contribution to individual cases of diagnosed COPD. The authors found that taking an occupational history would help identify possible relevant exposures. The authors stated that workers should be allowed to talk freely about their previous work, and a detailed list of jobs and job tasks should be recorded, where possible, including details of known exposures. Unfortunately, the participants in this study felt unsupported by the healthcare system. They found that physicians were unwilling to look beyond smoking to see that occupational exposures could contribute to a diagnosis of occupational COPD.

Vlahovich and Sood (2021) stated that, unfortunately, to the detriment of patients, occupational lung illnesses are frequently ignored, misdiagnosed, and misattributed to non-occupational causes.

Participants expressed regret about not wearing the minimal safety equipment; however, they firmly believed that safety equipment such as a mask could ultimately save an underground worker's life.

#### Limitations

This study was limited by the restrictions of (1) a small sample size, (2) the possibility of selection bias from some participants who were faced with negative encounters with the compensation process, (4) only English-speaking participants, (5) only male participants; female participants may have brought forward different perspectives, and (6) possible limitation of transferability of the findings due to the specific nature of this research study set in Northeastern Ontario. At the same time, this study was the first to explore the experiences of underground mineral workers diagnosed with COPD as an occupational illness and the compensation claim process in Northeastern Ontario. This study provided an opportunity to gather in-depth perspectives of underground mineral workers directly affected by COPD and the compensation claim process. This study adds value to previous research in the area of COPD as an occupational illness and the compensation claim process. Finally, the participants who consented to be involved with this study were interested in the area of COPD as an occupational illness and the compensation claim process.

#### Conclusions and Implications

The findings in this study draw attention to several areas that revealed challenges and barriers associated with an underground mineral worker diagnosed with occupational COPD and the compensation claim process. Ideally, participants in this study wanted a streamlined process for submitting a compensation claim and advocacy and support while going through the process.

The participant's viewpoints elicited and presented in this thesis expand the pool of evidence for

researchers gathering data about occupational COPD and the compensation claim process.

Additional studies might help determine how to best translate the findings into specific healthcare delivery or policy development components. Potential policy changes could involve improving physician remuneration for the medical management of compensation cases and mandatory basic occupational medicine training for all physicians.

One of the gaps identified by this research study is that the compensation office lacks the necessary human resources to eliminate underground mineral workers' distinct challenges when completing a compensation claim.

The outcomes of this research study could lead to systemic changes to the compensation process, increased education, and enhanced legislation. Ultimately, occupational disease claims need to be handled more efficiently, and if resources are available, an independent body could oversee occupational disease claims. Finally, increased advocacy and awareness about the implications of occupational COPD need to be addressed. Future research studies on the compensation claim experience by underground mineral workers diagnosed with COPD should continue to bring awareness to this crucial topic.

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## **Chapter 4: Smoke and Mirrors: The Compensation Claim System - Through the eyes of Physicians and Union Compensation Representatives**

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## ABSTRACT

Chronic obstructive pulmonary disease (COPD) causes countless deaths in the world. Cigarettes are the main cause of this disease. However, workplace exposures, including those in the mining industry, may also lead to COPD. Some of these exposures include dusts and fumes that can be higher for workers in the minerals industry who work in confined areas. As a result, workers in the minerals industry may submit compensation claims. Sadly, work-related COPD is not well compensated or recognized well by the Ontario Workplace Safety and Insurance Board (WSIB). Physicians and union representatives struggle to complete forms and have claims approved, and because of this, workers can struggle with money, family, and mental health problems. This qualitative narrative study used in-depth telephone interviews to collect information. The information collected from physicians and union representatives was analyzed to understand their perspectives and experiences when assisting workers with compensation claims. This is the first study to examine how COPD could affect underground mineral workers in Northeastern Ontario. The themes that were identified from this study include, 1) additional support resources are required, 2) smoking cessation is essential, 3) COPD is a crippling disease, 4) education is required, 5) the compensation claim process is challenging; 6) occupational diseases are challenging to prove, 7) occupational COPD is costly. This study may help improve services and support for physicians and union representatives involved with an underground mineral worker diagnosed with occupational COPD.

Keywords: COPD, physician, union representative, compensation, qualitative, narrative

## Introduction

Chronic Obstructive Pulmonary Disease (COPD) includes chronic lung diseases that can limit airflow into the lungs and is characterized as progressive and debilitating (Statistics Canada, 2020; WHO, 2019). COPD is considered an umbrella term that describes a group of chronic lung diseases such as emphysema, asthma, and bronchitis (WHO, 2019). In Canada, COPD primarily affects

individuals aged 35 and older (Public Health Agency of Canada, 2018). COPD is accompanied by respiratory symptoms, including dyspnea, cough, and sputum production (Rycroft et al., 2012; Public Health Agency of Canada, 2018).

COPD is a complex and heterogeneous disease associated with high morbidity and mortality (Soriano et al., 2017; Vos et al., 2012). According to the latest update of the Global Burden of Disease Study, the prevalence of COPD in 2017 was 174 million people worldwide, and it was estimated that it became the third most common cause of death globally since 2012, after ischemic heart disease and cerebrovascular disease (Soriano et al., 2017).

The primary cause of COPD in Canada and other developed nations includes long-term exposure to lung irritants, and the primary irritant is tobacco smoke (Public Health Agency Canada, 2018).

Tarlo (2020) reported that the 2019 Global Strategy for Diagnosis, Management and Prevention of COPD report included occupational dusts, organic and inorganic, among the risk factors for COPD development. The author (2020) indicated that there are no specific diagnostic tests to distinguish occupational COPD from COPD due to smoking.

According to the National Health and Nutrition Examination Survey III, of approximately 10,000 adults from 30-75 years of age, 19.2% of COPD cases were attributable to workplace exposures, which rose to 31.1% for non-smokers (Hnizdo et al., 2002; GOLD Science Committee Report, 2021).

Vlahovich and Sood (2021) noted a pronounced rise in various occupational exposures in the 2015 publication on the global burden of disease report. These exposures include diesel exhaust (72.1% men; 129.8% women), silica (72.6% men; 44.9% women) and benzene (48.5% men; 97.5% women).

Banerjee and Kushner (2005) indicated that occupational lung diseases are costly and prevalent. Accordingly, they constitute a significant public health problem. The authors reported that these diseases are also of particular interest at the patient-provider level because early recognition of work-associated illnesses could improve health outcomes. Delayed treatment and intervention can result in substantial economic consequences for both workers and employers.

Even though COPD cannot be cured, it can be controlled through education, smoking cessation, medication, and supplemental oxygen (The Lung Association, 2019).

Curkendall et al. (2006) found that patients' quality of life is a significant consideration for health services. People who have COPD also frequently have comorbidities. For example, population-based evidence has shown that the prevalence of cardiovascular disease and the incidence of hospital admissions for major cardiovascular events are higher in people with COPD than in the general population. In addition, Voegle and Leupoldt (2008) found a higher incidence of psychological disorders, particularly anxiety and depression, in people with COPD, than in the general public. The diagnosis and treatment of comorbid psychological conditions are essential in meeting the psychosocial needs of COPD patients.

Riley and Scieurba (2019) noted that assessing chronic obstructive pulmonary disease aims to determine airflow level limitation, its impact on the patient, and the risks of future events (e.g., exacerbations, hospital admissions, or deaths) to guide therapy. Banerjee and Kushner (2005) indicated that although workers' compensation is an aspect of an occupational disease that is often overlooked or avoided, the primary care physician (PCP) plays an essential, well-defined role in this system. The authors further stated that the initial function of the primary care physician is to treat the patient. However, as a matter of course, this role expands in the case of occupational lung disease in which the physician initially identifies the patient's condition as work-related and,

therefore, potentially compensable. In addition, Banerjee and Kushner (2005) indicated that the primary care physician often informs the worker that the condition is compensable and ensures that the employer knows about the illness. Therefore, the authors found that an occupational history is essential, including identifying the disease, preventing disease, and determining compensation. The authors further reported that to diagnose occupational lung disease, the healthcare provider must first suspect an association between work and disease based on the patient's symptoms and occupation. Therefore, as Banerjee and Kushner (2005) outlined, this suspicion requires completing an occupational pulmonary history that includes job-related questions.

A COPD diagnosis is based on examining symptoms, relevant history of smoking, industrial exposure, and spirometric measurements of lung function (Global Initiative for Chronic Obstructive Lung Disease (GOLD), 2021).

Bourke and Burns (2011) reported that as there is no single test that can be used to diagnose COPD, a diagnosis is made by relying on clinical judgment and a combination of history, physical examination, and spirometry to substantiate the presence of airflow obstruction.

Croft et al. (2020) reported that a physician might become entangled in legal questions about the causation of disease and compensation. The clinician's approach to assessing exposure in microenvironments such as the home, workplace, and transportation environments primarily involves interviewing the patient. Alaguney et al. (2020) reported that the clinical history of exposures might focus on a few widely known hazards, for example, asbestos, but rarely inventory duties of specific jobs, the materials handled, or the use of respiratory protection. Furthermore, the authors found that most physicians have limited knowledge of the exposures associated with specific occupations. The authors also reported that a routine history taken by a primary care provider classically addresses only tobacco smoking and current or typical employment.

Studies have found that physicians' barriers in diagnosing and reporting workplace exposures include incomplete and inadequate work exposure histories due to time constraints within the office (Holness et al., 2007; Alaguney et al., 2020; Tarlo, 2020). A second barrier can be physicians' lack of knowledge about the link between occupations, work-related exposures, and occupational lung diseases (Holness et al., 2007; Alaguney et al., 2020; Tarlo, 2020). Finally, a third barrier identified was the complexity (e.g., complicated forms, unfamiliar terminology on forms, and lack of knowledge on how to complete forms) of the compensation system, including how to initiate a claim (Holness et al., 2007; Alaguney et al., 2020; Tarlo, 2020).

Health Quality Ontario (2021) indicated that personnel that may be involved in the management of the patient might include respiratory and occupational physicians, primary care physicians (e.g., general practitioners), respiratory therapists, occupational hygienists, return to-work-coordinators, and mental health professionals (e.g., psychiatrists and psychologists).

Croft et al. (2020) found that a physician trained in environmental or occupational medicine routinely obtains more detailed and disease-relevant information. Therefore, this type of physician should be consulted in cases involving possible effects of complex environmental exposures. Croft et al. (2020) further reported that physicians trained in pulmonary medicine might also have specialized expertise related to environmental lung disease, and allergists with pulmonary education may also be appropriate for addressing workplace-related allergic disorders.

Baur et al. (2019) outlined that a lung disorder diagnosis should always include a detailed occupational history that considers various occupational exposures that could contribute to the diagnosis.

Health Quality Ontario (2021) reported that healthcare professionals managing patients with COPD in Ontario might employ multiple approaches to address patient's healthcare and workplace needs,

including conventional treatments (e.g., COPD medications), education (e.g., educating patients to avoid occupational triggers), workplace interventions (e.g., discussion with the compensation office or employer to modify the workplace environment), and other referrals (e.g., to mental health professionals), when appropriate. According to Health Quality Ontario (2021), management addresses the illness's multifaceted nature, including psychological and socioeconomic effects.

A social constructionist approach was used as the theoretical framework for this study. Crotty (1998) indicated that this framework allows the participants to provide meaningful insights into their situations. Using a social constructionist framework helped elicit the rich data gathered and validated participants' lived, shared experiences (Crotty, 1998). Additionally, this approach allowed the use of broad and general questions enabling the participants to construct the meaning of their situation (Crotty, 1998).

This study aimed to describe physician and union compensation representative experiences working with underground mineral workers diagnosed with COPD as an occupational illness and their experiences with the Ontario workers' compensation claim process.

#### Methods

A qualitative narrative study design allowed a flexible approach to understanding the participants' experiences involved with this study. A narrative inquiry approach is most appropriate to understanding the experiences, actions, motivations, and life journeys of individuals who are challenged by health, disability, trauma, change, adaptation, loss, or other significant life challenges (Clandinin & Raymond 2006; Holloway, 2007; Ennals & Howie, 2017).

Eight individual, in-depth semi-structured telephone interviews were conducted with physicians and union compensation representatives in Northeastern Ontario (Sudbury, Timmins, Kirkland Lake, and Matachewan), Canada, who were involved in the care and representation of underground mineral workers diagnosed with COPD as an occupational illness and were involved with a

compensation claim. Physicians and union representatives were involved in this study given their significant role in diagnosing, documenting, advocating, and supporting an underground mineral worker with a compensation claim for occupational COPD.

Participants provided informed consent and received twenty dollars via e-transfer at the interview commencement.

The Laurentian Research Ethics Board, Sudbury, Ontario, Canada, approved an ethics application for this study according to the Canadian Tri-Council Recommendations for Research with Human Participants (REB #6020884).

#### Sample and Setting

The recruitment strategy used for this study was purposeful sampling (Sandelowski, 2000).

Sandelowski (2000) indicated that this sampling method allows for participant recruitment that provides information-rich data for the purpose of saturating the data for the study. When using purposeful sampling, participants are selected because they possess particular characteristics or experiences necessary to answer the research question (Wright-St Clair, 2015).

Physician recruitment included advertising for participation in the Northern Ontario School of Medicine (NOSM) Clinical Sciences Newsletter (Approval received by the Associate Dean of Faculty Affairs). The newsletter was sent via email to all clinical faculty of NOSM throughout Northern Ontario. A paragraph in the newsletter outlined the research study briefly and included the primary researcher's contact number and email address should physicians wish to participate in the research study. Additionally, a search of the Doctor Search engine on The College of Physicians and Surgeons of Ontario website was conducted to generate a list of physicians with active primary care or lung specialist practices in Sudbury, Timmins, Kirkland Lake, and Matachewan. Once a list was generated, letters were mailed to the physicians. Finally, physician recruitment also took place with the support of the Occupational Health Clinics for Ontario

Workers Inc. (OHCOW). Physicians involved with the McIntyre Powder project were emailed as a method of recruiting participants for this study.

Recruitment of the union compensation officers included a letter sent by the primary researcher to the union compensation representative at the Local 6500 Union of Sudbury via email, who provided the participation letter to all union compensation officers of the Local USW 6500 union. Free and informed written consent was obtained from participants before commencing research. Participants who could not give written or verbal consent were excluded from the sample due to a lack of cognitive abilities. Participants were advised that they could withdraw from the study at any time, for any reason, and without penalty.

#### Data Collection and Analysis

Originally, in-person interviews were planned. However, due to the COVID-19 pandemic, conducting all interviews by telephone became necessary. Sturges (2014) indicated that telephone interviews in qualitative research are uncommon, mainly due to concern about whether telephone interviews are well suited to the task. Research studies have shown that qualitative researchers generally rely on face-to-face interviewing when conducting semi-structured and in-depth interviews. Conducting a telephone interview is typically seen as appropriate only for short, structured interviews or in very specific situations (Harvey, 1988; Fontana & Frey, 1994; Rubin & Rubin, 1995). However, Fenig and Levav (1993) noted that respondents who agree to be interviewed about sensitive topics might prefer the relative anonymity of telephone versus face-to-face interaction with the researcher. Miller (1995) reported that telephone interviewing might provide an opportunity to obtain data from potential participants who are reluctant to participate in face-to-face interviews or from groups who are otherwise difficult to access in person. Miller (1995) further noted that using the telephone could make it possible to obtain data from people who would not otherwise have their views represented in these cases. Telephone interviewing is a cost-

effective data collection method, particularly compared to face-to-face interviews in the respondent's typical environment (Tausig & Freeman, 1988; Aquilino, 1992; Miller, 1995). Tausig and Freeman (1998) found that even though the telephone interviews precluded probing the interviewees based on visual cues, it was still possible to probe participants. Furthermore, the authors noted that the interviewer could take notes without distracting interviewees when conducting telephone interviews. Finally, research studies have found that telephone interviews can yield valuable quality data with maximized response rates and can effectively collect data (Tausig & Freeman, 1988; Harvey, 1988).

Research studies have shown that some disadvantages of telephone interviews include limiting the interviewer's options to comfort respondents who become emotional during the interview. They may also limit the interviewer's ability to anticipate such a reaction due to a lack of visual cues of respondent distress (Tausig & Freeman, 1988; Harvey, 1988).

Participants who consented to participate in the study were asked semi-structured and open-ended interview questions with additional probes when required; however, reflexive journaling was also recorded throughout the study. In addition, with the participants' approval, all interviews were audio-recorded and subsequently transcribed verbatim to ensure accuracy.

Qualitative interviews with physicians inquired about: how to determine the diagnosis of COPD as an occupational injury; the factors affecting the treatment of COPD; the impact of COPD; knowledge of occupational exposures in the workplace; the experience of working with the compensation office; how the compensation process could be improved; and advice to other physicians who are working with underground workers diagnosed with COPD. Qualitative interviews with union compensation representatives inquired about: working with underground mineral workers diagnosed with COPD as an occupational illness; the impact of COPD; the

experience of working with the compensation office; the experience of working with the compensation office; how the compensation process could be improved; and suggestions for enhanced support for underground mineral workers diagnosed with COPD. The interviews were conducted by telephone and lasted about 60 to 90 minutes. The timing of the interviews was determined by the extent of sharing by each participant. All interviews were recorded, transcribed verbatim, and anonymized at the time of transcription.

Data analysis was conducted using an inductive approach aligning this process with the research study's theoretical framework (Braun & Clarke, 2006, 2012, 2013, 2019). Braun and Clarke's (2006, 2012, 2013, 2019) six-step process for data analysis was used. The steps included 1) intimately familiarizing with the dataset's content and noticing things relevant to the research question, 2) coding using a process of identifying aspects of the data related to the research question and generating initial codes, 3) searching for themes, 4) reviewing potential themes as a phase of quality control in relation to developing the analysis, and 5) clearly defining the themes and indicating distinctive and specific themes, 6) working towards a final analysis. Two research team members achieved consensus using samples of coding.

In order to ensure the trustworthiness, credibility, dependability, transferability, and application of the findings, all transcripts were read and re-read (Colorafi & Evans, 2016). Berger (2015) indicated that reflexivity and addressing biases enhance a research study's trustworthiness and objectivity. Colorafi and Evans (2016) indicated that trustworthiness, credibility, dependability, transferability, and application of the findings across all transcripts could be accomplished by reading and re-reading. Colorafi and Evans (2016) noted that dependability is achieved by using consistent procedures across all participant interviews, such as consistency in data collection (i.e., using the same interview questions in the same order) and clearly describing the researcher's role within the study. Credibility was achieved by providing thick and rich data that is believable from

the participants' perspectives. Additionally, transferability was accomplished by thoroughly describing the participants' characteristics to make comparisons with other groups (Colorafi & Evans, 2016).

## Results

Participants involved with this study included family physicians, occupational health specialists, and union compensation officers. The primary care physicians and occupational health specialists were in practice between 10 and 32 years (mean 21). The union compensation officers have supported underground mineral workers diagnosed with occupational COPD and were involved with compensation cases between 5 and 37 years (mean 21). Participants provided in-depth descriptions of the challenges of working with an underground mineral worker diagnosed with COPD as an occupational disease and their experiences with the compensation claim process, revealing overarching themes that include 1) additional support resources are required, 2) smoking cessation is essential, 3) COPD is a crippling disease, 4) education is required, 5) the compensation claim process is challenging; 6) occupational diseases are challenging to prove, 7) occupational COPD is costly. Themes were identified using an inductive approach to data collection and repetitions and similarities found in the transcriptions. Finally, interrater reliability added to the validity of the themes.

**Additional support resources are required:** During the interviews, the participants in this study indicated that other supports (human resources) are needed to assist underground mineral workers with their compensation claim process. They said that a lack of qualified union compensation representatives and a shortage of physicians and compensation staff who understand the process make it challenging to support underground mineral workers. Medical participant 1 recounted:

“In general compensation is worse than ever, they have removed the doctors from the equation; they have retired all their doctors, so the people making the decisions, the

adjudicators, are social workers and some of them are nurses, but there is no doctor in the back, so it is tough to argue for the worker.”

Physicians who participated in this study felt it was essential to have a physician to speak to the compensation office, and medical participant 2 stated:

“They need to put the doctors back into the equation; they took all the doctors out to save money, but they reduced the quality on something that is so complex and like the stakes are high like if a guy injures himself and does not get compensation his life is a disaster, it just disintegrates.”

Union compensation representatives involved with this study agreed that the reduction in staff at the compensation office caused some of the barriers they faced when supporting an underground mineral worker with a compensation claim. Union compensation representative participant 5 indicated:

“Compensation should bring back full-blown investigators, particularly when it comes to occupational diseases and other conditions because very often having a claim approved depends on accident history. Sometimes, putting everything together from 20 to 30 years ago is nearly impossible unless you are Sherlock Holmes. Those guys were trained to do it, they did not always get it right, but at least they knew where to go, and they put together a report even if it was not what I needed, it was a starting point, it gave me a roadmap to work with.”

The union compensation officers also spoke about the challenges they faced with increased compensation caseloads making it challenging to support complicated COPD compensation cases. In addition, they talked about the limited number of trained union compensation officers who had intimate knowledge of the compensation system, making it challenging to support underground

mineral workers because compensation cases for COPD were intricate and complex. Union compensation representative participant 6 indicated:

“They have not added any new employees for the office of the worker advisor for as long as I can remember. We used to fight for resources all the time, and they just kept squeezing us. Unions are finding it tough because even though they are not required to be licensed, they are being held to the same standards as a paralegal when it comes to representation, so you are pretty scared because you do not want to mess up.”

**Smoking cessation is essential:** During the interviews, the medical participants involved with this study spoke passionately about the necessity for smoking cessation for the health of the underground mineral worker. Some medical participants suggested that if the underground worker did not quit smoking, they could not adequately treat them. Medical participant 3 recounted:

“Well, smoking for sure, if they do not want to quit smoking, then there is nothing we can do. So, I tell them they have to quit smoking.”

Furthermore, medical participant 2 indicated:

“If you have a patient who is smoking, smoking cessation is clearly going to be one of the biggest things you can do. When you find people who are still smoking and are on treatment, that is a bit frustrating because you are thinking why you are bothering to take four puffs a day and still smoking 20 cigarettes a day.”

Some medical participants within this study also perceived smoking as the rationale for denying a compensation claim. Medical participant 4 stated:

“So, if you really want to save your lungs, you really have to quit smoking, and if you smoke, you are not going to get a COPD compensation claim because they will say you are

a smoker, so it is all your fault.”

**COPD is a crippling disease:** Participants in this study spoke about how workers suffered from the devastating effects of COPD, including the physical and emotional impact. Medical participant 1 reported:

“People are embarrassed because they cannot function the way they used to; they cannot button their shirts. It is a very crippling disease at many levels, functional and emotional.”

Furthermore, union compensation representative participant 3 said:

“The illness is debilitating; the struggle of getting air into your lungs is unbearable.”

Participants also spoke about the mental health struggles individuals diagnosed with COPD face.

Medical participant 5 stated:

“Being breathless, being short of breath, it is very anxiety-provoking. It can have some disastrous psychosocial impacts.”

Participants also spoke about the strain that COPD had on the family. Union compensation representative participant 6 indicated:

“Underground miners are mostly male, are mostly over their 50s and 60s when they get the final diagnosis and are the breadwinners of the family. They want to maintain the persona of the male breadwinner, and they will continue to suffer without telling anyone.”

Medical participant 7 also spoke about the significant social impacts (e.g., disruptive cough, sputum production, thoracic chest pain, sleep disorder, voices changes, and mental health issues) of COPD:

“The biggest impact that I hear about is the shortness of breath, which will restrict their activities and restrict the enjoyment they get; you know they cannot go for walks like they used to. They cannot do things with their families like they used to because they are so restricted by their lung disease, affecting their mental and physical health. It can lead to depression and anxiety because, in COPD, they can get anxious about if they are going to get sick.”

**Education is required:** Union compensation representative participants involved with this study discussed the importance of enhanced education for employers and physicians. They believed that this was necessary for understanding occupational illnesses and the compensation claim process and imperative to further support workers with an occupational illness and a compensation claim. The physicians involved in this study felt that employers need more education about how to best support an injured worker. Medical participant 6 stated:

“The employer could give a rundown of the compensation system during an orientation session. More information needs to be available, and employers need to have someone who can help.”

The union compensation representatives involved with the study felt that enhanced education for the physicians involved with underground mineral workers diagnosed with occupational COPD was required. Union compensation representative participant 1 indicated:

“Physicians especially like oncologists, and family doctors specifically should be educated on occupational illnesses and workplace exposures.”

Furthermore, union compensation representative participant 3 indicated:

“I do not think that physicians are educated enough on occupational disease and workplace

exposure because if they were, then that would be something they would discuss with their patients right away.”

The union compensation representatives also suggested that the compensation office should enhance their education for caseworkers reviewing compensation claims. Union compensation representative participant 4 said:

“More information from the compensation office needs to be available for workers. They need to find the basic information that would allow them to navigate the claim process better.”

The union compensation representatives also indicated that the employers require training. They noted that if an employer had proper training, the process for submitting a claim for COPD to the compensation office would not be as challenging for the employees. Union compensation representative participant 2 stated:

“The companies need better training. We want to think that the company would help the workers through this type of situation. They should be providing more information, but it is a battle. There is little accountability when an employer fills out the form incorrectly. The company needs to recognize that people with COPD are still valued; they can still contribute to society.”

**The compensation claim process is challenging:** Physicians play a critical role in diagnosing occupational COPD. They are responsible for gathering the health and employment data to support the diagnosis. Physicians are also key to ensuring the initial compensation claim is submitted with accurate information so that an underground mineral worker can receive compensation for occupational COPD. Union compensation representatives are vital to supporting an underground worker with a compensation claim. Their intimate knowledge of the system and their

understanding of exposures in the minerals industry can help support the approval of a compensation claim for occupational illnesses with the compensation office. The union compensation representatives and medical participants in this study spoke passionately about the challenges and barriers they faced when completing a compensation claim. They talked about complicated forms, a lack of easily accessible information, and frustrating processes. All participants discussed the difficulties of maneuvering through the compensation claim process. Participants indicated that they experienced challenges understanding and navigating through the compensation claims process. Union compensation representative participant 1 said:

“The compensation process has become very legal, and you almost need the credentials of a lawyer or an expert; there are so many **smoke and mirrors**, and there is such a play on words and policies.”

Similarly, union compensation representative participant 3 indicated:

“It is a million-piece jigsaw puzzle, and people cannot navigate the system. I wish there was funding for injured workers to get counselling and coaching to help people through the process.”

Participants in this study also noted a lack of easily accessible information to assist with completing a compensation claim for an occupational illness, and medical participant 9 said:

“If you look on the compensation website, there is some information there, but to be frank with you, some of it is crap.”

The medical participants involved in this study perceived that this frustration was partially due to not understanding the compensation claims process. They described how the compensation system was not always transparent with their decision-making process. This was particularly troubling to

the medical participants interviewed because they described the importance of following all the “right” steps to ensure the success of a claim. Medical participant 7 stated:

“With compensation, there is considerable paperwork, many appointments, and the paperwork has to be filled out by many people. Once you finally complete everything, the compensation office often makes decisions and changes. It is hard to argue with them, and often I will find out that my patient has been referred to a specialty clinic; I do not know ahead of time what is happening. Compensation very rarely asks for my opinion. Once I had to physically call them because they were completely unreasonable about a situation, and it was not until I spoke with them that we got the situation sorted out. Still, before that, there were multiple pieces of paper back and forth.”

The participants also spoke about the difficulty of using compensation forms to complete a compensation claim for an occupational illness. Participants found that the form did not allow for further clarification about an occupational illness and suggested that the form be changed to ensure that claims were not denied due to a lack of information. Union compensation representative participant 2 said:

“There needs to be more done on the compensation forms and more room to get specific answers about an occupational illness.”

Furthermore, medical participant 4 indicated:

“Using the physician compensation form, the other checkbox is pretty nonspecific; it should be more specific to include a primer or prompter, but it does not really specify if the illness is related to a workplace exposure.”

The union compensation officers also raised concerns about the worker compensation form. They

spoke about how difficult it is for workers to complete the forms and that they had to help complete the form so that the worker did not have their compensation claim denied. Union compensation representative participant 6 stated:

“A big issue with the compensation paperwork, when you look at the form, it is not designed for occupational disease or gradual onset injury, so that is a barrier for anyone applying for compensation. So, if you look on the front page of the form, in the middle, it says check off the area of your body that is affected, but there is no area for occupational illnesses, so workers check other, and there is one line that allows them to write something. If a worker has COPD, pulmonary fibrosis, or lung cancer, there is nowhere for them to write all of it. There is a lined sheet on the back of the form so they can write that they were diagnosed with COPD, what year and where they worked and doing what, and as the union representative, I guide them through it; I have spent countless hours on the form.”

**Occupational diseases are challenging to prove:** Medical participants in this study spoke about the difficulties connecting the dots between all the evidence required to support an occupational illness diagnosis. Several criteria were necessary to support the diagnosis and ensure the compensation claim was approved. Medical participant 5 stated:

“You are looking for silicosis, the fibrosis of asbestosis with the pleural plaque if it is there with any other defining components, then you could say you know what, I really think you have some COPD some lung changes from your exposure in the mines.”

Medical participants felt that many factors were necessary to diagnose COPD as an occupational illness. Diagnostic tests, a thorough history, and knowledge of the workplace exposures were required to make a final diagnosis. Medical participant 7 stated:

“The goal is to connect the diagnosis to the exposure. So, we were trying to connect it, and

you need to show pathology and pathophysiology; you need a chest X-ray, identified symptoms, PFTs, and CT scans. So, the connection can be very difficult because you need the occupational piece; otherwise, it is just COPD. You need to link it to the occupational exposure; it is the exposure that makes it the disease.”

Similarly, medical participant 8 indicated:

“The physical exposures are the ones that I really look at like dust, silica, some particulates like asbestos, and then there are the sensitizers that give you asthmatic conditions and bronchospasms. Determining work-relatedness for COPD requires a full inquiry into personal physical health, family histories, and industrial exposures.”

The union compensation representatives also found it challenging to support a compensation claim for occupational COPD. Participants indicated that they had to ensure that they had the exact information required to meet the criteria for occupational COPD outlined by the compensation board; otherwise, the claim would be rejected. Union compensation representative participant 1 said:

“30 - 40% of the cases that I represented were successful because we built the case, there were some that there was not just enough evidence, so they do not meet the bar for an appeal according to compensation.”

The union compensation representatives also struggled to put the jigsaw puzzle pieces of a case together to support the underground worker with a compensation claim for occupational COPD. They found it challenging to gather all the information necessary to accurately document a compensation claim to get approval. Union compensation representative participant 3 indicated:

“The daunting task is getting an exposure history; the compensation office requires proof of

exposure, and so many times we rely on case history. However, unfortunately, there is no central body that collects all that shit. We used to have the mining master file, but that stopped in 1987, and there is nothing that I am aware of; I know that certain companies may have their own, but only because the union insists on it. Before, there was a mining master file, and if you worked in a mine, they collected your silica exposure, your lung function, and an X-ray test, and they collected your radiation exposure; it did not matter where you worked. You were put in that database, which was right across Ontario if you were a miner.”

**Occupational COPD is costly:** Medical and union compensation representative participants spoke about COPD’s direct and indirect costs as an occupational illness. Specifically, the financial burden of not having a compensation claim approved by the compensation office was considered difficult for the worker when seeking pharmacological treatment for COPD. Union compensation representative participant 4 stated:

“Workers have a hard time affording medications and oxygen. Workers in their 70s and 80s were the primary providers, so they could not afford their medications if they could not work. Workers need to know that getting COPD was not their fault and when workers finally get money from the compensation system, it can be life-changing for them and their families.”

Furthermore, medical participant 7 indicated:

“Financial barriers are big, medications are expensive, and some people cannot afford them.”

Union compensation representative participants believed that because the compensation process is so challenging, many workers would not submit a claim saving the compensation system money.

Union compensation representative participant 2 said:

“The compensation system creates huge barriers for people to initiate claims, and they walk away from any responsibility for this, and it saves millions of dollars. The compensation board is getting away with millions and millions of dollars in compensation costs which are following onto OHIP.”

Medical participants also spoke about the time costs of completing a compensation claim. They believed the compensation claim process was daunting and that the time required to complete compensation forms was unrealistic. Medical participant 7 stated:

“The compensation office asks for unrealistic things. So we will get letters from the adjudicator, like give me a copy of the chart and then tell me the whole story on this guy. It is crazy, and I do not have a day to write all this down.”

Medical participants also spoke about the time costs of having patients who require a compensation form completed. Medical participant 5 indicated:

“Patients exhaust us asking for letters that can take an hour or two to write. It is a lot of work, and forms are a big deal; it is a hidden problem. It is an annoyance to the patient and me.”

## Discussion

The themes that were established from this study echoed previous research studies. Kuprys-

Lipinska and Kuna (2014) found that the inability to contribute to the household often leaves those with COPD experiencing feelings of being a nuisance or decreasing their role within the family.

This study’s medical and union compensation representative participants spoke about the family challenges that workers with occupational COPD faced. They indicated that shortness of breath associated with COPD often restricted everyday activities, limiting social and family interactions.

Medical and union compensation representative participants indicated that these restrictions often impacted mental well-being. Cavailles et al. (2013) reported that anxiety and depression are two common disorders among COPD patients. The authors further noted a strong link between anxiety and dyspnea, increasing the frequency of depression in individuals with COPD more than in any other chronic disease.

Medical participants who took part in the study came across in the interviews as caring and concerned for the welfare of their patients; however, they did speak about frustrations that arose when patients were not adherent. They talked about how difficult it was to continue to treat a patient with COPD if they continued to smoke, misunderstood how to take the inhalers properly or were not compliant with their medication regimen. In contrast, the union compensation representatives felt that physicians only cared about smoking and did not take the time required to document occupational exposures properly. The union compensation representatives felt that physicians were insensitive to the needs of the underground mineral worker and considered them to be a barrier to a worker getting a compensation claim approved. While the medical participants and union compensation representatives disagreed on how smoking contributed to the diagnosis and compensation of occupational COPD, they both agreed that smoking was a significant contributor to COPD and smoking cessation was important for the well-being of the underground mineral workers.

According to Baron (2003), 70% of individuals diagnosed with COPD continue to smoke. The study found that smokers cited various barriers to smoking; however, they had all attempted a smoking cessation. Medical participants in this study strongly felt that underground workers with COPD should quit smoking for their well-being. However, medical participants did not indicate that they provided support, education, or pharmacological options for smoking cessation and, in some instances, suggested smoking was a stronger correlation to COPD than the working

environment. Studies have found that cigarette smoking is the most common cause of the obstructive pattern; however, a history of smoking should not preclude careful investigation into occupational exposures as contributing, if not causal, factors for physiological impairment (Speizer & Tager, 1979; Croft et al., 2020).

Given that smoking is the number one risk factor for COPD, Godtfredsen et al. (2008) suggested that treatments for smoking cessation are essential for slowing down the progression of this disease. Thus, public health efforts to prevent and treat COPD must target smoking cessation and reduce adverse workplace exposures. Cahill et al. (2013) found that nicotine replacement products such as varenicline, bupropion, and nortriptyline increase the long-term smoking cessation rate and should be used as an element in a supportive intervention program. Other recommended strategies that have shown to be effective in helping smoking cessation include intervention programs and counselling delivered by either physicians or other healthcare professionals (Global Initiative for Chronic Obstructive Lung Disease, 2015). Criner et al. (2015) noted that for a smoking cessation intervention program to be successful, it has to contain the behavioural, physiological, and psychological consequences of smoking, recognize prior unsuccessful attempts at quitting, and target high-risk smokers.

Medical participants in this study spoke about the time required to adequately diagnose, treat, and submit a compensation claim for an underground worker diagnosed with occupational COPD. Research showed that physicians have expressed that they have insufficient time to spend on direct care due to extensive paperwork requested by the compensation system (Baril, 2003; Russell et al., 2005; Schweigert et al., 2004). Baril (2003) indicated that physicians have concerns about the lack of time required to gather sufficient information about an occupational illness. The medical participants in this study expressed similar sentiments and felt that the paperwork requirements from the compensation office were unrealistic. The WSIB was not viewed favourably by the

medical and union compensation representative participants in this study but instead was seen as a barrier to supporting an underground mineral worker who submitted a compensation claim.

Medical participants felt that completing compensation claim forms was time-consuming, challenging, and often frustrating due to a lack of physician support at the compensation office.

Research studies have shown that physicians' barriers in diagnosing and reporting workplace exposures include incomplete and inadequate work exposure histories due to time constraints within the office (Holness et al., 2007; Alaguney et al., 2020; Tarlo, 2020). A second barrier can be physicians' lack of knowledge about the link between occupations, work-related exposures and occupational lung diseases (Holness et al., 2007; Alaguney et al., 2020; Tarlo, 2020). Finally, a third barrier identified was the complexity (e.g., complicated forms, unfamiliar terminology on forms, and lack of knowledge on how to complete forms) of the compensation system, including how to initiate a claim (Holness et al., 2007; Alaguney et al., 2020; Tarlo, 2020). Medical participants in this study reaffirmed that it could be challenging to connect the dots to diagnose a worker with COPD as an occupational illness. Several requirements are necessary, including diagnostic tests, a thorough occupational history, and a complete physical examination. A lack of supporting information could change the outcome of a compensation claim. Therefore, those involved with the support of a worker diagnosed with occupational COPD must have easy access to the documentation required to complete forms.

Once a compensation claim is submitted to WSIB, the WSIB will review the claim to determine if the examining doctor obtained a detailed employment history and the smoking history (WSIB, 2022). WSIB (2022) states that data on environmental exposures and tobacco use are especially important when the physician is asked to give an opinion on apportionment (i.e., the allocation of work exposure and cigarette smoking to the lung disease) between causes of lung diseases.

According to WSIB (2022), the COPD binder recommends that, where a worker has a permanent

impairment rating for COPD, adjudicators consider paying the work-related portion of that permanent impairment if the work-related portion is measurable and distinct from the non-work-related component. The COPD Binder formula does this by using the observed rate of loss of lung function found in the epidemiological studies for dust exposure (of 5.8 mL per year) multiplied by the number of years the particular worker was exposed to respirable dust at work, compared with the observed rate of loss of lung function found in the epidemiological studies for cigarette smoking (of 8.5 mL per pack-year) multiplied by the number of pack-years the particular worker smoked. This formula is intended to determine the relative contribution of smoking and occupational dust exposure to the overall impairment from COPD, thereby allowing an adjudicator to pay for only the work-related part of the impairment from COPD.

Union compensation representative participants in this study discussed the need for further education for healthcare workers, compensation case managers, and employers. It was felt that enhanced education could help mitigate the barriers associated with being diagnosed with COPD as an occupational illness, submitting a compensation claim, and ultimately the worker's long-term well-being. Some medical participants noted that there had been an increased focus on occupational illnesses in both undergraduate and postgraduate physician training programs in recent years.

#### Limitations

This study was limited by the restrictions of (1) a small sample size, (2) the possibility of selection bias from some participants who were faced with negative encounters with the compensation process, and (3) possible limitation of transferability of the findings due to the specific nature of this research study set in Northeastern Ontario. At the same time, this study was the first to explore the experiences of physicians and union compensation officers in Northeastern Ontario who were involved with an underground mineral worker diagnosed with occupational COPD and the

compensation claim process; most other studies focused on physicians' experiences only. This study provided the opportunity to gather in-depth perspectives of physicians and union compensation officers directly involved with the care of an underground mineral worker diagnosed with COPD as an occupational illness. This study added value to previous research in the area of COPD as an occupational illness and the compensation claim process. Finally, the participants who consented to be involved with this study had an interest in the area of occupational health and the compensation claim process.

### Conclusions and Implications

The findings in this study draw attention to several areas that revealed challenges and barriers associated with supporting an underground mineral worker diagnosed with occupational COPD and the compensation claim process. Ideally, medical and union compensation participants in this study wanted improved education about diagnosing COPD as an occupational illness and streamlined processes for the compensation claim process. In addition, further research should be undertaken to understand the support systems (e.g., union, compensation, physician, and employer) gaps and failures. Additional education about occupational health is essential for new physicians. Education should include how to take an occupational history and report the findings to the compensation system minimizing the challenges of having a compensation claim approved.

Potential policy changes could involve improving physician remuneration for the medical management of compensation cases and introducing mandatory basic occupational medicine training for all physicians. Additional studies might help determine how to best translate the findings into specific healthcare delivery or policy development components. The medical and union compensation representative participants' viewpoints elicited and presented in this thesis expand the pool of evidence for researchers gathering data about the compensation claim process.

One of the gaps identified by this research study is that the compensation office has inappropriate

human resources necessary to eliminate some of the identified challenges that the physicians and union compensation officers face when completing a compensation claim. Therefore, reintroducing investigators and enhancing the physician compliment at the compensation office should be considered if deemed cost-effective. However, future studies could help to support the need for this intervention.

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## **Chapter 5: Occupational Medicine in Medical Education: Are We Doing Enough?**

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## ABSTRACT

**Background:** Despite increased funding to support occupational medicine education throughout Medical Schools across Canada, underground mineral workers in Northeastern Ontario diagnosed with occupational COPD struggled to have their occupational illness diagnosed and documented as an occupational illness with the Ontario Workplace Safety and Insurance Board. This qualitative study explored the compensation claim process experience of underground mineral workers in Northeastern Ontario diagnosed with occupational COPD.

**Methods:** Telephone interviews were conducted with 16 underground mineral workers in Northeastern Ontario diagnosed with COPD and involved with the Ontario Workplace Safety and Insurance Board (WSIB) claim process.

**Results:** Participants in this study expressed a lack of support from physicians when seeking compensation for occupational COPD. Participants indicated that they required more advocacy from their healthcare provider. They felt that physicians could not identify the possibility that their COPD was due to their mining exposure. Participants believed that a physician's inability to hear an alternate reason for their COPD was impeded by what they already knew about the relationship between smoking and COPD.

**Conclusions:** While some participants had positive experiences with the compensation claim experience, many participants felt that physicians meant to support them were not educated enough about how best to diagnose, document, and support a claim for occupational COPD with the compensation system. Therefore, increased education for medical students in the undergraduate medical education program about diagnosing and documenting an occupational illness is required.

**Keywords:** Northern Ontario, COPD, Occupational Medicine, compensation, Medical School

## Introduction

The Occupational Health Program (OHP) at the University of Alberta played an important and ground-breaking role in the specialty of occupational medicine in Canada between 1984 and 1999 (Guidotti, 2012). Occupational medicine training programs are offered broadly (e.g., Australia & USA) and provide physicians and nurse practitioners opportunities to enhance their knowledge of workplace and human health impacts of industrial practices (USF Health College of Public Health, 2021; American College of Occupational Medicine; 2021; RACP; 2021). Guidotti (2012) noted that occupational medicine is not determined by advances in medical science, such as the development of new drugs, but by changes in employment, the economy, and technology. Accredited certified training programs support the need for enhanced training in the field of occupational medicine along with research opportunities that will advance best practices in the field of occupational medicine (USF Health College of Public Health, 2021; American College of Occupational Medicine; 2021; RACP; 2021).

The Royal College of Physicians and Surgeons (RCPSC) of Canada (2021) defined *occupational medicine* as “a medical discipline that emphasizes prevention and deals clinically and administratively with the health needs of both individuals and groups concerning their working environments and includes the recognition, evaluation, control, management and rehabilitation of occupationally related diseases and injuries.” Occupational medicine was finally recognized as a separate specialty by the Royal College in 1984 (Guidotti, 2012). Outlined by Guidotti (2012), the practice of occupational medicine attracted hundreds of practitioners without Royal College fellowship credentials, many of them certified (or recognized by the new designation of fellowship) by the Canadian Board of Occupational Medicine (CBOM). The author noted that CBOM was influential in developing the specialty for many reasons, including demonstrating the sufficient numbers of interested physicians to support a viable specialty, the unity of the content of occupational medicine, and its advocacy for a Royal College fellowship training program.

According to Guidotti (2012), occupational medicine was recognized by the Royal College in 1984. The first programs to recognize occupational medicine as a specialty by the RCP were Alberta, University of Toronto, and McMaster University. In 2019, there were 54 Royal College occupational medicine trained physicians in Canada, and of those, there were 22 located in Ontario (Canadian Medical Association, 2019).

In 1994, the Workplace Safety and Insurance Board (WSIB) undertook a survey that documented the lack of educational activities related to occupational medicine in several of the five medical schools in Ontario (University of Toronto, 2021). Holness and Liss (2014) reported that the WSIB developed the Workplace Health Champions Program (WHCP) due to the needs assessment and survey. The six medical faculties in Ontario signed agreements with the WSIB agreeing to:

- (i) develop and implement a workplace health curriculum to support medical training in workplace health issues primarily at the undergraduate education level.
- (ii) select a physician as Workplace Health Champion (WHC) to assist in the development and implementation of a workplace curriculum.
- (iii) keep the WSIB informed of the progress and impacts of the curriculum in the training programme.
- (iv) participate with the WSIB in an evaluation of the curriculum and its impact on the training of new physicians.

Holness and Liss (2014) indicated that the champions work with the medical education and curriculum committees in their schools to find places for occupational health content, either as sessions devoted explicitly to occupational health or in other sessions such as case studies.

Banerjee and Kushner (2005) indicated that the primary care physician often informs the worker

that a condition is compensable. The authors noted that an occupational history is essential, including identifying the disease, preventing disease, and determining compensation.

Cullen and Cherniack (1989) found that primary care physicians underdiagnose environmentally and occupationally related disorders from a clinical perspective and far too frequently enter them into their differential diagnosis. Cullen and Cherniack (1989) revealed that more than 80% of occupational or environmental disease diagnoses are not correctly recognized before evaluation in an occupational medicine clinic, even though most patients had consulted one or more physicians.

This study aimed to explore the psychosocial, occupational, financial, and physical impact of chronic obstructive pulmonary disease on underground workers in the minerals industry in Northeastern Ontario. It also aimed to describe their experiences with the Ontario workers' compensation claim process and communicate physician and union representative experiences with underground mineral workers' diagnosed with COPD as an occupational illness and with the Ontario workers' compensation claim process experience.

#### Methods

A qualitative narrative study design was used to allow a flexible approach to understanding the work-related COPD experiences, including the compensation claim process experience, of the participants involved with this study. A social constructionist approach was used as the theoretical framework allowing the participants to provide meaningful insights into their situations (Crotty, 2015). A social constructionist framework helped elicit the rich data gathered and validate participants' lived, shared experiences (Crotty, 2015). Additionally, this approach allowed the use of broad and general questions enabling the participants to construct the meaning of their situation (Crotty, 2015).

The Laurentian Research Ethics Board, Sudbury, Ontario, Canada, approved an ethics application according to the Canadian Tri-Council Recommendations for Research with Human Participants (REB #6020884).

#### Participants

Purposeful sampling was used to recruit underground mineral workers in Northeastern Ontario who were diagnosed with COPD as an occupational illness and involved with the compensation claim process. Participants in this study were underground mineral workers employed at various mines (i.e., uranium, nickel, and gold) across Northeastern Ontario. Participants in this study were between 65 and 83 years of age (mean of 71.5), had a mean average of 28.5 years of employment in the mining industry and had levels of education that ranged between grades 7 to some college (median grade 9). Within this study, most participants attempted to seek support from a physician to obtain compensation for their COPD. Unfortunately, participants were advised that their COPD would not be compensable due to their smoking history, even though they provided detailed accounts of exposures to dusts, fumes, and toxins underground.

#### Data collection and analysis

Participants who agreed to participate in the research study were asked semi-structured and open-ended interview questions with additional probes when required. The interviews were completed via telephone, and the overall interview lasted about 60 to 90 minutes. Participants were asked how and when they received their diagnosis of COPD, the treatment options provided, and if their healthcare provider provided support for a compensation claim. This portion of the interview lasted approximately 10 – 15 minutes and was affected by the extent of sharing by the participants. All interviews were recorded, transcribed verbatim, and anonymized at the time of transcription. Data analysis was conducted using an inductive approach following Braun and Clarke's thematic analysis six-step method (2006, 2012, 2013, 2019). Two research team members achieved consensus with samples of coding, which assisted in identifying the themes.

## Results

All the participants in this study felt it was necessary to provide enhanced support for any worker who suffered from an occupational illness, and they thought they needed more advocacy from their physicians. For example, participant 2 stated, “If you have somebody on your side and have somebody to stand up for you, then it is okay.”

Participants expressed concerns about their healthcare worker not wanting to support COPD as an occupational illness. They felt that physicians could not conceive that their COPD was due to their mining exposure. Their inability to hear an alternative reason was impeded by what they already knew about the relationship between smoking and COPD. Participant 3 indicated:

“I do not think that physicians are educated enough on occupational diseases and workplace exposures because if they were, then that would be something they would discuss with their patients.”

Participant 10 said, “The doctor wants to blame everything on smoking,” and participant 13 stated, “cigarettes were the answer, and there was no going either way; cigarettes were the problem.”

Furthermore, participant 14 said:

“The doctor asked what kind of work I did, and she said, oh you work lots with diesel equipment, and I told her yes and she said that it did not help and she asked if I smoked, and I said yes, and she said well your smoking did not help, and that is your number one contributor to your lung disease.”

Most participants were unaware that they could submit a compensation claim and only submitted one on someone else’s advice even though they recalled in detail the exposures they had while working in the mining industry. Participant 1 stated:

“I submitted my compensation claim after I heard about it from a lady on television, and I believe I should get the claim because it was through the work because of all the dust I was breathing.”

Also, participant 3 recounted:

“I was not even thinking about compensation for my COPD. When I told my NP that I was going to submit it, she said that was fantastic. It had never come up in conversation with my doctor about submitting a claim to compensation.”

Furthermore, participant 6 said:

“I pretty much have been told that the damage was done and compensation would not have anything to do with that, so unless someone had told me that I could submit for compensation, I would not have known.”

Participants also indicated that physicians did not want anything to do with the compensation system, and participant 4 stated:

“I went to my doctor’s office, I asked him, you know doc can I ask you a question and I said do you know what silicosis is and he said yeah, and I said if I came here with a paper would you sign saying that. The doctor said, just between you and me, I would never sign this because then I would be signing my life away. He told me that if any doctor in Canada put their name on compensation papers, the board would take all of their credentials away and take them to the cleaners. He said no doctor in Canada would put their name on a paper for silicosis.”

Likewise, participant 4 said:

“If you do not have a doctor who protects you, you are a dead fish out of water. You will not have a leg to stand on. If you have a good representative, then they will fight for you. You have to find a good doctor who will acknowledge your position; otherwise, you will not stand a chance. Everything needs to be documented. If your doctor is on your side, it makes a big difference; they are willing to fight for you.”

Many participants were upset that their healthcare practitioners were unaware of the dangers of working underground. They felt that if they knew what the environment was like, they would not have questioned their work-related COPD. Participant 2 said:

“But when you talk to a doctor, they do not know anything about working underground; they do not know what it was like to breathe in that stuff, so the doctor does not support me.”

Furthermore, participant 6 said, “Like what I have seen from doctors nowadays they would not even understand what it was like to work underground,” and participant 7 stated:

“What I have noticed is that doctors do not want to be involved with compensation because it is overwhelming for them. It is hard to do when you are busy taking care of many people and dealing with compensation. The less they have to do with compensation, the better they are, so you feel left out.”

Most participants were unaware that they could submit a compensation claim and only submitted one on someone else’s advice even though they recalled in detail the exposures they had while working in the mining industry. Participant 1 stated:

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Furthermore, participant 6 said:

“I pretty much have been told that the damage was done and compensation would not have anything to do with that, so unless someone had told me that I could submit for compensation, I would not have known.”

#### Discussion

This research study helps to further our understanding of the challenges faced by an underground worker diagnosed with occupational COPD. The participants in this study alleged that physicians in Northeastern Ontario did not have enough education to properly support, diagnose, and submit a well-documented claim for their occupational COPD to WSIB. It was apparent throughout the participant stories that they felt under-supported by the healthcare system.

The creation of the WHCP has helped increase awareness about occupational medicine in both the undergraduate and postgraduate medical education programs in Ontario. However, given the results of this study, there is room for improvement. Moving forward, the WHCP could focus more on cases that would address prevalent occupational health concerns by geography. For example, the Northern Ontario School of Medicine WHCP could develop case studies that speak to the occupational challenges faced by underground mineral workers, such as musculoskeletal injuries, respiratory illness such as COPD, hand-arm vibration, and noise-induced hearing loss. These case studies could address how to best support an underground mineral worker who is faced with an

occupational injury or illness and how best to connect the injury or illness to occupational exposures.

Fishwick et al. (2015) found that taking an occupational history would help identify possible relevant exposures. However, it was noted by the participants in this study that physicians did not have enough time to address their concerns adequately. Fishwick et al. (2015) stated that workers should be allowed to talk freely about their previous work, and a chronological list of jobs and job tasks should be recorded, where possible, including details of known exposures. Sadly, the participants in this study found that physicians were unwilling to look beyond smoking to see that occupational exposures could contribute to a diagnosis of occupational COPD. Vlahovich and Sood (2020) stated that unfortunately, to the detriment of patients, occupational lung illnesses are frequently ignored, misdiagnosed, and misattributed to non-occupational causes.

Felton (1980) reported that an occupational history should encompass the employment history starting with the first job and then creating a work experience diary up till present time. Some suggested questions include company name and location, type of company, period of employment, job titles and work performed, potentially hazardous work exposures (e.g., physical, chemical, biological, and chemical), and personal protective equipment or devices worn. More recently, Walker-Bone and Hollick (2021) cited similar questions that should be asked as part of an occupational history. They expanded on questions that now include “do you have or have you ever had occupational exposure to fumes, chemicals, dusts, loud noises, vibration, radiation, or other occupational hazards?”, “when in relation to the exposure did the symptoms start?” and “could any other exposures explain the symptoms (e.g., smoking)?”

#### Limitations

This study was limited by the restrictions of (1) a small sample size, (2) the possibility of selection bias from some participants who were faced with negative encounters with the compensation

process, (4) only English-speaking participants, (5) only male participants; female participants may have brought forward different perspectives, and (6) possible limitation of transferability of the findings due to the specific nature of this research study set in Northeastern Ontario.

### Conclusion

The findings within this study draw attention to the gap of knowledge about occupational medicine by physicians. The participants in this study felt it was important for physicians to understand better the minerals industry and how occupational exposures could contribute to occupational illnesses. Although there have been significant improvements over the past years that have increased education in Ontario medical school programs about occupational medicine, many areas of improvement are still required. Currently, the only measure of success for the WHCP program is the ongoing delivery of the occupational health curriculum throughout the six medical schools in Ontario (Holness & Liss, 2014). However, there is no mechanism to connect this program's success based on the Medical Council of Canada Qualifying Examination (MCCQE) scores to improve occupational health knowledge. Based on the findings of this study, a further evaluation of the occupational medicine curriculum by the WHCP should be undertaken to enhance the occupational health curriculum further.

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## Chapter 6

### 6.0 Discussion

In this chapter, a summary of the literature findings will be discussed; the theoretical framework

will be discussed in relation to how it aligns with the study findings; the study strengths and limitations will be addressed; implications for future studies will be examined, concluding thoughts will be provided, and knowledge translation of the results will be presented.

This chapter will examine and discuss the resulting themes in terms of their relationship to the literature. Given that there were two distinct groups of participants, underground mineral workers and, secondly, primary care physicians/lung specialists and union compensation representatives, the discussion will be considered for both.

The use of in-depth, semi-structured telephone interviews provided an opportunity for the underground mineral worker participants in this study to openly discuss stories about the impact (i.e., psychosocial, occupational, financial, and physical) of chronic obstructive pulmonary disease and the compensation claim process experience. Additionally, primary care/lung specialists' and union compensation representatives' participants described their experiences working with underground mineral workers diagnosed with COPD and involved with the compensation claim system.

The openness and honesty of participants' accounts were humbling given the sensitive nature of COPD's impact on their overall health. I anticipated some resistance from those called upon even though they had agreed to participate. However, during the data collection phase, participants provided detailed and uncensored descriptions of their illness experiences, including their experiences in the mining industry, the reality of how being diagnosed with occupational COPD affected their quality of life and the challenges associated with submitting a compensation claim. Through a constructive process and research design that was based on mutual respect, I believe this study offered underground mineral workers in Northeastern Ontario an opportunity to share their stories in a manner that both respected their need to be heard and their desire to help others who

may be faced to deal with similar experiences. The effortlessness with which participants shared their private struggles in the face of a suspected occupationally associated COPD diagnosis was evident. Their experiences with the compensation claim process led me to believe that more research needs to be done to allow different experiences to emerge.

### 6.1 Discussion - Underground Mineral Workers

In this qualitative narrative study, the participants shared emotional and passionate stories about their experiences as an underground mineral worker diagnosed with occupational COPD and the compensation claim process. The stories they shared were filled with anger, sadness, regret, fear, hurt, frustration, confusion, disbelief, and skepticism. Many of these emotions were targeted towards the mining industry, the compensation office, and healthcare providers and they felt let down and unsupported.

The underground mineral worker participants in this study were all retired and had varied years of employment with the mining industry. However, it was clear that they had similar challenges when dealing with the compensation claim process, including frustration about a lack of understanding about the compensation claim process and feeling unsupported by the healthcare system when attempting to document COPD as an occupational illness with the compensation system.

Each identified theme related to the underground mineral workers is discussed below as they relate to the findings from the literature. The themes discussed include 1) COPD affects quality of life, 2) I smoked; I did not think I could get compensation, 3) the compensation process is a joke, 4) doctors do not know anything, and 5) working in the mine is a dirty job – we did not know any better.

#### 6.1.1 COPD Affects Quality of Life

This study has demonstrated COPD's impact on almost every aspect of the underground mineral worker participants' lives. Many of the underground mineral worker participants in this study

reported respiratory symptoms such as breathlessness, coughing, spitting up phlegm, and the clearing of the throat as the main struggles of having COPD. This study also revealed that many underground mineral worker participants felt limited in performing activities such as walking up the stairs or doing household chores. As a result of being unable to continue their favourite recreational activities, such as hunting or fishing, many participants ceased engaging in these activities altogether. Other authors have found similar results whereby these respiratory symptoms have inhibited individuals with COPD from conducting their daily routine and recreational activities and have led individuals to isolate themselves from their families and friends (Panos et al., 2013; Mulhall et al., 2013; Guthrie et al., 2001; Seamark et al., 2004). In a study conducted by Guthrie et al. (2001), it was found that those individuals who did not isolate themselves from their family and friends had a better quality of life by being more physically and socially active and independent in completing their daily activities.

Within the results of this study, quality of life issues emerged in response to the challenges faced by the physical limitations associated with COPD. Participants within this study demonstrated increased resilience as they endeavoured to cope with COPD's physical, psychological, and social consequences. In fact, they offered accounts of both formal (e.g., respiratory therapy) and informal (e.g., limiting walking, taking more frequent breaks) approaches used to adapt to living with COPD. For some, this involved re-evaluation of their current priorities, such as the need to mow the lawn or shovel the driveway. For many participants, quality of life became a measure of their productivity and social involvement.

Research revealed that in addition to the physical impact, most individuals who suffer from COPD experience emotional distress. Some of the most common feelings experienced by individuals with COPD include loneliness, embarrassment, loss, and feelings that life has no meaning (Ek & Ternstedt, 2008; Seamark et al., 2004; Hartman et al., 2013; Guthrie et al., 2001). Participants in

this study indicated that they felt embarrassed that they could not perform typical day-to-day activities such as mowing the lawn, shovelling snow, or contributing to daily chores. They were ashamed that their partners became responsible for taking care of them because of the impact of COPD. Similar results were found with the union compensation representatives and medical participants. They stated that feelings of embarrassment over the inability to perform daily tasks were devastating results of the impact of COPD. Over time the underground mineral worker participants and partners adopted a way of life, often working collaboratively to accommodate the illness into the routine of daily life, for example, by swapping traditional roles in carrying out household tasks and responsibilities.

Borge et al. (2010) found that living with COPD is a burden for most individuals as their daily activities and previous hobbies become increasingly limited. Participants often curtailed their activities and lifestyle, anxious to minimize the risk of COPD exacerbations.

The study revealed how participants struggled with their illness limitations to retain a level of independence but became increasingly dependent upon significant others such as family members, neighbours, friends, and health professionals as the illness worsened.

Depression or feeling down emerged in the interviews as a factor that reduced the ability to carry out normal daily activities and increased dependency on others to assist in performing daily activities. Participants reported that activities of daily living (ADLs) took much longer to carry out due to breathlessness or the need to stop at intervals during tasks such as getting washed and dressed in the morning. Therefore, people with COPD often rely on family for practical help and support in meeting their day-to-day needs.

Losses experienced by participants with COPD in this study, such as a reduction in physical capabilities leading to a loss of independence, are also highlighted in the literature review

conducted by Disler et al. (2014). In their study, Disler et al. (2014) found that loss of hope and meaningless in life was present in some patients with advanced COPD. Disler et al. (2014) stated that, despite improvements in medical treatment, people with advanced COPD still have unmet psychosocial needs, and future interventions should respond to their psychological and social needs.

This study revealed that the unpredictability of COPD symptoms was a perceived concern of participants where the breathlessness, wheeze, cough, and phlegm production impacted their physical well-being and were a cause of social embarrassment and self-consciousness. Difficulty in eating and swallowing and a predisposition to prolonged bouts of coughing and choking due to breathlessness, dry throat, or a smokey atmosphere were deterrents for socializing. Some participants in this situation revealed resorting to using a walker or a wheelchair to maintain a degree of social activity but were dependent upon the availability and willingness of others. These findings support previous studies, highlighting how COPD patients often become socially isolated (Seamark et al., 2004; Elofsson & Ohlen, 2004).

The underground mineral workers in this study stated that the experience of breathlessness was extraordinarily frightening and perceived as life-threatening. They described breathless experiences such as walking up the road, going upstairs without taking a break, and grocery shopping. Participants found themselves panicking as they were trying to catch their breath and, in some instances, afraid that they might die if they were alone while doing these activities. In order to avoid attacks of breathlessness, some participants felt that they had become a prisoner in their own homes. In support of these findings, the medical participants in this study revealed that COPD could restrict the ability to get air into the lungs leading to increased anxiety and debilitating psychosocial impacts. Participants opted not to go outside if it was cold, hot, humid, or if air pollution or pollen were present to reduce their risk of exacerbations of their condition. Participants

revealed using strategies such as pacing themselves, limiting activities, planning, stopping, and resting to conserve breath, energy, and social respectability, similar to findings in the study by Fagerhaugh, 1973.

#### 6.1.2 I Smoked; I did not Think I Could get Compensation

Within this study, smoking was discussed in most conversations. Smoking cessation has become a significant component of health promotion initiatives and primary care advice to prevent illness and reduce health risks. Most of the study's participants recalled receiving brief and sometimes blunt advice from a health professional to quit. However, most participants considered that smoking was standard in the past, encouraged by peers and society, but said they had since given up when they realized the health risk. Given the age of the participants in this study and the fact that all but one were previous smokers, it is a good indication of society's attitude toward smoking at a time when the majority of participants in this study would have been smokers or starting to smoke. When the participants were working underground, smoking was regarded as a positive experience that increased attraction and helped relieve stress. The dangers of smoking were either less well-known or unreported, and there may have been considerable peer pressure acting upon people who were encouraged to smoke by others.

Additionally, the participants in this study also spoke about smoking while working in the mine. They stated that it was customary to see many underground mineral workers smoking during their shifts, helping to illustrate the lack of awareness of the dangers of smoking that existed in that era and the context in which people who have COPD today may have started to smoke. Awareness and acknowledgement of this context may be helpful when advising patients about smoking cessation.

When Bailey et al. (2009) explored the narratives of people with COPD, they found a variation in their explanations for the perceived cause of their illness. Bailey et al. (2009) found that participants believed that the cause of their illness was more complex than simply having been a

cigarette smoker, highlighting the need for clinicians to consider these individual perceptions of causality, rather than concentrating on the fact that COPD is caused by cigarette smoke. Findings by Bailey et al. (2009) are especially relevant, particularly as one of the participants in this study indicated that they had never smoked. Participants expressed concerns about their healthcare provider not wanting to support their COPD as an occupational illness, and they felt that physicians could not think about the possibility that their COPD was due to their mining exposure. Their ability to hear an alternative reason was impeded by what they already knew about the relationship between smoking and COPD. The union compensation representative participants concurred with these results. While they recognized the health hazards of smoking, they believed that physicians emphasized smoking as the cause of COPD and were reluctant to consider the underground exposures that could have contributed to the diagnosis.

According to the World Health Organization (WHO) (2021), the status of COPD has risen considerably in recent years, currently making it the fourth leading cause of death. The WHO (2021) reported that 80 to 90% of COPD cases are due to smoking; however, other factors such as exposure to indoor and outdoor pollutants and occupational hazards could contribute to COPD development. The participants in this study understood that smoking was a significant contributor to COPD; however, they emphatically expressed that they believed that working in the mining industry and being exposed to dusts, fumes, and toxins contributed to their COPD, leading them to think that they were entitled to compensation for this occupational illness.

The results of this study are aligned with previous research studies. Fishwick et al. (2015) indicated that it is possible to assess the occupational contribution to individual cases of diagnosed COPD. The authors found that taking an occupational history would help identify possible relevant exposures. Vlahovich and Sood (2020) stated that unfortunately, to the detriment of patients, occupational lung illnesses are frequently ignored, misdiagnosed, and misattributed to non-

occupational causes.

### 6.1.3 The Compensation Process is a Joke

Some of the systemic issues experienced by the underground mineral workers in this study are the flawed nature of the compensation system. Therefore, improvement to communication strategies with workers and education should be undertaken by the WSIB to alleviate the struggles faced by a worker submitting a compensation claim. The union compensation representative and medical participants in this study concurred that there were challenges when dealing with compensation. From their perspective, they felt that a lack of qualified individuals working at the compensation office (e.g., physicians and investigators) impacted their ability to document a compensation claim and adequately support a worker.

The findings discussed in this study revealed negative interactions with the compensation staff. Soklaridis et al. (2010) noted that an occupational disease that involved maneuvering through the complicated compensation claim process could exacerbate existing psychosocial factors that could lead to depressive feelings.

The WSIB is an Ontario government-based insurance system that determines the eligibility for benefits after a workplace injury and thus plays a key role in adjudicating claims (WSIB, 2019). Strunin and Boden (2004) found that some workers who applied for compensation reported that their encounters with compensation often left them feeling mistreated, frustrated, and helpless. Furthermore, Beardwood et al. (2005) conducted a study of Ontario workers that revealed some workers had negative and unsatisfying relations with compensation staff who, they felt, did not respond to their needs, including timely response to phone calls. Strunin and Boden (2004) also indicated that some workers were dissatisfied with their dealings with claims representatives and felt they hindered their compensation case instead of assisting them. Participants in this study faced similar challenges and thought they were constantly chasing the compensation claim representative

and were frustrated by the lack of returned phone calls. Lippel (2007) indicated that personalized and supportive service from a compensation representative fostered trust and diminished the power imbalance between an injured worker and a claim representative. Klanghed et al. (2004) emphasized that respectful treatment towards any worker who submitted a compensation claim could act as a form of social and emotional support, leading to positive encounters for workers who filed a compensation claim.

According to the WSIB (2019), the standard way for injured workers to receive compensation decisions is via telephone and mail. Charlot and Duranton (2006) noted that with recent technological advances that created forms of virtual communication, a diminished human face-to-face interaction is now standard practice. Within this study, some participants experienced similar challenges. Participants who received information in the mail misread documents, which led to the inappropriate or missed submission of documentation that supported their claim, causing the compensation claim to be denied. Additionally, participants preferred to sit and discuss their compensation claims in person to seek cohesive clarification about the compensation requirements.

MacEachen et al. (2010) revealed that system problems appeared insurmountable to any worker who might not have the skill, education, or energy to deal with the uphill battle of submitting a claim with compensation. This was echoed by several participants who were tired, angry, and frustrated by a complicated process that led them to give up their fight. They felt defeated by the compensation claim process and decided to stop the process due to the amount of time and work necessary to complete a claim. The union compensation and medical participants raised similar concerns. They reported that the forms were time-consuming to complete and lacked appropriate space to document details of the occupational illness adequately. In many instances, forms were returned from the compensation office due to a lack of information to support the claim requiring additional time to add further information.

The participants in this study desired improved communication between their healthcare workers and the compensation staff. They believed a disconnect between healthcare workers and compensation staff hindered the time it took to have a compensation claim approved. Many participants felt that their primary caregivers did not want to take the time required to complete all the compensation forms because they were often sent back for more information. The primary caregivers were frustrated by the needs of the compensation office.

Lippel (2007) noted that the issue of power imbalance in the legal context is not new. In the context of workers' compensation, power imbalances could be more pronounced given that many workers had no legal representation at all. One participant in this study spoke about the need to be both a doctor and a lawyer to fully comprehend the compensation forms. Trief and Donaldson (1995) indicated that a sense of disempowerment could be related to the inability to understand or negotiate the compensation system.

Many participants in this study initially faced denial of their claim by the compensation office. At the time of the interviews, many were still awaiting a decision from the compensation office. The process was felt to be challenging, frustrating, and unfair. The participants specifically spoke about being punished by compensation because they were smokers. They did not feel it was fair to cut their compensation payment in half because they were smokers. Roberts-Yates (2003) noted that the compensation claim process lacked a personal touch, and the compensation adjudicators were not upfront with relevant information that would allow a worker to make informed choices.

It should be noted that while completing this study, the Ontario Workplace Safety and Insurance Board changed its process of compensating occupational COPD.

*“The WSIB will no longer reduce non-economic loss and permanent disability benefits for most people with claims for chronic obstructive pulmonary disease (COPD), who also have a smoking*

*history*” (WSIB, March 2021).

#### 6.1.4 Doctors do not know Anything

Having sought medical attention, participants demonstrated varying lack of knowledge of the diagnosis and familiarity with the term COPD, even after years of treatment by their primary healthcare provider. This situation indicates potentially inadequate professional knowledge, diagnosis of COPD, and poor communication between healthcare professionals and patients. In contrast to these results, the medical participants in this study spoke about the frustrations they felt when there was non-compliance with pharmacological treatments or adherence to smoking cessation after education and awareness were provided to the patient. Specifically, the medical participants indicated that ongoing treatment for COPD for a patient who continued to smoke contradicted their treatment plan.

The study highlighted a lack of empathy by some health professionals who did not understand the patient’s experience of coping with the COPD symptoms and had unrealistic expectations of the patient, such as the need for increased exercise. Lippel (2007) found that health professionals not understanding the fear and anxiety related to the dyspnea or severe breathlessness caused by exertion were perceived as judgmental by participants, especially when they questioned the need for assistance or allowed the patient to remain resting. These results were echoed by several participants in this study who reported feeling judged by those administering pulmonary function tests (PFT) because they could not complete or only partially complete the test. They thought that the staff person did not understand how difficult it was to perform the test, given they were always short of breath. In fact, one participant recalled having long-lasting effects after multiple attempts at a PFT test to satisfy the technician.

Fishwick et al. (2015) indicated that it is possible to assess the occupational contribution to individual cases of diagnosed COPD. The authors found that taking an occupational history would

help identify possible relevant exposures. They stated that workers should be allowed to talk freely about their previous work, and a chronological list of occupations and job-related duties should be recorded, where possible, including details of known exposures. Unfortunately, the participants in this study felt unsupported by the healthcare system. They believed that physicians were unwilling to look beyond smoking to consider that occupational exposures could contribute to a diagnosis of occupational COPD. Vlahovich and Sood (2020) stated that unfortunately, to the detriment of patients, occupational lung illnesses are frequently ignored, misdiagnosed, and misattributed to non-occupational causes.

It was apparent throughout the participant stories that they felt under-supported by the healthcare system. The participants in this study believed that physicians in Northeastern Ontario did not have enough education to properly support, diagnose, and submit a well-documented claim for their occupational COPD to the WSIB.

The Workplace Health Champions Program supports Ontario medical schools to enhance and expand their curricula in occupational health (Holness et al., 2014). Creating the Workplace Health Champions Program (WHCP) has helped increase awareness about occupational medicine in both the undergraduate and postgraduate medical education programs in Ontario. However, given the results of this study, there is room for improvement. Moving forward, the WHCP could focus more on cases that would address prevalent occupational health concerns by geography (e.g., rural and urban work exposures such as mining, farming, and production plants). For example, the Northern Ontario School of Medicine WHCP could develop case studies related to underground mineral workers' occupational challenges, such as musculoskeletal injuries, respiratory illness (e.g., COPD), hand-arm vibration, and noise-induced hearing loss. These case studies could address how to best support an underground mineral worker who is faced with an occupational injury or illness and how best to connect the injury or illness to occupational exposure.

Tarlo (2020) revealed that COPD is likely under-diagnosed and under-compensated. It remains essential that an occupational history be taken for all patients assessed for respiratory disease. Cullen and Cherniack (1989) found that primary care physicians underdiagnose environmentally and occupationally related disorders from a clinical perspective and far too frequently enter them into their differential diagnosis. Cullen and Cherniack (1989) revealed that more than 80% of occupational or environmental disease diagnoses are not correctly recognized before evaluation in an occupational medicine clinic, even though most patients had consulted one or more physicians. Croft et al. (2020) reported that a physician might become entangled in legal questions about the causation of disease and compensation. Standardized instruments for collecting information on environmental and occupational exposures have been published (Occupational and Environmental Health Committee, 1983), but clinicians generally take exposure histories in idiosyncratic ways where the completeness of the history reflects the clinician's training, knowledge, and familiarity with the environments of concern to specific patients. Clinical records of exposures may focus on a few widely known hazards, for example, asbestos, but rarely inventory duties of specific jobs, the materials handled, or the use of respiratory protection because physicians have limited knowledge of the exposures associated with specific occupations (Croft et al., 2020; Alaguney et al., 2020). A routine history taken by a primary care provider classically addresses only tobacco smoking and current employment (Croft et al., 2020; Alaguney et al., 2020). All the participants in this study were dissatisfied with their physician's lack of knowledge about the climate in underground mining, the effects of the inhalation of smoke, dusts, and fumes, and the connection between years of exposure to a diagnosis of occupational COPD.

#### 6.1.5 Working in the mine is a Dirty job – We did not know any Better

Kramer et al. (2018) reported that millions of Canadians are potentially exposed to many known and suspected workplace hazards and risks that cause thousands of fatalities, disability, and pain.

The authors noted that some of these exposures include chemicals, physical, and biological agents; however, these exposures, and consequent chronic illnesses, are preventable. Del Bianco and Demers (2013) noted that since 2001 in Canada, there had been more accepted death claims related to occupational diseases from occupational exposures than traumatic injuries and disorders. Kushner et al. (2018) reported that occupational disease claims have steadily increased over the last dozen years. The WSIB (2021) said that in 2016, 136 occupational disease deaths in Ontario were compensated, compared to 72 traumatic fatalities.

Bray and Thompson (1992) reported that in Ontario, uranium mining and milling operations were conducted from 1955 to 1996. During that time, approximately 28,500 workers would have been exposed to radiation, silica dust, and diesel exhaust. The participants in this study were employed in the mining industry in Ontario between 1955 and 1996; therefore, their COPD could have been attributed to their underground exposures. Ultimately, the participants within this study believed that their COPD was not attributed solely to smoking and that all the years of underground mining exposures also contributed to COPD development.

According to the WHO (1999), airborne dust is concerning because of its association with widespread occupational lung disease. As outlined in the WHO Hazard Prevention and Control in the Work Environment: Airborne Dust report (1999), there is a risk of occupational disease when people inhale airborne dust at work.

Cherrie et al. (2013) reviewed the adverse toxic effects of crystalline silica inhalation on stonemasons, miners, and other similar British and US worker groups. In the past, exposure to dust with low crystalline silica was not linked to toxicity and was instead considered a “nuisance” (i.e., less than 1% quartz) dust. Low-toxicity specks of dust include all poorly soluble, non-fibrous particles of dust that, at low levels of exposure, have an insignificant toxic effect on the body but, if

inhaled in sufficient quantity, can accumulate and cause injury in the terminal airways and proximal alveoli, which could lead to inflammation with subsequent development of COPD. While the authors noted that the highest risk of developing COPD is attributed to cigarette smoking, further studies revealed that COPD could be caused or made worse by dusts, fumes, and irritating gases. As a result of these findings, it is not surprising that the underground mineral workers in this study who worked in the minerals industry for 25 plus years would have been subjected to constant inhalation of toxins that could lead to a diagnosis of COPD. In fact, many participants in this study spoke about co-workers who had since passed away and had been diagnosed with COPD. Cherrie et al. (2013) found that work-related COPD was connected to hundreds of deaths and economic loss.

Participants within this study spoke about the perceived influence of occupational exposures underground as the major contributing factors in developing their COPD. They shared detailed stories of dark, dusty, and dirty environments that produced dusts, toxins, and fumes that were inhaled daily. Participants expressed regret about not wearing the minimal safety equipment; however, they firmly believed that safety equipment such as a mask could ultimately save an underground worker's life.

Bray and Thompson (1992) indicated that in 1968, unions, the public, and the press noted the poor safety record of the mining industry compared with other resource sectors. The authors suggested that the industry attempted to explain the phenomenon as being due to the inherently dangerous nature of mining. From as early as 1958, union officials were aware of the potential health hazards to which uranium mine workers were being exposed and consequently sought to undertake measures that would reduce workers' exposure to radiation and silica dust.

The results of this study were aligned with research studies. Fishwick et al. (2015) indicated that it

is possible to assess the occupational contribution to individual cases of diagnosed COPD. The authors found that taking an occupational history would help identify possible relevant exposures. Vlahovich and Sood (2020) stated that unfortunately, to the detriment of patients, occupational lung illnesses are frequently ignored, misdiagnosed, and misattributed to non-occupational causes. Many participants in this study discussed how they had to fight with physicians and the compensation office to approve a compensation claim.

The majority of the participants had a fundamental understanding of COPD. They understood that it was a lung disease, that there was treatment but no cure, and that it was a progressive disease for some. Gardiner et al. (2009) found confusion about the progressive nature of the disease and the general impact, limitations, and restrictions that COPD would have on the participants' lives. Wilson et al. (2007) found that healthcare providers also recognize the lack of understanding regarding COPD and the medication used to treat it. Individuals with COPD need to receive accurate information about this disease to understand it, treat it, and cope. Earle (2010) noted that some individuals with COPD relied on their personal experiences with the disease and the personal experiences of others as a source of information.

This study revealed similar results as many participants found out about submitting a compensation claim for COPD through the Internet as a source of information. Other sources of information included union representatives, friends, and flyers posted in common areas such as grocery stores. This is supported by Delgado et al. (2015), who found that 58.5% of the participants reported obtaining more information and knowledge of COPD by using the Internet.

**6.2 Discussion – Physicians/Lung Specialists and Union Compensation Representatives**  
Participants involved with this study also included family physicians, occupational health specialists, and union compensation officers. Physicians and union compensation representative participants described in-depth the implications of working with an underground mineral worker

diagnosed with COPD as an occupational disease and their experiences with the compensation claim process.

Work-related COPD is not well compensated or well recognized by the Ontario Workplace Safety and Insurance Board (WSIB). Physicians and union compensation representatives often struggle to complete forms and have claims approved, and because of this, workers can struggle with money, family, and mental health problems.

Each identified theme within this study will be discussed as they relate to the literature. These include 1) additional support resources required; 2) smoking cessation is essential; 3) the compensation claim process is challenging; 4) occupational diseases are challenging to prove; 5) occupational COPD is costly.

#### 6.2.1 Additional Support Resources Required

Physicians' barriers in diagnosing and reporting workplace exposures frequently include incomplete and inadequate work exposure histories due to time constraints within the office (Holness et al., 2007; Alaguney et al., 2020; Tarlo, 2020). A second barrier can be physicians' lack of knowledge about the link between occupations, work-related exposures, and occupational lung diseases (Holness et al., 2007; Alaguney et al., 2020; Tarlo, 2020). Finally, a third barrier is the complexity (e.g., complicated forms, unfamiliar terminology on forms, and lack of knowledge on how to complete forms) of the compensation system, including how to initiate a claim (Holness et al., 2007; Alaguney et al., 2020; Tarlo, 2020).

During the interviews, the medical and union compensation representative participants in this study echoed similar concerns as in previous research studies that suggested that additional supports (i.e., human resources) are required to assist underground workers with their compensation claim process. Medical participants in this study were unfamiliar with documenting an occupational COPD claim with the compensation office. The medical and union compensation representative

participants indicated that the forms were complicated and felt unsupported by the compensation staff. These results are in line with concerns expressed by the underground mineral workers. They also expressed frustrations with the complex compensation forms and the inability to get support from compensation adjudicators leading to denied compensation claims. The medical and union compensation representative participants stated that a shortage of physicians and investigators at the compensation office hindered their ability to support a worker diagnosed with occupational COPD. Union compensation representative participants said that a lack of qualified union compensation representatives and a shortage of physicians and administrative staff with the compensation office who understand the process made it challenging for them to support underground mineral workers.

The union compensation representative participants also spoke about the challenges they faced with an increased number of union compensation caseloads, making it challenging to support complicated COPD compensation cases. In addition, they mentioned that a limited number of trained union compensation officers have intimate knowledge of the compensation system, making it challenging to support underground mineral workers because compensation cases for occupational COPD are intricate and complex.

#### 6.2.2 Smoking Cessation is Essential

Research revealed that cigarette smoking is the most common cause of the COPD obstructive pattern; however, a history of smoking should not preclude careful investigation into occupational exposures as contributing, if not causal, factors for physiological impairment (Speizer & Tager, 1979; Croft et al., 2020). In fact, any abnormality in lung function is often attributed to cigarettes to the exclusion of other potential agents. However, research has shown that some of the impairment in persons with occupational lung disease may be due to smoking but could also be caused by occupational exposures (Speizer & Tager, 1979; Croft et al., 2020).

During the interviews, the medical participants in this study spoke passionately about the necessity for smoking cessation for the health of underground mineral workers. However, medical participants did not indicate that they provided support, education, or pharmacological options for smoking cessation and, in some instances, suggested smoking was a stronger correlation to COPD than the working environment. In contrast, while the union compensation representatives recognized the health risks associated with smoking, they believed that physicians emphasized smoking as the cause of COPD instead of taking the time to document occupational exposures. The union compensation representatives thought that many underground mineral workers with COPD would not have a compensation claim approved because of the physician's mindset about the correlation between smoking and COPD.

### 6.2.3 The Compensation Claim Process is Challenging

Holness et al. (2008) noted that, in general, the workers' compensation process is viewed as a complex, time-consuming, overwhelming, and unappealing process by physicians. Medical participants within this study felt it was essential to have a compensation physician available to speak to at the compensation office. They believed that uninformed staff made it more difficult for them to complete compensation forms.

Union compensation representative participants involved with this study agreed that the reduction in staff at the compensation office caused some of the barriers they faced when supporting an underground mineral worker with a compensation claim.

The medical and union compensation representative participants spoke powerfully about the challenges and barriers they faced when completing a compensation claim. Medical and union compensation representative participants indicated that they experienced challenges understanding and navigating through the compensation claims process.

The medical and union compensation representatives discussed the difficulties of using compensation forms to complete a compensation claim for an occupational illness. Union compensation representative participants found that the form did not allow for further clarification about an occupational illness and suggested that the form be changed to ensure that claims were not denied due to a lack of information.

Research showed that physicians have expressed that they have insufficient time to spend on direct care due to extensive paperwork requested by the compensation system (Baril, 2003; Russell et al., 2005; Schweigert et al., 2004). Baril (2003) also indicated that physicians have concerns about the lack of time required to gather sufficient information about an occupational illness.

Holness et al. (2008) found that some factors that have been identified in the literature as leading to under-reporting of occupational diseases include lack of knowledge and skills on the part of clinicians, time constraints, the administrative bureaucracy of the workers' compensation process, and lack of clear referral routes.

Kosny et al. (2011) suggested that physicians are essential knowledge brokers for sick workers and play an essential role in the workers' compensation process by identifying work-related illnesses and injuries, giving detailed information to workers' compensation boards about the illnesses or injuries, and providing treatment for sick and injured workers. McCurdy et al. (1998) indicated that physicians record patients' medical histories and, in doing so, have the opportunity to collect crucial occupational information. Unfortunately, McCurdy et al. (1998) found that physicians rarely collect detailed occupational information from patients. Furthermore, McCurdy et al. (1998) found that 70% of medical students recorded some information about a patient's occupation; however, only 8% of the students noted specific occupational exposures.

Croft et al. (2020) found that a physician trained in environmental or occupational medicine

routinely obtains more detailed and disease-relevant information. Therefore, this type of physician should be consulted in cases involving possible effects of complex environmental exposures. Croft et al. (2020) further reported that physicians trained in pulmonary medicine might also have specialized expertise related to environmental lung disease, and allergists with pulmonary education may also be appropriate for addressing workplace-related allergic disorders.

It is important to note that while the Ontario WSIB system appears to have systemic challenges as previously identified by the participants in this study, compensation systems in provinces such as Quebec are also highly adversarial in nature (Lippel, 2012). Lippel (2012) noted that the Québec occupational health and safety system was ranked among the worst in North America. The author indicated that some reasons for this ranking include non-mandatory occupational health and safety committees, low fines for any safety lapses, and aggressive claims management practices. Lippel (2012) indicated that appeals processes have often allowed videotaped evidence of injured workers as a mechanism to encourage workers to withdraw their claims. The adversarial nature of the Québec system triggers behaviours such as employer mistrust and recourse to private detectives that stigmatize workers. In comparison to Québec, both Ontario and British Columbia had fewer appeal claims which could be attributed to better access to worker representation through the Office of the worker advisor and access to the Fair Practices Commission.

According to Lippel (2012), when designing a worker-centric workers' compensation system, it is not only the broad conception but also the technical details that make the difference in the experience of the claimant. Therefore, it is also important to look at compensation systems in other countries that have successfully achieved a better claimant experience. As an example, in New Zealand, the spokespersons for businesses and unions are strongly supportive of the universal no-fault compensation system (Lippel, 2012). Lippel (2012) found that one advantage of this system is the inclusion of all forms of accidents avoiding litigation with regard to causation of injury in cases

where the claimant is exposed to a variety of confounding causes for the injury, some of which relate to non-work accidents. Therefore, as outlined by the author, the New Zealand example shows that a universal accident compensation scheme can reduce in part, but not completely, the adversarial nature of the system. Other countries that adopt a less adversarial system include the Netherlands, Sweden, and Denmark. Lippel (2012) noted that in Denmark, unlike New Zealand, the disability system does not affect workers' rights to sue those responsible for their injury and illnesses (e.g., employer). The author also found that in the Netherlands, the compensation system provides benefits that are connected to pre-injury and illness wages regardless of the cause of disability which is a characteristic of key importance for individuals suffering from work disability as they, therefore, provide benefits that are higher than those offered by the other public disability insurance systems.

The author found that European countries provide much broader social security protections that make workers' compensation less critical to workers because a social safety net exists regardless of the cause of the injury or illness. In Sweden, workers' compensation insurance is highly coordinated with Sweden's comprehensive, national social insurance system (Government of Sweden, 1998). Furthermore, in Sweden, workers' compensation is not a limited remedy of the worker against the employer (Government of Sweden, 1998). Employees who are not covered by no-fault liability insurance, which provides benefits over and above the legal benefits provided under Sweden's social security system, may pursue a claim for damages against an employer.

Dembe (1997) noted that Swedish employers must pay an increasingly greater portion of the wage-replacement benefits provided to injured and ill workers. The author also found that workers can receive compensation for lost income and costs due to the injury or illness. Finally, in Norway, the law states that all workers are covered by mandatory occupational insurance and cover all full-time and part-time workers.

As noted by Lippel (2012), regardless of the rules of the compensation system, the philosophy of the organization responsible for its application must, itself, be based on respect for worker dignity and on the evasion of stigmatization, if a system is going to serve better those who are hurt or become ill because of their work.

Lippel (2012) indicated that all Canadian workers' compensation systems replace the tort system and workers cannot file tort claims against their own employers and lawsuits against any other employer. The author noted that the system is a no-fault system that replaces civil liability by access to benefits regardless of the circumstances of the injury or illness.

While it is important to look at other systems, it is also important to recognize that comparisons must be made with countries that also possess similar social legislation as Canada, such as access to universal health care. Reforms to compensation systems across Canada cannot disadvantage workers. As outlined by Lippel (2012), all compensation systems must itself be predicated on respect for claimant dignity, fairness and justice, and on the avoidance of stigmatization if a system is going to serve better those who are injured.

#### 6.2.4 Occupational Diseases are Challenging to Prove

Holness et al. (2008) found that relating symptoms to an occupational illness diagnosis could be difficult because the exposures happened long ago. Medical participants in this study indicated some awareness of occupational factors. However, because the exposures were so long ago and because hazards were different from what they are now, they would not necessarily be able to identify the potential hazards that would lead to a diagnosis of occupational COPD. In comparison, the union compensation representative participants were well versed in underground mineral exposures and felt that physicians needed further education about exposures such as dusts, fumes, and toxins that could lead to an occupational illness. Holness et al. (2008) also noted that while there is an awareness of the more apparent associations, physicians admitted a lack of knowledge

regarding the many exposures related to occupational diseases. Additionally, there is a lack of awareness of which exposures are associated with various occupations.

Holness et al. (2008) noted that clinicians varied in how they took a workplace history. Within this study, many perceived barriers were identified when taking an occupational history, including a lack of training about occupational exposures associated with mining, time constraints, the total number of questions to ask, focus on treatment and management, the overwhelming effect of smoking, and WSIB complexity (including the time required for submission of documentation). Medical participants within this study found that their focus tended to be on the current symptomatology, recent history, and deciding what is appropriate care. The medical participants in this study also stated that they received minimal curricular content about occupational exposures associated with occupational COPD in their undergraduate medical education and residency training.

Banerjee and Kushner (2005) indicated that although workers' compensation is an aspect of an occupational disease often overlooked or avoided, the primary care physician plays an essential, well-defined role in this system. The authors further stated that the initial function of the primary care physician is to treat the patient. However, as a matter of course, this role expands in the case of occupational lung disease in which the physician initially identifies the patient's condition as work-related and, therefore, potentially compensable. In addition, Banerjee and Kushner (2005) indicated that the primary care physician often informs the worker that the condition is compensable and ensures that the employer knows about the illness. Therefore, the authors found that an occupational history is essential, including identifying the disease, preventing disease, and determining compensation. The authors further reported that to diagnose occupational lung disease, the healthcare provider must first suspect an association between work and disease based on the patient's symptoms and occupation. Therefore, as Banerjee and Kushner (2005) outlined, this

suspicion requires completing an occupational pulmonary history that includes job-related questions.

Lippel (2010) stated that workers' compensation is primarily under provincial and territorial jurisdiction in Canada. The author reported that workers' compensation boards exist in each province and territory, and occupational lung disease (OLD) is almost always compensable through workers' compensation or a civil lawsuit. For this reason, a diagnosis could come under scrutiny, especially when workers' compensation is the main issue. Martin (1998) outlined many pitfalls associated with a diagnosis that could lead to a denial of a workers' compensation claim.

Therefore, as Martin (1998) outlined, physicians must ensure an in-depth and focused history is taken, appropriate diagnostic testing is ordered, interpretation of tests is accurate, and a thorough occupational history is taken from the patient.

Banerjee and Kushner (2005) indicated that the pathway to diagnose and treat occupational COPD requires multiple resources to establish a link between exposure and disease, including physical examination, chest radiography, pulmonary function tests, disability evaluation, notification of employer, and appropriate health organizations. They noted that if the cause of the respiratory disease is unexplained, a pulmonologist's referral is recommended.

Medical participants in this study spoke about the difficulties connecting the dots between all the evidence required to support an occupational illness diagnosis. Several criteria were necessary to support the diagnosis and ensure the compensation claim was approved. Diagnostic tests, a thorough history, and knowledge of the workplace exposures were required to make a final diagnosis. Similarly, the union compensation representative participants also expressed frustration over a lack of a database that contained workplace exposures. They were challenged by going back several years to see what exposures an underground mineral worker would have been exposed to

based on the mine where they were employed.

Libu et al. (2021) found that early recognition of occupational diseases is the primary challenge for physicians. Occupational COPD, once identified, follows the same treatment procedures and pulmonary rehabilitation as non-occupational COPD, with the only specific recommendation being to terminate occupational exposure. The authors also noted that estimating exposure is impossible without a proper occupational history.

Libu et al. (2021) also reported that differentiating between occupational and non-occupational COPD is reasonably simple if there is only one cause of exposure (i.e., smoking or an occupational source). However, it is challenging if the person with documented workplace exposures is also a smoker, which is often encountered in clinical practice. The authors found that most countries exclude smokers from the category of patients who could claim compensation for occupational COPD because, at an individual level, it is difficult to assess the quantity of work-related exposure in the occurrence of disease among smokers. Libu et al. (2021) also reported that another reason for the ignorance of occupational COPD is the late onset of the disease, often after retirement or at least after exposure to the toxic occupational agent has stopped. Therefore, the authors stated that the main challenges for diagnosing occupational COPD are the emerging hazards, the lack of early detection, and the constraints towards recognizing COPD as an occupational disease.

Holness et al. (2008) noted that taking an occupational history could allow the physician to make a more accurate diagnosis, prevent the development of work-related diseases, initiate workplace evaluations, launch the medical basis for future compensation claims, and detect new associations between exposures and diseases.

Kushner et al. (2018) reported that occupational exposures are not systematically collected, tracked, measured, or located at the provincial level. Therefore, a lack of a basic surveillance

system of workplace exposures and risk factors makes it difficult for researchers to establish the health impacts of present or emergent risks or hazards or assess occupational exposures' social and personal impact. In 2010, WSIB highlighted the lack of data about occupational exposures and diseases as a potential issue and adopted an Occupational Disease Response Strategy in response to a lack of data. Farquhar and Molino (2017) reported that the WSIB strategy highlighted the need for appropriate reporting and surveillance mechanisms. The authors further noted that the report emphasized that currently, no effective reporting or surveillance of occupational diseases or exposures exists and that this is essential for identifying problem areas and monitoring improvements. Kushner et al. (2018) reported that the Ontario Ministry of Labour launched its Integrated Health and Safety Strategy to improve workplace health and safety delivery in December 2013. In 2017, outlined by Kushner et al. (2018), the Ontario Occupational Disease Action Plan (ODAP) and an Occupational Disease Framework were announced. One initiative listed under the ODAP is to systematically collect workplace exposure data and create a strategy to embed occupation into patients' medical records.

Kushner et al. (2018) indicated that training primary care physicians to gather surveillance data about occupational exposures in their patients' charts is a logical proposal because primary care providers see patients with work-related problems. The authors stated that primary care physicians are essential knowledge brokers for workers at risk, and they play a fundamental role in the workers' compensation process by recognizing occupational injuries and illnesses, delivering information to workers' compensation boards about the nature of injuries or illnesses, and providing treatment for sick and injured workers. The authors suggested that clinicians could collect this information as part of their information about patients' health history. The authors also noted that work and working conditions are major social determinants of health, and physicians often ask about family history, lifestyle, and income or job. Therefore, Kushner et al. (2018)

indicated that if questions about occupational exposures were asked systematically, the data could easily be entered in the patient's chart and referenced in future health appointments.

Furthermore, suppose the medical records across primary care offices were linked. In that case, a procedure could be established to gather and analyze this data for surveillance, leading to evidence-based prevention measures at the provincial level. However, despite these advantages, previous research has suggested that although primary care clinicians think it is important to record patients' occupations, they infrequently and inconsistently collect occupational information from their patients (Richards-Taylor et al., 2013; Thorley et al., 2015). There are also barriers to collecting this information, including time constraints, inadequate training, perceived lack of importance, lack of transparent referral sources, and legal, economic, and administrative complexities (Thompson et al., 2000; Harbert et al., 2001; McCurdy et al., 1998; Holness et al., 2007).

#### 6.2.5 Occupational COPD is Costly

Research studies have reported that the worker's compensation systems were Canada's first social insurance systems, appearing in the early twentieth century to substitute the tort system (Ison, 1996; Lippel, 2007). Research revealed that Ontario's first legislation was crafted as an original Canadian model and has evolved under the influence of occupational parties but with a more substantial influence from governments (Ison, 1996; King, 2014).

Several studies have examined the workers' perception of the compensation process; however, only a few have specifically focused on the experience of doctors involved in compensation systems (Kosny et al., 2011; Murgatroyd et al., 2011; Kilgour et al., 2015; Brijnath et al., 2016; Lippel et al., 2016).

Banerjee and Kushner (2005) indicated that occupational lung diseases are costly and prevalent. Accordingly, they constitute a significant public health problem. COPD is a significant illness in Canada that consumes extensive health dollars (Bailey, 1998, 2001, 2004).

Health Quality Ontario (2021) reported that in 2011, the total financial burden of COPD in Ontario, comprising of direct and indirect costs, was estimated to be \$3.9 billion. Public Health Ontario (2019) reported that in 2015, chronic diseases caused about three-quarters of deaths in Ontario. Their estimated annual direct healthcare costs are \$10.5 billion (2010 estimate in 2018 dollars).

Medical and union compensation representative participants spoke about the direct and indirect costs of COPD as an occupational illness. Specifically, the union compensation representative participants spoke about the financial burden of not being approved by the compensation office, which caused difficulties for the worker when seeking pharmacological treatment for COPD. The union compensation representatives believed that because the compensation process is so challenging, many workers would not submit a claim saving the compensation system money. Medical participants also spoke about the time costs of completing a compensation claim. They believed the compensation claim process was daunting and that the time required to complete compensation forms was unrealistic.

Medical and union compensation representative participants also raised key issues of concern regarding medication, specifically when workers could not financially afford them. They stated that if a compensation claim was denied, it impacted a worker's ability to purchase new treatments for COPD that were quite costly. The medical participants in this study advised that when offering new treatment options that were costly, underground mineral workers would refuse the offer because they could not afford medications due to a lack of health benefits because their compensation claim was denied.

### 6.3 Theoretical Framework

The theoretical framework incorporated into this research study is social constructionism/interpretivism with an ontological relativist approach. Crotty (1998) indicated that this approach considers how individuals understand the world in which they live and work.

Furthermore, Crotty (1998) showed that a social constructionist theoretical framework allows participants to validate their lived and similar experiences. This framework allowed participants to be empowered to share in a respected and valued manner. All study participants (i.e., underground mineral workers, physicians, and union compensation representatives) were able to voice their concerns, leading to improved outcomes for underground mineral workers diagnosed with occupational COPD and future studies. Additionally, this framework allowed the primary researcher to gain insight and gather in-depth information to understand further the participants lived experiences. Finally, the use of this framework supported the collection of valuable data that could provide researchers interested in COPD as an occupational illness in the mining industry insights that could help future research studies in this area.

According to Kim et al. (2009), qualitative research helps us understand the meaning of life events that can outwardly appear as a chaotic series of events. However, observation and organization could help outsiders gain understanding by studying participants of these events in their natural setting. The objective of qualitative research is to provide a way of understanding the experience of individuals from their lived perspective (Schwandt, 1994; Miller & Alvarado, 2005).

#### 6.4 Reflexivity

Within this study, it was recognized that researcher situatedness or positioning could have affected the underground mineral worker participants, so the questions formulated to generate knowledge and finally the interpretation of the data were carefully examined (Berger, 2015). To ensure space was made for the participant's identities and voices, self-reflection and an empathetic and compassionate view towards the participant's stories were taken (Berger, 2015). Recognizing that each participant's account of their illness was different, based on their gender, cultural beliefs and formed identities, I was cognizant of withholding any judgment about how and why they were challenged with dealing with the physical, social, emotional, and occupational components

associated with a diagnosis of occupational COPD and their challenges with the compensation claim process experience (Berger, 2015).

Furthermore, I was cognizant that the interviews could evoke emotional responses in the participants and remained sensitive to their responses and did not dismiss what each participant was feeling in the moment (Berger, 2015). Berger (2015) noted that acting in a supportive manner ensures that the participants feel comfortable sharing. Upon completing each interview, I reflected upon the complex account of the challenges participants faced due to an occupational illness and the compensation claim process experience (Berger, 2015). Berger (2015) indicated that participants could be more willing to speak about their experiences with a researcher who was sympathetic to their situation. I wanted to help in emotional moments but remained mindful not to project my own emotions into the research, avoiding possible researcher bias. However, I ensured participants received a document that provided information about various mental health supports that were available to them locally. Berger (2015) noted that reflexivity allowed a researcher to maintain a balance between personal and universal. As the interviews progressed, I became aware not to insert my thoughts into conversations, limiting my own opinions and allowing participants to describe first-hand accounts of their challenges. After completing the interviews, I felt a desire to further this research and hoped that the results of this study could help to affect changes in the compensation claim process, reducing struggles faced by future workers who had to submit a compensation claim. Using reflexivity allowed me to minimize any effect on the findings of this study, enhancing the credibility and accuracy of the research findings (Berger, 2015).

Finally, throughout the interview process, I could not help but reflect on how my life was impacted by a partner who suffers from a diagnosis of COPD. While my partner is not an underground mineral worker, he is in an industry that exposes him to dusts, fumes, and toxins that have led to being diagnosed with severe COPD. At the start of this thesis, my partner worked as a surface

driller. Over the course of completing this thesis, he has since become a truck driver to reduce workplace exposures such as dusts and fumes. This decision was made after a respirologist found further lung function decline and worsening of his COPD. Like many participants in this study, my partner was never provided with an opportunity to provide an occupational history that could have helped diagnose his COPD as work-related. Instead, his physicians focused solely on his smoking history. He has been subjected to stern warnings about smoking by a family physician and a lung specialist and, in many ways, made to feel that this was the only cause of COPD. In fact, one lung specialist refused to provide him ongoing care because he was a smoker.

Additionally, my partner continues to work even though he has severe COPD for similar reasons that the participants in this study indicated. He feels it necessary to work to provide for his family and remain an active member of society. My partner asked his primary care provider about submitting a claim for occupational COPD, only to hear that there would be no way he would get approved because he was a smoker. Again, this supports what was discussed by the participants; if you are a smoker, do not attempt a WSIB claim for COPD even though you were exposed to occupational hazards because all physicians see is that COPD is a smoker's disease.

Finally, not unlike the participants in this story, I have taken over simple chores that my partner would normally have completed. For instance, I am responsible for bringing in groceries and parking the car in the back car lot because of his shortness of breath. Chores such as mowing the lawn and shovelling snow were not something that my partner could perform; therefore, I took on those responsibilities. Given the difficulties of maintaining a home, my partner and I opted to live in an apartment to minimize activities that required physical exertion.

## 6.5 Study Strengths and Limitations

### 6.5.1 Study Strengths

This study was the first to explore the experiences of some underground mineral workers in

Northeastern Ontario who were diagnosed with occupational COPD and were involved in the compensation claim process.

This thesis aimed to explore and understand underground mineral worker participants' accounts about the impact of occupational COPD and their experiences with the compensation claim process. Additionally, this thesis sought to gain insight into the experiences of physician and union representatives involved with an underground mineral worker diagnosed with occupational COPD and involved with the compensation claim process. While underground mineral worker participants in this study constructed their experiences with the disease and thus their understanding of its impact on their personal, social, and emotional contexts; collectively, their stories depicted the realities faced by many underground mineral workers who are faced with specific challenges when attempting to have a compensation claim approved by the WSIB. This study captured an emic understanding of their challenges by allowing underground mineral worker participants to share their personal stories respectfully. This thesis enabled underground mineral worker participants to provide a detailed description of individual situations about managing the impacts of occupational COPD and the compensation claim process.

Another strength of the study was capturing in-depth perspectives of underground mineral workers who had direct experiences with the compensation claim process. All were volunteers who had a particular interest in the topic of this research study and were very forthcoming about sharing their experiences about their illness and the compensation claim process experience. All underground mineral workers, union compensation representatives, and medical participants were keen on seeking changes to improve any challenges or barriers with the compensation claim process for any worker who suffered an occupational illness.

The significance of this study was to reveal in-depth accounts of the impacts on underground

mineral workers diagnosed with occupational COPD and the compensation claim process experience. The results of this study can provide primary and specialized care healthcare teams with important information to prepare and better support future underground mineral workers diagnosed with occupational COPD. In addition, the findings in this study could help physicians better understand underground mineral worker needs by recognizing how to connect better an illness such as COPD to occupational exposures and the need to document work exposures to have an occupational compensation claim approved accurately.

This study adds to the literature by providing insight and reflecting on the experiences of underground mineral workers in Northeastern Ontario diagnosed with occupational COPD and the compensation challenges. This study demonstrates the importance of patient education. According to Riemsma et al. (2003), *patient education* has been defined as “any planned education activities designed to improve patients’ health behaviours and health status.” Riemsma et al. (2003) outlined that the primary purpose of patient education is to improve or maintain health and contribute to slow deterioration. Patient education is essential as it provides information and helps individuals understand the disease’s etiology and impact on their lives. Patient education and awareness strategies have to occur at various levels to be successful. Some preventative measures include increasing knowledge of COPD in general, its etiology, and its impact. Zwerink et al. (2014) revealed that most programs educate individuals once diagnosed with COPD, but not on preventative measures. The authors suggested that the best preventative measures occur through open discussion and understanding the first-hand experiences of those who have it.

This thesis demonstrated the value of using a qualitative narrative study design allowing for an in-depth and descriptive understanding of experiences and challenges faced by the participants. Seeing from an emic perspective reveals the realities of the compensation claim process and occupational COPD in the minerals industry in Northeastern Ontario.

### 6.5.2 Limitations of the Study

This study had several limitations. Various challenges arose with the recruitment of the participants for this study. Difficulties with recruiting medical participants after multiple attempts using social media, in-person meetings, and email invitations may have contributed to bias in this study. Due to older age, some potential underground mineral worker participants might have had difficulty hearing, which could explain not wanting to participate, putting them in an uncomfortable situation. Another possible explanation could be the lack of trust and comfort associated with uncovering their personal story to a researcher.

Throughout the recruitment process, the primary researcher approached numerous health organizations and individuals to recruit more underground mineral worker participants to gain a better insight into the experiences of underground mineral workers diagnosed with occupational COPD.

This study was based on the in-depth interviews of participants across Northeastern Ontario. The breadth of this study's sample allowed for a comprehensive account of the impacts of occupational COPD and the compensation claim process among underground mineral workers; a population often overlooked within current academic journals. However, given the reality of virtual research and participant recruitment, they may be considered only a small representation of this population. In addition, it should be noted that underground mineral worker participants who volunteered to be a part of this study could be considered to be of a particular personality predisposition (i.e., one that is compelled to participate, had a personal interest, or felt the need to advocate for others) that influenced their desire to share their experiences. In other words, underground mineral worker participants who were unsuccessful in their fight against the WSIB might have been more willing to participate in this study contributing to participant bias.

Another limitation of this study was that the underground mineral worker participants provided

retrospective accounts (30 – 45 years) of the exposures that led to a diagnosis of occupational COPD and the challenges faced by the compensation claim process. As such, these accounts may not have been as accurate as they would have been closer to the time at diagnosis or when they initially filed for workers' compensation. However, the combination of emotions, thoughts, and detailed experiences that the participants shared did not discount the authenticity of each story. Therefore, the shared stories amplified the participants' voices in reports of the impact of occupational COPD and the compensation claim experiences revealing their complexity. In addition, while some participants spoke about their partner's ongoing day-to-day support due to the physical limitations of COPD, the relationship dynamics that occurred with underground mineral workers and their partners were not further discussed. Further research is required to uncover the impacts on the relational dynamic of couples' who are faced with the impacts of a diagnosis of occupational COPD.

Additional study limitations include language as interviews were conducted only in English. There are Francophone workers in the area (most participants were Francophone), gender (only males were included in this study), race, and culture.

Finally, the primary researcher could have unknowingly misinterpreted data or only included data deemed relevant to the study contributing to researcher bias within this study.

In order to ensure the trustworthiness, credibility, dependability, transferability, and application of the findings, all transcripts were read and re-read (Colorafi & Evans, 2016). Berger (2015) noted that reflexivity and addressing biases enhance a research study's trustworthiness and objectivity. Dependability was achieved using consistent procedures across all participant interviews, such as consistency in data collection (e.g., using the same interview questions in the same order) and clearly describing the researcher's role within the study (Colorafi & Evans, 2016). Credibility was

achieved by providing thick and rich data believable from the participants' perspectives in the research study (Colorafi & Evans, 2016). Transferability was accomplished by thoroughly describing the characteristics of the participants such that a comparison with other groups could be made. Finally, the utilization of the data was achieved by the accessibility of the findings found in publications and discussed at conferences (Colorafi & Evans, 2016).

#### 6.6 Real-World Implications

All the participants' stories brought forth a unique perspective about occupational COPD and the compensation claim process. This new knowledge and insight may allow physicians, employers, union representatives, and compensation workers to understand better the challenges faced by underground mineral workers diagnosed with COPD as an occupational illness.

Recommendations for future research involve building upon the findings presented within this study, such as the need for enhanced education for physicians about the importance of taking an occupational history, improved compensation claim processes, and further advocacy and support for a worker diagnosed with an occupational illness from those meant to support the worker including the physician, union compensation representative, and the compensation office.

Advocacy is critical to ensuring underground workers receive the support they require to obtain approval of a compensation claim. The findings within this study illustrate the need for education for physicians and WSIB compensation workers involved in the care and management of an underground mineral worker diagnosed with occupational COPD. Good management of COPD patients, optimizing physical and mental functioning, and including secondary prevention could improve patient experiences and reduce costs to healthcare services. Further research using data from both quantitative and qualitative sources may give a better understanding of how a combination of symptoms is experienced in patients with COPD.

The results of this study could provide directions for future research in this area and impact policy

development. There is a need for continued research into occupational illnesses and the compensation claim process so that the barriers to compensation claim approval can be broken down. All participants felt processes within the compensation system need to be re-examined and addressed to facilitate easier completion and timely approval of a compensation claim. A critical step to affecting processes and policies is through advocacy at all levels.

Although much is known about the risk factor of smoking and its relationship with COPD, less is known about the occupational risk factors, including vapours, gases, dusts, and fumes. Creating a job-exposure matrix specific for occupational COPD could help improve our understanding of the association between COPD and work-related exposures and current trends in COPD by occupation and exposure.

Despite progress in occupational health, work exposures contribute to a substantial burden of chronic lung disease in high-income countries. Changing work structures and exposure patterns have resulted in silicosis re-emerging, an irreversible and potentially fatal occupational lung disease. There is a need for clinicians to have a high level of suspicion for occupational lung disease and integrate a thorough occupational history into their evaluation of patients with chronic lung diseases.

All participants (i.e., underground mineral workers, physicians, and union compensation representatives) spoke about the need to change WSIB forms to allow the appropriate collection of occupational data. Therefore, the WSIB could utilize the findings in this study to improve forms used by physicians and individuals submitting a compensation claim for an occupational illness. One suggested area of improvement is to expand compensation forms allowing for more detailed information about an occupational illness.

Korzycki et al. (2008) indicated that knowledge transfer is an essential element that could help

injured workers become informed, understood, and help them to make their own decisions during the compensation claim process. Providing injured workers with knowledge could enhance their understanding of the compensation claim process, reducing frustration.

Compensation staff could find some aspects of this thesis helpful. Firstly, developing a more cohesive relationship through information sharing could help to reduce tensions, such as anger or frustration between the compensation claim adjudicator and the worker submitting a claim. An improved understanding of an occupational illness could benefit both the worker and the compensation employees. Knowledge about an injury and the appropriateness of timely phone calls could reduce the length of time required to approve a compensation claim.

While the union strived to work for the best outcome for an underground mineral worker diagnosed with occupational COPD, it was clear that given the complexity of these compensation cases, further resources are needed to alleviate the overload of cases amongst union compensation representatives.

Suppose clinicians were knowledgeable about their patients' work-related risk factors. In that case, this might positively impact their patients' health and help identify existing work-related health problems and contribute to the conversation about prevention. These questions could help to connect the dots to occupational exposure. Work should be conducted to create a standardized occupational work exposure template that could be used in all physicians' offices. Additionally, clinicians require further training or information to ascertain quickly if a further referral is necessary.

Furthermore, primary care physicians should have an accessible referral system to occupational medicine expertise when it is needed. This information should also be provided to the patient since the patient often raises the issue of occupational factors.

All physicians should be aware of and report work-related respiratory hazards and cooperate with occupational physicians to clarify the diagnosis and ensure proper treatment. Identifying methods for early detection and monitoring occupational COPD should be a priority for public health research. Implementing more sensitive procedures could allow workplace interventions to discontinue exposure and prevent the evolution to the severe forms of COPD.

While the barriers to reporting and receiving compensation for occupational COPD are well recognized, few studies have sought to improve occupational history taking while simultaneously linking exposure and disease and assisting interested patients with reporting to workers' compensation authorities. The research findings from this thesis have illuminated the complexity of filing a compensation claim. Filing a claim for workers' compensation is mainly perceived to be a task for occupational health and safety specialists. Workers and physicians alike do not consider the process readily understandable, accessible, or doable. This process needs to be deconstructed and made readily accessible by all, regardless of barriers to literacy or education. Future studies need to examine further how difficult it is for workers to establish their exposures to occupational hazards.

The WSIB attempts to adjudicate claims promptly; however, occupational disease claims are often complicated and could take time to finalize. This time frame is particularly problematic for COPD patients. Therefore, the WSIB should explore policies that allow occupational COPD claims to be fast-tracked. Unfortunately, the WSIB has specifically designated doctors, making it difficult and slow to get time with them. The WSIB should provide easy access to a contact list or choice of doctor's contact. Finally, increased remuneration by the WSIB could attract physicians to take more time to complete WSIB claim forms.

The results of this study have revealed a need for better and more comprehensive routine

respiratory health monitoring when workers are exposed to hazardous substances. Regular health monitoring could identify early stages of occupational diseases so that action could be taken to reduce exposure for the individual, implement early treatment, and hopefully limit or reduce the severity of the occupational disease. When signs of occupational disease in workers are identified, it may indicate that workplace exposures are too high and that control measures should be implemented to protect the rest of the workforce.

Establishing a comprehensive national dust and fume disease registry could also be a major step forward in improving occupational COPD incidence estimates in Northern Ontario. It could systematically collect data on new diagnoses of occupational COPD regardless of whether the cases are compensated. This data could then be used to provide statistical evidence of the overall scale of the problem, and preventive actions could be appropriately targeted by industry and regulators.

Increased advocacy and awareness of occupational health issues are essential, and those responsible for providing these functions must be made accountable for their actions. The issue of enforcement is central to all occupational health and safety issues and can be strengthened by the mobilization of workers, the community, the government, and the general public.

## 6.6 Knowledge Translation

*“To him who devotes his life to science, nothing can give more happiness than increasing the number of discoveries, but his cup of joy is full when the results of his studies immediately find practical applications.” – Louis Pasteur (Brownson et al., 2006)*

Knowledge translation and exchange are invaluable in the research process (Brownson et al., 2006; CIHR, 2016; Straus et al., 2013). Whether integrated during the research or at the end of the research project, synthesizing research findings and disseminating them adds significant value to a research study (Brownson et al., 2006; CIHR, 2016; Straus et al., 2013). Disseminating findings

assist with communicating and delivering the translated research findings to populations in meaningful and relevant ways (Brownson et al., 2006; CIHR, 2016; Straus et al., 2013). Ultimately, the goal of KTE is to create change that will impact and improve health through long-term policy and program changes (Brownson et al., 2006; CIHR, 2016; Straus et al., 2013).

Researchers must recognize the practical applications of their findings and learn to identify collaborations and build partnerships that can address the many complexities of moving a project from start to finish (Brownson et al., 2006; CIHR, 2016; Straus et al., 2013).

As outlined by CIHR (2016), *knowledge translation* (KT) is “the synthesis, dissemination, exchange, and ethically sound application of knowledge to improve health, provide more effective health services and products and strengthen the healthcare system.” Knowledge translation is categorized into two activities: end of grant KT and integrated KT (Brownson et al., 2006; CIHR, 2016; Straus et al., 2013).

End of study KT is the development and implementation of a research plan for making knowledge users aware of the results of a research project (Brownson et al., 2006; CIHR, 2013; Straus et al., 2013). Straus et al. (2013) indicated that end-of-study KT activities could include publishing journal articles and presenting research at relevant meetings. Straus et al. (2013) noted that when dissemination is targeted to researchers, it is essential to consider which journal audiences should be targeted. Straus et al. (2013) also stated that when researchers present research at meetings or conferences, there should be a consideration of the target audience interested in the research.

Finally, if implementation is the researcher’s goal, the research study results should contain knowledge that promotes change in attitudes, behaviour or influence decision making (Brownson et al., 2006; CIHR, 2016; Straus et al., 2013).

Integrated KT research applies KT principles to the entire research process (Brownson et al., 2006;

CIHR, 2016; Straus et al., 2013). It is a collaborative approach that engages knowledge users in the research and shares similarities with participatory research and action-oriented research (Brownson et al., 2006; CIHR, 2016; Straus et al., 2013). Integrated KT research reflects a spectrum of activity from engaging the knowledge user in development or refinement of the research questions, selection of the methodology, data collections and tools development, selection of the outcome measures, interpretation of the findings, crafting of the message, dissemination, and implementation of the results (Brownson et al., 2006; CIHR, 2016; Straus et al., 2013). The idea behind this approach is that if knowledge users are involved with the research, the research will be more solutions-focused and more likely to yield results that they will use in decision making (Brownson et al., 2006; CIHR, 2016; Straus et al., 2013).

CIHR (2016) noted that five factors should be included with an end-of-grant KT plan. These five factors include *goals, audience, strategies, expertise, and resources*.

Some KT goals of this study are to increase knowledge and awareness of COPD as an occupational illness in the minerals industry, further the understanding of the economic and non-economic impacts of underground workers diagnosed with COPD and bring forward awareness of the challenges associated with the Ontario worker's compensation claim process to inform future research. The identified key audiences of this research study are union compensation representatives, physicians, medical students, underground mineral workers in Northern Ontario, researchers in the field of occupational health in the minerals industry, and administrators and managers of organizations meant to support an injured worker, including unions and the Ontario WSIB. As a method of reaching these audiences, a KT strategy includes disseminating the research findings in peer-reviewed journals and presenting research findings to peers at academic conferences at local, national and international conferences on occupational COPD. Furthermore, workshops for unions and medical student presentations will be conducted. Additionally, a plain-

language summary report will be shared with participants, clinical, academic, and administrative audiences within the occupational health and safety systems. Finally, inviting clinicians and union compensation representatives to take part in a round table discussion could stimulate new collective information that could help to improve processes and policies and mitigate barriers that were identified by the underground mineral worker participants. The research team acknowledges their ability to communicate with the target audiences, and their expertise will allow for publications and presentations within the field of study. Any fees required to cover open-access publication costs, conference registrations, and travel are included in a research budget to ensure sufficient resources to implement the KT plan.

#### 6.7 Conclusions

This study generally supports findings from previous qualitative work on occupational COPD and the compensation claim process experiences. This study gives a deeper understanding of previously identified issues of living with occupational COPD and suggests why individuals act in the way they do. The participants revealed detailed accounts of how they perceived the impacts of occupational COPD and their experiences when submitting a compensation claim.

Okun et al. (2017) found that unions have played a critical role in health and safety issues, but they are not perfect institutions, and there is a varying culture between the shop floor and head office, which can influence the treatment of compensation claims. Often, it is felt that there is a disconnect between what union representatives on the ground view as safety issues compared to those who reside in the head office. Those on the shop floor have a finger on the pulse of workers' concerns. The authors noted that if education is not filtered down from the head office to the shop floor representatives, there could be a lack of awareness and understanding about how best to support a worker, limiting their ability to support a worker who submits a compensation claim. Hirsch et al. (1997) noted that unions play a vital role in reducing the number of rejected compensation claims.

The main challenges for occupational COPD are workplace hazards, the lack of early detection, and the constraints towards recognizing COPD as an occupational disease. In order to overcome these challenges, physicians should be aware of and report cases about occupational respiratory hazards. Physicians should cooperate with occupational physicians to clarify the diagnosis and ensure proper treatment is provided. Identifying methods for early detection and monitoring occupational COPD should be a priority for public health research. Implementing more sensitive procedures could allow workplace interventions to cease exposure and prevent the development of severe forms of COPD.

There needs to be a revamp of the compensation system where the burden of proof does not rest on workers' shoulders. This considerable weight would be lifted with enhanced education on occupational health issues, particularly for physicians, increased government involvement with funding for causation studies related to workplace exposures, and perhaps a move towards a universal coverage system, either provincial or countrywide. The only way to push for such measures is if the workers, their advocates, and the community mobilizes to put pressure on powerful forces (e.g., big industry and the government). Egilman et al. (2014) outlined that these powerful forces can contribute to occupational diseases and injuries because of their political, economic views that prioritize values of profit and wealth over human health and environmental well-being.

While smoking is a significant cause of COPD, this study contributes to the research that indicates that exposure to hazardous workplace toxins continues to be linked with the development of COPD. This research contributes to the existing evidence that supports the connection between hazardous exposures and the development of occupational COPD. Multiple epidemiologic studies published in peer-reviewed journals have demonstrated statistically significant and consistent associations using different definitions of COPD and across various industries and occupations.

The diagnosis of occupational COPD in current or former smokers too often suggests that smoking precludes a determination that COPD is work-related. Either the physician fails to move beyond the smoking history to an occupational history in someone with COPD or dismiss the occupational history as relatively unimportant in a smoker. With ongoing research, a shift can happen in understanding the diagnosis of occupational COPD.

COPD is a preventable disease (Viegi et al., 2020). Not only must public health agencies continue providing education about the importance of smoking cessation, but they should also work to maintain a safe and healthy workplace by substituting non-toxic agents for toxic agents and providing adequate ventilation and proper respiratory protection.

Without the extensive sharing of stories by all the participants in this study and their willingness to help bring about change, this research study could not have produced thick, rich data. As a result of their significant challenges and barriers, this study becomes an essential first step towards eliminating similar problems and obstacles for future workers.

This study will help guide future studies on the divergent areas that emerged from this study. Additionally, future studies could focus on the unanswered aspects of this study, such as the impacts of a diagnosis of COPD on partners of underground mineral workers. Finally, this study could also help guide future studies that address the impact (i.e., psychosocial, occupational, financial, and physical) of COPD on underground workers in the minerals industry and their experiences with the Ontario workers' compensation claim process beyond the limitations of this study, such as location, gender, language, and culture.

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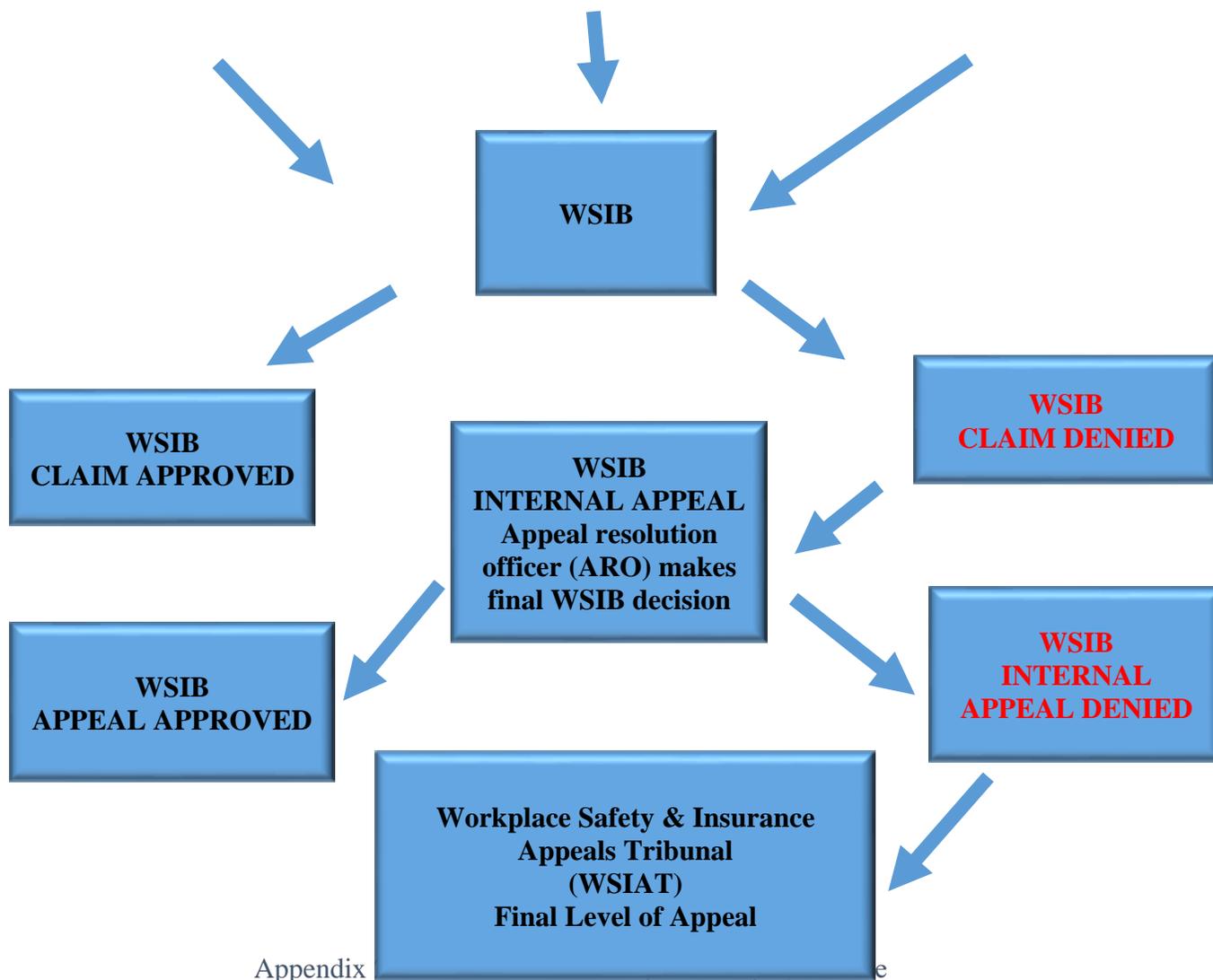
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#### Appendix 1 - Workplace Safety and Insurance Board (WSIB) - Claim Filing Process





0006a-workersreport  
ofinjury-en.pdf

Appendix 3 – Form 8 Health Professionals Report



form8.pdf

Appendix 4 – Participant Consent Form



**Study Title:** Chronic Obstructive Pulmonary Disease (COPD): Challenges in the Minerals Industry.

**Principal Investigator:**

Sherry Mongeau, Ph.D. candidate, School of Rural and Northern Health, Laurentian University

**Co-investigators:**

Nancy Lightfoot, Ph.D., Thesis Supervisor, School of Rural and Northern Health, Laurentian University

**Dear potential participants,**

This research study will examine the impact of COPD and the compensation claim process experience of some underground mine workers in Northeastern Ontario.

Information will be collected through telephone interviews. After written consent is obtained, you will be asked to participate in an in-person interview, which could last 60 to 90 minutes. The interviews will be conducted by telephone call.

Following the interview, I will choose personal quotes from your stories to describe how it felt to have experienced an injury and the compensation process. As a method of verifying themes, member checking will occur by having the participants review and approve quotes from your story.

**As a participant, you understand that:**

- Participation is voluntary and that you can withdraw from the study at any time by notifying me.
- You agree to be audio recorded during all interviews. The interview will be audio recorded so that it can be typed. The researcher will delete any personal identifying markers to ensure your confidentiality.
- Your name and location will be kept confidential, and any individually identifiable information will not appear in any documents.
- All information collected will be entered into a secure database accessed only by the principal researcher and supervisor, Dr. Lightfoot. All gathered information will be stored in a locked cabinet in Dr. N. Lightfoot's office at Laurentian University. All electronic files will be password protected. At no time will other parties have access to this information. The information collected will be kept indefinitely; however, participant names and ID numbers will be destroyed once the research study is complete.

**What risks will I face by taking part in the study? What will the researchers do to protect me against these risks?**

- Given the study's emotional, stressful and sensitive nature, focus participation may trigger negative/ill-wanted psychological/emotional feelings in the underground mineral worker study participants. In order to minimize these risks, a document containing counselling resources will be provided to you as the participant at the beginning of the interview process. Also, you do not have to answer any questions that you do not wish to answer.

**Potential Benefits:**

- You may not receive any personal benefits from being in this study. However, others may benefit from the knowledge gained from this study.
- A one-page summary will also be created to inform participants of the research study's findings. Finally, the findings will be presented at conferences, submitted to journals and presented at the Local 6500 Union Hall in Sudbury.
- Additionally, the findings will be provided to the WSIB as a method of possibly impacting change in their processes.

**What should I do if I want to stop participating in the study?**

You are free to leave the study at any time. If you leave the study before it is finished, there will be no penalty to you. If you decide to leave the study before it is finished, please advise either Sherry Mongeau or Dr. Nancy Lightfoot. If you choose to tell the researchers why you are leaving the study, your reasons may be kept as part of the study record. The researchers will keep the information collected for the research unless you ask us to delete it from our records.

### How will the researchers protect my information?

- As the primary researcher, I will collect and de-identify participants at the time of transcription by removing any participant identifiers.
- All electronic data (on computers, laptops, USB storage) will be stored in locked cabinets in the locked offices of Dr. N. Lightfoot at Laurentian University.
- All hardware will be password protected, and only pseudonyms will be used as individual identifiers.
- All interview data will be digitally audio-recorded, collected, housed and locked at both the researcher's home and Laurentian University, ensuring the privacy and confidentiality of the participant information.
- Physical safeguards for the data will include locked file cabinets and a computer containing the research data located away from public areas.

Project reports of this study will be generated for publications, conference presentations and a presentation to the local union.

A twenty-dollar cash honorarium will be provided to thank you for participating in this study.

If you have any questions or concerns about the study or about being a participant, you may contact the principal researcher (Sherry Mongeau) or her supervisor (Dr. Nancy Lightfoot) for information:

**Sherry Mongeau, PhD candidate**

School of Rural and Northern Health

(705) 675-4883 ext. 7257

1-800-461-8777

[smongeau@laurentian.ca](mailto:smongeau@laurentian.ca)

or

**Nancy Lightfoot, PhD**

School of Rural and Northern Health

(705) 675-1151 ext. 3972

1-800-461-4030

[nlightfoot@laurentian.ca](mailto:nlightfoot@laurentian.ca)

The Laurentian University research ethics board has approved this research project. For concerns or questions regarding the ethical conduct of the study, you may also contact the Laurentian University Research Officer at (705) 675-1151 or 1-800-461-4030, ext. 3213 or email at [ethics@laurentian.ca](mailto:ethics@laurentian.ca).

I agree to participate in this study, and I have received a copy of this consent form. I understand that signing the consent form does not give up any rights.

By signing this document, you agree to be in this study. Make sure you understand what the study is about before you sign. I will give you a copy of this document for your records, and I will keep a copy with the study records.

I agree to have the interview recorded:

Yes  No

Signature (Participant): \_\_\_\_\_ Date: \_\_\_\_\_

Copies of the research project summary will be made available to all participants.

I would like to receive a copy of a one page/short summary of the study:

Yes  No

If yes, please provide your contact information:

Email address: \_\_\_\_\_

Mailing address: \_\_\_\_\_

Appendix 5 – Participant Letter – Underground Mineral Workers



Dear Potential Participant,

I am a Laurentian University Ph.D. candidate at the School of Rural and Northern Health who invites you to participate in my research project called ***Chronic Obstructive Pulmonary Disease (COPD): An Occupational Hazard in the Minerals Industry***. The study aims to understand better the impact of COPD in the minerals industry and the compensation process experience in some underground workers in northeastern Ontario. This letter is being sent to you on behalf of your union.

You are being asked to participate in this research because you have been diagnosed with chronic obstructive pulmonary disease (COPD) and have a claim or have had a claim with the Workplace Safety and Insurance Board and are, or were, an underground worker. If you decide to participate

in this study, the results will be submitted to journals for publication, presented at conferences, given to your local union. A summary of the project results will also be provided to you at the end of the study. Additionally, this study may help guide future studies in this specific area of the compensation process and therefore, results will also be shared with the Workplace Safety and Insurance Board.

The study participation is voluntary, and you can withdraw from the study at any time without consequence by notifying me. Deciding not to participate or withdraw from participation will not affect any aspect of your compensation process. Information will be collected by performing telephone interviews, which could last 60 to 90 minutes. The interviews will be conducted by telephone call.

Your name and the location will be kept confidential throughout the entire project and onward. Any personal information will not appear on any documents. Please note that your union will not be advised who does or does not agree to participate in this study.

We would greatly appreciate it if you would consent to participate in this important project. If you would like to participate in this study, please contact by phone or email as listed below, **Sherry Mongeau, Principal Researcher**. A twenty-dollar cash honorarium will be provided to thank you for participating in this study.

Sincerely,

Sherry Mongeau, MA, BA, PhD (c)

Sherry Mongeau, PhD (c)                      or  
School of Rural and Northern Health  
(705) 561-2158  
[smongeau@laurentian.ca](mailto:smongeau@laurentian.ca)

Nancy Lightfoot, PhD  
School of Rural and Northern Health  
(705) 675-1151 ext. 3972  
1-800-461-4030  
[nlightfoot@laurentian.ca](mailto:nlightfoot@laurentian.ca)

Appendix 6 – Participant Letter - Physicians



Dear Potential Participant,

I am a Laurentian University Ph.D. candidate at the School of Rural and Northern Health who invites you to participate in my research project called ***Chronic Obstructive Pulmonary Disease (COPD): An Occupational Hazard in the Minerals Industry***. The study aims to better understand the impact of COPD in the minerals industry and the compensation process experience in some underground workers in northeastern Ontario.

You are being asked to participate in this research study because you are a primary care physician or lung specialist who has been involved with the care of an underground mineral worker diagnosed with chronic obstructive pulmonary disease (COPD). If you decide to participate in this

study, I will submit the study results to journals for publications and at conferences. Additionally, this study may help guide future studies in this specific area of the compensation process and therefore, results will also be shared with the Workplace Safety and Insurance Board.

The study participation is voluntary, and you can withdraw from the study at any time without consequence by notifying me. Information will be collected by performing telephone interviews, which could last 60 to 90 minutes.

Your name and the location will be kept confidential throughout the entire project and onward. Any personal information will not appear on any documents.

Laurentian University research ethics boards have approved this research project. For concerns or questions regarding the ethical conduct of the study, you may also contact the Laurentian University Research Officer at (705) 675-1151 or 1-800-461-4030, ext. 3213 or email at [ethics@laurentian.ca](mailto:ethics@laurentian.ca).

We would greatly appreciate it if you would consent to participate in this important research project. If you would like to participate in this study, please contact **Sherry Mongeau, Principal Researcher**, by phone or email as listed below. A twenty-dollar gift card will be provided to thank you for participating in this study.

Sincerely,

Sherry Mongeau, MA, BA, PhD (c)

**Sherry Mongeau, PhD (c)** or  
School of Rural and Northern Health  
(705) 561-2158  
[smongeau@laurentian.ca](mailto:smongeau@laurentian.ca)

Nancy Lightfoot, PhD  
School of Rural and Northern Health  
(705) 675-1151 ext. 3972  
1-800-461-4030  
[nlightfoot@laurentian.ca](mailto:nlightfoot@laurentian.ca)

Appendix 7 – Participant Letter – Union Representatives



Dear Potential Participant,

I am a Laurentian University Ph.D. candidate in the School of Rural and Northern Health who invites you to participate in my research project called ***Chronic Obstructive Pulmonary Disease (COPD): An Occupational Hazard in the Minerals Industry***. The study aims to better understand the impact of COPD in the minerals industry and the compensation process experience in some underground workers in northeastern Ontario.

You are being asked to participate in this research because you have been involved with the compensation claim process for an underground mineral worker who has been diagnosed with chronic obstructive pulmonary disease (COPD) as an occupational illness. If you decide to

participate in this study, I will submit the results of this study to journals for publication and at conferences. Additionally, this study may help guide future studies in this specific area of the compensation process and therefore, results will also be shared with the Workplace Safety and Insurance Board.

The study participation is voluntary, and you can withdraw from the study at any time without consequence by notifying me. Information will be collected by performing individual telephone interviews, which could last 60 to 90 minutes. The interviews will be conducted by telephone call or via video conference.

Your name and the location will be kept confidential throughout the entire project and onward. Any personal information will not appear on any documents.

We would greatly appreciate it if you would consent to participate in this important project. If you would like to participate in this study, please contact by phone or email as listed below, **Sherry Mongeau, Principal Researcher**. A twenty-dollar cash honorarium will be provided to thank you for participating in this study.

Sincerely,

Sherry Mongeau, MA, BA, PhD (c)

Sherry Mongeau, PhD (c)                      or  
School of Rural and Northern Health  
(705) 561-2158  
1-800-461-8777  
[smongeau@laurentian.ca](mailto:smongeau@laurentian.ca)

Nancy Lightfoot, PhD  
School of Rural and Northern Health  
(705) 675-1151 ext. 3972  
1-800-461-4030  
[nlightfoot@laurentian.ca](mailto:nlightfoot@laurentian.ca)

Appendix 8 – Interview Questions – Underground Mineral Workers



ID # \_\_\_\_\_

Date of Interview (day/month/year):

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Sudbury \_\_\_ Timmins \_\_\_ Matachewan \_\_\_\_\_ Kirkland Lake \_\_\_\_\_

*Hello, my name is Sherry and I want to thank you again for participating in this interview. The goal is to share your stories as you see them; there are no right or wrong answers to the questions asked. Feel free to ask me to repeat the question or explain if you do not understand the question.*

*You may also choose not to answer a question. If you need a pause or a break, we can stop the interview at any time. Do you have any questions before we start?*

**Questions:**

1. Would you like to be addressed by your first name?
2. What was it/is it like to work in the mining industry? What types of jobs did you do?
3. I understand you have been diagnosed with COPD; can you tell me how that happened?
  - a. Prompts: When? How? Under what conditions? What type of treatment did you receive physician/specialist? How long after your diagnosis did you submit a claim for WSIB? Was it granted/denied? How long did it take to get financial compensation?
4. How did your employer/union/family/co-workers/usual physician/healthcare provider or caregiver/WSIB react/respond to the diagnosis?
5. Can you tell me a little bit about your experiences with the WSIB process?
6. What is it like living with COPD?

Probing questions: Can you describe what it is like having COPD?

  - b) Can you describe a normal day to me?
  - c) What is your day-to-day routine like?
  - d) What do you find most challenging to do in your day-to-day routine because of COPD?
  - e) What do you find most challenging about having COPD?
  - f) How has having COPD affected you?
  - g) How does having COPD impact your everyday life?
7. What advice would you give others trying to submit a claim for an injury through WSIB?
8. Were there any financial impacts of COPD on your family? Financial impacts on you and/or the household? Suggestions about how to help others cope.
9. Did you have to take any form of medical leave?
10. What suggestions do you have for other underground workers with COPD?
11. Is there anything else you want to share?

**Other prompts:**

- Please explain more.
- Can you give me more details?
- How did that make you feel?

1. Preference for me to follow up with you. Mail\_\_\_ Email\_\_\_ Telephone\_\_\_
2. How old are you? \_\_\_\_\_
3. Marital Status: \_\_\_\_\_
4. Any Children? \_\_\_ Yes \_\_\_ No
5. Your current hometown: \_\_\_\_\_
6. At which company did you work? \_\_\_\_\_
7. What is your highest level of education? \_\_\_\_\_
8. Are you?
  - a. Retired \_\_\_\_\_ Regular Full-time \_\_\_\_\_ Regular Part-time \_\_\_\_\_ Casual \_\_\_\_\_
9. How long have you worked in the mining industry? \_\_\_\_\_

**Health Information:**

How would you best describe your current health status?

Were you ever admitted to the hospital for COPD?

Approximately how long have you been living with COPD?

Are/were you a smoker? How long did you smoke for?

Do you currently access health services for COPD treatment?

Additional comments

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Appendix 9 – Interview Questions – Physicians



ID # \_\_\_\_\_

Date of Interview (day/month/year):

\_\_\_\_\_  
*Hello, my name is Sherry and I want to thank you again for participating in this interview. The goal is to share your stories as you see them; there are no right or wrong answers to the questions asked. Feel free to ask me to repeat the question or explain if you do not understand the question. You may also choose not to answer a question. If you need a pause or a break, we can stop the interview at any time. Do you have any questions before we start?*

**Questions:**

1. Can you provide me with the focus of your practice (family or specialist)?
2. How do you determine if COPD is related to the occupation? (occupational history, exposure levels)
3. What are the factors affecting the treatment of COPD? (access to healthcare, patient compliance/smoking)
4. What types of impact (such as: emotional, physical, financial, occupational, practical, quality of life, other) does possibly work-related COPD have on the patient? Can you describe the impact?
5. How much knowledge do you have about occupational exposures in the workplace? Did you receive specific training about occupational illnesses?
6. What has your experience been with WSIB? How could the process be improved? (challenges/barriers/communication/documentation)
7. What advice would you give to other physicians treating COPD as an occupational illness?
8. Is there anything else you want to share?

**Other prompts:**

- Please explain more.
  - Can you give me more details?
10. Preference for me to follow up with you. Mail\_\_\_ Email\_\_\_ Telephone\_\_\_

Appendix 10 – Interview Questions – Union Representatives



ID # \_\_\_\_\_

Date of Interview (day/month/year):  
\_\_\_\_\_

*Hello, my name is Sherry and I want to thank you again for participating in this interview. The goal is to share your stories as you see them; there are no right or wrong answers to the questions asked. Feel free to ask me to repeat the question or explain if you do not understand the question. You may also choose not to answer a question. If you need a pause or a break, we can stop the interview at any time. Do you have any questions before we start?*

**Questions:**

1. Can you provide your job title and what your job involves?
2. How long have you been working with/involved with people with possibly mining-related COPD?
3. What types of impact (such as emotional, physical, financial, occupational, practical, quality of life, other) does possibly work-related COPD have on the patient? Can you describe the impact?
4. Do most people apply for compensation? What are the barriers and facilitators to filing a claim for the patient and caregiver? What percent of claims for potentially mining-related COPD are successful, and what is the average wait time a compensation claim takes to resolve (and what is the range from shortest to longest, in your experience)? How do patients find the compensation process? What is challenging, what could be done better?
5. What do you think companies, unions, health care providers, the WSIB, and anybody else could do to help people who experience mining-related COPD?
6. Could anything more be done to help you assist patients with possibly mining-related lung COPD?
7. Is there anything else that you would like to add?

**Other prompts:**

- Please explain more.
- Can you give me more details?

Preference for me to follow up with you. Mail\_\_\_ Email\_\_\_ Telephone\_\_\_

Appendix 11 – Participant Resources



**Ontario Mental Health Helpline (1-866-531-2600)**

**Sudbury Crisis hotline (705-675-4760)**

**Timmins Crisis hotline (705-264-3003)**

**Kirkland Lake Crisis hotline (1-866-531-2600)**

**Matachewan Crisis hotline (1-866-531-2600)**

Appendix 12 – OHCOW Participant Letter



**Occupational Health Centres de sante  
Workers Inc. de l'Ontario Inc.  
des travailleurs (ses) Clinics for Ontario**



Sudbury Clinic  
84 Cedar Street, 2<sup>nd</sup> Floor Sudbury Ontario P3E 1A5 Tel: (705) 523-2330 Fax:  
1-877-817-0336 E-mail:sudbury@ohcow.on.ca Website:  
<http://www.ohcow.on.ca/sudbury>

February 22, 2021

Dear McIntyre Powder Intake Clinic Participant,

**Re: Participants needed for Laurentian University study**

We are sending this letter to inform you that Sherry Mongeau, a Ph.D. Candidate of the Rural and Northern Health Ph.D. Program at Laurentian University is conducting a research study on underground mine workers who were exposed to McIntyre Powder and have been diagnosed with COPD due to working underground.

Sherry is seeking participants on a voluntary basis for her research, which would involve a one-on-one interview by telephone. Details are enclosed.

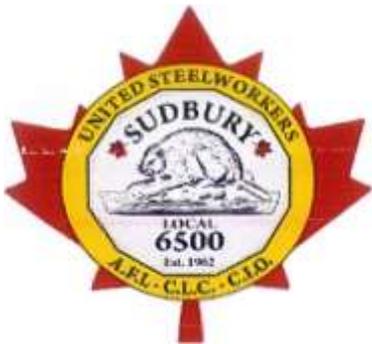
Please note that we have not disclosed any identifying information about you to Sherry. We are sending this letter on her behalf to every tenth worker on our McIntyre Powder-exposed worker list. Sherry will not know your identity unless you return the consent form to become part of her study, and OHCOW will not know whether you have chosen to participate unless you tell us directly.

Should you have any questions or concerns, please do not hesitate to contact us.

Sincerely,

Janice Martell, Occupational Health Coordinator  
[jmartell@ohcow.on.ca](mailto:jmartell@ohcow.on.ca)  
1-877-817-0336, ext. 2421

#### Appendix 13 – Union Letter of Support



UNITED STEELWORKERS

LOCAL 6500

Brady Street  
Sudbury, ON, PSE 1C8  
Phones 705-675-3391  
FAX: 705-675-2438

Tuesday, September 29, 2020

To Whom It May Concern:

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The United Steelworkers Local 6500 is proud to endorse Ms. Sherry Mongeon, MA, BA Ph.D. Student, School of Rural and Northern Health in her thesis.

Kindly accept this letter to confirm our support in her research project titled - Chronic Obstructive Pulmonary Disease (COPD): The Impact of Occupational Hazards in the Minerals Industry.

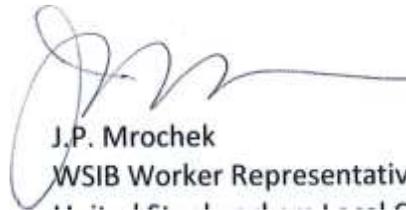
We recognize the limited amount of research that exists regarding non-malignant respiratory illness and the debilitating impact it has on the mining cohort.

We wish Ms. Mongeon success in her endeavour and we look forward to her findings.

In Solidarity



Nick Laroche  
President  
SIB Worker Representative  
United Steelworkers Local 6500



J.P. Mrochek  
WSIB Worker Representative

United Steelworkers Local 6500

President/General Correspondence/2020 Support Letter — Sherry Mongeau Research

Appendix 14 – Physician Recruitment – Division of Clinical Sciences – Northern Ontario School of Medicine

11/30/2020

Laurentian University Mail - Fwd: Research Project

Laurentian University  
Université Laurentienne

Sherry Mongeau <smongeau@laurentian.ca>

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Fwd: Research Project

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Sherry Mongeau <smongeau@nosm.ca>  
To: Sherry Mongeau <smongeau@laurentian.ca>

Wed, Nov 25, 2020 at 8:12 AM

----- Forwarded message -----

From: Harshad Telang <htelang@nosm.ca>  
Date: wed, Nov 25, 2020 at 5:33 AM  
Subject: Re: Research Project  
To: Sherry Mongeau <smongeau@nosm.ca>  
Cc: Clinical Nosm <divclinsci@nosm.ca>, Barbara Zelek <bzelek@nosm.ca>

Hi, Sherry, thank you for your email. Unfortunately, I will not be able to help with your request to disseminate information to specific physicians. However, we can advertise your study in our electronic newsletter by asking physicians who meet your criteria to get in touch with you if they wish to be involved. If you want to proceed please send a brief paragraph to Lorie at divclinsci@nosm.ca

All the best

Harshad

Sent from my iPhone

1/1

## Appendix 15 – Underground Mineral Worker Participant Recruitment – Social Media

### **Miners sought for study on COPD and workplace compensation**

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SHARE ON:



Rosalind Russell, staff [Friday, Apr. 16th, 2021](#)



A woman carrying out a study for her PHD is looking for miners who developed chronic obstructive pulmonary disease after working as an underground miner in Northern Ontario. Photo - unsplash.com

A woman carrying out a study for her PHD is looking for miners who developed chronic obstructive pulmonary disease after working as an underground miner in Northern Ontario.

Sherry Mongeau is looking for voluntary participants to take part in a research study that will contribute to her PhD in occupational illness through the School of Rural and Northern Health at Laurentian University.

She says the focus will be about the participants and their stories, their journey through COPD as an occupational disease and their experiences with the compensation process.

COPD is a group of lung diseases that make it difficult for people to breathe because their airways have been narrowed and includes chronic bronchitis and emphysema.

Mongeau would like to hear from prospective participants by April 30 aiming to have her thesis defended by May 2022.

For more information on the study, or to register as a participant, contact Sherry at 705-561-2158 or [smongeau@laurentian.ca](mailto:smongeau@laurentian.ca).

Appendix 16 – Research Ethics Approval



**APPROVAL FOR CONDUCTING RESEARCH INVOLVING HUMAN SUBJECTS**  
Research Ethics Board – Laurentian University

This letter confirms that the research project identified below has successfully passed the ethics review by the Laurentian University Research Ethics Board (REB). Your ethics approval date, other milestone dates, and any special conditions for your project are indicated below.

TYPE OF APPROVAL / New X / Modifications to project / Time extension	
<b>Name of Principal Investigator and school/department</b>	Sherry Mongeau, Nancy Lightfoot, co-investigator, Centre for Rural and Northern Health Research,
<b>Title of Project</b>	Chronic Obstructive Pulmonary Disease (COPD): Challenges in the Minerals Industry
<b>REB file number</b>	6020884
<b>Date of original approval of project</b>	January 08 <sup>th</sup> , 2021
<b>Date of approval of project modifications or extension (if applicable)</b>	
<b>Final/Interim report due on:</b> <i>(You may request an extension)</i>	January 08 <sup>th</sup> , 2022
<b>Conditions placed on project</b>	

During the course of your research, no deviations from, or changes to, the protocol, recruitment or consent forms may be initiated without prior written approval from the REB. If you wish to modify your research project, please refer to the Research Ethics website to complete the appropriate REB form.

All projects must submit a report to REB at least once per year. If involvement with human participants continues for longer than one year (e.g. you have not completed the objectives of the study and have not yet terminated contact with the participants, except for feedback of final results to participants), you must request an extension using the appropriate LU REB form. In all cases, please ensure that your research complies with Tri-Council Policy Statement (TCPS). Also please quote your REB file number on all future correspondence with the REB office.

Congratulations and best wishes in conducting your research.

Rosanna Langer, PHD, Chair, *Laurentian University Research Ethics Board*

#### Appendix 17 – Mines and Minerals Mined

Location (Ontario)	Primary Extraction	Exposures
Virginiatown	Gold	Vapours, dusts, fumes, toxins, silica exposures
Garson	Nickel	Dusts, fumes, toxins
Elliot Lake	Uranium	Protracted exposure to radon decay

		products, dusts, fumes, toxins
Timmins	Gold	Vapours, dusts, fumes, toxins, silica exposures
Timmins	Gold	Vapours, dusts, fumes, toxins, silica exposures
Timmins	Gold	Vapours, dusts, fumes, toxins, silica exposures
Sudbury	Nickel	Dusts, fumes, toxins
Timmins	Gold	Vapours, dusts, fumes, toxins, silica exposures
Cobalt	Silver	Soluble silver compounds and silver metal dusts, fumes, toxins
Falconbridge	Nickel	Dusts, fumes, toxins