**The Complexities of Unknowns: Knowledge Contestations and Occupational
Disease Recognition**

by

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Abstract

In decision-making processes, competing knowledge claims create tensions, contestations, and negotiations between various social actors in their efforts to reach a decision. While attention to questions of knowledge (such as how certain knowledge gains legitimacy and authority) are useful in examining the dimensions and stakes of knowledge contestations, broadening the analysis to consider the complex role of unknowns can provide fruitful and nuanced insights into these contestations. Through a qualitative methodological research design, in this dissertation I focus on knowledge contestations in relation to the challenges of recognizing occupational diseases in the context of the Ontario workers' compensation system. The research questions that drive this investigation are as follows: (1) how do unknowns complicate knowledge contestations, specifically those surrounding the recognition of occupational diseases; (2) how do various types of knowledges and unknowns become mobilized in these recognition processes; (3) what counts as evidence in recognition processes, and what role does evidence play in supporting various knowledge claims; and (4) how do social and political factors influence the recognition of occupational disease? In exploring these questions, I primarily draw on three theoretical resources: new materialism, sociology of knowledge, and ignorance studies. I find that multiple dimensions of unknowns play a pivotal role in knowledge contestations over occupational disease recognition. The forms that such unknowns tend to take complicate and obscure connections between occupational factors and the development of disease. The mobilization of unknowns in contestations over disease recognition presents further challenges due to conflicting economic and other interests of the various social actors involved in these decision-making processes, as well as the broader influence of the dominant biomedical model in knowledge about disease and the body.

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List of Abbreviations

ACGIH: American Conference of Government Industrial Hygienists
AO: Archives of Ontario
ATI: Access to Information
AWCBC: Association of Workers Compensation Boards of Canada
BPA: biphenyl A
CEP: Communications, Energy and Paperworkers Union
CI: Chrysotile Institute
CLC: Canadian Labour Congress
CRA: Canadian Revenue Agency
FIPPA: Freedom of Information and Protection of Privacy Act
FOI: Freedom of Information
GE: General Electric
IARC: International Agency for Research on Cancer
IDSP: Industrial Disease Standards Panel
ILO: International Labour Organization
INCO: International Nickel Company, Ltd.
ISCD: International Statistical Classification of Diseases
MCS: Multiple Chemical Sensitivities
MOL: Ministry of Labour
NCGIH: National Conference on Government Industrial Hygienists
NDP: New Democratic Party
ODAP: Occupational Disease Advisory Panel
ODP: Occupational Disease Panel
OELs: Occupational Exposure Limits
OHIP: Ontario Health Insurance Plan
OHS: Occupational Health and Safety
OHSA: Occupational Health and Safety Act
OHSAH: Occupational Health and Safety Agency for Healthcare
ONA: Ontario Nurses Association
PBDEs: polybrominated diphenyl ethers
PC: Progressive Conservatives
PSPC: Public Services and Procurement Canada
RR: Relative Risk
SCC: Supreme Court of Canada
SIR: Standard Incidence Ratio
TCE: Trichloroethylene
TLV: Threshold Limit Value
USW: United Steel Workers
WCAT: Workers' Compensation Appeals Tribunal
WCB: Workers' Compensation Board/Workmen's Compensation Board
WCIA: Workmen's Compensation for Injuries Act
WHMIS: Workplace Hazardous Materials Information System
WHO: World Health Organization
WSIA: Workplace Safety and Insurance Act

WSIAT: Workplace Safety and Insurance Appeals Tribunal
WSIB: Workplace Safety and Insurance Board

Preface

Since 2004, former General Electric (GE) Peterborough workers have filed over 650 occupational disease claims to the Workplace Safety and Insurance Board (WSIB). While employed at GE, these workers were exposed to a plethora of toxic substances at high levels for decades without adequate health and safety protections. Then they got sick; they found out that they have diseases such as brain cancer and lung cancer. Less than half of the claims had been accepted, with the remainder being rejected or withdrawn due to ‘insufficient evidence’ of a connection between working at GE and contracting a disease (Mojtehdzadeh, 2016 December 17).

Recently, there has been another push by retired GE workers to get compensation from the WSIB for the occupational disease claims. Their efforts have attracted media and political attention, including a special project by *The Toronto Star* (entitled “Lethal Legacy”) published in December 2016. As members of the GE Retirees Occupational Health Advisory Committee, the workers also collaborated with occupational health researchers and their union (Unifor) to produce an investigative report researching exposure conditions. *The Report of the Advisory Committee on Retrospective Exposure Profiling of the Production Processes at the General Electric Production Facility in Peterborough, Ontario 1945-2000*) was publically released in May 2017. Findings from this report support previous knowledge about the toxicity of the work environment, identifying the existence of 3,000 toxic substances at GE Peterborough, about 40 of which are carcinogenic. Immediately after the release of the report, Ontario Minister of Labour, Kevin Flynn, stated that there needs to be an expedited process to deal with the

GE occupational disease claims. Premier Kathleen Wynne expressed her full support for this statement. On September 18, 2017 the WSIB announced that it would re-examine the compensation claims that were denied. A month later, the GE Retirees Occupational Health Advisory Committee released a letter to Minister Kevin Flynn to remind him of the promise for an expedited process and to urge him to take action on it, as the government still had not provided the resources necessary to assess the occupational disease claims in a timely manner. As of December 2017, the WSIB reviewed 47 compensation claims (of the 250 denied claims that were set to be re-opened), with 30 of them being overturned in favour of the worker.

The GE Peterborough situation is one story that I have followed in the media while writing my dissertation. The health concerns at GE Peterborough epitomize the frustrations experienced by workers, their families, and their advocates when there is long-held knowledge about exposure to toxic substances and experiences of disease, yet such knowledge hits significant barriers when occupational disease claims for workers' compensation are made. In media outlets, workers spoke of how their knowledge and evidence of workplace exposures was dismissed as anecdotal when presented to the WSIB. *The Toronto Star* found, amongst many other issues, that government inspections by the Ministries of Health and Labour from 1945 to 1981 raised concerns over the levels of toxic substances workers were exposed to, some of which were in excess of the more lax exposure limits at the time. For example, a 1961 government report "found highly toxic biphenyls at five to 11 times the legal limit of the time. Today that would be up to 220 times the allowable amount" (Mojtehdzadeh, 2016 December 17: np). *The Report of the Advisory Committee* illustrates that GE knew about the hazards of exposures, such as

asbestos, since the 1930s. Yet, workers in the Peterborough facility were routinely handling asbestos without protective equipment throughout the twentieth century.

In response to what has happened to former GE Peterborough workers, Premier Kathleen Wynne says the situation is “tragic”. She elaborates by explaining that “there was no malicious intent – people just didn’t know” (see Kovach, 2017 August 3). Premier Wynne, in other words, was making a claim to an unknown in explaining the struggles and suffering of the GE Peterborough working community. But people knew. Many people knew, actually. And they knew for a very long time. The problem is not that “people just didn’t know”.

Occupational disease recognition is one context where various types of claims about unknowns are made and mobilized as a way to evade sufficient legitimation of, and response to, social justice issues, especially when there is a lack of political will to address such issues. This dissertation takes as its starting point the challenges that workers and their advocates face in trying to attain recognition for diseases that are occupationally related, especially when they encounter the snarl of unknowns in their struggle to do so.

Chapter One:

Introduction: The Complexities of Unknowns in Occupational Disease Recognition

In decision-making processes, competing knowledge claims create tensions, contestations and negotiations between various social actors in their efforts to reach a decision. While attention to questions of knowledge (such as how certain knowledge gains legitimacy and authority, how knowledge becomes mobilized, and how various knowledge claims interact in these contexts) are useful in examining the dimensions and stakes of knowledge contestations, broadening the analysis to consider the role of unknowns can provide fruitful and nuanced insights into these contestations. This dissertation has two central aims: to contribute to the sociology of knowledge and ignorance by exploring and unraveling the complexities of unknowns and their dynamics in knowledge contestations, and to contribute to the development of a sociological analysis of occupational health and disease. I do so with a particular focus on knowledge contestations in relation to the challenges of recognizing occupational diseases in the context of the Ontario workers' compensation system.¹ While important distinctions exist between occupational diseases in terms of how (and whether) they become recognized, the focus of this dissertation is on the phenomenon of occupational disease in general as

¹ I acknowledge that the concepts of "occupational disease" and "work-related disease" may be sometimes used in distinct ways. For example, the World Health Organization (WHO) defines occupational diseases as diseases with a primary occupational cause and work-related diseases as those with multi-factorial etiologies. For the purposes of this dissertation, and in accordance with the legal principles of disease adjudication as they operate through Ontario's workers' compensation system, I use the term "occupational disease" in the general sense to refer to diseases where occupational components may be primary contributing factors (occupation is the main factor for the development of a disease) or significant contributing factors (occupation is a necessary factor for the development of a disease, but not the only one).

an initial way to understand the broader framework, conflicts, and challenges of unknowns in the recognition processes.

Through a qualitative methodological research design, I utilize multiple methods to explore the complexities of unknowns in processes of occupational disease recognition. These methods include in-depth semi-structured interviews with individuals professionally involved with issues of occupational disease, participation in events on occupational disease as an observer, Freedom of Information (FOI) requests, archival methods, and extensive document analysis. The research questions that drive this investigation are as follows: (1) how do unknowns complicate knowledge contestations, specifically those surrounding the recognition of occupational diseases; (2) how do various types of knowledges and unknowns become mobilized in these recognition processes; (3) what counts as evidence in recognition processes, and what role does evidence play in supporting various knowledge claims; and (4) how do social and political factors influence the recognition of occupational disease? In exploring these questions, I primarily draw on three theoretical resources: new materialism; sociology of knowledge, especially in terms of the production and legitimation of knowledge; and ignorance studies. Each theoretical resource adds to the conceptual grounding of this exploration of the complexities of unknowns in the context of occupational disease recognition.

Through my research I find that multiple dimensions of unknowns² play a pivotal role in knowledge contestations over occupational disease recognition. The notion of

² What I am referring to by the notion of multiple dimensions of unknowns is that unknowns are not singular and they do not exist in isolation from one another. There are different types and processes of unknowns, which may overlap in meaning in some contexts but encompass distinct components in other contexts. For example, absences may or may not take the form of ignorance (Santos, 2015) and uncertainty

multiple unknowns acknowledges the intricacy of unknowns, as there are divergent strands, processes, and productions of unknowns that are context specific. In the context of occupational disease recognition in Ontario, the dominant forms that such unknowns tend to take complicate and obscure connections between occupational factors and the development of disease. These unknowns present further challenges due to conflicting economic and other interests of the various social actors involved in occupational disease recognition, as well as the broader influence of the dominant biomedical model in knowledge about disease and the body. In connection with these observations, I develop four main arguments: (1) multiple dimensions of unknowns influence the occupational disease recognition process, and this occurs both subtly and explicitly; (2) the ways that unknowns become identified, mobilized, and responded to is highly contested, with divergences occurring between different social actors; (3) certain forms of scientific evidence hold a considerable amount of evidentiary weight, and medical conceptualizations of workers' bodies are entangled with the dynamics of unknowns in the context of occupational disease recognition; and (4) within the context of Ontario's workers' compensation system, unknowns tend to be used as a mechanism to obscure the recognition of a connection between disease and occupation, resulting in the denial of compensation claims.

In this introductory chapter, I first outline the problem of occupational disease and articulate why this is an illuminating case focus for understanding the complex role of unknowns in knowledge contestations. Second, I clarify what I am referring to by the

may come into existence by casting doubt, but uncertainty is not always the same thing as doubt (see discussion in Chapter Four). The notion of multiple dimensions of unknowns also illuminates that there are variegated characteristics within an unknown. For example, unknowns encompass both regular and deviant features (Gross and McGoey, 2015).

notion of complexities of unknowns in the context of occupational disease recognition. I then delve into a discussion of each of the three theoretical resources and how they contribute to an understanding of the challenges of recognizing diseases as occupationally related. Finally, I outline the focus of each of the subsequent chapters.

The Problem of Occupational Disease Recognition

The problem of occupational disease is not solely a medical-scientific-technological one that can be remedied through advances in these fields. The long historical trajectory of knowledge about certain occupational exposures (such as asbestos)³ belies any attempt to argue that the problem is a simple lack of medical, scientific and technical knowledge and that through the linear progression of these knowledges, more will eventually be known about links between occupational factors and disease. While not dismissing the important role of these epistemic fields in their potential to develop knowledge and provide evidence about occupational disease (through epidemiological studies, bio-monitoring, X-rays, etc.), it has been argued that the problem of occupational disease is highly influenced by, and interconnected with, social and political factors (Dembe, 1996; Levenstein et. al., 2002; McIvor, 2012; Rosner and Markowitz, 2006; Tataryn, 1979). It has further been pointed out that not acknowledging the salience of social and political factors leads to the framing of occupational disease as a problem that can only be understood and addressed by scientific and medical experts. Such framings remove occupational disease from the public and political realm and limit the types of knowledge mobilized. For example, Rosner and Markowitz (2006) highlight that curbing public participation in decision-making

³ For a historical timeline of knowledge about occupational health risks, see Tataryn (1979: 6-8).

processes has historically served to abstract disease from human suffering by reducing it to a technical issue.

There are also many challenges to recognizing occupational disease due to its relative invisibility as a health problem. In contrast to more easily perceivable workplace health and safety issues, such as an ‘accident’ (e.g., cutting off a finger) or disaster (e.g., mine explosion),⁴ many diseases have long latency periods where the ill health effects from an occupational exposure can take decades to manifest in terms of symptoms within the worker’s body. Coupled with other factors, such as multi-factorial disease etiologies, synergistic effects between exposures, a lack of exposure data and/or occupational histories, and contestations over standards of proof, the recognition of occupational diseases is filled with numerous obstacles. Social and political factors, such as media attentiveness and labour activism, also influence the degree of public attention and awareness of occupational disease, as well the kind of political response directed towards these problems.⁵

Furthermore, occupational disease is characterized by controversy in two key ways. First, controversy arises due to the inherently economic dimensions of occupational disease in capitalist societies. There are tensions between motives that prioritize profit and economic growth on the one hand, and the interests of workers and

⁴ It is important to emphasize, however, that while they are more perceivable in their connection to occupational factors, accidents and disasters are not singular events but can be better understood as resulting from a build-up of processes that led to them (lax enforcement of health and safety regulations; speeding up work processes, etc.). Wolkowitz’s (2006) conceptualization of accident is useful here, as she highlights how ‘accident’ is often conceptually conflated with ‘accidental’, which problematically reinforces the ideas of accidents as isolated, unintended events that are simply unfortunate occurrences. In other words, workplace accidents are not necessarily accidental.

⁵ Political responses may range from ignoring the issue or denying knowledge about the occupational disease (or aspects that led to the disease’s occurrence); initiating consultations without sufficient follow-up or implementation of recommendations; introducing systemic initiatives to better protect workers’ health (legislation, policies, and regulations); and/or entrenching systemic and efficient enforcement mechanisms to ensure employer compliance.

their advocates to have physically and psychologically healthy workplaces on the other hand.⁶ Class conflict is an important element not only in the struggle to recognize diseases as occupationally related but also for action to be taken against unhealthy workplaces and labour processes (Levenstein et. al., 2002).

While class conflict between capital and labour is an important dimension of these contestations, it is not the only one as many social actors and epistemological claims are entangled in these debates (Sellers, 1996). A second major way that occupational disease is characterized by controversy is due to the multiplicity of social actors involved in decision-making processes about occupational disease, and the various knowledges that they bring into these processes. As Prince (2008) points out in relation to contestations about health policies, “[t]he more forms of knowledge that are in play in a given policy field, the greater the possibility of divergent perspectives especially if information sources are aligned with different value systems and interests endowed with authority” (33). In the context of occupational disease recognition the various social actors involved include the state; the workers’ compensation board; the workers’ compensation appeals tribunal; the fields of medicine, science, and law; the labour movement; international, national, and community organizations; and the workers themselves.

It is important to emphasize that while there may be contestations and varying configurations of power relations *between* these social actors, they are not monolithic groups and therefore there are also divergent positions *within* them. Phillips (2015)

⁶ Marx (1990 [1867]) describes these tensions in his chapter on The Working Day in *Capital*, as he points to the tensions between capitalist interests and healthy bodies: “capital oversteps not only the moral but even the merely physical limits of the working day. It usurps the time for growth, development and healthy maintenance of the body [...] Capital asks no questions about the length of life of labour-power. What interests it is purely and simply the maximum of labour-power that can be set in motion in a working day” (375-6). See also Harvey (2000) for a discussion on Marx’s analysis of the body in relation to health and capital.

illustrates this point by identifying differences between occupational health experts in their perspectives and approaches towards multiple chemical sensitivities (MCS), especially in terms of whether MCS should be considered a legitimate disease. With a focus on MCS in the Australian context, Phillips situates sympathetic experts (those who tend to side with, and advocate for, individuals affected by MCS) as having distinct interests and approaches from mainstream experts (who are more firmly situated in the orthodoxy of their professions), even though the former tend to become marginalized in their fields for advancing such positions.

In sum, there are numerous challenges and barriers in recognizing connections between an occupation and a disease, and these recognition processes are characterized as controversial due to economic dimensions and the multiplicity of social actors involved. As I will argue, occupational disease recognition constitutes a revealing case focus through which to better understand how various kinds of unknowns complicate knowledge contestations, and how social and political factors affect these dynamics in terms of their operation and consequences.

The Complexities of Unknowns

When someone experiences a health problem in the form of disease, various knowledges come into play to try and figure out what is going on, why it is occurring, and what can be done to address and treat the disease. The individual's own knowledge that something is "not quite right" with their body is often a starting point, which may be further legitimated or de-legitimated in speaking with other people in their everyday life about the problem and/or in going to see a health care practitioner with their concerns. Being able to recognize the health problem as a disease also depends on several other

factors, including how straightforward the etiology of the disease is, how common the disease is (and, in turn, the physician's familiarity with the disease symptoms), whether the bodily impacts are easily observed and measured, and the availability of medical technologies to diagnose the disease. While emphasis is often cast upon what is known or what can be known, various unknowns are interwoven through the process of identifying the existence of a disease and how to manage it. An individual may be unsure if what they feel requires medical attention, and a medical practitioner may be uncertain over the pattern of symptoms they observe when examining the patient, which could result in misdiagnosing the disease.

The potential challenges of recognizing diseases at the general level intensifies when attempting to recognize diseases as occupationally related, as with the latter there is a necessity to attend to questions of 'causality' in the sense of trying to make linkages between an occupation and a disease. This is further complicated by the previously discussed problem of occupational disease recognition, where economic interests and the multiplicity of social actors characterize these decision-making processes. For example, a multiplicity of social actors is accompanied by divergent epistemological definitions of what constitutes known and unknown. This is exemplified between differences over how certainty and uncertainty are defined in relation to scientific and legal standards of proof. WSIB and WSIAT adjudicators will draw on scientific evidence in considering whether occupation is a significant contributing factor to the disease experienced by the worker, while simultaneously needing to apply legal standards of proof to make this decision. Tensions arise in decision-making processes as concepts of certainty rest on different notions of probability between science and law. Scientific certainty is based on statistical

significance (a confidence interval of 95 percent), while legal certainty in this context is premised on a probability of 50/50, with the benefit of doubt principle applying.⁷

This dissertation spotlights the dynamics of three processes of unknowns in the context of occupational disease recognition: uncertainty, absences, and closure. My conceptualization of unknowns draws on theoretical insights from ignorance studies (which I discuss subsequently in this chapter), although I identify unknowns as broader level social phenomena. A central reason for this is because unknowns do not necessarily flow from ignorance, even if a general definition of ignorance is applied. For example, while uncertainty and ignorance may be closely connected in some contexts (Michaels, 2008b), uncertainty is not always related to ignorance (it could be a consequence of indecisiveness). My aim is to be as open as possible to dimensions of unknowns, and using the broader notion of unknowns provides me with the opportunity to do so.

I draw attention to two central points by emphasizing the complexities of unknowns. First, there are always unknowns in knowledge practices and decision-making processes, and these unknowns are multi-dimensional and dynamic. Even in relatively straightforward decisions about health problems, unknowns may take subtler and less visible (or direct) forms. The inevitability of unknowns recognizes that there will be some element or level of complication in making a decision about a health issue. Second, how these unknowns are attended to in relation to knowledge constitutes a prominent feature in decision-making processes. This point acknowledges that while unknowns are inherent in knowledge practices, they do not have to take the current form they are in. How they become mobilized can be advantageous to one social group over another, and it is

⁷ The benefit of doubt principle means that when the weight of evidence is equally for and against the worker's claim, the benefit of doubt should go to the worker.

important to consider the strategic usefulness of unknowns (whether intentional or not) within the social and political dimensions of knowledge contestations (McGoey, 2007; McGoey, 2009).

New Materialism

One theoretical resource that I draw upon problematizes the lack of attention within social sciences towards matter, especially material bodily matter. My primary influence here is literature on the new materialism and its critique of poststructuralist paradigms that prioritize social constructivism and cultural analysis, while lacking engagement with material matter. As Barad (2003) argues, “Language has been granted too much power [...] Language matters. Discourse matters. Culture matters. There is an important sense in which the only thing that does not seem to matter anymore is matter” (801).

New materialist approaches share a common concern of emphasizing how ‘matter matters’, with a general starting point being “the material, specifically the materiality of the body and the natural world” (Alaimo and Hekman, 2008: 1). Such literature points out that despite an emphasis on deconstructing binaries, poststructuralist approaches reinforce ontological divisions, especially with the categories of culture/nature, discursive/material, biological/social, and human/non-human animals (Alaimo, 2010).⁸ It has also been pointed out that while the body has gained attention as a site of inquiry, epistemological approaches tend to focus on meanings inscribed on the surface of the body. What becomes overlooked is adequate engagement with bodily material matter, such as cancer cell mutations, inflammation and scarring of lungs, and nerve pressure in

⁸ See also: Alaimo and Hekman, 2008; Barad, 2003; Barad, 2007; Birke, 2003; Coole and Frost, 2010; Davis, 2009; Doucet, 2013; Haraway, 2008; Noske, 1997; Tuana, 2008.

the wrist. Highlighting this disparity, Langstan (2010) recalls her own corporeal experiences in relation to the diethylstilbestrol (DES) controversy, and its consequences, in the United States: “The endless series of reproductive problems among the women in my family were hardly social constructs. The scalpels that sliced out my uterus existed within a network of signifiers, but the blood that flowed had a material reality” (146). Rather than reinforcing such binaries, a new materialist approach aims to evade “dualism or dialectical reconciliation by espousing a monological account of emergent, generative material being” (Coole and Frost, 2010: 8).

Karen Barad’s (2003; 2007) work on agential realism has been particularly influential in considering how to move beyond these binary divisions, especially in terms of understanding how bodies are not bounded ontological entities that exist separate from the environment in which they are situated. In this regard, binary categorical divisions between ‘social’ and ‘natural’ need to be problematized. Through the development of a diffractive methodology and an agential realist framework,⁹ Barad (2007) argues, “[w]hat we need is an analysis that enables us to theorize the social and natural world together, to read our best understandings of social and natural phenomena through one another in a way that clarifies the relationship between them” (25). Barad’s notion of “intra-action”

⁹ **Diffractive methodology:** Barad (2007) draws on feminist science studies and quantum physics in developing a diffractive methodology. While emphasizing that diffraction is a complex phenomenon, a key point is that diffraction patterns differ from reflective phenomenon as diffraction does not take for granted a “fixed frame of reference” but rather “involves reading insights *through one another* in ways that helps illuminate differences as they emerge: how different differences get made, what gets excluded, and how those exclusions matter” (30; italics added). A diffractive methodology is attentive to patterns in phenomenon and is particularly helpful in considering the fluidity of binaries and boundaries in how they come into being. **Agential realism:** Barad (2007) conceptualizes this as an “epistemological-ontological-ethical framework” that moves beyond binary divisions (e.g., human/non-human; realism/constructivism, discourse/matter) and entails “a strong commitment to accounting for the material nature of practices and how they come to matter” (45).

has been a pivotal conceptual tool used to highlight the ontological entanglement between the body and its environment, which she defines as

the mutual constitution of entangled agencies. That is, in contrast to the usual “interaction”, which presumes that there are separate individual agencies that precede their interaction, the notion of intra-action recognizes that distinct agencies do not precede, but rather emerge through their intra-action. (33; italics in original)

In conceptualizing the body as ontologically entangled with its environment, the dominant Western biomedical paradigm that situates the body as mostly impermeable to social-environmental processes becomes disrupted.¹⁰ This is because a materiality approach recognizes that environmental substances and forces enter and mix with the body, rendering it impossible to understand the ontological existence of these environmental factors as strictly external to the body. It is, in other words, the recognition that our bodies are porous (Harvey, 2000; Tuana, 2008; Walker, 2010). Tuana (2008) uses the example of the plastic industry in order to illustrate how polyvinyl chloride (the chemical composition of plastic) is not a separate entity from our bodies, but rather amalgamates with our bodies and changes their very being:

The molecules that mix with our flesh are endocrine disruptors that mimic, enhance, or inhibit a hormonal action. They function as chemical messengers, traveling through our blood until they hit an appropriate target – a lung, our liver. When such a molecule hits such an organ, it interacts with a receptor, which “recognizes” the molecule as a hormonal component. It then either passes through the membrane into the cell to turn on or off a genetic process, or it releases a molecule that is part of the receptor that does the same thing. That interaction can lead to cancer. (201)

In a similar vein, Alaimo’s (2010) notion of “trans-corporeality” helps understand connections between “people and places” by putting forth “a conception of the body that

¹⁰ An example of this would be focusing heavily on genetics and lifestyle determinants of health at the expense of environmental and occupational ones.

is neither essentialist, nor genetically determined, nor firmly bounded, but rather a body in which social power and material/geographic agencies intra-act” (83). In doing so, Alaimo delves into the epistemological challenge of taking seriously the materiality of bodily matters without resorting to biological determinism. She argues for the importance of medical and scientific knowledge in providing environmental and occupational health activists with information about bodily harms, especially with regards to opportunities to ‘trace toxins’ by turning the invisible into something perceivable (such as how X-ray machines can show evidence of silicosis in the lung).¹¹ This is not, however, an uncritical embracing of medical or scientific knowledge. Alaimo emphasizes the necessity to recognize that Western scientific knowledge is not objective, unbiased, universal, or the only form of knowledge that is capable of producing information on bodily matters. She also insists not everything can necessarily be measured, and just because something cannot be quantified does not mean that it should be discounted or rendered insignificant.

While finding ways to engage with science in confronting environmental and occupational health issues, a materiality approach is careful not to fall back on unchallenged positivist notions of truth or to overlook the social injustices committed through scientific claims to knowledge (Alaimo, 2010).¹² It also does not situate science

¹¹ While medical technologies may be used to make the visible invisible, temporal considerations are important here in questioning *when* can they make the toxins perceivable. In the case of using radiographic imagery to show silicosis in the lung, the long latency period between exposure and effect (which can be ten or twenty years) complicates the ability to visualize hazardous effects. As will be discussed subsequently in this dissertation, there are also limitations in using medical technologies, especially in terms of trying to gain knowledge about causality.

¹² A prominent example of this is how problematic claims of biological differences have been used to argue for inequality between variously situated social groups, including how references to nature has been used to justify essentialist arguments. In the context occupational health and safety issues, such arguments have been drawn on to situate certain social groups as biologically inferior in terms of being more prone to bodily damages. For example, working-class Italian men felt significant frustration in dealing with the

and technology as outside of the social realm, but acknowledges how it is infused with political and ethical concerns (Coole and Frost, 2010).

While I have discussed the body at some length, it is worth emphasizing two key summary points about how the body is conceptualized through a new materialist lens. First, the body is not a universal entity; it is enmeshed in intersecting positions of privilege and oppression that affect the health of the body, especially in terms of how and where the body is situated within the environment and the experiences inscribed on/within the body. A body that works in a petrochemical refinery in an employment position that does not allow much autonomy in terms of working conditions will become differently situated than one that does not work in (or live in close proximity to) such a toxic environment. This understanding of the body illuminates the intra-action between the biological and social in how disease comes into being, rather than perceive the body as passive to inscriptions by determinative forces such as genetics (Alaimo, 2010; Guthman, 2011; Harvey, 2000). It also provides us with the opportunity to acknowledge the possibilities of how the health of our bodies could be different, and that through collective action at the social and political level practices that render certain bodies as more disposable than others can be challenged.

Second, the body is conceptualized as porous and permeable to the environment it is situated within. This runs counter to a notion of a time-bounded individualized and ontologically distinct entity, which has been influential in traditional Western political and social theory (Harvey, 2000) and in contemporary Western medical and scientific

WCB in the 1970s as their musculoskeletal problems tended to be attributed to racialized assumptions that Italian men had inherently weaker backs (Storey, 2009: 87-88). As Mol (2002: 21) reminds us, it is not only scientific claims premised upon biology and nature that can be utilized to justify inequality but also cultural claims of inferiority and superiority. Therefore, social analysis cannot simply sidestep biology and nature in favour of culture and discourse as a way to address these problems.

knowledge about bodies and disease (Nash, 2006). An acknowledgement of porous bodies allows us to further understand the active connections between bodies and unhealthy work environments, as well as to problematize individualized notions of occupational health and responsibility that have intensified in an era of neoliberal political economy (Gray, 2009). It also allows us to see the body as a site of contestation in matters of occupational health (Lippel, 2008), as well as through broader processes of global capitalism that rely on the working body for the accumulation of profit (Harvey, 2000). As Harvey (2000) argues, “[t]he human body is a battleground within which and around which conflicting socio-ecological forces of valuation and representation are perpetually at play” (116).

Drawing insights from a new materialist approach towards knowledge contestations about occupational diseases is particularly useful in emphasizing the connections between people and the places they are situated within. This thereby challenges the notion that the occupational factors that workers are exposed to on a daily, cumulative basis could exist separate from the body and somehow be innocuous or insignificant in terms of their effects. It further highlights the importance of paying attention to the material bodily suffering that workers endure; the centrality of such biological suffering in relation to knowledge contestations; and how workers and their advocates have to draw upon biological harms in order to make compensation claims (Petryana, 2013[2003]).

Knowledge and Knowledge Contestations

How knowledge is produced, the authority and credibility granted to certain types of knowledge, the mobilization of knowledge in decision-making processes, and tensions

between and within epistemological approaches are important to consider when looking at knowledge contestations and competing knowledge claims. The second theoretical resource I draw upon highlights the social and political dimensions of knowledge as a way to attend to these questions, rather than take knowledge for granted as universal, static, and outside the realm of power relations.

Sociological literature on knowledge has been particularly robust in demonstrating how knowledge is situated in social contexts and how its production is influenced by social and political factors. This has been important in demonstrating how knowledge is constantly changing, not only in terms of shifts in knowledge about something but also over varying definitions around what counts as knowledge in any particular social and historical context. In other words, what is accepted as legitimate knowledge is socially contingent (Smithson, 1989). Much attention has been directed specifically towards examining the social production of scientific knowledge, with emphasis on problematizing claims to objectivity and neutrality. Literature in the fields of Science and Technology Studies (STS) and Sociology of Scientific Knowledge (SSK), as well as through feminist and post-colonialist studies (e.g., Harding, 1991; Santos, 2015), has made important contributions in highlighting the social and political dimensions of knowledge production.

Of particular influence in drawing attention to the social aspects of scientific knowledge production has been Ludwick Fleck's (1979[1935]) notion of "thought collectives" and Thomas Kuhn's (1996 [1962]) concept of "paradigm". While there are important distinctions between their approaches,¹³ both have been pivotal in challenging

¹³ Kuhn (1996 [1962]) defines scientific paradigms as "universally recognized scientific achievements that for a time provide model problems and solutions to a community of practitioners" (x). He elaborates how

positivist claims to knowledge as objective, value-free, linear and universal, as well as sociological approaches that situated scientific knowledge as outside the boundaries of sociological inquiry.¹⁴ For example, rather than accepting a realist notion of an apriori existence of facts, Fleck (1979[1935]) argues that facts *come into* existence and have to *become* accepted as facts.¹⁵ Through a case focus on how the scientific fact of the Wassermann reaction became established in relation to knowledge on syphilis, Fleck emphasizes how definitions of a fact are highly contestable in their development and how there is a necessity for epistemic conformity in order to establish an idea as a fact. Instead of accepting a fact as “definite, permanent, and independent of any subjective interpretation by the scientist” (xxvii), Fleck argues that a fact is historically dependent and a result of epistemological developments through a thought collective, i.e., “*a community of persons mutually exchanging ideas or maintaining intellectual interaction*” which thereby “*provides the special “carrier” for the historical development of any field of thought*” (39; italics in original). Based on this perspective, dominant scientific facts about syphilis are understood as historically fluid and “as being the result and development of several lines of collective thought” (23). However, as I will subsequently elaborate in this chapter and in chapter four, arguing for constructivist approaches to facts requires reflexivity especially in a political milieu where powerful social actors may

changes to paradigms occur through a gradual weakening of current components of that paradigm, which is achieved through collective social processes. The achievement of a paradigm shift is understood as constituting a scientific revolution. While both challenge taken-for-granted assumptions about how scientific knowledge is produced and legitimated, distinctions between the approaches are evident. Kuhn, for example, is interested in processes of how scientific revolutions occur but this is not taken up through Fleck’s discussion of thought collectives (see the Preface to Fleck (1979 [1935])).

¹⁴ An example is functionalist understandings of scientific institutions developed by Robert Merton (1979).

¹⁵ As Fleck (1979 [1935]) argues, “The explanation given in any relation can survive and develop within a given society if this explanation is stylized in conformity with the prevailing thought style” (2) and “A stylistic bond exists between many, if not all, concepts of a period, based on their mutual influence. We can therefore speak of a thought style which determines the formulation of every concept” (9).

mobilize such perspectives as a way to emphasize the uncertainty of facts about health and social problems.

Of particular relevance for the discussion that follows in this dissertation are considerations around what kinds of knowledge becomes mobilized as evidence in decision-making processes on occupational diseases. One key element in this regard is how expertise is understood, and the significance of moving beyond the dualism of ‘expert’ and ‘lay’ knowledge in order to acknowledge the complexity of such knowledges and their interactions. Collins and Evans (2006) provide a useful starting point as they put forth a nuanced analysis of different types of expertise, with the aim of contributing to the active development of a detailed typology of expertise. For example, they make a distinction between “contributory expertise” (the ability to practice and contribute towards a particular activity) and “interactional expertise” (the ability to communicate and converse with experts without being a contributory expert in that field).¹⁶ In looking more specifically at matters of occupational health, it is also useful to recall Phillips’ (2015) distinction between ‘sympathetic experts’ and ‘mainstream experts’ in the recognition of MCS as a legitimate disease and health problem.

The significance of illuminating the complexity of expertise is that it underlines the point that experts in general, and fields of expertise more specifically, are not monolithic but are characterized by multiple variations based on how they are situated in

¹⁶ In offering a starting point to develop a more robust typology of expertise, Collins and Evans (2006) also outline a ‘Periodic Table of Expertise’ as a way to illustrate the complexity of technical expertise. The organization of this table is as follows: at the top there is **ubiquitous expertise**, and working down the table there are **dispositions** (interactive ability and reflexive ability), **specialist expertises** (ubiquitous tacit knowledge – beer-mat knowledge, popular understanding; and primary sources; and specialist knowledge – interactional expertise and contributory expertise), **meta-expertises** (external/transmuted expertises – ubiquitous discrimination and local discrimination; and internal/nontransmuted expertises – technical connoisseurship, downward discrimination, and referred expertise) and finally there is **meta-criteria** (credentials, experience, and track record) (see pp. 13-15).

relation to the topic or issue at hand. This allows us to also consider how knowledge becomes negotiated and contested within and between fields of expertise. For example, Sellers (1996) demonstrates how industrial hygienists became accepted as a type of scientific expert in matters of occupational health, and the centrality of knowledge contestations that occurred throughout the twentieth century in establishing this expertise. As Sellers argues, “[a]t every step of the way, theirs was a drama of knowledge: who should produce it, what shape it should take, how it should be used, and who should use it” (8). With regards to contestations between different disciplines, Jasanoff (1995) highlights the role that science plays in American courts, and the tendency for legal experts to (problematically) defer to scientific experts when it comes to decisions over technological issues. Indeed, the science-medicine-legal nexus is also a central site through which knowledge contestations over occupational disease occur.

While expert knowledge is a central consideration when looking at knowledge contestations, other forms of knowledge are also fundamental, although often not granted the legitimacy of specialized, accredited and/or formal ways of knowing. Often informal knowledge or knowledge gained through experience is referred to as lay expertise. Collins and Evans (2006) problematize the notion of lay expertise as they point out how the term implies a complete lack of expertise. Instead, Collins and Evans propose using “experience-based expertise” to better denote the type of knowledge being referred to, which is expertise based on experience rather than through formal credentials. Shotwell (2011) centers her focus on the importance of knowledge that differs from propositional knowledge, which is knowledge that can provide verifiable claims to justify that something is true. Through her notion of “implicit understanding” in relation to political

transformation, she highlights the necessity of such understanding as a way to “work explicitly with and on our implicit, affective, tacit, and embodied experience of the world” (xxi). Although there are distinctions between propositional knowledge and implicit understanding, Shotwell points out that the two are not mutually exclusive as implicit frameworks are drawn on when developing propositional knowledge claims (4). While experiential knowledge and implicit understanding often do not achieve the same authoritative status in formal decision-making processes, this does not mean that such knowledge lacks important insights into these matters, especially in cases when expert knowledge is not readily available or when there is a lack of incentive to produce such knowledge on a particular issue.

The final theoretical insight on knowledge that I wish to emphasize is the complex interrelationship between expert knowledge and other knowledge forms, specifically when looking at knowledge contestations about health issues. The literature on contested illnesses is useful in highlighting the multiplicity of knowledge contestations over health-related matters (Brown, 2007; Morello-Frosch et al., 2012; Moss and Tegtsounian, 2008). While some health social movements have taken strong critical stances against science and medicine especially due to the problems encompassed with the contemporary biomedical model which prioritizes individualized approaches to health matters, other movements, such as those around AIDS activism (Epstein, 1996) and environmental health (Brown, 2007), have a more complex relationship with scientific experts. These health movements acknowledge the issue of “scientization” on decision-making processes, including how scientific experts are often deferred to through the reinforcement of the idea that they contain the ability to provide specialized and

objective knowledge in policy matters (Brown, 2007; Morello-Frosch et al., 2012). At the same time, social actors involved in these types of health movements recognize the potential benefits of working together with scientists as such collaborations could help identify what kind of knowledge needs to be developed about the health problem, while simultaneously bringing awareness and legitimacy to often overlooked health claims (Alaimo, 2010; Brown, 2007; Morello-Frosch et al., 2012). The very boundaries of what counts as science also become more nebulous since members outside of formal scientific groups work with scientists to co-produce health knowledge: “health social movements shape and reshape science, and science in turn shapes and reshapes health social movements” (Morello-Forsch et al., 2012: 5).

The theoretical literature on knowledge production and legitimization is useful in examining the case of occupational disease recognition due to the contentious character of this health problem. Numerous knowledge contestations occur in decision-making processes over whether a disease should be recognized as occupationally related, including contestations over disease etiology, definitions and classifications of a disease, and even over the very existence of a disease (Lippel, 2008), as is seen in the case of MCS (Phillips, 2015). Acknowledging the social and political contingencies of knowledge and the complexity and interactions within and between various forms of knowledge provides a valuable approach to identifying and analyzing contestations about occupational diseases.

Ignorance Studies

While assumptions of objectivity and neutrality within scientific knowledge have been largely challenged, recent literature has illuminated the importance not only of

engaging with questions of what is known, but also questioning what is not known (or claimed not to be known), why it is not known, and what social significance this carries (e.g., Davies and McGoey, 2007; Tuana, 2008; Proctor, 2008). As Tuana (2008) emphasizes, “[i]f we are to fully understand the complex practices of knowledge production and the variety of factors that account for why something is known, we must also understand the practices that account for not knowing” (204). The third theoretical resource that I draw upon is the interdisciplinary field of ignorance studies, as this provides a useful lens through which to better understand the complexities of unknowns in knowledge contestations over occupational diseases.

Common understandings of ignorance tie in with standard dictionary definitions that center upon a ‘lack of knowledge’ and are accompanied by negative connotations (being called ignorant by someone is often not perceived to be a compliment). The Merriam-Webster dictionary, for example, defines ignorance as “the state or fact of being ignorant: lack of knowledge, education, or awareness” (nd). However, literature in the field of ignorance studies has illuminated the point that ignorance should and could be better understood as a complex and multi-faceted phenomenon rather than a simple negation of knowledge. To develop this insight, taxonomies about ignorance have been produced to conceptually grapple with and unravel what ignorance means, as well as how and why it may be practiced (Croissant, 2014; Gross, 2007; Smithson, 1989; Tuana, 2006).

While differing in their conceptual classifications, these taxonomies highlight how there are many types of ignorance, such as inaccuracy, doubt, distortion, suppression, absence, error, secrecy, ambiguity, uncertainty, and taboo. Although these

concepts may be referring to similar processes in one social context, it is important to recognize that in another context the same concepts may take on different meanings and that analytical usage of such terms should consider the specific forms they may take. As Croissant (2014) elaborates,

Ignorance may be the privative of knowledge, or more specifically, certain kinds of ignorance are the privative of knowledge, while others are not, and this distinction is important. Privative forms of ignorance should be amenable to the same forms of analysis as other forms of absences, and vice versa, while ignorance that are not the result of absence but as a result of misinformation or error require slightly different analytic considerations (15).

Such taxonomies provide a valuable starting point in identifying the numerous variants of ignorance and in building theories and methodologies around the study of ignorance. However, the growing amount of taxonomies and literature on ignorance has produced some conceptual confusion in the field, as can be seen when different authors use the same term to refer to different phenomena (Gross, 2007). The negative connotations associated with ignorance have also led some to adopt different terms to avoid such confusion. For example, Boschen et al. (2010) use the concept ‘non-knowledge’ rather than ignorance as they find that the latter tends to imply “the sense of actively and consciously “ignoring” something knowable” (804, footnote 1).

Regardless of the conceptual challenges in the study of ignorance and the various ways in which it is understood and applied, the literature identifies some key considerations that are important to keep in mind when using ignorance as an analytical tool in studying social phenomena. In the following discussion, I will identify and elaborate upon four key points that are important to acknowledge in conceptualizing ignorance: (1) ignorance is not the polar opposite of knowledge; (2) ignorance can entail

negative and positive aspects; (3) ignorance is an unavoidable aspect of knowledge practices, but this does not mean that the current forms it takes are inevitable; and (4) ignorance can be intentional or unintentional, although this is particularly difficult to empirically demonstrate.

The first point illustrates the complexity of ignorance by arguing for a move beyond binary juxtapositions of knowledge-ignorance. As McGoeey (2012) argues, ignorance should be understood “not as a precursor or an impediment to more knowledge, but as a productive force in itself, as the twin and not the opposite of knowledge” (3). This is a significant point as it calls attention to how solutions to health problems cannot simply be achieved by calls for ‘more knowledge’. Indeed, such appeals are often strategically utilized to delay recognition of the ill-health effects that can result from a hazardous substance or process (Brown, 2007; Michaels, 2008a, 2008b; see also McGoeey, 2012 for a discussion of “strategic ignorance”). Overall, one can be better attuned to the complexities of ignorance in knowledge practices by problematizing the notion of a linear relationship between ignorance and knowledge (Gaudet, 2013).

Second, although ignorance is commonly associated with negative qualities, an understanding of the multi-dimensionality of ignorance demonstrates that ignorance is not limited to negative dimensions but could also be accompanied by positive connotations and progressive goals. With a focus on ignorance in science, Firestein (2012) argues that ignorance should not be viewed as a shortcoming of science, but rather as an integral component that drives science since a strong study will yield further questions (ignorance) for investigation. In looking at how ignorance is used by those in power to oppress marginalized social groups, ignorance could also be used by those in

marginalized positions to contest power relations. This may include not disclosing one's sexual orientation or not internalizing historical narratives that downplay racialized violence (Gross and McGoe, 2015; Sullivan and Tuana, 2007).

Third, while it is important to acknowledge that ignorance is unavoidable in the sense that it always exists in relation to knowledge practices, this does not imply that the current forms of ignorance are inevitable. I will spend some time elaborating this point, as there is a prominent and relevant debate in the field of ignorance studies over how ignorance is framed and understood. The basis of this debate is whether or not notions such as 'manufactured' forms of ignorance fall short of capturing the multiple dimensions of ignorance, as it is argued that such terms imply that ignorance is solely characterized as deviant and as constructed out of nothing (Gross and McGoe, 2015; McGoe, 2009).

On the one hand, some scholars focus on the active construction of ignorance, which is generally understood "as something that is made, maintained, and manipulated of certain arts and sciences [...] ignorance should not be viewed as a simple omission or gap, but rather as an active production" (Proctor, 2008: 8-9). A vivid example of active ignorance is how companies may suppress information when they do not want the public to know about the health effects of their production practices or products since such knowledge would harm business profits (Michaels, 2008a; Michaels, 2008b; Tuana, 2006). The phrase "doubt is their product", a quote Michaels (2008a) extracts from an internal corporate memo, clearly illustrates the active construction of ignorance as it refers to the ways in which unknowns are strategically and intentionally manufactured by industries.

On the other hand, scholars argue that the primary emphasis on active construction tends to overshadow how these unknowns are always present. The pertinent point here is that unknowns have a “regular” character to them and not just a “deviant” one (Gross and McGoey, 2015; McGoey, 2009). Proponents of this approach also problematize binaries between real and constructed forms of ignorance. With a focus on scientific uncertainty in pharmaceutical controversies, McGoey (2009) argues for the need

to reject such a distinction and to shed light on the ways that all situations have a degree of inherent scientific uncertainty: the difference is that in some cases that uncertainty is strategically harnessed by various parties. Uncertainty is not manufactured: it is emphasized, fomented, mobilized and capitalized as a financial or political resource. (161, footnote 2)

Both sides of the debate spotlight important considerations in understanding processes of ignorance and the multi-dimensionality of this phenomenon.¹⁷ The unavoidability of ignorance is essential to acknowledge because, as Gross and McGoey (2015) demonstrate, ignorance is central to social life: “ignorance needs to be understood and theorized as a regular feature of decision-making in general, in social interactions and in everyday communications” (4). The argument that ignorance should be conceptualized in terms of its regularity rather than just its deviance is premised upon the dynamic boundaries between known and unknown. Such an acknowledgement highlights how there are always elements of ignorance in knowledge practices and in decision-making processes, and that such unknowns should be acted upon within these processes rather than strategically mobilized to refute knowledge claims. This is an important point in

¹⁷ Within this dissertation, I see the value of both approaches and do not situate them as mutually exclusive to one another. Literature on manufactured ignorance does acknowledge that elements of ignorance are always present, but this is not necessarily the central focus due to the context of analysis.

thinking about how expertise becomes mobilized as it recognizes how certainty in medicine (Fox, 2000; Seely, 2013) and science (Ison, 2008; Briggs et al., 2009) is an unattainable goal. Arguments premised on the need for more knowledge or for a knowledge claim to be premised upon certainty should therefore be critically and carefully scrutinized.

The recognition of the regularity of ignorance does not simply translate to a taken-for-granted acceptance of ignorance in its current forms and practices. While there is debate over what the most suitable terminology is to adequately explain this point (whether ignorance is ‘manufactured’), it is important to consider active components of ignorance. As Proctor (1995) argues in relation to knowledge about cancer, “ignorance is not just a natural consequence of the ever shifting boundaries between the known and the unknown but a political consequence of decisions concerning how to approach (or neglect) what could and should be done to eliminate the [cancer] disease” (13). Latour (2004) reflects upon such phenomenon in relation to his scholarly work on constructivist approaches towards scientific facts. In particular, Latour identifies how the status quo could usurp constructivist discourses about facts in order to actively intensify the uncertainty of the connections between industrial processes and environmental outcomes (e.g., global warming) – a process that he refers to as “artificially maintained controversies” (226).

The significance of problematizing the naturalness of ignorance also lays in the opportunity to recognize the operation of power relations in knowledge practices. When the existence of a particular type of ignorance becomes perceived as natural, it becomes normalized and accepted as an inevitable feature of social life (Code, 2007).

Responsibility is therefore interconnected with knowledge and ignorance, and a normalization of ignorance has the potential to allow for unjust practices to continue. This provides certain social actors with the ability to deny knowledge about the harmful effects such practices cause, as well as opportunity to relinquish and deny responsibility by claiming ignorance.¹⁸ As I aim to illustrate with the case of occupational disease recognition, this has important implications in whether or not a disease becomes recognized as occupationally related.

A final key aspect to consider when using ignorance as a conceptual tool is the difficulty of assessing intentionality. While one may identify processes of ignorance occurring, the important question arises of whether social actors intend to practice ignorance or whether such actions are unintentional. For example, data that demonstrates deliberate intention by industries in producing scientific ignorance may not be publically available or may only become available in certain contexts (such as when documents are publically released through litigation processes) (Michaels, 2008b). More subtle forms of ignorance, such as methodological decisions in the design of scientific studies, may be even more difficult to assess in terms of intentionality as the social actors themselves may not be well aware of how unknowns are influencing their decision-making processes.

As previously noted, throughout this dissertation I focus on unknowns as broader social phenomena beyond ignorance. This is due to the broader conceptual reach of the

¹⁸ As discussed in the Preface, one example is when the Premier of Ontario, Kathleen Wynne, spoke to a media outlet about the ongoing hazardous exposures that former workers from the GE Peterborough plant faced, her comments diffused responsibility away from the employers: “It’s really tragic when people are put in situations, through no fault of their own that exposes them to these environmental dangers [...] And there was no malicious intent – people just didn’t know”. This was despite the release of an investigate report (DeMatteo et. al., 2017) which identifies that knowledge about the hazards in GE operations, such as asbestos, was known to the employer since the 1920s. See, for example: Kovach, J. (2017, August 5). “Premier Kathleen Wynne’s comments upset General Electric Peterborough toxins researchers”. Retrieved from: <http://www.thepeterboroughexaminer.com/2017/08/05/premier-kathleen-wynnes-comments-upset-general-electric-peterborough-toxins-researchers>

concept of unknowns in exploring the multitude of its dimensions and manifestations, as well as Boschen et al.'s (2010) point about the confusion generated by the concept of ignorance when looking at matters of unknowns (which is something that I have frequently encountered and reflected upon throughout this research process). Nevertheless, ignorance studies are a particularly useful theoretical resource to bring into my examination of knowledge contestations about occupational diseases, as the operation and presence of unknowns are central to identifying the various ways in which connections between occupation and disease become obscured through decision-making processes. As ignorance studies scholarship provides insight to the multiplicity and complexity of unknowns, this is helpful in avoiding oversimplified approaches to the role of unknowns by identifying the various challenges they create in the context of occupational disease recognition.

Outline of Dissertation Chapters

In sum, the aim of this dissertation is to develop an understanding of the complexities of unknowns in knowledge contestations, and I do so by examining the case of occupational disease recognition as it operates through Ontario's workers' compensation system. The theoretical resources of new materialism, sociology of knowledge, and ignorance studies provide me with conceptual resources to help untangle the dimensions of unknowns and how they impact the recognition process.

The dissertation is organized in six further chapters. Chapter Two describes the qualitative research design developed and employed, where I utilize multiple methods (in-depth interviews, participant observation, FOI requests, archival methods, and document analysis) as part of my investigation. In this chapter I also clarify my

methodological rationale for selecting the case study of workers' compensation as a way to understand the complexities of unknowns in relation to occupational disease recognition. Chapter Three sets the context for further discussion as it outlines the case study of occupational disease recognition in relation to Ontario's workers' compensation system, with specific attention to detailing the historical and legislative framework. I introduce and describe key legislative terminology (such as the purpose and significance of Schedule 3 and Schedule 4) and I identify four historical phases of workers' compensation and occupational disease in Ontario.

The following three chapters focus on spotlighting three processes of unknowns to elaborate upon the complexities of unknowns and how they play out through knowledge contestations on occupational disease recognition. Chapter Four focuses on uncertainty as a dimension of unknowns and how uncertainty tends to obscure the connection between a disease and an occupation in the context of Ontario's workers' compensation system. I look at the explicit and subtle ways in which uncertainty becomes used as a tool of obscuration, including how uncertainty is emphasized to keep controversies open, how uncertainty is maintained through suppression, and how uncertainty becomes situated as an obstacle that cannot be overcome when demands are made for more certainty in relation to standards of proof. Chapter Five addresses absences as an unknown, where absence is conceptualized as a more complex social phenomenon than the negation of knowledge or the binary opposite of presence. A central point in this discussion is that absences should not be inferred to imply a complete lack of something. Rather, consideration should be directed to how certain knowledges become legitimated as evidence at the expense of other types of knowledge, and what the

consequences of this are in terms of how “absence of evidence” is interpreted, understood, and applied. Chapter Six looks at closure as a process that creates fluid boundaries between what is known and unknown, and the difficulties this poses for occupational disease recognition. I grapple with the problem of how there is an openness of health effects that can occur from working conditions, and how common ways of addressing this messiness and complexity result in constructing unknowns through attempts at enclosure through the two pillars of definition and classification. A key focus in this chapter is the dynamism of closure and how practices of closure could be amendable to alternative frameworks of knowing. Finally, Chapter Seven concludes the discussion by providing a summary of key points and arguments. I also identify contributions of this research to the sociology of knowledge and the sociological study of occupational disease recognition, as well as suggest directions for further research in these sociological fields.

Chapter Two:

Methodology

In exploring the complexities of unknowns through knowledge contestations by looking at the case of occupational disease recognition, and in aiming to address the four central research questions identified in the previous chapter,¹⁹ a multiple-method qualitative research design was developed for this study. The design consists of three main phases: (1) content and document search, including freedom of information (FOI) requests and access to private archives; (2) semi-structured, open-coded interviews and participant observation; and (3) analysis of research material, and writing the dissertation. Although in practice there was considerable overlap between these phrases, the general intention was to initially research a wide range of relevant documents on occupational disease as a way to develop a better understanding of key discourses, events, processes, and contestations. With this information in place, I was able to move forward with research involving human participants (participant observation and in-depth interviews), referring to the analysis of documents as required. Once my research was underway, I began to analyze the data by coding for themes of unknowns in knowledge contestations about occupational disease recognition.

In this chapter, I begin by providing a detailed description of the research phases, including the primary methods used during these phases. Second, since FOI requests and archival methods are not as commonly used in sociological inquiry, I spotlight a

¹⁹ Recall that the research questions are: (1) how do unknowns complicate knowledge contestations, specifically those surrounding the recognition of occupational diseases; (2) how do various types of knowledges and unknowns become mobilized in these recognition processes; (3) what counts as evidence in recognition processes, and what role does evidence play in supporting various knowledge claims; and (4) how do social and political factors influence the recognition of occupational disease?

discussion of them in order to elaborate upon how they were used and their connection to my broader methodological framework. Third, I clarify the methodological reasons for selecting the case focus of Ontario's workers' compensation system to examine the complexities of unknowns in relation to occupational disease recognition. Fourth, I focus discussion on methodological considerations in researching unknowns, especially given the connection to ignorance studies and the fact that methodological insights in this field of ignorance studies remain relatively under-developed. I wrap up the chapter by acknowledging the epistemological position I take in this study, and the importance of reflexivity in studying unknowns in the context of occupational disease recognition.

Research Phases and Methods

In developing a research design to study the complexity of unknowns, I utilize a multiple method approach that draws on and integrates several types of qualitative data in order to generate evidence and address the research questions (Siltanen et al., 2017). These methods include: the analysis of various documents (annual reports, archival records, Royal Commissions, background papers, research and inquiry reports, news articles, etc.); FOI requests; in-depth interviews; and participant observation. While my research progressed in phases, it is important to point out that these phases were not mutually exclusive to one another and did not occur in a linear manner. For example, when beginning the analysis of the interview transcripts, I was still actively doing interviews with participants. Such an approach aligns with the purposes of qualitative research designs, as it has helped me to better identify themes in my research while I am actively conducting my research, which further allows me to develop a clearer understanding of when a point of saturation is being reached (van den Hoonaard, 2014).

Phase One: Document Search and Content Analysis

The first phase of my study commenced in May 2014 with a content and document search. The purpose of this phase was to gain a more in-depth understanding of the kinds of information available on the research topic, to gain a familiarity with the issue of occupational disease and the framework of workers' compensation in Ontario (including terminology used, such as relative risk, no-fault compensation, Schedule 3 and Schedule 4), to begin identifying key documents of interest and relevance, and to begin developing an active list of potential individuals and organizations to contact for participation in interviews.

I began by searching through a broad range of publically accessible documents, which I found online or through a university library (Carleton University, University of Ottawa, or University of Toronto). The searches included items such as news articles and press releases on occupational disease issues; relevant legislation, such as the *Workplace Safety and Insurance Act* (WSIA) and the *Occupational Health and Safety Act* (OHSA); information from the WSIB and Association of Workers' Compensation Boards of Canada (AWCBC) websites; Workplace Safety and Insurance Appeals Tribunal (WSIAT) decisions; and publically accessible reports and inquiries (Ison Report 1989; ODAP report and supplementary documents; the 1976 Ham Royal Commission; Weiler Report 1984; WCB/WSIB annual reports, etc.). In order to delve more into historical matters around occupational disease, I searched the online database of the Archives of Ontario (AO) and the Library and Archives of Canada websites for relevant material.

After conducting this broader online search, I aimed to focus my research on these documents by actively reviewing them and making research notes on them. This close

reading of the documents was useful in itself, but also helpful to identify key documents that were missing from my initial search. For example, if I noticed that particular documents were highly referenced or identified as a key document (such as the 1983 Yassi Report), then I engaged in a further search to find a copy of that document either online or through an academic library. I was also beginning to access documents that were not publically available, such as archival records with FOI restrictions on them. Once I began doing interviews, participants often referred me to further documents and/or emailed me copies of documents (e.g., presentation and conference material; research reports; links to WSIB documents; reflection papers; and public documents that were flagged as important to look at, such as the Dupré Royal Commission of 1984). In the discussion that follows for this research phase, I identify the four main groupings of documents that resulted from these processes.

The first grouping of documents is archival records, which I accessed from the AO located on the York University campus in Toronto, Ontario. I visited this archive on three separate occasions (December 2014, June 2015, and November 2015), with each visit consisting of approximately one week of full-time on-site work and then continued off-site work based on photographs and photocopies of selected records. I searched for these documents using the online Archives Descriptive Database available on the AO website. My first search produced a list of 10 files based on the keyword search “occupational disease” and the purpose of my December 2014 visit to AO was to view these files. Subsequently, having more familiarity with the search functions of this database and being increasingly aware of potential other keywords that may yield fruitful results, I conducted a second search on documents related to certain public reports and

inquiries (e.g., “Ham Royal Commission” and “Weiler Report”) and on “occupational health” more generally. This search produced a list of 24 selected files, which became the focus of my second visit in June 2015. My third search lead to a selected list of 27 items (25 files and 2 groupings of files) based on keyword searches such as “industrial disease”, “occupational/industrial medicine”, and specific well-known diseases for which records existed (silicosis and asbestosis).²⁰

The majority of the archival files had FOI access restrictions on them, requiring the submission of an FOI request in order to be able to view them. For the files in the third search, all the files and both file groupings had access restrictions on them and, as there was a significant amount of material, I was faced with three options: (1) paying a high processing fee for the processor to go through all the files and redact personally identifying material; (2) reducing the number of files on my list; or (3) submitting a *Request for Access to Personal Information for Research Purposes* so that I could view all these files without having to pay the high processing fee. I selected the third option, which entailed filling out and submitting a form outlining how I was to protect and not disclose personal information both when going through the files and referring to them throughout my research.

The second grouping of documents is a sample of WSIAT hearing decisions. While I acknowledge that this tribunal is an agency independent of the WSIB and that, in practice, there are divergences in how decisions over occupational disease claims are

²⁰ The inclusion of “industrial disease” for my third search points to how awareness to changes in terminology are pivotal to conducting searches, since prior to the adoption of the term “occupational disease” in the 1990s, it was referred to (and categorized under) industrial disease. These two search terms, while referring to the same phenomenon, yielded different results based on the file names.

made by the WSIB and the WSIAT,²¹ I accessed these decisions for two main reasons. First, the hearings for decisions by the WSIB are not publically accessible, although I was able to attend a WSIB occupational disease hearing as part of the participant observation component of this study (to be discussed shortly). Second, although there are distinctions in decision-making processes between the two agencies, examining these decisions provided me with a better understanding of what kinds of occupational disease claims were being made, what kinds of knowledge-related issues and debates came up, how unknowns were addressed, and what kinds of evidence was drawn upon. To narrow the focus, I selected a sample of relevant decisions derived from one year per decade, starting from the mid-1980s.²² More specifically, I did a keyword search for “disease” in the WSIAT online database for the years 1986, 1994, 2004, and 2014. This resulted in n = 4 in 1986; n = 24 in 1994; n = 33 in 2004; and n = 28 in 2014, for a total of n = 89 hearings. I also looked up key decisions that were being referenced either through the selected decisions and/or by interview participants. For example, Decision Number 600/97 was not in my original sample but was often referred to as being a pivotal hearing through which the role and evaluation of epidemiological evidence was outlined, and I therefore included a review of this decision.

A third major grouping of documents stemmed from my visit to the WSIB Reference Library in June 2015. These documents are the publically recorded submissions sent in response to the *Draft Report of the Chair of the Occupational*

²¹ As some research participants explained to me, although in theory the decision-making processes between the WSIB and the WSIAT should be similar, in practice the WSIB tends to be more restrictive in relation to the criteria used and what kinds of evidence is accepted. However, concern was also expressed that the WSIAT is shifting to become more restrictive in its decision-making processes.

²² The WSIAT, originally called the WCAT, was established on October 1, 1985 and replaced the internal appeals system of the Board.

Disease Advisory Panel. The WSIB Reference Library is a small publically accessible library located at the WSIB Head Office in downtown Toronto. I initially became aware of it from previous experience as a research assistant working on the topic of workers' compensation. While not knowing beforehand what kinds of occupational disease related documents would be available at this library (if any), my decision to visit was based on wanting to see if I could find anything relevant to my research. It was at this library that I came across three large binders of the textual records for these submissions (96 oral and 77 written), which were part of the public consultation that took place in 2004 around the Occupational Disease Advisory Panel's (ODAP) draft report.²³ These submissions stemmed from a variety of social actors, including labour organizations, employers, individual workers, community agencies, academics, and medical and scientific professionals. I found a key theme within them to be the role of scientific and medical evidence as applied through the legal framework of workers' compensation, and these documents were particularly helpful in gaining further insight into knowledge contestations over this issue. I spent one week at the reference library taking research notes, which consisted of relevant direct quotes from the public submissions.

The fourth grouping of documents fall under what I broadly refer to as publically accessible documents. Many of these documents are various kinds of reports either specific to the Ontario workers' compensation context (e.g., WSIB annual reports, inquiry-based reports), or relevant to issues of occupational disease more generally (e.g., European Risk Observatory report on emerging occupational disease risks). The documents further include relevant International Agency for Research on Cancer (IARC)

²³ When referencing the submissions to the ODAP public consultation in this dissertation, I indicate which individual or organization submitted the submission, the date of the submission, and that I accessed it through the WSIB's reference library.

monographs and material from other international agencies, such as the International Labour Organization (ILO) List of Occupational Diseases; Royal Commissions (Middleton, Roach, McGillivray, Ham, and Dupre); and miscellaneous documents (a symposium transcript; a workers' compensation informational pamphlet on occupational disease, etc.). As previously mentioned, while many documents were accessible online, to view others I visited government reference sections of academic libraries.

In going through these documents, my initial approach was to take notes in the form of direct quotes of relevant material, as I had done with the archival records and the ODA public submissions. These notes provided the basis of my subsequent analysis on the topic. The main criterion for the initial note taking was based on identifying textual material presenting contextual information. This includes any themes or important points that I was noticing as I was reading through the documents; any relevant points that caused tension in understanding occupational disease issues (if it countered a previously well supported claim or assumption); connections with my research questions; and any discussions that spoke to the broad theoretical concepts of knowledge and unknowns.

At this stage of the document analysis, my epistemological approach was to understand the documents as having the potential to provide useful insights while acknowledging that they do not simply represent factual or complete information. Bowen (2009), for example, emphasizes the necessity to critically approach the analyses of documents and that “[r]esearchers should not simply ‘lift’ words and passages from available documents to be thrown into their research report. Rather, they should establish the meaning of the document and its contribution to the issues being explored” (33). It has also been noted that the meanings of texts are not one-dimensional but rather could

be open to various interpretations and therefore a “multiplicity of meanings” (Schwartz-Shea and Yanow, 2012: 46). Such an acknowledgement includes the need to think critically about the purposes, proceedings and discourses of documents, rather than take them at face value. For example, it has been argued that public inquiries in the form of Commissions “are not just modes of scientific investigation but are also performances which serve to authorize a form of social discourse”, which in turn produce certain truth claims and knowledge frameworks and may reinforce power relations (Ashforth, 1990:7).

With these considerations in mind, I began reviewing and sorting through the documents by using methods associated with qualitative content analysis. While content analysis is often correlated with a quantitative word count approach that focuses on tabulating the frequency of particular words throughout texts, it has become much more flexible and varied in its use and can be used qualitatively to identify key concepts and themes (Bowen, 2009; Hsieuh and Shannon, 2005). As noted, I initially approached the texts through “a first pass document review, in which meaningful and relevant passages of text or other data are identified” (Bowen, 2009: 32). I used the broad theoretical concepts of knowledge and unknowns to guide me, although I did not have these concepts pre-defined prior to my analysis. Rather, I was open and attentive to the configurations and meanings that these key concepts were taking in this particular context. Such an approach differs from a positivist methodological orientation where concepts are defined beforehand and then tested throughout the research process, as it provides me with the flexibility to develop the conceptual understandings during the fieldwork component of the research study. The openness of a qualitative content analysis thereby allows for an enhanced opportunity to reformulate my comprehension

“in light of new insights, new understandings, new knowledge acquired” (Schwartz-Shea and Yanow, 2012: 56). In practice, this entails being continuously attuned to, and reflexive about, whether the selected concepts would be appropriate to use in guiding my research; the various configurations that the concepts may take; and whether I would need to incorporate additional concepts. For example, throughout the research process I was constantly thinking about whether ‘ignorance’ would be a useful overarching concept as I had initially thought it might be. I ultimately decided that the broader conceptual term of ‘unknowns’ would more accurately reflect the social phenomena of interest, as not all unknowns stem from ignorance.

Overall, engaging with this first phase prior to doing interviews was methodologically useful as it provided me with the opportunity to begin mapping out and contextualizing some of the key issues, actors, challenges and contestations interwoven throughout the recognition of occupational diseases, as well as the historical circumstances and changes that were occurring. This phase was also fruitful in helping to begin developing my interview guide by providing insight into the kinds of questions to ask, identifying where I needed further clarity and developing a list of contacts for the interviews. By epistemologically acknowledging how such documents are socially situated and incomplete, I was also able to gain more insight about them, their purpose, and their impacts by asking interview participants to elaborate on them, when appropriate.

Phase Two: In-Depth Interviews and Participant Observation

The second phase of my research consisted of strategic in-depth interviews and participant observation. This phase began in January 2015 when I attended a public

forum on breast cancer and occupational disease in Toronto, and I started doing interviews in May 2015. To begin, I'll explain the participant observation component of my study. While comprising a relatively small portion of my overall research design, this method was particularly useful in attaining insight into activities within the field as they are happening, rather than recounting and reflecting upon such events at a later date. In particular, I participated in two in-person events (a WSIB occupational hearing and a public forum on occupational disease) and took on the role of observer in each case due to my outsider status. In the case of the WSIB hearing, my observer status was also pre-determined and mandatory in order to conform to organizational protocols on outsider participation.

First, in January 2015 I took part in a public forum on occupational risks for breast cancer held in Toronto. This forum included speakers who presented on academic research, community organization initiatives, and worker experiences, and the presentations were followed by a robust question and answer period. A key issue in these discussions was the difficulties of getting breast cancer recognized as an occupational disease in Ontario and how to develop next steps in attaining better recognition for breast cancer. Then, in November 2015 I attended a WSIB hearing on an occupational disease claim that took place at one of the WSIB offices.

Participating as an observer provided me with the opportunity to be present for a normal or regular event that takes place within the workers' compensation system (the WSIB hearing) or in response to workers' compensation practices (the public forum). In attending these events, I was able to attain insight into the implicit and explicit aspects embedded within them (DeWalt and DeWalt, 2011). For example, as the affected worker

was present in the WSIB hearing, it provided understanding of the social interactions between the worker and the adjudicator, such as what kinds of questions the adjudicator was asking and what aspects of the worker's response were picked up on and further questioned by the adjudicator. I took field notes either in the field or right after I left the field (with the WSIB hearing, I was not allowed to take notes during the hearing), and used these notes when analyzing my research.

The interview component of phase two overlapped with the participant observation aspect, as I began doing interviews in May 2015. The interviews took on an open-ended semi-structured format, which permitted me to create interview guides that encompass central questions of interest and incorporate key conceptual components of the research. A semi-structured format also allows for flexibility in my research process and for divergences between interviews based on the topic discussed and the points being made (Bryman, 2004). This interview format is particularly useful considering the different epistemic backgrounds that the participants were from, since it allows participants to discuss what they perceive to be important and to reflect upon the experiences they have encountered (Bryman, 2004; Seidman, 2013). For example, while some interview participants did not perceive the varying standards of proof between science and law to be necessary to discuss at length, others identified this disjuncture to be a pivotal issue and wanted to spend more time elaborating on the difficulties it presents in the context of occupational disease recognition and workers' compensation. As I had left the notion of "recognition" open-ended in the interview guide, it was also interesting to see how participants spoke to different types and levels of recognition. Some participants focused more explicitly on the difficulties of attaining recognition at

the level of individual claims or because of the policy procedures of the WSIB, while others emphasized broader regulatory issues inextricably interconnected with the recognition of disease claims.

For the interviews, I utilized purposive sampling techniques to strategically identify specific organizations and individuals as potential contacts, followed by a snowball sampling technique where initial participants referred me to other individuals whom they recommended I speak to about occupational disease recognition. The criteria for selection was that the individuals worked in a paid employment capacity with issues related to occupational disease, but their employment responsibilities did not have to focus exclusively on occupational disease. I also wanted to include multiple perspectives on occupational disease through the incorporation of different epistemological fields. The overall rationale for my selection of participants was that the experiences they have could speak to the framework and purpose of the study. These individuals were well situated to speak to issues of how diseases become recognized, historical events that took place in relation to occupational disease, what the key debates are surrounding decision-making processes, and what the difficulties are of obtaining recognition. I did reflect on including interviews with individual workers when designing my research study, but decided not to because of methodological and ethical considerations. These concerns included my outsider status and having to work on building a network of contacts, which would be particularly difficult with workers due to ethical reasons (such as worker concerns about participation due to the sensitivity of the topic, especially if they have an active claim). My research included worker voices through other methods, such as in the documents examined and the participant observation component.

In total, I interviewed fourteen individuals, who together had a combination of experiences from different and overlapping fields. For the purposes of providing some context, I categorize participants based on their primary field of expertise such that there are 5 participants in science and medicine; 4 in law; and 5 in research, organized labour, and/or professional advocacy.²⁴ In accordance with the research ethics protocol, each participant was given an informed consent form and signed it prior to commencing the interview. Interviews ranged in time length from 45 minutes to 3 hours, and were held either in-person or over the phone. Each interview was audio-recorded and transcribed verbatim. The identities of the research participants are kept confidential; however in the informed consent form I included the option for individuals to have their contributions identified if they were interested in doing so and one participant requested this option.²⁵ Throughout the dissertation, I identify individuals in relation to their primary fields of expertise but am unable to describe further identification factors due to the relatively small network of individuals working on issues of occupational disease in Ontario.

The questions asked during the interviews initiated with the general interview guide, but due to the semi-structured design I had the flexibility to ask questions appropriate to the content and flow of the interviews. The guide included questions about the participants' professional background in occupational disease, their experiences in relation to the kinds of evidence used in decision-making processes, their assessment of the role of scientific evidence and whether it causes any tensions in a legal framework of adjudication, their view on how a lack or absence of evidence impacts the decision-

²⁴ See Appendix I for a contextual overview of research participants and the code used to refer to them when quoting from their interview material.

²⁵ Jim Brophy requested his to have his contributions identified. When quoting from his interviews, I identify him as JB.

making process, their assessment of what improvements could be made in recognizing occupational diseases, and their understanding of the difficulties of recognizing diseases with multi-factorial etiologies. In wrapping up the interviews, I asked participants if there was anything else that they would like to bring up or elaborate upon and whether they thought there are further questions I should be asking but had not raised during the interview. This provided participants with the opportunity to address any points they view as important and want to discuss in more depth. These wrap up questions also helped me identify further key questions and issues on this topic. In addition, throughout the interview process I aimed to be cognizant of any issues or concepts brought up that I had not been previously aware of or attentive to. For example, some participants spoke to the issues of synergistic effects between exposures (e.g., asbestos and smoking) and the challenges this posed for occupational disease recognition, and so I asked questions about this in subsequent interviews (when appropriate). Overall, I believe my position as an outsider to the field of occupational health provided me with an opportunity to identify key concepts and/or taken-for-granted concepts within this field due to my initial lack of familiarity with them.

Phase Three: Data Analysis and Writing

The third phase of my study was focused on analysing the textual material (notes and transcripts) that resulted from the first two phases of the study, as well as writing the dissertation. As previously mentioned, when conducting my content analysis I did so by doing a first-read of documents and taking notes in the form of direct quotes, while simultaneously being attentive to the discourses of these documents and their connections to the broad theoretical concepts of knowledge and unknowns. All non-document

material, such as conversations from my interviews and observations from doing participant observation, were put into written format (interview transcriptions and field notes). Additionally, throughout the research process I jotted down notes in a research journal in order to document my ideas, reflections, and questions. Consequently, a substantial amount of textual material formed the basis of my analysis.

The analysis of the data coincided with the writing of this dissertation in that I broke it down on a chapter-by-chapter basis, and used my analysis of material for one chapter to help guide the direction of subsequent chapters. What I often found was that my plan for the focus of a chapter needed to be narrowed down as I was trying to do too much. For example, rather than have ‘absences’ and ‘uncertainty’ in one chapter, I saw that these concepts needed to be unpacked in more detail and that they could be more clearly presented through two chapters.

I coded the data manually by using colour-coded themes as I went through the material. I considered the use of qualitative software (such as Atlas TI), but decided to do my coding manually to better gain in-depth familiarity with the research material. A manual coding gave me the opportunity to develop the constantly shifting conceptualizations, as well as specific dimensions and operations, of unknowns. There were also some technical limitations to using qualitative software, including having some of my document notes and field notes written out by hand rather than typed.

The first pass of coding was at a very broad level in order to identify what material would fit well with the focus and arguments of which chapter. For example, when writing the history and legislative framework chapter, I went through the material and highlighted or underlined in coloured pencil anything that spoke to historical or

legislative issues. I was not selective at this point as to what I was coding for, as I planned to develop the coding as I went along. I then applied open coding analysis to identify broad themes within the chapter's topic matter. For example, regarding historical events, "labour activism" constituted an open code. I then went through the material again in order to identify focused codes. With labour activism as the broad code, focused codes include "hard rock miners wildcat strike", "role of Stephen Lewis and the NDP", "political responses", "regional narratives", "media coverage", and "labour power in relation to capital power". I would then pull quotes from the textual material on these issues and organize them into a document file, which I could refer to during the writing process in terms of pulling out quotes that spoke to the themes identified. I applied this coding technique when writing each chapter, but it is important to acknowledge that the codes changed as I progressed through the chapters and developed my conceptualization of unknowns. While ignorance was a broader level code early on in the analysis, it became a more focused code as I began to identify ignorance as a dimension of unknown rather than as the overarching concept to refer to unknowns.

The writing of my dissertation took place alongside the analysis of research material, and overlapped with the previous two phases. The benefit of interweaving the writing throughout the research process is that it allowed me to detect potential gaps in my understanding of an issue or in the collection of data, which further helps in identifying the point of saturation. This approach to writing also provides for enhanced opportunity to practice reflexivity, as I can continuously question how I am integrating the research data into the writing, which also makes me actively reflect on my assumptions and interpretations of the research material. As a central aim of the research

is to identify multiple perspectives on the challenges of recognizing occupational disease, this is reflected in the writing as I illustrate how the process of occupational disease recognition is understood from the perspectives and experiences of various individuals. This also connects with the selection process of interview participants, as the participants are attentive to and experienced with issues of occupational disease recognition and can therefore clearly articulate their viewpoints from their positions.

A Spotlight on FOI Requests and Archival Methods

As FOI requests and archival methods constitute a notable component of this study and since they are not as frequently discussed in sociological methodologies as other methods are, I will elaborate on their use in more detail within this section. In doing so, I will first focus on how I used FOI requests as a research tool and I will then discuss my use of archival methods.

FOI Requests

I utilize FOI requests as a research tool in order to obtain access to restricted records primarily from the AO, while also submitting a small request to the WSIB in order to access a draft copy of a report that was no longer publically available. Access to information (ATI)²⁶ legislation may be understood as “a legal right to seek access to materials not already of the public record” (Larsen and Walby, 2012: 6). Academics from various disciplines played a pivotal role in advocating for access to governmental legislation in the 1960s and 1970s (Kazmierski, 2011). Central to this push were concerns

²⁶ Access to Information or Freedom of Information legislation is administered under various levels (federal, provincial, and municipal) of government throughout Canada and the name of this legislation varies based on level of government and jurisdiction. At the federal level, the term used is Access to Information (ATI) with the corresponding legislation being the Access to Information Act (ATIA). At the provincial level in Ontario, it is referred to as Freedom of Information (FOI) and falls under the Freedom of Information and Protection of Privacy Act (FIPPA).

surrounding the lack of governmental transparency and accountability, issues of governmental secrecy, and how such information was deemed to be essential for more meaningful participation in democratic decision-making processes (Clement, 2015; Kazmierski, 2011). At the federal level, Canada first enacted ATI legislation in 1983 through the Access to Information Act (ATIA), while provinces and territories varied in their adoption of this legislation.²⁷ In Ontario, FOI requests fall under the Freedom of Information and Protection of Privacy Act (FIPPA), which was enacted in 1988.

More recently, Canadian scholars have brought heightened attention to how ATI/FOI requests could be used as an academic research tool to study governmental agencies, while also identifying the notable barriers and limitations in doing so (Clement 2015; Kazmierski, 2011; see also the edited volume by Larsen and Walby, 2012). As they point out, access to information does not equate with the ability to access information. Key barriers and limitations include temporal delays, financial costs, issues around the administration of the legislation, issues in appealing decisions, arbitrariness and inconsistencies with what information becomes released, experience and skill in identifying the existence of records (especially when being told that they do not exist) and, if records are released, issues around how much information was released and how heavily redacted the documents may be (Larsen and Walby, 2012). As Hameed and Monagham (2012) argue, “[t]he greatest concern facing ATI users is that the adjudication of requests has become an institutional process that is, according to a host of critics, reliably unreliable” (142). There is also unevenness in how ATI/FOI requests are processed between different agencies, which contributes to varying experiences when

²⁷ For example, Prince Edward Island was the last province to enact access to information type of legislation in 2001.

attempting to attain information. A glance at the 2014 Annual Report produced by Ontario's Office of the Information and Privacy Commissioner demonstrates the temporal inconsistencies between different agencies in how they process requests, with some taking much longer than others.²⁸

While being aware of these barriers and limitations, and encountering some of them throughout this research process, I nevertheless found such requests to be an invaluable and important research tool to access information I otherwise would not have the opportunity to view. If I did not use FOI requests, the major implication for my dissertation would be not having access to any of the archival documents. Without these documents, I would have significantly fewer methodological resources from which to draw in order to collect historical accounts.

I submitted three FOI requests to the AO (October 2014, March 2015, and July 2015); one for each list of archival records as all the records of interest had access restrictions on them. I was also interested in obtaining a copy of the previously mentioned *Draft Report of the Chair of the Occupational Disease Advisory Panel* as the submissions I reviewed at the WSIB reference library were in response to this draft report; however I could not find a public copy either on the WSIB website (where all the other ODAP documents were listed) or elsewhere. Through a literature review on FOI requests I was aware that some agencies, including the WSIB, are identified as less likely to informally provide information that is not publically accessible (Roberts, 2008). Since I was aware that I might encounter obstacles if I informally asked for this document, and

²⁸ As Ontario's legislation also has a reporting requirement, each agency is required to report on the processing of the requests they receive each year, thereby allowing the Office of the Privacy Commission to assemble and make public annual and statistical reports that present an array of informational data, including how many requests were received in total, how many requests each agency received, and what kinds of decisions were made (e.g., whether information was released in full, partially, or not at all).

keeping in mind temporal considerations, I decided to submit a formal FOI request to the WSIB for the draft report rather than try to request it informally.

Given my research focus and previous information searches, an advantage I had in making the FOI requests was my ability to request access to clearly identified files and documents, rather than submitting requests for more nebulous clusters of information (such as asking for information relating to a particular issue or event or around a particular concept). In other words, I had a relatively good idea of what information existed before making my requests and this permitted me to request specific files and documents by name, as well as avoid potentially costly search fees. For example, when searching keywords in the archival database, the results included the name, category number, and barcode number of the file. For these requests I addressed a letter to the Privacy Unit at the AO stating that I was requesting items under the FIPPA and I then identified a list of files along with the relevant information (category and barcode number). For the WSIB, I filled out a FOI request form available on their website and jotted down the exact name of the document of interest.

Nevertheless, I did encounter some barriers and limitations throughout my research experience with FOI requests. The first was a temporal delay. Although there is a legislative requirement for agencies to make a decision in response to the FOI request within 30-days, agencies have the option of giving an official notice of extension, thereby granting them a longer time period to respond. While the length of these extensions vary, it is not unheard of to experience delays that extend beyond 90-days (e.g., Clement 2015). For three out of the four responses submitted, I had received a decision within the 30-day period. For one request to the AO I was notified that due to the volume of files requested

they would be filing for a 75-day extension for my request. As I had initially made my request in July 2015, this meant that I did not receive a decision until early November 2015. Economic barriers were also encountered, as costs accumulated due to processing fees, especially when larger volumes of material needed to be checked by the privacy analysts. This was, however, also alleviated to a certain extent, as the privacy analyst at the AO informed me of the previously noted research agreement option which allowed me to view all the files within that particular grouping without having to pay additional processing fees to do so. Finally, a further limitation in using FOI requests is whether or not one can identify the existence of records. I had encountered the need to do this with the request to the WSIB, as I was initially told that the requested document did not exist. Fortunately, I discussed this with the privacy officer over the phone, providing her with additional information about the document (the exact title, where it was referenced in other documents, how a public consultation existed around this document). This conversation resulted in the document being successfully located and a copy mailed to me.

The types of documents I accessed via the submission of FOI requests include: memoranda, letters, correspondence, news clippings, draft versions (of reports, speeches, memoranda), handwritten notes, meeting minutes, and roundtable discussions. Such material provided me with insights into the backstage texts and conversations from various governmental agencies,²⁹ as a compliment to the carefully constructed discourses of official documents (Walby and Larsen, 2011: 624). The use of FOI requests also granted me access to finalized documents I could not locate elsewhere, such as the *Report*

²⁹ While the AO is under the Ministry of Governmental and Consumer Services, the records accessed themselves stemmed from various provincial agencies including the MOL, Ministry of Health and Long-term Care, and the WSIB.

of the Occupational Disease Task Force that was submitted to the Ministry of Labour (MOL) in 1993.

In congruence with my approach to archival documents more generally (to be discussed in the next section), I regard FOI documents as providing partial accounts of various processes. This is a particularly important point considering that I received partial access to the documents, with some information redacted. Throughout the research process, I was also aware of how there are significant limitations in using FOI requests as research tools. This includes the acknowledgement that they are considered by FOI scholars to be “reliably unreliable” (Hameed and Monagham, 2012: 142), which led me to use these requests as one tool amongst others in order to grasp a better understanding of the issues, problems, and processes and stake. Nevertheless, in studying governmental institutions which are often characterized by their ambiguity (Best, 2012), using FOI requests as a research tool was useful in getting a perspective on various aspects of these institutional processes, while remaining cognizant of the partially and fragmentation of these documents.

Archival Methods

In initially developing my research design, I did not expect to have a notable portion of my methods dedicated to archival research. However, I decided to look into what kind of records may be available as I had previous, and positive, research experience in using archival records (albeit not ones specific to occupational disease). My first search of the archival database resulted in a list for ten files. As I gained familiarity with issues on occupational disease and what kinds of terms could produce search results, I added two more requests for archival material. In total I reviewed approximately sixty

files and two large groupings of files, resulting in three visits to the AO to review these records.

As I engaged with the process of archival research, I actively reflected on the kind of information I was obtaining from archival records. While the Merriam-Webster dictionary defines the archives as “a place in which public records or historical documents are preserved” and “a repository or collection especially of information” (nd), scholarly discussions bring to light how contested and variegated this concept is. Rather than considering archival-based research as the simple retrieval of information for knowledge purposes, emphasis is cast upon the multiple ways through which the researcher is situated in processes of knowledge production. This includes, for example, the selective criteria employed at various points throughout archival research, such as what kinds of records are made available through the archives.³⁰ As Burton (2005) elaborates,

archives do not simply arrive or emerge fully formed; nor are they innocent of struggles for power in either their creation or their interpretive applications. Though their own origins are often occluded and the exclusions on which they are premised upon often dimly understood, all archives come into being as a result of specific political, cultural, and socioeconomic pressures – pressures which leave traces and which render archives themselves artifacts of history (6)

The preservation and availability of certain records at particular archival sites has led to epistemological contestations around what historical research could offer, with more traditional accounts making positivist claims to objectivity and historical truths, while others have stressed the importance of considering how archival records are

³⁰ See as well Ghosh (2005) who provides an illuminating discussion of this in relation to the differing influences that nationality and national identities have on the production of knowledge around colonial histories. As she notes, her research experiences varied significantly between the British and the Indian archives to the point where she realized that “what seemed like a great project in Britain was a terrible, even unspeakable one in India” (27)

historically, socially and politically situated (Burton, 2005; Ferreira-Buckley, 1999; Ghosh, 2005; Tamoukou, 2014). This has led to the general recognition that historical knowledge will always be limited to some extent. As Tamoukou (2014) argues,

archival research is fragmented through and through: there is always something missing, because not everything found a place in an archive, because of serendipity, because of intentional selections and deselections as well as because of specific rules of taxonomy and classification that allow certain documents to be preserved and others to become obscure or marginalized. (631)

In acknowledging these methodological considerations, my interest in the archive began at a very basic level: to see what kind of material was available with the hope that this would provide some perspective into the historical events, debates and processes that occurred in relation to the identification and recognition of occupational disease. I was unsure what I would come across or whether the information gathered there would be relevant to my project but was open to considering how this may shape my insights into issues of recognition processes. In this way, my experience resonated with Gold's (2008) description of starting out in archival research:

The process of doing archival research is largely organic. Though we may apply a critical lens or favor a particular theoretical approach, the basic methodology of archival research remains the same: read absolutely everything and try to make sense of what happened. It is a bottom-up process and messy as hell – and, more to the point, scary, requiring faith that something will be found, even if it's not what you first went looking for (18)

I also drew influence from Tamboukou's (2014) discussion, which employs Barad's (2007) new materialist approach and her concept of intra-action, in thinking about how material conditions of conducting research in the archive intra-act with research strategies on archival discourses. In working at the archives, I made use of photocopying and photographing resources so that I did not have to feel rushed with my

visits and therefore did not have to be more selective with the content than necessary. This way I could continue to work through the documents off-site. What further aided me in my research was that I had previously worked in this specific archive and had previous research experience in making decisions about going through large volumes of archival material, including decision-making about what to take notes on and what to make copies of. Through a combination of note taking, photocopying, and photographing, I selected relevant information from these documents based on key contextual information. This information provided me with insight into issues of occupational health and disease that were occurring at particular temporal periods, and it also allowed me to identify theoretical concepts of interest and broader research themes. This selection process may be understood as “archival interventions” through “the researcher’s cut”, meaning that as one tries to understand the topic matter, “the researcher actively intervenes in delimiting its boundaries” (Tamboukou, 2014: 626).

While finding the archival records to be valuable in developing a better understanding of the historical processes and fluxes of occupational disease recognition, due to the partiality of these documents I found archival records to be particularly useful when combined with other methods, especially in-depth interviews. As interview participants had notable experience working with occupational diseases in relation to workers’ compensation, some also spoke to and provided interpretations of historical processes. Their perspectives and experiences, including what historical moments they identified as being important and how they discussed these moments, allowed me to gain clarity and context into the archival information, as well as develop insights that I would not be able to sufficiently extract from archival material alone. For example, I noticed

throughout the 1980s and early 1990s there seemed to be considerable awareness of issues of occupational diseases. There were numerous media reports covering occupational disease issues, public inquiries were being conducted, and the importance of knowledge production (research, funding, developing databases, etc.) on occupational disease was being emphasized. It was through the interviews that various elements of the political context of this time period came into better focus, including the role the New Democratic Party (NDP) played as the official opposition during that time period and the challenges espoused by the Harris provincial government.

Case Selection: Occupational Disease and Ontario's Workers' Compensation System

In Chapter One, I outlined why occupational disease recognition constitutes an illuminating site to study the complexities of unknowns in knowledge contestations. In this section, I address the rationale for specifically selecting Ontario's workers' compensation system to examine the complexity of unknowns in relation to occupational disease recognition. In looking at Ontario's workers' compensation system, I am attentive to the broader processes that feed into practices of occupational disease recognition and, where appropriate, I draw on the case focus of the WSIB to illustrate how unknowns complicate these recognition processes. Selecting a case to focus on provides the opportunity to produce concrete and context-dependent knowledge (Flyvbjerg, 2001: 70-73). To better understand how unknowns complicate the recognition of occupational diseases, I needed to identify an empirical site through which the processes of occupational disease recognition operate. The methodological decision to select Ontario's workers' compensation system as my case focus is based on four main reasons.

First, the administrative and operational practices of workers' compensation in Ontario have been a site of contestation since its inception (as will be discussed in the subsequent chapter on history and legislation). As with occupational disease recognition more generally, workers' compensation encompasses conflicting economic interests and a multiplicity of social actors, despite its original intentions to be a relatively simple and straightforward adjudicative process. These conflicts and tensions have arguably intensified since the 1980s, with increasing focus placed on financial matters (such as the WSIB's unfunded liability), and the mid-1990s when there was a shift in the framing of workers' compensation to workplace insurance.

Second, the WSIB is characterized by its institutional ambiguity and lack of transparency, especially in relation to occupational disease. The justifications behind its internal operational processes are often perceived to be unclear, especially in occupational disease matters. The WSIB has been critiqued for its arbitrariness in handling occupational disease issues (see the Dupre Royal Commission, pp. 17-18). Coupled with the inevitability of unknowns in relation to knowledge about occupational disease, this makes Ontario workers' compensation system a particularly important site through which to study the complex role of unknowns in knowledge contestations.

Third, the selection of Ontario's workers' compensation system was due, at a more general level, to considerations about methodological feasibility. This included identifying the availability of research data, as well as temporal and financial considerations in carrying out this research. I found that in Ontario there is a significant amount of textual material available on workers' compensation and occupational disease that I could draw on. I was also able to develop a list of interview participants even

though the number of people working on occupational disease matters in Ontario is relatively small.

Fourth, the WSIB offered a rich opportunity to ground the more theoretical interests of this research. By doing so, the case study material enabled theoretical exploration and development of core concepts. In addition, it provided a wide range of materials and circumstances through which to examine and illustrate these concepts in action.

A Note on Methodological Considerations in Researching Unknowns

Although attention has been paid to methodological approaches to studying knowledge (such as Latour's development of laboratory field research to study scientific knowledge), methodologies to research unknowns remains relatively undeveloped. There are a multitude of theoretical conversations about unknowns, especially in relation to the concept of ignorance, with emphasis on identifying and untangling the nuanced meanings of unknowns and the conceptual dimensions that they can take (Croissant, 2014; Gross, 2007; Smithson, 1989; Tuana, 2006). However, less consideration has been placed on raising questions specific about how to research unknowns and the challenges of doing so.

The lacuna of literature on such methodologies has been recently taken up through a special edition on absences in the journal *Social Epistemology*, where it is recognized that the researcher is placed in a bit of a conundrum concerning how to research unknowns in general, and absences in particular. An important reminder in this regard is that when we speak of unknowns, we are often not defining unknowns as the opposite of knowledge. Frickel (2014) acknowledges the methodological challenges of

studying “that which is not there”, but identifies that there is a distinction between absolute and relative absences. Although absolute absence entails a complete absence or lack of something, Frickel highlights how most scholars are interested in the social phenomenon of relative absences: ““things that are not there” but were there or have become hidden, or are somewhere else” (87). He puts forth ten methodological suggestions for researching absences, including the need to articulate stronger definitions of the concept, to specify the type or form of absence being studied, to identify case parameters, and to remain reflexive of absences in one’s own methods (89-91).

Frickel’s (2014) point about the necessity for conceptual clarity was particularly helpful to keep in mind throughout my research process, as the wide array of meanings of unknowns and their entwinement with related concepts (such as ignorance, absence, and uncertainty) could easily lead to nebulous discussions about unknowns and how they are to be understood. However, rather than approaching my study with a well-defined and succinctly bounded conceptualization of unknowns, the meaning of this term was actively and continuously developed based upon the meanings and shapes it took throughout the research process (Schwartz-Shea and Yanow, 2012). Instead of pre-defining a term and seeing if it fit in with the context under investigation, I was continuously attentive to whether and how the concept of unknown continued to be a useful theoretical framework through which to understand the issues occurring in processes of occupational disease recognition. It was through such attentiveness that I decided to switch from the overarching concept of ignorance to that of unknowns, as I felt the former was too narrow a concept to explain the social phenomenon occurring and is too strongly attached to

particular connotations (such as a simple lack of knowledge) or sources of literature (particularly Proctor's (2008) discussions about agnotology).

In thinking about how to study unknowns, I was also attentive to studies that more explicitly highlight how they identify and trace concepts related to unknowns and how they apply these concepts in their research. In focusing on scientific uncertainty in relation to regulations on whaling, for example, Heazle (2006) sketched out how the role of, and interpretations around, scientific certainty had shifted throughout temporal periods. His methodological strategies include a document analysis of the International Whaling Commission's major policy decisions to see how science was treated within them, and what were the various interpretations of scientific uncertainty in different historical and political periods. This influenced my work as it gave me further considerations to keep in mind when analyzing documents and conceptualizing knowledge and unknowns, such as considering the possibility for nuanced differences in how unknowns may take shape in different historical and political periods, including how social actors respond to such unknowns.

Reflexivity and Epistemology

Another key point brought forward by Frickel (2014) is the practice of reflexivity when researching absences, with particular emphasis on the necessity for social scientists to be reflexive of absences in their own methodological designs and research studies. As Frickel elaborates:

[w]e should be attentive to how our own processes of problem selection, term definition, parameterization of cases, strategies for data collection, measurement techniques, and expository conventions influence what absences we do and do not see, and understand these decision points as fundamental to the knowledge politics of our own practice. (91)

In other words, when studying absences and related concepts, it is important to avoid intentionally or unintentionally situating one's work as outside the realm of absences. Methodologically, there will always be a degree of unknown produced through one's research, as certain aspects will be placed in the foreground, while others will receive less attention or not be included within the study. This is not necessarily due to oversight, but rather stems from the acknowledgement that any methodological approach cannot incorporate every important detail, and this is why the selection and construction of various boundaries (concepts, variables, etc.) is necessary to provide focus to one's project. Such an acknowledgement also constitutes an important dimension of reflexivity when social scientists study other knowledge fields. Callon (1986), for example, has cringed at the privileging of social scientist analysis towards scientific knowledge, stating that "[s]ometimes the effect can be so devastating that the reader has the impression of attending a trial of natural science presided over by a privileged scientific knowledge (sociology) which has been judged to be indisputable and above criticism" (198).

Throughout my research I was continuously reflexive about the boundaries and absences in my own work, as well as how I was discussing unknowns in relation to other epistemological approaches and the knowledge claims I was making. For example, when talking about unknowns, such as the boundaries enacted in processes of closure, it was important to keep in mind that boundaries are a central component of any epistemological and methodological approach, and that this project also has parameters around its discussion as a way to focus the research. The point then is not to criticize the existence of boundaries, but to consider how certain boundaries are constructed and mobilized in

order to make some ways of knowing permissible and possible while making it difficult to put forth other types of knowledge claims.

At the same time, I was also reflexive about being reflexive, especially due to how unknowns in knowledge contestations are often targeted and mobilized as a way to delegitimize studies and the knowledge claims they put forth.³¹ For example, how do I write about the fact that all knowledge practices (including sociological ones) encompass absences and uncertainty, without this point being misinterpreted as a methodological weakness or design flaw? As Rappert (2014) points out, acknowledging the limitations of one's own writing about absences is accompanied by notable tensions:

[t]o write about what cannot be written about invites raised eyebrows about the status of that same writing. Indirect, non-literal, unconventional forms of writing meant to gesture toward what is not on the page can themselves, in turn, invite raised eyebrows about what is on it. (45)

I was also reflexive about my own social position and relations with the research respondents, as well as epistemic relations with other disciplinary fields (especially since I was interviewing individuals from various fields, such as medicine, epidemiology, and law) (Doucet, 2008). I viewed my position as an outsider to the field of occupational disease. Aside from some research experience on workers' compensation through a previous research assistantship, I did not have any prior experience or contacts with individual in this field. The reason I selected this topic was serendipitous – I had taken a

³¹ Messing (2014) highlights a revealing example of this in relation to quantitative scientific studies, where epistemic norms of using cautious language and avoiding making claims to absolute certainty (e.g., “may affect” instead of “does affect”) can be misinterpreted in a legal framework of workers' compensation adjudication. She highlights how one scientific article by Barbara Silverstein – a prominent U.S. occupational health researcher who has been influential in making connections between occupational factors and repetitive movements – was misinterpreted as ‘stopping short’ of making a conclusive link between occupation and cumulative trauma disorders (such as carpal tunnel syndrome), and therefore was actually used to justify the denial of a workers' compensation claim in Quebec. See also Premji, Messing and Lippel (2008) for a discussion of the use of cautious scientific language in formal scientific texts and the negative impacts this has on workers' compensation for musculoskeletal claims.

graduate course on occupational health and safety during my Master's degree and subsequently held a one-year research assistant position that focused on the history of workers' compensation in Ontario. I also attended a couple injured worker events in Toronto, where I lived at the time. It was through these experiences that I began developing an interest in matters of occupational health and safety as an important social problem. After deciding to focus my doctoral research on this topic, I had to become familiar with organizations and individuals who are active in this field (as discussed in phase one of my research). Although my outsider status encompassed limitations (such as gaining trust and having to develop a foundational understanding of the issues in this field prior to doing interviews), it also provided me with a useful perspective on the topic. My lack of familiarity with the issues of occupational disease made me less likely to take for granted what may have otherwise been normalized, as I was sensitive to what was being discussed and how it was being discussed (both in text and in person) throughout the process of developing my understanding of the issue and mapping out central themes.

The necessity of being reflexive has also led me to consider more thoroughly my own epistemological practices. At a general level, the epistemological underpinnings of my methodology differs from a positivist orientation in various ways, including in terms of how I situate myself as a researcher and my approach to bias, which is influenced by Schwartz-Shea and Yanow's (2012) discussion of "trustworthiness" in social research. As many social scientists have emphasized, objectivity in the positivist sense is not achievable, as one cannot be situated in a completely external manner from the social context they are in. How one is socially situated in shifting positions throughout their life, the experiences they have, the social interactions they encounter and broader social

and political forces inevitably influence one's thoughts and perspectives, whether it is consciously or unconsciously. Tsing (2015), for example, argues that every social interaction we have "contaminates" us in the sense that it affects who we are, even if these are small, daily encounters that we often take for granted. As Harding (1993) had argued, claims to objectivity without reflecting upon one's assumptions and social positions actually leads to "weak objectivity", whereas acknowledging how such factors affect one's research practices leads to possibilities for "strong objectivity".

Acknowledging the limitations of positivist notions of objectivity does not mean that I am inattentive to issues of bias as it is the researcher's responsibility to produce trustworthy analysis rather than one that simply supports their beliefs and perspectives. It is important to be reflexive of one's own assumptions and approaches throughout the research process. For example, when talking with a participant during an interview, if there is something they said that is a surprise or tension, further probing questions could be asked (if possible) and considered when analyzing the transcripts, rather than dismissing the statement and casting it aside. Indeed, such surprises should be seen as a positive component of research, as they help to better identify unacknowledged assumptions and they also push one to recognize how complex the social phenomenon is. Another example of being reflexive about one's assumptions and approaches is when writing the research report. In writing this dissertation, I was constantly reflexive about what data I was selecting, with particular concern on ensuring that the selected data reflected and connected to larger research themes. I practiced this by being reflexive about whose voices I was incorporating from the interview transcripts, and how I was doing so. I aimed not to misrepresent discussions or to take quotes out of context from

the larger discussion. I also wanted to include as many perspectives as possible around the issue at hand rather than make generalized claims. By doing so, I was not seeking to ‘confirm’ my findings through a singular narrative, but rather recognize how there are multiple perspectives about the issue at hand. If different experiences are put forward or different items are identified as important, it does not diminish the quality of the interpretations offered but rather is considered normal as it is expected that differently positioned individuals will contribute differing perspectives on the topic (Schwartz-Shea and Yanow, 2012).

Finally, I was reflexive about my epistemological approach in terms of the theories I drew upon as resources to guide my study. In reviewing sociological literature on knowledge and health, I experienced a tension around the categories being constructed and some of the central tenants of the social constructivist lens. This was because I noticed a tendency to deflect attention away from the material effects that social and political processes have on/in human bodies. A key site of such tension was in how biology – as a knowledge practice and as bodily systems – is often approached with a critical lens by social scientists (Williams, Birke, and Bendelow, 2003). In the realm of occupational and environmental health issues it has been acknowledged that there is a need to better engage with biological impacts on the body and how these biological processes are inextricably connected with social ones (Scott et al., 2015). In engaging with biology, it does not mean that social scientists should return to a simplified and problematic notion of biological essentialism. Rather, it emphasizes the importance of considering the complexities and intra-actions of social and biological processes. What this means in terms of practicing reflexivity is the significance of continuously reflecting

on “the political and social consequences of interpreting these arguments in simple or politically conservative ways” (Doucet, 2013:298).

Conclusion

Through a multiple-methods qualitative research design, this study aims to better understand the complexities of unknowns in knowledge contestations through the case focus of occupational disease recognition as it operates through Ontario’s workers’ compensation system. The methods selected offer multiple points of access into these contestations, as they allow me to cover a broad range of perspectives, practices and events. The purpose of utilizing multiple methods is not to verify one claim as true over another, but to better understand the intricate challenges of occupational disease recognition and how unknowns complicate these recognition processes.

Instead of having predefined notions of key concepts and issues developed at the onset of the research project, the openness of a qualitative approach allows for insights from data to emerge and develop throughout the research process. This was a suitable approach considering my outsider status to the field and due to the conceptually tangled notion of unknowns in the ignorance studies literature. The openness of this methodological approach also allows me to actively practice reflexivity, including with regards to how I am interpreting the social significance and epistemic limitations of different types of knowledge.

Having outlined the methodological framework in this chapter, next I set the context for further analysis by discussing the historical and legislative framework of occupational disease recognition and workers’ compensation in Ontario. Afterwards, the next three chapters engage more in-depth with research material, with the aim of

demonstrating how various dimensions and processes of unknowns (uncertainty, absences, and closure) complicate the recognition of occupational diseases.

Chapter Three:
Historical and Legislative Framework of Occupational Disease and Workers’
Compensation in Ontario

The purpose of this chapter is to set the stage for further discussion by providing a detailed outline of the case focus of the recognition of occupational disease in relation to Ontario’s workers’ compensation system, specifically in terms of a historical overview and laying out the legislative and regulatory framework. In doing so, I aim to map some of the historical circumstances and identify temporal shifts around occupational disease issues, as well as introduce some of the relevant legislative terminology (e.g., Schedules 3 and 4 of the WSIA) that will be referred to in subsequent discussions. This chapter therefore takes on a more descriptive tone, with the intention to delve into deeper analysis throughout subsequent chapters.

I will first provide an overview of the legislative framework that occupational disease is situated within in relation to workers’ compensation. While there is a notable amount of important legally relevant terms around processes of occupational disease recognition (such as significant contribution, benefit of the doubt, and the thin-skull principle) as well as many interconnected issues (including benefit levels), the focus here is to introduce how an occupational disease is legislatively defined and the adjudicative routes available for recognizing a disease as occupationally related and eligible for compensation. Second, I discuss the history of occupational disease in Ontario and identify four key historical periods (1) mid-1800s – 1914; (2) 1915 – 1970; (3) 1970s – mid-1990s; and (4) mid-1990s – present. In drawing upon research material to develop

this historical discussion, my aim is not to suggest a singular historical narrative but rather to provide a general overview that includes identification of some of the key moments and contestations occurring as a way to help guide further discussion and analysis.

Legislative Framework: Workplace Safety and Insurance Act (WSIA)

Workers' compensation in Ontario is currently legislated through the WSIA and administered by the WSIB.³² As stated within this Act, its purpose

is to accomplish the following in a financially responsible and accountable manner: 1. To promote health and safety in workplaces. 2. To facilitate the return to work and recovery of workers who sustain personal injury arising out of and in the course of employment or who suffer from an occupational disease. 3. To facilitate the re-entry into the labour market of workers and spouses of deceased workers. 4. To provide compensation and other benefits to workers and to the survivors of deceased workers.³³

The Act also outlines the role of the Board, noting how it is granted “the powers of a natural person”³⁴ including powers “to review and approve major changes in its programs”³⁵ and “to review this Act and the regulations and recommend amendments or revisions to them.”³⁶

The WSIA provides compensation for workers whose employers are covered by the Act and listed in either Schedule 1 or Schedule 2.³⁷ Such workers have a legal right to

³² Workers' compensation in Ontario experienced a couple of name changes since its establishment in 1915. Originally, the Board was referred to as the Workmen's Compensation Board, with the Act being the *Workmen's Compensation Act*. On December 21, 1982 the name changed to the gender-neutral Worker's Compensation Board and *Workers' Compensation Act*. Finally, on January 1, 1998 the name changed to its current form The Workplace Safety and Insurance Board and the *Workplace Safety and Insurance Act*.

³³ WSIA, Section 1.

³⁴ WSIA, Section 159. (2)

³⁵ WSIA, Section 159. (2) (e)

³⁶ WSIA, Section 159. (2) (b)

³⁷ It is important to acknowledge that not all workers can access compensation, with precariously employed workers being particularly vulnerable to OHS issues if not covered. For example, casually employed workers are not covered by the WSIA. For an overview of who is covered under the WSIA, see <http://www.owa.gov.on.ca/en/filingclaim/Pages/Who-is-Covered-by-the-Act.aspx>

compensation if they experience an injury due to their employment or if their employment is a significant contributing factor to the development of their disease. The

WSIA defines occupational disease as:

(a) a disease resulting from exposure to a substance relating to a particular process, trade or occupation in an industry, (b) a disease peculiar to or characteristic of a particular industrial process, trade or occupation, (c) a medical condition that in the opinion of the Board requires a worker to be removed either temporarily or permanently from exposure to a substance because the condition may be a precursor to an occupational disease, (d) a disease mentioned in Schedule 3 or 4, or (e) a disease prescribed under clause 15.1(8) (“maladie professionnelle”).³⁸

In Ontario, occupational disease claims are adjudicated through the Occupational Disease and Survivors Benefits Program of the WSIB. There are three main routes through which a disease may be recognized as occupationally related and eligible for compensation: (1) Schedule 3 or Schedule 4 (2) WSIB policies, or (3) on a case-by-case basis. I will briefly review each of these routes below.

Schedule 3 (presumptive legislation) and Schedule 4 (irrebuttable legislation) provide legal recognition to the connection between an occupation and a disease.³⁹ They are structured by listing a type of disease in one column, and a description of a corresponding work process and occupation in the second column. If the disease is to be considered occupationally related, it must have resulted through the described work process in the specific occupation. For example, in Schedule 3 asthma is listed as a respiratory disease in the first column, while the second column notes the description of “any process involving exposure to allergenic off-set sprays in the printing industry”.

³⁸ WSIA, Section 2. (1)

³⁹ For a complete list of diseases in Schedule 3 and Schedule 4, see <https://www.canlii.org/en/on/laws/regu/o-reg-175-98/latest/o-reg-175-98.html>

Schedule 3 was introduced as a component of the original *Workmen's Compensation Act* (WCA) in 1914, based on the recognition that workers who develop diseases due to their employment have a right to be compensated for it.⁴⁰ The schedule initially listed six diseases (anthrax, lead poisoning, mercury poisoning, phosphorus poisoning, arsenic poisoning, and ankylostomiasis), all of which were fairly straightforward in their etiologies (e.g., exposure to mercury leads to mercury poisoning). Throughout the first few decades there were multiple amendments made to the Schedule (additions, deletions, changes in terminology or description), but up until the mid-1940s only diseases listed in Schedule 3 were defined as occupational diseases (which at the time were referred to as *industrial* diseases). There were no other routes through the legislation that allowed a disease to be recognized as occupational and to be granted compensation. This changed with the 1947 amendment, where the definition of “industrial disease” was expanded through the addition of the clause “disease peculiar to and characteristic of a particular industrial process, trade, or occupation”. This resulted in a subsequent shift away from using Schedule 3 to determine occupational relatedness, and a shift towards using policies and case-by-case adjudicative routes more regularly. Currently, there are thirty diseases listed in Schedule 3 (see Table 3.1), with firefighters constituting an occupational group that has special presumptive legislation due to recognition of the diseases they face in relation to the nature of their work.

⁴⁰ As will be discussed in the historical overview, this recognition did not extend to all workers and was premised upon gendered and racialized exclusions. The very name of the original Act – *Workmen's Compensation Act* – denotes the exclusionary coverage.

Table 3.1: Occupational Diseases listed under Schedule 3 of the WSIA

	Column 1	Column 2
	Description of Disease	Process
	Poisoning and its Sequelae	
1.	By arsenic	Any process involving exposure to or the use of arsenic, arsenic preparations or arsenic compounds
2.	By benzene	Any process involving exposure to or the use of benzene
3.	By beryllium	Any process involving exposure to or the use of beryllium, beryllium preparations or beryllium compounds
4.	By brass, nickel or zinc	Any melting or smelting process involving exposure to brass, nickel or zinc
5.	By cadmium	Any process involving exposure to or the use of cadmium, cadmium preparations or cadmium compounds
6.	By carbon dioxide	Any process involving exposure to carbon dioxide
7.	By carbon disulphide	Any process involving exposure to carbon disulphide
8.	By carbon monoxide	Any process involving exposure to carbon monoxide
9.	By chlorinated hydrocarbons	Any process in the manufacture of, or the use of, or involving exposure to chlorinated hydrocarbons
10.	By chromium	Any process involving exposure to or the use of chromium or chromium compounds
11.	By lead	Any process involving exposure to or the use of lead, lead preparations or lead compounds
12.	By mercury	Any process involving exposure to or the use of mercury, mercury preparations or mercury compounds
13.	By nitro- or amino-derivatives of benzene, phenol or their homologues	Any process involving manufacture, handling, use or exposure to nitro- or amino- derivatives of benzene, phenol or their homologues
14.	By oxides of nitrogen	Any process involving exposure to oxides of nitrogen
15.	By phosphorous	Any process involving exposure to or the use of phosphorus
	Diseases from Biological Agents	
16.	Anthrax	Handling of animals and animal parts, or any other process that results in exposure to a source of anthrax infection
17.	Tuberculosis	Any employment in a health care facility, a laboratory as defined in the <i>Laboratory and Specimen Collection Centre Licensing Act</i> or a reform institution, any employment in providing health care services or health care support services or any other employment in which there is a known risk of exposure to tuberculosis or to the tubercle bacillus

	Diseases from Physical Agents	
18.	Bursitis	Any process involving constant or prolonged friction to or pressure on the bursae
19.	Infected blisters	Any process involving friction to the skin that creates opportunity for infection
20.	Tenosynovitis	Any process involving continual or repetitive injury to tendons of the limbs
21.	Dysbarism: decompression sickness including caisson disease	Any process involving work in compressed or decompressed air
22.	Any disease due to exposure to X-rays, radium or other radioactive substances	
	Respiratory Diseases	
23.	Asthma	Any process involving exposure to allergenic non-offset sprays in the printing industry
24.	Silicosis	Any process involving exposure to crystalline silica
25.	Pneumoconioses other than silicosis or asbestosis	Any process involving exposure to the relevant dust
	Skin and Eye Diseases	
26.	Allergic contact dermatitis	Any process involving exposure to a skin allergen
27.	Ulceration of the skin or cornea	Any process involving use, handling, or exposure to tar, pitch, bitumen, mineral oil or paraffin or any compound, product or residue of these substances
28.	Photo keratoconjunctivitis and photo retinitis	Any process involving prolonged or intense ultra-violet or infra-red exposure, including gas or arc welding or use of lasers
	Cancer	
29.	Epitheliomatous (skin) cancer	Any process involving use or handling of tar pitch, bitumen, mineral oil or paraffin or any compound, product or residue of these substances
30.	Primary cancer of the nasal cavities or of paranasal sinuses	Concentrating, smelting or refining in the nickel producing industry

Source: WSLA

Schedule 4 is a more recent addition to the Act, as it was introduced in 1984 (effective 1985). This Schedule lists three diseases with corresponding processes and occupations, and is considered to entail the strongest level of evidence for a connection between an occupation and a disease (see Table 3.2). If a disease listed in the first column (“primary malignant neoplasm of the mesothelium of the pleura or peritoneum”) matches with the description outlined in the second column (“any mining, milling, manufacturing, assembling, construction, repair, alteration, maintenance or demolition process involving the generation of airborne asbestos fibres”) then the disease is deemed to be occupationally related.⁴¹ Although this Schedule was introduced in 1984, it initially sat empty. It was not until 1992, when asbestosis, mesothelioma and nasal cancer were added, that Schedule 4 had any relevance.

Table 3.2: Occupational Diseases listed under Schedule 4 of the WSIA

	Column 1	Column 2
	Description of Disease	Process
1.	Asbestosis	Any mining, milling, manufacturing, assembling, construction, repair, alteration, maintenance or demolition process involving the generation of airborne asbestos fibres
2.	Primary malignant neoplasm of the mesothelium of the pleura or peritoneum	Any mining, milling, manufacturing, assembling, construction, repair, alteration, maintenance or demolition process involving the generation of airborne asbestos fibres
3.	Primary cancer of the nasal cavities or of paranasal sinuses	Any process at the Copper Cliff sinter plant of Inco Limited

⁴¹ “If, before the date of the impairment, the worker was employed in a process set out in Schedule 4 and if he or she contracts the disease specified in the Schedule, the disease shall be deemed to have occurred due to the nature of the worker’s employment” WSIA, Section 15.1. (4)

4.	Primary cancer of the nasal cavities or of paranasal sinuses	Any process in the Port Colborne leaching, calcining and sintering department of Inco Limited that was practised before January 1, 1966
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Source: *WSIA*

If a disease is not listed in either Schedule 3 or Schedule 4 of the WSIA, but has a policy developed on it through the WSIB, it would then be adjudicated through the policy route. For occupational disease, policy guidelines are developed internally and these policies are listed in the WSIB's *Operational Policy Manual*.⁴² Occupational disease policies outline the entitlement criteria to guide adjudicators in deciding whether a worker's disease claim is eligible for compensation. Take, for example, gastrointestinal cancer in relation to asbestos exposure (policy 16-02-11). As of October 7, 1976, the Board stated that it "was in a position to compensate gastrointestinal cancers as industrial diseases" (WCB, 1976: 12).⁴³ The current policy around this cancer defines it as encompassing "[a]ll primary cancers associated with the esophagus, stomach, small bowel, colon, and rectum", in relation to asbestos exposure. To be eligible, the criteria outlined are: first "a clear and adequate history of occupational exposure to asbestos dust, and while such occupational exposure cannot quantitatively described, it should be a continuous and repetitive nature, and should represent or be a manifestation of the major component of the occupational activity", and secondly, "a minimum interval of 20 years between the first exposure to asbestos and the diagnosis of gastro-intestinal cancer".

⁴² The WSIB Operational Policy Manual can be retrieved from:
http://www.wsib.on.ca/WSIBPortal/faces/WSIBManualLandingPage?fGUID=835502100635000476&_afLoop=1876769313950000&_afWindowMode=0&_afWindowId=null#%40%3F_afWindowId%3Dnull%26_afLoop%3D1876769313950000%26_afWindowMode%3D0%26fGUID%3D835502100635000476%26_adf.ctrl-state%3Dixb8pb2ps_71

⁴³ As noted in the 1976 WCB Annual Report (p. 12): "Two studies commissioned by the Board on the relationship between asbestos dust and gastrointestinal cancer – involving both a specialist in pathology and a senior epidemiologist – were completed in 1976. The Medical Branch prepared recommendations and guidelines based on these studies; and, as a result, on October 7, the Corporate Board was in a position to compensate certain gastrointestinal cancers as industrial diseases"

Finally, the third channel through which an occupational disease claim may be adjudicated is on a case-by-case basis. Essentially what this means is that the disease is not listed in either Schedule 3 or Schedule 4, and it does not have a WSIB policy developed for it. These decisions are to be made by Board adjudicators based on the merits and justice of the case at hand, rather than legal precedent. The adjudicator would therefore have to consider all the evidence for the case, as well as abide by the provisions of the WSIA.

In addition to these adjudicative channels, it is also important to point out the role of the WSIAT. Up until the 1980s, the WCB was the only administrative body with the authority to make decisions on compensation cases. If an appeal to a decision was filed, the decision for that appeal could only take place internally within the Board. Based on the inquiry into the WCB conducted by Professor Weiler in the 1980s, and the subsequent passage of Bill 101 (*An Act to amend the Workers' Compensation Act*), the Workers' Compensation Appeals Tribunal (WCAT) came into existence on October 1, 1985 as an expert decision-making body that would be independent from the WCB and which would replace the WCB's internal review appeal process. Initially existing as a tripartite body that included employer and worker representatives, the WCAT's general mandate was "to consider again the same evidence considered at the final WCB appeal level and to hear new evidence, including, in appropriate cases, evidence obtained by the Appeals Tribunal on its own initiative" (WCAT Annual Report, 1985-1986: B-1). Through the passage of the *Workplace Safety and Insurance Act, 1997*, the Tribunal changed its name from WCAT to WSIAT, with "[t]he name change reflect[ing] the former government's philosophical shift from a compensation based scheme to an

insurance-based scheme” (WSIAT, 2010: np). This Act brought additional procedural changes to the Tribunal, including the requirement for a tripartite panel as hearings could now be held by only the Vice-Chair.

Having provided an overview of the legislative framework in which occupational disease claims are situated in relation to Ontario’s workers’ compensation system, including the role of the WSIAT in this structure, I will now discuss the history of occupational disease and workers’ compensation.

Occupational Disease and Workers’ Compensation: Historical Overview

Within this section, I identify four temporal periods in relation to the recognition of occupational diseases and Ontario’s workers’ compensation system. The first period is from the mid-1800s – 1914 (before the modern workers’ compensation system); the second is from 1915-1970 (development of the WCB and growing concerns about occupational disease); the third period takes place from around 1970 to the mid-1990s (characterized by considerable labour activism) and finally, from the mid-1990s to the present day (contemporary challenges to recognizing occupational diseases).

Before the Modern Workers’ Compensation System: mid-1880s to 1914

As Canada was experiencing social and economic changes accompanying the Industrial Revolution in the mid-1800s, there was no specific health and safety legislation or workers’ compensation system in existence. The employment contract fell under the *Masters and Servants Act*, enacted at the federal level in 1847. In Ontario, industrial safety legislation was first enacted in 1874 with *An Act to Require the Owners of Threshing and Other Machines to Guard Against Accidents* and then a decade later through the introduction of the *Ontario Factories Act, 1984* (Smith, 2000; Tucker, 1984).

Without a workers' compensation system in place, if a worker wanted to attain any form of compensation for damages due to their employment, they had to turn to the courts and sue their employers. The legal framework that underpinned this process was the English common law of employer liability, and it was heavily prejudiced in favour of employers, reflecting the dominant laissez-faire economic ideology of the era (Tucker, 1984). The key challenge workers faced when trying to successfully win a lawsuit was encapsulated through the "trilogy of defences": (1) contributory negligence; (2) voluntary assumption of risk; and (3) the fellow servant rule (Tucker, 1984: 217-219). For example, the voluntary assumption of risk was premised on the notion that the worker was, or should have been, aware of the risks embedded in their employment position and industry. Based on these risks, it was further assumed that the employers would have to pay higher wages in order to attract workers to do such work, otherwise no one would be willing to do that work. Therefore, the employer was (in theory) paying more for the worker to undertake such work and the rationale was they should not have to pay for further damages as that would mean they "paid twice" (Tucker, 1984: 236). Issues such as unequal power relations between employer and worker in bargaining for higher wages to undertake such work were largely overlooked (ibid).

By the late nineteenth century, workers' compensation systems were being constructed both internationally and within Canada. Abrams (2001) identifies von Bismark as laying the foundation for "the first social insurance legislation in the Western world" by enacting "sickness insurance" in 1883 and then workers' compensation by 1884 in Germany. The rationale for doing so, Abrams argues, was not because Bismark was acting "out of the goodness of his heart, but to quell the growing socialist

revolutionary sentiment in Germany” (47). Ontario was the first province in Canada to enact a form of workers’ compensation legislation with the introduction of the *Workmen’s Compensation for Injuries Act* (WCIA) in 1886. As Tucker (1984) explains, “[t]his substantially modified the common law rules restricting an employer’s liability to workers. Where an injury was caused by defect in machinery, or by the negligence of a fellow servant [...] the employee could sue the employer as if no employment contract existed” (234). While it continued to be difficult for workers to secure compensation, with this Act the workers nevertheless experienced more favourable compensation outcomes than they were previously able to obtain.

In 1910, Sir William Ralph Meredith, a former leader of the Ontario Progressive Conservative (PC) Party, was appointed to head a Royal Commission on workers’ compensation. As Storey (2011) explains, “[t]he legislation that Sir William Meredith was commissioned to research and introduce was supposed to fashion legal measures that would eliminate the tension and conflict that had developed as a result of the old employer liability laws” (27). In October 1913, Meredith submitted his final report, which included a discussion of the decisions he made, as well as his vision for this compensation system. In this report, entitled *Final Report on Laws Relating to the Liability of Employers to Make Compensation to their Employees for Injuries Received in the Course of their Employment which are in Force in Other Countries, and as to How Far Such Laws are Found to Work Satisfactorily*, Meredith emphasized the need for significant legal changes due to the injustices of the employer liability approach and the inadequacy of the WCIA. As Meredith (1913) stated: “In my opinion there is no reason why this objectionable doctrine should not, as one of the provisions of Part II of the draft

bill provides, be entirely abrogated” (9). Meredith’s report provides further insight into his principles upon which a modern compensation system should be premised. While it has been acknowledged that the interpretation of these principles is contested, Storey (2011) identifies the general principles of “no fault, exclusive jurisdiction, collective liability, and an independent administrative board” (3).

Of particular relevance was how Meredith identified compensation as the rights of workers who experienced an injury through their employment, as well as those who develop an occupational disease (or, to use the terminology of the era, ‘industrial disease’). As Meredith (1913) emphasized:

It would, in my opinion, be a blot on the act if a workman who suffers from an industrial disease contracted in the course of his employment is not to be entitled to compensation. The risk of contracting disease is inherent in the occupation he follows and he is practically powerless to guard against it. A workman may to some extent guard against accidents, and it would seem not only illogical but unreasonable to compensate him in one case and deny him the right to compensation in the other. (13)

Stemming from Meredith’s Royal Commission, in 1914 Ontario was the first province in Canada to adopt a modern workers’ compensation system through WCA, which was to be administered by the WCB. The new Act went into effect on January 1, 1915 and was premised on the “historical compromise”. In gaining a right to compensation workers were better positioned to receive adequate compensation benefits, while employers were no longer on the receiving end of lawsuits as workers had given up their right to sue. As elaborated upon in the first WCB Annual Report (1915): “Employers are immune from the expense and annoyance of litigation. The intricacies and hardships upon workmen and their families of the old doctrines of negligence, common employment and assumed risk are eliminated” (6). This legislation, however,

was not premised upon an all-inclusive notion of worker, but rather was notably gendered, racialized, and classed (Storey, 2009). For example, occupational groups such as domestic workers and those in the farming industry were excluded from coverage, as Meredith believed there would be a lack of public acceptance to have such occupational groups included. As Storey (2009) argues, this “legislation aimed almost exclusively at the white male working body” (83).

Development of WCB and Growing Concerns about Occupational Disease: 1915 to 1970

As previously noted, when the WCA came into effect there were only six occupational diseases listed under Schedule 3 and these diseases had a relatively straightforward connection with occupational factors (multiple entries for diseases were for poisonings caused by a type of exposure). As explained by a lawyer interviewed,

back then there was a very narrow, a very clear-cut idea of a few things in the nature of occupational exposures that were seen as pretty well irrefutably contributing to health conditions [...] So you had this narrow range of health conditions with a narrow range of exposures.
(I 6)

While the legislative inclusion of occupational disease was narrow and straightforward when the Act came into existence, in the years following the Act's commencement there were constant discussions and concerns raised over amendments to include additional diseases in Schedule 3 and how occupational disease claims should be adjudicated. During this time period, three Royal Commissions on workers' compensation took place: (1) the Middleton Commission (*Report of the Commissioner in the Matter of the Workmen's Compensation Act*, 1932); (2) the Roach Commission (*Report of the Hon. Justice Roach, Commissioner Appointed to Inquire Into and Report*

Upon, and to Make Recommendations Regarding the Workmen's Compensation Act upon Subjects other than Detail Administration, 1950), and (3) the McGillivray Commission (*Report of the Royal Commission in the Matter of the Workmen's Compensation Act*, 1967). To provide some insight into the types of issues being raised in relation to occupational disease, I will first review the discussions on occupational disease in each of these Commissions and second, I will spotlight concerns over silicosis as an occupational disease.

A central concern throughout these three Commissions in relation to occupational disease was whether or not the Schedules should be amended to include additional diseases. The Middleton Report emphasized how “it is necessary that great care be taken to prevent the inclusion of diseases which cannot be properly regarded as industrial disease but which are mere misfortunes liable to overtake any individual, or which are the result merely of advancing years” (1932: 14). Premised on this claim, Middleton did not think that diseases such as heart disease or arthritis should be recognized as industrial diseases, although he did recommend that infected blisters, cancer arising from the manufacture of pitch and tar, dermatitis, and bursitis be added to Schedule 3. The Roach Report tackled the issue of whether or not the Board should have the legislative powers to add diseases into Schedule 3 (which at the time, the WCB did not have). Despite the fact that a few years following this Commission, the WCB was granted such powers, at the time Roach did not believe they should have the ability to do so. Finally, the McGillivray Report acknowledged that since the disease no longer had to be listed in the Schedule to be eligible for compensation, the WCB had begun treating Schedule 3 “as a working guide” (113) as it had been shifting towards the use of policies instead.

McGillivray further acknowledged that the shift away from updating the Schedule was a contested practice as not everyone agreed with it. Significantly, some medical doctors justified the practice of reducing the number of new entries into Schedule 3, arguing that it would not be feasible to continue scheduling diseases due to the vast amount of occupational exposures. As Dr. Powell (the Director of Medical Services of the WCB at the time) stated:

the Board's reluctance to continue to add diseases to the Schedule was by reason of the difficulty in listing all diseases that can arise in industry, there being at least half a million materials and substances in use in industry today whose use by employees could give rise to industrial disease. (113)⁴⁴

However, organized labour opposed it, with the argument that workers would be systemically disadvantaged by not having the Schedule updated with disease entries on a regular basis, as this would hinder possibilities for diseases to be recognized as occupationally related. Ultimately, McGillivray decided not to make any recommendations for additions into Schedule 3.

While these discussions over adjudicative matters were occurring, silicosis as an occupational disease was causing a significant amount of concern for many social actors. The mining industry was particularly worried about the economic implications that could result from not having silicosis covered by the WCA. This was due to the magnitude of

⁴⁴ This sentiment was also expressed by doctors in governmental positions, such as Dr. Mastromatteo and Dr. Sutherland from the provincial Department of Health (the provincial agency responsible for occupational health research at the time). As Dr. Mastromatteo argued, "I think I have said here there are so many chemical agents that it would be very difficult. You raised the question that if something is not scheduled then, by inference, it may not be covered. I think that it would be a very difficult task to schedule every occupational disease. There are books on industrial diseases and there are literally thousands of diagnoses made which could pertain to occupational disease. I think the schedule is useful in a historic way in setting down the well-known occupational diseases and this business of presumption is an important one, but I think the blanket coverage is of a sufficient latitude for people with experience and the ability to investigate to render, I think, valid opinions on the relationship between the job and the healthy condition or normal condition or unhealthy condition reported" (Ontario., McGillivray, 1950: 114).

the problem of silicosis, and therefore industry representatives pushed for silicosis to be incorporated into Schedule 3 of the WCA in the 1920s as a way to reduce economic risk for the industry. The industry also took the position that workers should be medically screened before commencing work in the mines, so that such workers could be licensed as suitable for work on dusty occupations.

The WCB was aware of the high number of incidences of silicosis amongst miners in Ontario: “the Department of Industrial Hygiene found that in the mining camps a very considerable number of miners were suffering from a disease known as silicosis” (WCB Annual Report, 1926: 6). In 1926, Schedule 3 was amended to specifically include “silicosis” for those working in the mining industry. Although other diseases such as pneumoconiosis and caisson disease were also added, the WCB stated that “[t]he most important of these is silicosis” and that “it felt that immediate action should be taken to place this insidious disease as an industrial disease” (ibid.). *The Ontario Mining Act* was passed in 1928, making testing for silicosis amongst workers a mandatory process. As described in the 1928 WCB Annual Report, this required underground workers to have a medical examination “by a medical doctor appointed under the provisions of The Workmen’s Compensation Act at least once in every twelve months, and the Board is authorized to appoint the necessary medical officers to carry out the provisions of this Act” (7). Nevertheless, concerns by the mining industry and the WCB continue to be expressed following the incorporation of silicosis to Schedule 3 and the “alarming” number of silicosis cases.⁴⁵

⁴⁵ See for example, “Silicosis in Ontario Mines” (File RG 13-27, b222096: “Silicosis”. Retrieved from AO in Toronto, ON) and the WCB Annual Report of 1933. A further point here is a methodological one. The reason why industry and WCB concerns are noted is due to the lack of archival records on miners’

In response to such concerns, in the early 1930s research was being conducted by medical doctors from the McIntyre Porcupine Gold Mines Ltd. and the Banting Institute into the therapeutic effects of aluminum powder on animals. Based on these studies, they claimed there were “no deleterious effects on human lungs” and on March 5, 1943 it was decided that aluminum dust would be administered in the change rooms of silicosis-affected mines in Ontario as a therapeutic measure. While not being directly involved in the projects, Ontario’s Department of Health and the WCB were noted to have been consulted about this proposal and had also endorsed its application.⁴⁶ This ‘treatment’ and its claimed ‘therapeutic’ effects were highly controversial. Throughout the archival records reviewed, there was a lack of supportive data to indicate potential benefits of this practice and an underlying assumption that a lack of scientific evidence of harm equated to an absence of harm. As one interview participant explained, this was based on an illogical premise: “they were trying to protect your lungs with good dust from bad dust, if you can imagine the logic behind that [...] I think that’s the most ridiculous thing I’ve ever heard” (I 2).⁴⁷

In sum, while the original WCA included only a short list of diseases, there were discussions and contestations over which diseases should be listed in Schedule 3 and how such diseases should be adjudicated, especially once the policies came into effect and

concerns, which inevitably existed but were not adequately recorded in the files I reviewed. This further points to the necessity of methodologically approaching archival records as partial historical accounts.

⁴⁶ ‘Brief on Silicosis and Aluminum Therapy for Presentation to the Honourable Mr. Frost, Minister of Mines of the Province of Ontario, November 1, 1945, by W.D. Robson, M.D. (File RG13-13, b237405: “Silicosis IV”. Retrieved from the AO in Toronto, ON.) and, Letter to L. M. Frost, Minister of Mines from E. L. Longmore, President, Ontario Mining Association, September 6, 1946. (File RG13-13, b237405: “Silicosis IV”. Retrieved from the AO in Toronto, ON)

⁴⁷ To the present day, concerns are being raised over the neurological and respiratory diseases that workers faced in proceeding decades, and whether their exposure to aluminum dust contributed to these health effects. One notable example of this are the efforts of the McIntyre Research Project in collecting data on miners exposed to aluminum dust through these practices.

once the Board was granted the power to add diseases to Schedule 3. As we can see from this discussion, both employers and workers initially expressed interest in having diseases added to Schedule 3, albeit for differing reasons. Employers saw it as a way to limit their liability for the alarming number of occupational diseases (such as silicosis) arising from industrial labour processes, while workers sought the incorporation of diseases into Schedule 3 as it would provide legal recognition of a disease as occupationally related.

The Tumultuous Years: 1970s to mid-1990s

The period starting around 1970 encompassed a whirlwind of activity focused on issues of occupational disease, including strong labour activism and political uptake. As one participant described it, this was “a stage where there was a real uproar in political activity around occupational health and safety. During the 70s, the NDP captured that as their issue, and the labour movement made it a very politically charged issue” (I 12).

In discussing the history of occupational disease in Ontario, multiple interview participants identified the events that unfolded around the hard rock miners as a key historical moment that triggered a notable amount of political action around occupational health issues. Uranium mining commenced in the 1950s in Northern Ontario, and union concerns over occupational health quickly followed, with mounting union pressure to address such issues taking place by the 1960s (MacDowell, 2012). Despite continuous attempts by the United Steelworkers (USW) to gain information from the employers and the government about the hazards of working in the mines, union representatives were not given any information about these matters. As MacDowell (2012) notes, “[g]overnment agencies were indifferent when the union first requested proper medical examinations of miners and information about the mines’ air quality” (92).

Although the government was unresponsive to the issue of hazardous working conditions in mines, this did not mean that knowledge about occupational health issues for miners did not exist. Studies on occupational cancers amongst hard rock miners were being conducted but the findings of these studies were not being made known to the union representing the workers (the USW) or the workers themselves. The USW found out about the hazardous nature of the radiation and other exposures in the mine by chance when representatives attended an occupational health conference in France. At this conference, there was a presentation on a study done by the Ontario Ministry of Health on the high incidences of cancer amongst miners working in Elliot Lake. As once participant described this moment:

It's interesting, you know how the workers found out that there was something amiss with the exposures, particularly the Elliot Lake miners? The company had maintained there was no problem with any of this stuff but one year the health and safety committee of the Steelworkers Local 6500 was sent on a junket in Europe to attend an occupational health conference. And they're sitting in the room and all of a sudden this presenter starts presenting data on their mine showing the cancers. That's how they first heard of this [...] This is how they found out that they were at risk. It confirmed what their suspicions were. (I 12)

The way in which such knowledge was gained, and the initial suppression of its existence, was a key factor that led the miners to a wildcat strike in 1974. These actions by the government and employer, along with the response from labour, led some interview participants to identify this as a key historical moment that brought occupational disease issues to the forefront of political attention:

Certainly in Ontario, the genesis of the modern occupational disease or occupational health movement – regimes, rights, all those things – starts really in Elliot Lake and Northern Ontario with the struggles of the hard rock miners. They were the engine, the driving force, that drove the

whole thing probably, certainly for the first five years, maybe even longer [...] I think this was *the* key moment; this is the genesis of the movement. I mean, not that there weren't other places where workers were fighting around health and safety but their actions provided the fuel for change. (JB)

This one, it tells the most vital story of all. Basically if you could imagine in the middle of the Cold War, these miners shut down the Western world's most significant source of uranium. They went on a wildcat strike and they said "we are not taking it anymore". (I 6)

The political impacts that stemmed from this moment were significant. An initial response was the initiation in 1974 of the *Royal Commission on the Health and Safety of Workers in Mines*. Professor James Ham from the University of Toronto was commissioned to lead this inquiry, with hearings commencing on January 14, 1975 in Elliot Lake. In 1976, the Commission's report was submitted with the general findings confirming the increasing public concern around health and safety issues in the mines.

A key concern identified by Ham was the weakness of what he referred to as the 'responsibility system' around occupational health and safety matters, i.e., the "complex structure of relationships between worker, supervisor, management, union, industry, government, and the public" (Ontario, 1976: 5). Two central problems were identified in this regard: (1) the divisions between governmental jurisdictions, and (2) the lack of efficient opportunities for participation on behalf of labour, where participation was premised upon the three interconnected components of knowledge, contributive responsibility, and direct responsibility:

1/ knowledge – having ready access to information about actual and expected conditions at the workplace and about the state of the health of the workers; 2/ contributive responsibility – to provide individual and collective insight on problems on the basis of knowledge and work experience; and 3/ direct responsibility – to make operative decisions that influence conditions at work (Ontario, 1976: 6).

In moving forward, Ham's vision rested on the themes of co-operation, openness, responsibility, and risk. More specifically, an important issue that Ham identified was the lack of openness due to the suppression of information regarding health issues, thereby making risk (in particular, knowledge about risks) a key matter for concern. Significantly, he emphasized that determining what constitutes an 'acceptable risk' is not simply a scientific or technical issue, but a social and political one as well:

It is desirable that the real risks be reduced. But the operative level of risk of industrial disease and injury is not settled simply by setting environmental standards. It is determined by individual, legislative, and social judgments as expressed in work practices and their supervision, in regulatory standards, and processes of enforcement, and in practices of compensation. All these matters are pertinent and should not be considered in isolation (Ontario, 1976:95)

As a result, Ham's recommendations included the need for various social actors (management/employers, labour, government) to "share a common framework of understanding of the risks of work and their consequences in injury and disease" (Ontario, 1976:250). This, however, was not seen as possible unless workers and unions had access to decisions and knowledge about risk: "[o]penness, contributive participation by workers, and thorough accountability can re-establish the self-regulatory character of the internal-responsibility system at the company level as they key to the control of risks at work in a technologically complex future" (258). This notion of a self-regulating internal responsibility system was a key contribution by the Ham Commission in addressing matters of occupational health and safety, especially in conjunction with recommendations for the right to know and right to participate in joint health and safety committees, which were enacted in the OHSA along with the right to refuse unsafe work.

The Ham Commission generated a whirlwind of media attention, political support from the NDP, and was largely considered a win for labour. While the idea behind the rights to know and to participate were not novel as this was already taken up by Bobb Sass (former deputy Minister of Labour under the Blakeney NDP government) in Saskatchewan, Ham's recommendations were seen as progressive in addressing issues of occupational health and safety, especially in terms of recommending labour participation in such matters. The political context was particularly significant as the Conservative government held political office in Ontario, but was perceived to be losing their stronghold to the NDP under the leadership of Stephen Lewis. Importantly, Lewis' NDP government made occupational disease one of their key platform issues. As one participant elaborates:

So Stephen Lewis saw the unbelievable injustice of it and saw that the government had been colluding with the employers, not protecting occupational health or the exposed workers. The NDP started exposing publically these injustices. Occupational health became a huge issue in the legislature, and the Premier Bill Davis, who was leading a minority government position, was concerned that his government might fall. So at that historical moment the workers power was significant, and of course the media picked up on this, and there were all these stories on miners dying and people contracting lung cancer (JB).

In reviewing archival records, many news articles at the time spoke to the impact of the Ham Commission and how the Conservative government and industry representatives publically put forth an agreeable response to it. A key reason for this was that it would have been difficult to politically contest the premises of Ham's recommendations while maintaining a favourable public position, especially considering how the NDP was gaining traction as the opposition party. An opinion editorial piece in

the *Globe & Mail* newspaper succinctly captured the political tensions facing the Conservative government at the time because of this Commission:⁴⁸

it's a new world this week, with Cabinet ministers falling upon the Ham Report with glad cries and vows to implement its recommendations. They could hardly do otherwise. The Ham proposals are so firmly based on simple justice and good sense that they could hardly be resisted. And that's not even considering the political considerations. These are heavy. This has been Stephen Lewis's issue [...] This one issue may have done more to put a human face on the NDP and its once-frightening leader than any other [...] The Tories just can't afford to let that image persist.⁴⁹

The momentum generated through labour activism and the recommendations of the Ham Commission continued throughout the 1970s and 80s. OHSa came into effect in 1979, and it incorporated the notion of an internal responsibility system through the right to know, right to participate, and right to refuse. In 1988, WHMIS was established in order to provide information to workers and employers about hazardous exposures in Canadian workplaces. The impact of WHMIS is that it allows workers to be better positioned to receive information about occupational hazards, through mechanisms such as safety data sheets and product labeling.⁵⁰

⁴⁸ This tension was also prominently noted in other archival documents. For example, in a 1976 internal memo by George Jewett, Director of the Division of Mines, suggestions were made on how to formulate a brief in response to the Ham Commission in a way that casts the government of the time in a favourable light: "The positioning is quite simple: the brief is intended to pre-empt much of the ground now occupied by our critics. This involves an admission of the central shortcomings of our policies to date in that they did not adequately involve the miners themselves in determination of questions of health and safety. The Ministry has recognized this, and has clear forward policies to rectify it. In view of this, there is no reason not to make these admissions. Because we are making these sound changes, we will be able to emerge as "reformers" while our critics remain merely critics [...] There is no question that this has become a political issue" ('Ham Commission Brief: Preamble, Closing and Structure' Memo to Doug Scott from George Jewett, Executive Director, Division of Mines. May 8, 1975. (File RG 1-525, box 1: "Ham Commission – Occupational and Environmental Health Royal Commission." Retrieved from the AO in Toronto, ON).

⁴⁹ Webster, N. (1976, August 26). 'Dandy Issue for Poles [sic]'. The *Globe & Mail*. (RG 1-525, Box 1: "Ham Commission – Occupational and Environmental Health Royal Commission." Retrieved from the AO in Toronto, ON)

⁵⁰ Although as will be discussed in chapter four, WHMIS does not necessarily translate with workers being given adequate information about hazardous exposures in the workplace.

A subsequent hazardous exposure that picked up traction in relation to occupational disease was asbestos, especially in relation to the Johns-Manville plant in Scarborough, which was Stephen Lewis' political riding. In connection with these increasing concerns, Professor J. Stefan Dupré of the University of Toronto was commissioned to lead a Royal Commission on asbestos in the early 1980s, with the final report of findings and recommendations (*Report of the Royal Commission on Matters of Health and Safety Arising from the Use of Asbestos in Ontario*) released in 1984. The Dupré Commission was quick to identify the Johns-Manville plant as “a world-class occupational health disaster” (Ontario, 1984: 6), and noted that the recognition of asbestos as an occupational health hazard was not a new phenomenon. Rather, at the time of the Commission, the claim that asbestos was a health hazard “had long been an established fact” (74).

While the Dupré Commission encompassed a broader focus on asbestos, occupational concerns and the workers' compensation were not only spotlighted within the inquiry but it was also acknowledged that “[n]o issue before this Commission proved more sensitive than those posed by workers' compensation” (Ontario, 1984: 17). One issue was the WCB's arbitrariness in decision-making processes over asbestos-related diseases:

The Ontario WCB is a paradox. From one perspective, it is, in the sphere of asbestos disease, one of the most progressive compensation agencies in the world. This perspective is valid [...] From the other perspective, the Board appears arbitrary and capricious, lacking in top-down direction and procedural fairness. Regrettably, we find this latter perspective eminently valid. (ibid.)

Another key issue points to how occupational health concerns are often approached, where the evidence about harms has to accumulate before any sufficient action is taken

even though suspicions are raised and the people suffering the ill-health effects have experiential knowledge about the exposure's harms. As Dupré elaborates:

[t]he asbestos story demonstrates that the process of hazard identification can unravel slowly and that regulatory responses can lag behind the knowledge that slowly accumulates while a mounting toll of disease and death is borne by workers who are thereby cast in the role of human guinea pigs. (Ontario, 1984: 21)

In addition to the Dupré Commission there was a considerable amount of activity around, and inquiry into, the question of occupational disease in relation to workers' compensation throughout the 1980s. On January 30, 1980, Professor Paul Weiler was appointed by the MOL to conduct a private inquiry into workers' compensation in Ontario and put forth recommendations. The mandate for his first report, entitled *Reshaping Workers' Compensation for Ontario*, focused largely on the broader decision-making structure, compensation scheme and financial considerations of the workers' compensation system, with brief comment towards occupational disease. He notes, for example, some of the particular difficulties that diseases pose for the workers' compensation system and whether or not it remains appropriate to use the notion of 'work-relatedness' as a determining factor for assessing disability payments.

Weiler took up the issues around occupational disease more extensively in the second part of his report, *Protecting the Worker from Disability: Challenges for the Eighties*, which drew from the research done by Annallee Yassi that aimed at providing "the scientific background necessary to appreciate some of the complexities involved in compensating occupational diseases" (Yassi, 1983:iii). Weiler (1983) highlights how occupational disease has a type of second-class status within the workers' compensation system in relation to injuries resulting from 'accidents'. He identifies the many

difficulties encompassed in recognizing diseases as occupationally related (e.g., long latency period), and the challenges that the workers' compensation system was facing in adequately processing occupational disease claims:

For a long time, this did not greatly trouble workers' compensation in Canada because there was little popular realization that the job was much of a factor in such diseases. By the Seventies, this age of innocence was over. The number of such disease claims has risen every year, nowhere more than Ontario. But they regularly encounter major legal and medical hurdles in being fitted within the traditional boundaries of a program for compensation occupational disabilities. The result has been a highly controversial caseload, lengthy delays, extensive appeals, and an overall rejection rate of well over 50%: all in all, eerily reminiscent of the tort regime for industrial accidents in the early 20th Century. (Weiler, 1983:10-11)

One important issue in this regard is how scientific evidence was being used in the compensation framework, and the overall disjuncture between scientific and compensation perspectives in evaluating evidence. Weiler (1983) identifies the difficulty in trying to untangle occupational from non-occupational factors in disease etiologies, and critiqued the approach of waiting for "unimpeachable scientific evidence" (40) when making decisions about the connections between occupational factors and a disease due to the inevitability of unknowns in scientific knowledge:

In a world of inevitably limited knowledge, insisting on rigorous scientific backing for either general disease policies or adjudication of individual claims will inevitably tilt the balance against recognition of real occupational disease cases (as has been shown again and again by subsequent evolution of both scientific knowledge and the Board's guidelines themselves). (43)

The theme of openness (or, more accurately, the lack thereof) also came up in the Weiler Report, especially in relation to the lack of openness of the WCB in their decision-making processes. He argues that this "closed system" is deficient in that it

obscured the policy-making dimensions while simultaneously illuminating the scientific aspects encompassed in these processes, thus making it appear as a scientific issue. Such an approach, he argued, does not provide meaningful opportunity for others to play a role in decision-making processes and that “like many public problems, issues of science policy are far too important to be left solely to medical experts” (1983: 44).

Notable changes occurred following the Weiler Report, and it is important to situate these changes in the broader social and political context, as there was a constellation of factors that propelled action to make such changes possible. Of particular significance was the aforementioned passage of Bill 101 (*An Act to Amend the Workers’ Compensation Act*) on December 14, 1984, as this Act encompassed notable administrative and regulatory changes. This included the establishment of the Industrial Disease Standards Panel (IDSP), the creation of the Workers’ Compensation Appeals Tribunal (WCAT), and the formation of the Office of the Worker Advisor and the Office of the Employer Advisor. As was noted in the WCB Annual Report of 1984, “[i]n addressing the Board’s administrative practices and structure, as well as a variety of benefits to injured workers, Bill 101 contains the most sweeping changes to workers’ compensation in this province since the Workers’ Compensation Act came into effect in 1915” (3).

While progressive changes and important inquiries were occurring, political economic shifts towards neoliberal ideology and policy were also gaining traction during this time period. The WCB had begun to focus on its unfunded liability in the 1980s, as evidenced through the incorporation of this issue in its annual reports. In the early 1990s, the WCB stated that “doing more with less” would be a goal in its operating planning

process (WCB Annual Report, 1993). Suspicion towards workers who were allegedly ‘faking the system’ was being positioned as a key concern, with the WCB exclaiming that it would “take a lead role in recognizing and aggressively addressing all types of fraud”, and to do so it would establish a Special Investigations Branch aimed at “investigat[ing] suspected cases of revenue, benefit, supplier, service provider and employee fraud” (WCB Annual Report, 1994: 11). As we will see in the next section, such discourses came to dominate discussions of workers’ compensation, as they became the key cornerstones of the Harris Conservative government.

Challenges to Occupational Disease Recognition: mid-1990s to Present

The mid-1990s marked a general turning point in the momentum that occupational disease issues gained in the preceding decades. As one interview participant reflects,

“[i]n the 60s, 70s, and 80s there was a real interest in long chronic diseases. The interest has now reverted to accidents and things like that. So right now in the WSIB and in the Ministry of Labour the emphasis is on slips, trips, and falls, musculoskeletal, accidents things like that. People aren’t really interested in occupational disease” (I 3).

While one issue is the relative lack of media and public attention to (some) occupational diseases in this period, participants also pointed out that even if increasing awareness was being raised, there remains the question of whether there would be enough organization to actually mobilize these issues into political action.

The Harris Conservative government is often identified as a turning point in the political attention to occupational disease issues. This government stepped into provincial office on June 26, 1995 and became well known politically for its strong neoliberal and pro-business approach, as exemplified through Harris’s platform *The Common Sense*

Revolution. With regards to workers' compensation, the government placed the spotlight on fraudulent compensation claims and the alleged need to cut compensation benefit levels (and, simultaneously, employer premium levels). The rationale behind this was premised on discourses of fiscal efficiency and individual responsibility through labour market participation, with the WCB's unfunded liability being used as justification for the alleged necessity of such actions.⁵¹

The Harris government imposed funding cuts that resulted in the disassembling of recently established agencies and initiatives aimed at knowledge production around occupational health and safety issues. These actions included shutting down the ODP (formerly the IDSP) and aborting the Royal Commission on workers' compensation that was originally announced in 1994. Rather than continuing on with this Commission, Harris had appointed Minister Cam Jackson as responsible for reviewing the workers' compensation system and compiling a report of findings and recommended reforms, which was submitted in February 1996 (*Report on New Directions for Workers' Compensation Reform*). This report served as the basis for further legislative changes to workers' compensation, especially in its influence on Bill 99 (*Workers' Compensation Reform Act, 1996*), which included the disbanding of the ODP. Such actions stirred criticism over how the government was attempting to shift the system from a compensation framework to an insurance-oriented one, as evidenced through the name change of the WCB to the WSIAT, where "compensation" for "workers" was replaced with "insurance" in relation to the "workplace".

⁵¹ Mike Harris held provincial office as the Premier of Ontario from June 26, 1995 to April 14, 2002, when he was replaced by Minister of Finance Ernie Eves, who was soon defeated by Liberal leader Dalton McGuinty on October 23, 2003. Regardless of changes in the political party, the neoliberal ideology of the Harris era continues to have a strong influence on workers' compensation in Ontario.

Although there was a general lull in terms of inquiries on occupational disease in the latter half of the 1990s due to these governmental changes and political economic shifts, in 2000 the WSIB adopted an Occupational Disease Response Strategy. As a result, the following year an Occupational Disease Advisory Panel (ODAP) was established. The purpose of the ODAP was “to provide advice to the Workplace Safety and Insurance Board (WSIB) on the use of scientific evidence and legal principles in the compensation of occupational diseases (Smith, 2005:1). While the Panel membership initially consisted of representatives from labour, employers, MOL, Institute for Work and Health, and WSIB staff, at the last minute a lack of consensus emerged between labour and employer representatives. An interview participant discussed with me how the reason behind this was a last minute substitution of one of the employer representatives, who refused to consent to items that had already been negotiated and agreed on. For this reason, the Chair of the Panel moved forward with the Report, but rather than a consensus panel report it became the Chair’s report.⁵²

In May 2004, a draft copy of this report (entitled *Draft Report of the Chair of the Occupational Disease Advisory Panel*) was released for public consultation, resulting in 96 oral presentations and 77 brief submissions. The submissions included responses from employers, labour, individual workers, community organizations, and health care professionals working in industry, academia, and labour organizations. There was a notable divide in the responses between employer- and labour-oriented responses. One key site of contestation was over the level of contribution that occupational factors should have in relation to the development of a disease. Employers emphasized that occupation

⁵² This situation points to growing concerns over how consultations can be a mechanism through which one is constantly driving up dead-end roads rather than attaining action on the issue at hand, as exemplified through the notion of being “consulted to death” (Smith, 2000)

should be identified a *primary contribution* (the main factor), while labour supported that the current legal standard which specified occupation as a significant contribution (it does not have to be the main factor). The *Final Report of the Chair of the Occupational Disease Advisory Panel* was released in 2005.

Although some participants identify the current period as politically quieter in terms of occupational disease (and occupational health more generally), this is not to imply that there is a lack of activity. Two recent events have garnered steady media and political attention: (1) the occupational disease claims stemming from Peterborough's General Electric (GE) plant, and (2) the work done by the McIntyre Powder Project and the Occupational Health Clinics for Ontario Workers to develop data and better understand the health effects of the aforementioned aluminum powder that was administered to miners in Northern Ontario. While there are important distinctions between both cases, a connecting theme is the struggle to attain recognition for diseases (such as cancers, respiratory diseases, and neurological diseases), and the challenges of facing the barriers of unknowns in doing so. For example, despite long-term knowledge of the health issues existing at the GE plant (DeMatteo et al., 2017; see also Mojtehdzadeh, 2016 December 17), GE workers have been told that there is insufficient evidence of a connection between the exposures and diseases.⁵³ Former miners who were exposed to aluminum dust have confronted a similar narrative. A recent WSIB review on the adverse health effects of occupational aluminum exposure concluded that their

⁵³ However, as noted in the Preface, as of December 2017 the WSIB had reviewed 47 of the 250 cases it said it would re-open, and overturned the initial decision in 30 cases. See, for example: Mojtehdzadeh, S. (2017, Dec. 17). "WSIB reverses majority of denied GE Peterborough cancer claims" <https://www.thestar.com/news/gta/2017/12/17/wsib-reverses-majority-of-denied-ge-peterborough-cancer-claims.html>

Thomas, J. and Davis, G. (2017, Dec. 19). "WSIB reverses decision on 30 occupational disease claims against Peterborough General Electric" <https://globalnews.ca/news/3923655/wsib-reverses-decision-on-30-occupational-disease-claims-against-general-electric-peterborough/>

“findings cannot conclusively state whether or not aluminum is a causative agent in development of adverse health conditions, [and] the evidence considered in total has not supported a link” (Ferguson et al., 2017: 70).⁵⁴ Nevertheless, in both cases there has been ongoing action addressed at attaining recognition and appropriate compensation for affected workers or their families.

Conclusion

Occupational disease was incorporated into workers’ compensation legislation ever since it came into effect in 1915. Indeed, Sir William Meredith saw compensation for occupational disease as a right that workers should have if their employment adversely affected their health. When the WSIB and WSIA were first enacted, the short list of six occupational diseases incorporated into Schedule 3 was fairly straightforward in terms of the etiology between occupational factors and disease. Nevertheless, the recognition of occupational disease has been a site of contestation ever since occupational diseases were first introduced into the original Act. Notable changes to the way occupational diseases are recognized through the workers’ compensation system include additions to Schedule 3, the establishment of Schedule 4, and the shift to using policies and case-by-case adjudication for occupational disease claims.

Although occupational disease is often thought of as solely a medical-scientific-technical issue, as this chapter illustrates there is a plethora of social factors that influence

⁵⁴ The findings of the WSIB review have been contested, and on October 11, 2017 the MOL announced that the Ontario government would provide \$1 million of funding to OHCOW “to review worker exposure to McIntyre Powder” (MOL, 2017 Oct. 11:np). See: MOL. (2017, Oct. 11). “Ontario providing funding to review impact of McIntyre Powder on worker health” <https://news.ontario.ca/mol/en/2017/10/ontario-providing-funding-to-review-impact-of-mcintyre-powder-on-worker-health.html>
See also: Kelly, L. (2017, Sept. 19). “‘Fired up’ to keep searching for justice: no cause found between McIntyre Powder exposure and neurological disease in miners, says WSIB.” <https://www.northernontariobusiness.com/industry-news/mining/fired-up-to-keep-searching-for-justice-718317>

the recognition of occupational disease. Strong labour activism, political support, and media attentiveness can lead to broader recognition of occupational disease, but these elements are not historically static. Neoliberal ideology and policies, accompanied by the strengthening of capital's position and the regression of public support for workers' causes (as seen through the emphasis on individual responsibility that parallels the backlash directed at organized in recent decades), construct notable barriers for the recognition of occupational diseases. These barriers include the dismantling of knowledge production about occupational disease, as exemplified through the abolishment of the ODP in the mid-1990s, as well as the lack of public inquiries into workers' compensation and occupational disease in the past three decades.

The complexities of unknowns are pivotal in knowledge contestations about occupational disease throughout these social and historical processes. In the following three chapters I will elaborate on the challenges of recognizing occupational diseases by analytically engaging with three processes of unknowns: uncertainty, absences, and closure. Each chapter aims to highlight multiple ways that unknowns complicate decision-making processes about occupational diseases, and how the impact of such processes tends to obscure connections between occupation and disease.

Chapter Four:

Uncertainty

The focus of this chapter is on how uncertainty complicates processes of recognizing diseases as occupationally related. I consider the ways in which uncertainty may be actively emphasized and constructed, while also remaining cognizant of the regularity of its existence. Paying attention to these characteristics of uncertainty acknowledges the strategic usefulness of uncertainty in knowledge contestations for some social actors (Michael, 2008a; Michael, 2008b; McGoey, 2009), as well as how there is always a need to address and respond to uncertainty in decision-making processes as the elimination of uncertainty is an unachievable goal. As with unknowns more generally, uncertainty can possess positive or negative components, and what is interpreted and experienced as positive or negative is contingent on one's social position (Hess, 2015). The strategic value of uncertainty is not a universal one, as certain configurations of uncertainty can benefit some social groups at the expense of others. In the context of occupational disease recognition, I argue that uncertainty is often used as a tool to obscure the recognition of a connection between a disease and an occupation, resulting in the de-legitimization and/or denial of compensation claims. In an era of neoliberalization, the usefulness of uncertainty has been particularly beneficial for employers seeking to reduce their premium costs, and for a workers' compensation system strongly focused on matters of financialization.

The organization of this chapter is as follows: I begin by putting forth a conceptualization of scientific uncertainty that takes into account explicit and subtler

ways in which uncertainty could affect the recognition of occupational diseases. I follow with three sections that look at the strategic value of uncertainty in creating barriers for the recognition of occupational disease: (1) by being emphasized in order to continuously sustain the openness of scientific controversies; (2) by being suppressed in order to avoid sparking controversy; and (3) by making demands for certainty in order to raise the standard of proof.

Prior to engaging in this discussion, recall how a key issue to keep in mind when analyzing unknowns is the question of intentionality. As noted in the introduction chapter, an important consideration of ignorance studies is the methodological challenge of determining whether or not ignorance is intentionally constructed or mobilized, or if such practices are unintentional. This is a pertinent point to keep in mind when discussing the complexities of unknowns, including when examining the complex uses of uncertainty, as in many situations it simply may not be possible to establish intentionality. This was a methodological tension experienced throughout this research. In some historical cases, intentionality can be assessed because the events have already played out and can be examined through a contemporary lens; but in many other instances it is difficult to obtain sufficient data to ascertain whether a practice was intentional or unintentional. Therefore, the discussion that follows is not primarily focused on making claims about intentionality. Rather I consider how social practices that mobilize uncertainty impact the recognition process, as well as the material consequences that result from how uncertainty is drawn on and addressed in these processes.

Conceptualizing Uncertainty

Uncertainty is generally referred to as a state of feeling unsure about something in a context where there is a lack of knowledge. The Cambridge Dictionary definition of uncertainty is “a situation in which something is not known, or something that is not known or certain” (np). Terms such as doubt, ignorance, ambiguity and unpredictability are often used as synonyms of uncertainty, although it is important to recall Croissant’s (2014) discussion about the relevance of context when conceptualizing unknowns. While uncertainty and doubt both commonly refer to a lack of knowledge, there is a nuanced dimension to doubt in that it specifically denotes hesitancy to believe something. This is observed in the Cambridge Dictionary’s definition of doubt: “(a feeling of) not being certain about something, *especially about how good or true it is*” (np; emphasis added). While dictionary definitions provide a starting point in conceptualizing uncertainty, as with other processes of unknowns, uncertainty may be better understood analytically as a more complex social phenomenon than the simple negation of knowledge. With a particular focus on scientific uncertainty, in this section I present a conceptualization of uncertainty that takes into account the dimensions of regularity and active reinforcement.

In contrast to popular images of science that represent these knowledge practices as definitive, uncertainty is a regular feature in science (as well as knowledge disciplines more generally). A central component of scientific methodological designs is to estimate, control, and quantify uncertainty as best as possible, while acknowledging that complete certainty is not possible to produce (Briggs et al., 2009; Seely, 2013). This can be seen in the use of statistical methods, where confounding variables are controlled for and

probability values are calculated in order to determine the likelihood of a cause-and-effect relationship between variables.

The role of uncertainty in scientific knowledge about diseases is particularly complex due to methodological limitations, since it is not ethical to deliberately expose humans to substances that are suspected of contributing to the development of disease (Michaels, 2008b). Instead, knowledge about disease is produced through epidemiological studies by looking at exposures that have already occurred and/or through animal laboratory studies (*ibid.*). The effects of low-level exposures are particularly contested, as experts diverge in their positions of what constitutes a ‘safe level’ of an exposure, or if a safe level can even be established at all (Alaimo, 2010; Murphy, 2006; Vogel, 2013). Scientific uncertainty in knowledge production about disease is also complex due to the vast amount of chemical exposures people encounter and the additional challenge of producing knowledge about interactions among these exposures. The regularity of uncertainty is important to account for because, as Alaimo (2010) notes in relation to knowledge about carcinogenic chemicals, “even after bracketing the intentional production of ignorance, uncertainty, and blatant misinformation, the fact remains that it may not be possible to predict the staggeringly vast number of chemical interactions that may occur” (20).

Although there is a regular characteristic to uncertainty in the sense that not everything can be known, ignorance studies scholars emphasize that what is not known (or claimed not to be known) is not simply a natural by-product of knowledge practices. This is perhaps most explicitly exemplified through industry strategies aimed at contesting scientific studies that suggest a connection between the industry product or

employment processes and ill health outcomes. Michaels (2008a; 2008b) refers to such strategies as “manufacturing uncertainty” to illustrate how uncertainty in these contexts is not merely a lack of knowledge, but doubt that is actively produced. The notion of manufactured uncertainty also touches on the significant point that uncertainty is not absolute. Some social groups may have a sufficient amount of knowledge about health harms, but do not want other social groups to obtain this knowledge, as it would not be in the best interests of the former group to make such information known (Tuana, 2006). In looking at the pharmaceutical industry, McGoey (2009) similarly identifies how uncertainty can have a strategic value to powerful social actors through the notion of “capitalized uncertainty”. As McGoey (2009) elaborates, “[t]he term capitalized uncertainty encapsulates the strategy of purposefully exploiting scientific doubts over the risks of a commercial product or a course of action” (152).

In this chapter I focus on various strategies of uncertainty and how they are used in knowledge contestations as a way to complicate the recognition of occupational disease claims. The discussion illustrates the multiple dimensions of uncertainty by highlighting the different and nuanced ways that scientific uncertainty is deployed, as well as the variegated characteristics of uncertainty. These characteristics include regarding uncertainty as both a regular and a deviant feature in social processes, as well as the explicit and subtle ways that uncertainty is mobilized.

Emphasizing Uncertainty to Keep Controversies Open

The usefulness of uncertainty in complicating knowledge about health matters is prominent in scientific controversies over many commercial products and occupational practices, including tobacco (Michaels, 2008a, 2008b; Christensen, 2008), asbestos

(Egilman et al., 2003; McCulloch and Tweedle, 2008), and pharmaceutical drugs (Abraham, 1995; Langston, 2010; McGoey, 2009). A key concern in these controversies is how uncertainty becomes emphasized as a way to continuously fuel debate over linkages between a product or process and the ill health effects that result from it. By fueling uncertainty, the controversy is kept open through the presentation of conflicting knowledge claims, and this complicates classificatory, compensation, and regulatory decision-making processes. In this section I consider the ways in which a scientific controversy may be kept alive by looking at industry-influenced asbestos research in Canada; as well as through subtler approaches, such as how funding opportunities affect research decisions.

Although uncertainty about a linkage between a product or process may reflect current conversations in the scientific community (as scientific consensus is uncommon and difficult to achieve), the issue here are attempts to continuously encourage controversy by keeping it alive – to add fuel to the fire, so to speak. Processes aimed at keeping controversies open may be understood as “artificially maintained controversies” (Latour, 2004: 226-7). The tobacco industry epitomizes this phenomenon. It actively contested scientific knowledge throughout the twentieth century that suggested a causal connection between tobacco products and lung cancer (amongst other health problems).⁵⁵ Many industries in the present-day, such as petrochemical and sugar, follow the tobacco

⁵⁵ Michaels (2008a) succinctly describes the tobacco industry’s strategic approach in this regard: “For almost half a century, the tobacco companies hired consultants and scientists – swarms of them, in times of greatest peril – initially to deny (sometimes under oath) that smokers were at greater risk of dying from lung cancer and heart disease, then to refute the evidence that secondhand smoker increases disease risk in nonsmokers. The industry and its scientists manufactured uncertainty by questioning every study, dissecting every method, and disputing every conclusion. What they could not question was the enormous, obvious, casualty – the thousands of smokers who died every day from a disease related to their habit – but no matter. Despite the overwhelming scientific evidence, the tobacco industry was able to wage a campaign that successfully delayed recognition and victim compensation for decades – and it is still doing so” (4).

industry's lead by adopting similar strategies that aim to emphasize uncertainty as a way to cast doubt. These strategies can also be seen operating at broader levels of contestation beyond a specific product or industry. A contemporary example of this strategic deployment of uncertainty is the debate about climate change. Despite the existence of considerable scientific evidence to suggest human activity is contributing to global warming (Cook et al., 2013), the causal connection between human practices and environmental degradation is often denied by social actors who have an interest in maintaining uncertainty about such knowledge claims.

The strategy of emphasizing scientific uncertainty also links with paradigms of medical knowledge, especially with epistemologies about disease in relation to human bodies. In Nash's (2006) history of disease, she traces a shift from the dominant medical approach in the 19th century that saw the body as porous and permeable to the environment (the "ecological body") to the approach in the 20th century that situates disease as primarily manifesting within the body (the "modern body"). Alaimo (2010) draws on Nash's work to demonstrate how renewed interest in the 19th century notion of porous bodies causes unease for industries producing products that incite contemporary health concerns (such as the use of pesticides in agricultural production). In response, scientific uncertainty is drawn on as a way to blur connections between a company product and the suspected ill health effects. Alaimo argues, "[a]s a backlash against the reemergence of an older sense of permeable bodies, then, particular industries work to manufacture not only products and their often toxic by-products, but a state of uncertainty" (91).

An important example in the Canadian context that illustrates the strategic use of uncertainty is that of the contentious asbestos research carried out through McGill University and the Chrysotile Institute (CI). Despite declaring hazards of asbestos to be a well-known fact by 1984, the Dupré Royal Commission acknowledged and reviewed the contestations over chrysotile asbestos:

“[t]here is perhaps no issue related to the health effects of asbestos that has evoked as much debate as the issue of whether the amphiboles, and particularly crocidolite, are more hazardous than chrysotile or whether they are all equally hazardous” (231).⁵⁶

Claims over the risk of chrysotile asbestos continued to be contested through the generation of uncertainty about the harmful health effects of asbestos. The asbestos industry-scientific research partnership at McGill University and the government-funded CI are key sites that propelled uncertainty about the asbestos-disease link as they both argued for the safety of chrysotile asbestos.

The scientific and industry partnership at McGill University came to fruition in the 1920s and was later revitalized in the 1960s, with Dr. J. Corbett McDonald from the Department of Epidemiology being a leading figure and receiving significant funding from industry to conduct research on the health risks of asbestos (Ruff, 2014). Based on the data from this research, McDonald and his colleagues claimed that at certain levels chrysotile asbestos was innocuous and that smoking exposure was a more significant concern (Liddell, McDonald, and McDonald, 1997). Chrysotile asbestos is one of six types of asbestos, and the only one with fibres composed of serpentine minerals (the

⁵⁶ It is important to point out that the Dupré Royal Commission did not suggest a ban on chrysotile asbestos. As McCulloch and Tweedle (2008) elaborate, the Dupré Commission “to no one’s surprise gave a green light to Canadian chrysotile exports. This was the prelude to the formation in 1984 of the last major lobby group, the Asbestos Institute, based in Quebec” (102).

other five types of asbestos are amphiboles).⁵⁷ As Ruff (2014) explains, based on these findings the assumption was “[w]orkers could therefore be exposed to high levels of asbestos fibers per cubic centimeter of air without adverse affects to health” (1). This assumption points to how medical conceptualizations of “modern bodies” that are impermeable to their environment are drawn on in knowledge contestations, and the ways that these notions complicate the recognition of occupational factors that contribute to disease. Despite exposure to a known carcinogenic substance, the position of Dr. McDonald demonstrates that attempts were made to argue that somehow the body could be sealed off from the health risks these hazards pose.

The CI has a more recent (and shorter) history, as the Institute was established in 1984 and abolished in 2012. Originally named the Asbestos Institute, the CI was a non-profit organization funded by the Canadian federal and Quebec provincial governments. The CI was composed of representatives from the federal government, Quebec government, trade unions, and employers. The CI took the position that chrysotile asbestos could be safely controlled through a risk management approach and should not be banned in Canada. The CI, in arguing for the safety of chrysotile asbestos, heavily emphasized the distinguishing characteristic of serpentine. In addition to producing scientific studies to support their claims, the CI also actively contested or misrepresented scientific perspectives that countered their own. Even though IARC recognized chrysotile asbestos as a carcinogen as of 1987 (IARC, 1987: 106-109),⁵⁸ the CI sought to

⁵⁷ The five types of asbestos characterized as amphiboles are: crocidolite, amosite, anthophyllite, tremolite and actinolite.

⁵⁸ See also IARC’s 1977 monograph on asbestos (pp. 80-81) where the carcinogenicity of asbestos is discussed. In identifying evidence that supported the hazards of asbestos, including chrysotile asbestos, in 1977 the IARC concluded that a safe level to asbestos was not known: “At present, it is not possible to assess whether there is a level of exposure to humans below which an increased risk of cancer would not occur” (81).

complicate such findings by denying that sufficient scientific research exists on the hazards of this type of asbestos. These actions led the CI to claim “[t]he banning of chrysotile is inconsistent with all current scientific evidence.”⁵⁹

Scientific findings in support of the safety of chrysotile asbestos are in sharp contrast to the majority of scientific perspectives on the health risks of asbestos. The IARC position is that “[t]he associations between asbestos exposure, lung cancer, and mesothelioma have been well established in numerous epidemiological investigations” (2012: 234). While IARC recognizes the controversy over whether or not chrysotile asbestos is carcinogenic (see 2012: 236), based on extensive literature reviews of scientific studies, IARC classifies all six forms of asbestos as carcinogenic to humans.⁶⁰ The divergent position of the McDonald studies also led an epidemiologist (Dr. Egilman) from Brown University to examine published and non-published studies produced by the asbestos industry-McGill scientists partnership. Egilman et al.’s (2003) findings indicate that the industry-McGill studies were conducted “to develop contrary scientific evidence, hoping to sow doubt about the toxicity about various asbestos fibre types” (541). Recently, the contentious studies by the industry-McGill research partnership have received increasing public attention by being featured in a CBC documentary entitled “Fatal Deception”⁶¹ that aired in February 2012. The documentary was followed by demands to McGill University for an independent investigation of Dr. McDonald’s work,

⁵⁹ Chrysotile Institute, FAQs. Retrieved from: <http://www.chrysotile.com/en/faq.aspx>

⁶⁰ As also emphasized in a WHO document on chrysotile asbestos: “Bearing in mind that there is no evidence for a threshold for the carcinogenic effects of asbestos, *including chrysotile*, and that increased cancer risks have been observed in populations exposed to very low levels, the most efficient way to eliminate asbestos-related diseases is to *stop using all forms of asbestos*” (4; emphasis added).

⁶¹ “Fatal Deception” by CBC News can be accessed from: <http://www.cbc.ca/player/play/2196289159>

including the demand by the international scientific community for McGill to “sever ties with the asbestos industry” (Beaudin, 2012 February 12).

This broader level of how uncertainty becomes deployed in knowledge contestations over the hazards of substances connects with more local levels of occupational disease recognition. Studies that support the safety of a hazardous substance may be mobilized into legal decision-making processes to muddle the connections between an occupational exposure and ill health effects, resulting in a phenomenon of knowledge traffic that jams decision-making airwaves. The difficulty of assessing knowledge about a substance that a worker has been exposed to is particularly problematic if adjudicators do not have the skills necessary to distinguish scientific studies with strong methodological designs from industry-supported studies that are constructed to try and produce certain findings. As one participant explains, “the actual production of doubt can be orchestrated. You know, you make sure you don’t have enough subjects to get statistical significance – either you drown them or you have too small a sample, and either way that could allow you to publish an article that says there’s no relationship found” (I 14). Another participant connects the studies done by Dr. McDonald with occupational disease more specifically, arguing that if it were not for the production of these “garbage” studies, “we would have a more robust occupational disease regime” (I 8).

The discussion of manufactured uncertainty or capitalized uncertainty is not a new story. Indeed, a few of the interview participants utilize terminology such as manufactured uncertainty when discussing some of these broader level issues, while also referencing the influential work of David Michaels (2008a) on how doubt can be actively

produced. The ways in which industries emphasize uncertainty to manufacture doubt is perceived to be a notable issue in creating barriers to the recognition of occupational disease. While the asbestos industry provides an illuminating example of how controversies may be artificially maintained in the Canadian context, there are also more subtle ways of producing and reinforcing uncertainty (Elliot, 2012; Premji, Messing, and Lippel, 2008). Elliot (2012) highlights how uncertainty as a form of an unknown may be maintained through “the wide range of often subtle research choices or “value judgments” that lead to the collection of some forms of knowledge rather than others” (331). One example of this in the context of occupational disease is when there is a lack of funding or professional opportunity in a scientific discipline to study occupational factors that contribute to the development of disease. One participant perceives this to be a challenge with occupational epidemiology, especially due to a relative lack of funding and a diminishing research community. As this participant notes,

if you don't provide much funding, you don't build a community which is reliant on that funding to do that research. And that's what we have right now in Ontario – we have a lot of people who have done research in occupational epidemiology who are retiring and there's hardly anyone to step into their shoes because you can't get funding for it. (I 3)

Elliot (2012) suggests that these subtle research choices influence scientific practices that result in the selective understanding of phenomena. If funding support is not sufficiently available to pursue a particular field of epidemiological study, this may influence incoming scholars to take up different areas of epidemiology which are seen to be more likely to lead to prospective (and better funded) research opportunities. Unfortunately, the result is that occupational factors of disease patterns in populations become taken up to a lesser degree, and this leads to a weaker overall understanding of

the connection between occupation and disease. While such choices may be less explicit (the science student may not be fully aware what leads them to consider one field of epidemiology over the other, or at least how strong this influence is), they nevertheless play an important role in maintaining uncertainty. Such uncertainty can then be mobilized into broader knowledge contestations. As Elliot (2012) argues, “the selective ignorance that stems from these choices can promote some socially important or perspective systems rather than others” (331).

Overall, the utilization of scientific uncertainty to keep controversies alive underlines the critical point that “science and technology do not always ‘do’ what is right for vulnerable people” (Waldman, 2011: 179). When knowledge is produced about the potential or probable harms of an industrial product, and the industry response is to emphasize uncertainty about this causal connection, such knowledge claims need to be engaged with critically while guarding against tendencies to slip into a simplistic anti-science approach (Alaimo, 2010; Scott, 2016). Consideration of more explicit, as well as subtler, forms through which uncertainty is created and maintained provides for enhanced opportunity to understand the complexities of unknowns in the context of fueling knowledge controversies and contestations about workplace responsibilities.

Maintenance of Uncertainty through Suppression of Information

The previous section focused on keeping controversies about health problems alive by emphasizing, and contributing to, uncertainty in scientific research as a way to obscure connections between an industrial product or process and ill health. In this section, I suggest that there are other pathways through which uncertainty may be deployed, specifically through the suppression of information. This includes the active

concealment of knowledge about research studies that provide evidence of health harms from occupational exposures, as well as legislative protections that permit certain information to be withheld by classifying it as a trade secret. To be sure, suppression and secrecy may also be observed in the use of uncertainty to keep controversies open. There was, for example, much contestation over the lack of disclosure of Dr. McDonald's research funding from the asbestos industry and the obvious conflicts of interests. While the central purpose of suppression in these practices was to keep controversies open, the predominant focus in this section is how uncertainty is maintained when political and economic actors are not forthright with relevant information about health risks. The strategic goal in these cases is to avoid disclosing knowledge that could spark contestation.

In demonstrating how uncertainty is maintained through suppression of information, I primarily draw on the historical example of the wildcat strike of 1974 by the hard rock miners at Elliot Lake and the subsequent Ham Royal Commission. While the history of this strike, the Ham Commission, and the resulting legislation may be well known to some,⁶² less known and requiring more attention is the dimension of recognizing occupational disease as an issue in this case. Prior to the 1974 strike, there was minimal public and legislative recognition of the occupational diseases that hard rock miners experienced.⁶³ It is also important to acknowledge that issues of workers' rights to know what they are working with is not simply situated within a by-gone historical period, as relevant issues about adequate information on occupational exposures continue to persist to the present day. To illustrate this point, I address the recent initiative by the

⁶² For a detailed history, see MacDowell (2012).

⁶³ Personal document provided through participant correspondence.

federal government to develop a public registry of asbestos in public servant buildings (the National Asbestos Survey), as well as the extent of the ability to know due to legally protected trade secrets.

Recall from the previous chapter how the mining of uranium in Ontario commenced around 1954 and was an important resource for the nuclear industry in the Cold War era since uranium is used to make nuclear fuel. Despite the long latency periods of disease (it could be twenty years between exposure and onset of disease), it did not take long for workers and organized labor to become significantly concerned about the health effects of working in uranium mines, as workers were exposed to hazards such as radon (which is released as a gas during the uranium mining process) and silica dust. As one interview participant notes, “they were mining uranium at Elliot Lake and there were around 10,000 miners up there in the bush. That was contributing to the Cold War arsenal of nuclear weapons, so it was a strategic industry. They were being exposed to radon gas down in the mines – terribly inadequate ventilation – they knew they were getting sick” (I 6).

These working conditions and health concerns resulted in increasing “union pressure [...] over miners’ occupational health problems” (MacDowell, 2012:91). Despite labour’s attempts to obtain information about these hazards, neither the government nor the employer provided them with any. MacDowell notes that the USW sought information about the hazardous health implications of working in these mines as early as 1959, and the union also pressed for adequate medical exams of workers in order to measure exposures and inform the workers. These demands were left unmet, which prompted the USW to take matters of knowledge production into its own hands. Similar

strategies to produce knowledge have been undertaken by labour and environmental movements when there is a lack of scientific knowledge available to provide people and their communities with information about the health effects of the substances they are exposed to (Alaimo, 2010; Brown, 2012; Scott, 2016). As MacDowell (2012) notes, “[w]ithout medical information from the companies or government, the union surveyed its members in 1973 and asked them to report any silicosis or cancer cases” (93).⁶⁴

As previously discussed, it was only when two UWA representatives by chance attended a health conference in France did anyone from the union discover that there was a study done by the Ontario Department of Health on cancer in Elliot Lake miners. They discovered also that this study showed elevated risk for cancers among Elliot Lake miners. This situation sparked the wildcat strike in Ontario on April 18, 1974. As a way to settle this tumultuous situation, the government initiated the Ham Commission in 1974, which led to the development of the trilogy of rights in Ontario: the right to know, right to participate, and right to refuse. These rights became legislated through the enactment of OHSA in 1978, with WHMIS added in 1987.

The attainment of these legal rights demonstrates how progressive changes in health-related matters do not solely stem from the availability of scientific knowledge on occupational disease or the efforts of a single individual. It was not Professor Ham who was singularly responsible for the legislation of the trilogy of rights. These rights came to

⁶⁴ It should be noted as well that employer responses at this time were not directed at reducing hazardous dust exposures; rather, workers were given aluminum dust ‘treatments’— a contentious practice that started in 1942 where workers were subjected to inhaling aluminum dust as a way to counter the inhalation of silica dust, even when the government and mining industry acknowledged that there was “a lack of positive information on its benefits” (Memo dated July 6, 1949 from D. G. Sinclair, Assistant Deputy Minister of Mines to Mr. G. D. Smuts, Goldfields American Development Company. (File RG 13 B237405: “Silicosis.” Retrieved from the AO in Toronto, ON)). The practice was ultimately discontinued around 1979 shortly after a CBC Fifth Estate episode (“Powder Keg”) was broadcasted which highlighted objecting medical opinions to industry’s proclaimed safety of this ‘therapy’.

fruition through a constellation of social and political contingencies, including strong labour activism, a key strategic industry being at stake, and the political context of the time, with pressure from the NDP government to make occupational disease a public issue.

Although the suppression of information of hazardous materials in the workplace was no longer legally permissible by the late 1980s with the introduction of WHMIS legislation, such practices continue to impact the recognition of occupational diseases to the present day. If a worker was exposed to hazardous agents prior to the enactment of WHMIS, they would be less likely to have concrete or confirmed knowledge about the exposures they worked with at the time. This uncertainty, due to lack of information, feeds into workers' compensation decision-making processes, as it becomes an unknown that complicates the assertion that one's occupation significantly contributed to the development of the disease. To demonstrate this, I draw on my experience as a participant observer at a WSIB occupational disease hearing. The worker in this instance was represented by a worker's advocate and had worked in job positions prior to the 1980s, where he claims to have been exposed to asbestos. In this case, the worker knew that there was asbestos in the workplace without having access to formal information to confirm that he was being exposed to a hazardous substance. The worker's knowledge was experiential; it was premised on what workers knew about their working conditions from being in the workplace on a regular basis (and sharing concerns with one another through "shop talk"). In addition, the worker drew on retrospective knowledge about how certain work processes are now publically known to have involved working with asbestos, and this fit in with the experiential knowledge of performing such work. When

questioned by the adjudicator about the specifics of what substances he was exposed to through his employment, the worker nevertheless could not honestly respond that he was a hundred percent sure that he worked with asbestos because workers were not provided with such information at the time. This uncertainty was not the only factor complicating the decision-making process, but it was an important way in which an unknown that was articulated through the discursive manner that the adjudicator framed the initial and probing questions.

Furthermore, the legislative achievement of the trilogy of rights has not necessarily translated into the ability to exercise these rights in practice. The notion of an Internal Responsibility System is perceived by some as being limited in its effects to bring about positive change, as it does not adequately account for unequal power relations between labour, government, and employers. While the legal gains are important and provide some significant advances to occupational health and safety, there is a tendency to slip into historically repetitive practices of placing responsibility and blame for health and safety matters on individual workers, even though they have the least power and control over the labour process. As some interview participants note, this results in a critique of the Internal Responsibility System. For example, one participant argues that internal responsibility, as a stand-alone approach, is not effective in addressing occupational health and safety problems: “Internal responsibility is really a sham. It does not work. What workers call it really, in my experience, is the Eternal Responsibility System – it takes an eternity to get anything happening” (I 12). Smith (2000) elaborates this point, highlighting that:

Under the Internal Responsibility System the role of the inspector was to identify and respond to breakdowns in the system. He should only

enforce the law when the internal responsibility's limits had been reached. And there were no clear guidelines as to what those limits were. For this reason many workers have come to term it the Eternal Responsibility System: issues could remain unresolved for all of eternity (59).

There continues to be present day instances where workers cannot practice their rights. Consider, for example, the right to know. In early 2015, the story of an electrician unknowingly working with asbestos at the Canadian Revenue Agency (CRA) building in Ottawa made mainstream news by featuring Denis Lapointe's experience. Mr. Lapointe was an electrician who worked at the CRA building for sixteen years and did not know that there was asbestos in the building. He had only recently discovered the hazardous substance he was exposed to through his employment during this time period. As noted in a news article that featured Mr. Lapointe's story, "His job involved drilling and pulling wires through walls, floors, and ceilings. He says since he didn't know he could be disturbing asbestos all those years – his fellow workers wouldn't have known either" (Ireton, 2015 March 9). Mr. Lapointe had obtained this knowledge of asbestos in the building material not through his legal right to know, but through a different legislative channel – he submitted ATI requests. The reports obtained through these requests revealed not only that asbestos was present throughout the CRA building, but that the employer had known that there were potential risks for employees to be exposed to asbestos. Mr. Lapointe was never informed of such risks.⁶⁵ In December 2015, more workers at the CRA expressed concern over not being told of the hazardous substances in

⁶⁵ Mr. Lapointe noted as well that from 1998-2004 he, along with three other electricians, were sent for health (chest and pulmonary) tests, but never received the medical results, for which they were told was due to chemical exposure in the building. It was only through his ATI requests that he found out that "he was diagnosed with pulmonary restrictions on several occasions" [...] "They never told me there was any concerns," he says" (Ireton, 2015, March 9).

their workplaces that they could potentially have been, and continue to be, exposed to.⁶⁶ Regardless of having a right to know through OHSA, and despite employer knowledge that asbestos was present in the CRA, such information was not provided to Mr. Lapointe or other workers in similar employment positions.

Backed by pressure from labour groups and occupational health advocates, Public Services and Procurement Canada (PSPC) recently launched an initiative to develop a federal public registry, named the National Asbestos Survey. The intention behind this registry is to create an inventory of all PSPC building (with the CRA building being one of them) containing asbestos.⁶⁷ Although this national inventory is currently specific to the PSPC, there are plans for twelve other federal departments to develop their own inventories by the end of 2017 and the Canadian Labour Congress (CLC) has called for asbestos inventories to be developed for *all* publicly owned and leased buildings. Advocates argue registries such as the National Asbestos Survey are essential in providing adequate information to workers.⁶⁸ In turn, workers become better positioned to practice their legal right to know what hazards they work with.

As we see from the above example, issues with suppressed information and not being able to exercise one's right to know continue in the contemporary context, and they are not limited to industrial employers. The National Asbestos Survey was publically

⁶⁶ See for example: Ireton, J. (2016, Jan. 28). *CBC News*. Retrieved from: "Ottawa taxation centre workers astonished after asbestos found in ceiling." <http://www.cbc.ca/news/canada/ottawa/asbestos-discovery-tax-centre-1.3421998>. For additional news on how access to information requests were used to attain withheld information in the case of asbestos at the CRA, and the difficulties of attaining information through this process, see also: Press, J. (2015, May 21). "Public Works held back documents on asbestos in tax centre building." *Ottawa Citizen*. Retrieved from: <http://ottawacitizen.com/news/politics/public-works-held-back-documents-on-asbestos-in-tax-centre-building>

⁶⁷ The National Asbestos Survey can be accessed from: <http://www.tpsgc-pwgsc.gc.ca/biens-property/documents/invamiant-asbestosinv-eng.pdf>

⁶⁸ See for example: Ireton, J. (2016, Nov. 16). Canada-wide asbestos inventory 'a positive step,' say health and safety advocates." *CBC News*. Retrieved from: <http://www.cbc.ca/news/canada/ottawa/asbestos-inventory-lauded-health-safety-advocates-1.3788177>

released in 2016 – three decades after workers won the legal right to know by having this right incorporated into OHSA. Withholding information about specific health hazards, however, is not the only way in which knowledge about what one is working with is suppressed. Even though workers have the right to know, this does not necessarily mean that they will be given detailed knowledge about every health hazard they encounter through their employment. This is because certain elements, such as chemical compositions of a product, may fall under the rubric of trade secrets.

Trade secrets are defined as “any valuable business information that derives its value from that secrecy” (Canadian Intellectual Property Office, np). In Canada, trade secrets are dealt with through common law procedures, and in the United States there is specific trade secrets legislation (the Trade Secret Act). Despite this distinction, there are concerns over the influence of the Trade Secrets Act in terms of how the lack of specific knowledge about chemical formulas and technologies affect what can be known about the health risks of these substances in the Canadian context. As one interview participant discusses:

I 8: I find it interesting that you have nanotechnology in almost everything right now and no one knows the volatility of these small fibers. The smaller the fiber the more dangerous it is. In the U.S., they’ve done it with oil and gas exploration. You don’t know what they’re pumping into the ground, so no one will tell you what they were pumping into the ground, what those chemicals are. It’s actually in legislation, they don’t have to tell you.

CP: Yeah right, it’s the trade secrets.

I 8: You got it.

Even though workers theoretically have the right to obtain knowledge about the substances they are working with, there are numerous obstacles that, in practice,

complicate and obstruct access to such information. As the example of trade secrets exemplifies, some of these obstacles are woven into a legal framework and justified on the basis of economic interests. The implications of this for workers filing occupational disease claims is that there may be more uncertainty when trying to establish exposure history. This uncertainty could complicate the worker's claims that the exposures they encounter from their occupation contribute to their ill health, as the worker cannot definitively report all the hazardous exposures they have been exposed to.

Emphasizing Scientific Certainty as the Necessary Standard of Proof

I have previously presented strategies that emphasize uncertainty in scientific controversies as a way to keep such controversies open and obscure connections between exposure and disease. In this section the focus shifts to emphasizing scientific *certainty* as the standard of proof that should be achieved in order to claim that one's occupation caused their disease. The strategy of emphasizing the need to meet a high level of scientific certainty capitalizes on the fact that much of scientific knowledge has an inherent degree of uncertainty. In emphasizing the need for more certainty, the argument made is that 'more evidence' is needed to establish a connection between a product or substance and a disease. What can become overlooked in calls for more scientific certainty is that the definition of certainty in scientific knowledge hinges on statistical significance (based on a probability value of 0.05 or 0.01), which constitutes a high bar for identifying causality.

To illustrate this phenomenon, I first elaborate on the notion of scientific standards of proof and I then turn to discussing how this plays out in the context of occupational disease recognition through workers' compensation. I do so by drawing on

the contestations over scientific certainty expressed through submissions in response to the *Draft Report of the Chair of the Occupational Disease Advisory Panel* in 2004, as well as how these issues have been taken up more recently through a Supreme Court of Canada (SCC) case about occupational disease claims for breast cancer.

The scientific definition of certainty rests upon the meaning of statistical significance, which is often based on a 95 percent confidence interval. What this means is the likelihood of the relationship between the dependent and independent variables occurring by chance is less than five percent. The high standard of certainty as defined through statistical significance creates a large area of uncertainty. As one participant with a science background elaborates, most scientific knowledge falls into this large area of uncertainty: “there’s a big area in-between being confident that it is related or being confident that it is absolutely not related, the big portion in between is “we don’t know yet” [...] So much of science happens in-between, in that area of uncertainty, not one way or another” (I 3).

Interlinked with a high standard of proof for certainty are epistemic norms around false negatives and false positives. In scientific and medical professions, knowledge practices are based on the norm that it is more legitimate to suggest that a relationship does not exist (even if it is found out later that this was an error), rather than incorrectly suggesting a relationship does exist. Messing (2014) highlights the regularity of uncertainty within scientific knowledge, noting how this uncertainty is not only perceived to be acceptable, but commendable as well. She argues that this is reinforced throughout one’s scientific career: “So our whole, very long period of training, teaches us never to say anything positively. We are taught to feel contempt, even disgust for scientists who

make unqualified positive statements. They are not being scientific” (10). Some interview participants, who have a background in the scientific and medical fields, acknowledge this sentiment. One participant explains,

epidemiologists and physicians I think in general never want to be accused of crying wolf. I think it's, I don't know if it's hard-wired into physicians but it's sort of like the, you know, you'd rather let a convicted criminal go than falsely incarcerate an innocent person. So I think in epi and medicine, the bias is avoiding false positives. (I 5)

Another participant elaborates how this practice can be disadvantageous in the context of occupational disease recognition: “what you're guarding against is positive results. It's almost like if you're in court you're innocent until proven guilty [...] so we extend the presumption of innocence to chemicals or the inanimate object” (I 12).

The epistemic norm to avoid false positives complicates the recognition of occupational disease by allowing potential occupational factors to be more readily dismissed within decision-making processes that draw on legal principles for guidance. Yassi (1983) identifies a trend for Board medical doctors in the 1980s to more willingly accept negative evidence for occupational disease. As she elaborates,

When a worker's doctor reports that he or she is suffering from occupational pneumoconiosis the report is not considered definitive and is submitted for further consideration. If, however, the worker's doctor reports that he or she is in good health or has an illness attributed to chronic obstructive lung disease likely due to smoking, for example, this is almost routinely accepted at face value and the claim is rejected. (419)

Interview participants also raise concerns over the practice of negative scientific and medical evidence about occupational factors being more likely to be accepted than positive evidence in the workers' compensation system adjudication process, and how this is disadvantageous when trying to recognize diseases as occupationally related. One

participant expresses how easy it can be to deny a claim if the worker is a smoker because the smoking exposure is often taken as the causal explanation for the disease: “it [smoking] completely overwhelms the workplace exposure” (I 1). As the participant elaborates, the issue is that sometimes the smoking explanation is taken at face value and not well looked into, unlike with occupational factors. To illustrate this, the participant gives the example of a compensation claim being denied based on smoking history. When the claim was looked into in more detail, it was found that the smoking history was much less than originally proclaimed as the worker had quit for a period of twenty years before taking up smoking again.

There is also the example of a recent WSIAT Decision (Decision 78/14) on lung cancer, where the worker worked in the uranium and nickel mining industries and was exposed to multiple substances (radon, silica, arsenic, diesel exhaust, asbestos) from his employment. He had a smoking history but quit smoking thirty years ago. The compensation claim was denied, as the accepted medical opinion was that there was not enough scientific research to determine a connection with the occupational exposures. The smoking exposure was seen as being more likely than not to have contributed to the worker’s lung cancer. The WSIAT accepted the calculations of relative risk (RR) done by Dr. P. Bozak, an occupational hygienist. In making these calculations, Dr. Bozak is noted in the Tribunal decision to have acknowledged “that there is uncertainty in estimating the relative risk of each exposure” and the estimated ranges calculated “cover the most likely estimates of relative risk” (WSIAT Decision 78/14, p. 8). Dr. Bozak presents the calculated RR ranges as: “radiation (1.5 to 2.0), crystalline silica (1.75 to 2.0), arsenic (1.5 maximum), diesel exhaust (1.32 to 1.5), asbestos (0.0), and smoking (1.5 to 2.5)”

(ibid.). In recognizing that “the relative risk for any individual worker is equally probable at the low and high ends of the range” (ibid: 9), the Tribunal takes the average of the range to determine RR (see Table 4.1). This results in RR calculations for the exposures as follows: radiation (1.75), crystalline silica (1.88), arsenic (1.5 maximum), diesel exhaust (1.41) and smoking (2.0).

Table 4.1: Inferences made by the WSIAT based on Dr. Bozek’s RR Ranges

Exposure Agent	Mid-point relative risk	Probability of agent causing cancer	Probability of cancer developing in the absence of occupation
Radiation	1.75	43%	57%
Chrystilline silica	1.88	47%	53%
Arsenic	1.5 (maximum)	33%	67%
Diesel exhaust	1.41	29%	71%
Smoking	2.0	50%	50%

Source: WSIAT Decision 78/14, p. 9

In this WSIAT decision, how the worker’s smoking history was being interpreted was a point of contestation. The worker advocate representing the worker argued that the worker’s “smoking history was not so significant that it rendered insignificant the worker’s employment exposures”, and there was debate amongst medical professionals about potential synergistic effects between smoking and the workplace exposures. Through the estimated RR ranges, Dr. Bozak situates smoking as the most significant exposure. Ultimately smoking was determined to be more likely than not the cause of the worker’s lung cancer; with the occupational exposures not considered significant enough based on the average RR figures. As noted in a document obtained through participant correspondence that reflected on the rationale of this decision, the interpretations of workplace and smoking exposures were problematically made as they allow for smoking to become more easily established as the significant contributing factor:

Radiation seems to have a promoter effect on cancer rather than an initiator and thus the further in time you are away from the exposure, the lower the risk. Ironically enough, this is also the case for tobacco smoke which is the reason why ex-smokers' risk decline the longer they have stopped smoking. I find it quite contradictory for [the panel] to claim that 20 years after radiation exposure is too long a latency period and yet 30 years after quitting smoking is not.⁶⁹

As this discussion aims to emphasize, uncertainty is a central feature of scientific knowledge and the epistemic norm within scientific communities is to practice caution when proclaiming a certain and causal relationship between variables. This results in a tendency to avoid making false positive claims. These are regular knowledge practices in scientific communities. Tensions and complexities arise, however, when such knowledge becomes mobilized in different epistemic fields or in a broader public realm.

It is important to recognize that there are different standards of proof within the legal field (for example, between criminal law and civil law), which result in different definitions of what constitutes certainty. As one participant succinctly puts it, “there are different standards in the legal [fields] as well. Remember O.J. Simpson – found [criminally] not guilty beyond a reasonable doubt but civilly found guilty of wrongful death” (I 8). In the context of administrative law in which the workers' compensation system of Ontario is situated, the definition of certainty is often interpreted based on a 50/50 probability and the benefit of doubt principle. The workers' compensation system often uses the significant contribution test in determining causation (where the workplace exposure has to be a significant, but not necessarily the primary, contributing factor). A key issue when mobilizing scientific evidence in the legal frameworks is that this evidence introduces divergent perspectives over definitions of certainty: “There's always a danger that somebody will import the scientific standard for having confidence in your

⁶⁹ Personal document provided through participant correspondence.

findings into the causation determination – the legal causation determination” (I 3). This issue is perceived to intensify when scientific and medical professionals sit in positions where they are required to interpret evidence for legislative and policy matters, as happens with the expertise drawn on by workers’ compensation boards: “What is clear is that if you have a compensation system where the medical or medically trained or scientifically trained are in positions of decision-making, they will use their [epistemic] baggage” (I 14).

A further concern is that while much of science happens in the “in-between space” of uncertainty and does not fit well with a yes-no type of framework when it comes to addressing disease etiology, in the legal field a conclusive decision has to be made. The legal decision cannot wait indefinitely until ‘enough evidence’ is produced to try and attain more scientific certainty on the matter; it has to rely on the best available evidence. As Paul Weiler notes in his 1983 report:

Historically, the law of workers’ compensation has required an absolute yes-or-no answer to the question of whether an individual disease is actually caused by an exposure on the job. Medical science gives us, at best, more-or-less evidence founded on statistical probabilities within larger groups. (11)

Complexities around standards of proof in the scientific-legal nexus are not a new issue in legal decision-making processes more generally,⁷⁰ and in the framework of occupational disease recognition specifically. Concerns about the heavy reliance on scientific definitions of certainty are exemplified in discussions presented in *The Report of the Occupational Disease Task Force* (ODTF) (submitted to the MOL in 1993) and the Weiler Report and Ison Report released in the 1980s. These concerns centered on the

⁷⁰ For a detailed discussion how the issues around the scientific-legal nexus have been taken up in other legal fields, such as tort law in the United States, see Jasanoff (1995).

Board's lack of ability to distinguish scientific notions of certainty from the legal definitions of certainty required to allow a compensation claim, and that this results in the denial of claims that do not have strong scientific evidence of a statistically significant relationship between occupation and disease.

Submissions to the ODAP public consultation in 2004 provide an illuminating site to explore some of the contestations over the use of scientific definitions of certainty in workers' compensation adjudicative processes for occupational disease claims, as this constitutes a major theme of the submissions. Employer submissions argue for the application of scientific certainty in decision-making processes, and for occupation to be considered the primary (rather than a significant) contributing factor in the development of the disease. As one submission on behalf of INCO argues in relation to the criteria used to incorporate diseases into Schedules 3 or 4:

we believe entitlement should be accepted only in those instances where occupational exposure is a primary factor. In other words, only diseases for which there is scientific certainty that a workplace exposure was the primary cause be granted entitlement under the provisions of the current legislation.⁷¹

In arguing for increased levels of certainty in relation to recognizing occupational diseases, employer submissions also emphasize the complexity of diseases due to factors such as multi-factorial etiologies. As expressed through a submission from Falconbridge Ltd.: "Multi-factorial causation predetermines the complexity of determining fundamental cause. For this reason, it is imperative that only diseases for which there is scientific certainty that a workplace exposure was the primary cause, be granted entitlement under the provisions of the current Workplace Safety & Insurance Act." If

⁷¹ Submission to the ODAP Draft Report from Dr. S. Williams and M. Medine, INCO Ltd. (Sept. 13, 2004). Retrieved from the Workplace Safety and Insurance Board's Public Reference Library (Head Office, Toronto ON.).

such a response were explicitly adopted by the WSIB, it would become increasingly difficult to attain recognition for occupational diseases. This difficulty would be due to the requirement for workplace exposures to be a primary contributing factor, especially for diseases characterized by complex etiologies that evade simplified or straightforward understandings of causality.

Labour and community advocate submissions contest the idea that the recognition of occupational disease should be premised on scientific standards of proof and that workplace exposures be based on the primary contributing factor test of causation. Labour-oriented submissions point to how scientific certainty has been used as grounds for denying compensation claims. They insist that the proper interpretation of the legislation is the legal definition of uncertainty, based on a probability threshold of 50/50 with the benefit of the doubt going to the worker. As succinctly noted in the submission by the national Communications, Energy and Paperworkers (CEP) union: “Adjudication should be placed within the legal framework of the Act and not abuse scientific certainty as a top criteria to deny claims”.⁷² The Ontario Nurses Association (ONA) clearly elaborates on how scientific certainty has been misused, submitting that:

It is in our experience in representing our ill and injured members through the WSIB claims and appeal process that the greatest barrier to justice for workers in Occupational Disease Claims is the WSIB’s insistence on 100 per cent certainty of causation to allow claims, and specifically scientific certainty [...] The absurdity of some of the decisions workers receive because of the WSIB’s insistence on irrefutable scientific proof would be laughable if the consequences were not so tragic.⁷³

⁷² Submission to the ODAP Draft Report from CEP Canada (Sept. 27, 2004). Retrieved from the Workplace Safety and Insurance Board’s Public Reference Library (Head Office, Toronto ON.).

⁷³ Submission to the ODAP Draft Report from the ONA (Sept. 27, 2004). Retrieved from the Workplace Safety and Insurance Board’s Public Reference Library (Head Office, Toronto ON.).

While arguments for scientific certainty were made in employer-oriented responses, what becomes overshadowed is the regularity of uncertainty in scientific knowledge practices. Since uncertainty is a regular feature of all forms of knowledge, absolute certainty in medicine (Fox, 2000; Seely, 2013) and science (Briggs et al., 2009; Ison, 2008) is an unattainable goal. Arguing for more certainty in these decision-making contexts may therefore be understood as drawing on the strategic usefulness of uncertainty (McGoey, 2009) in order to diminish opportunities for diseases to be recognized as occupationally related. This could clearly be seen in discursive strategies in the employer responses that argue for the necessity of scientific certainty on one hand, while emphasizing the complexity of multi-factorial disease etiologies on the other hand. In making such arguments, employers are situating occupational disease recognition as a challenging, indeed as a practically impossible, task - a point acknowledged by employer and employee groups alike.⁷⁴

The issue over scientific evidence and standards of proof has also recently been taken up in a 2016 Supreme Court of Canada (SCC) case. Although this case refers to compensation claims for breast cancer in British Columbia, it is relevant in understanding the complexities between scientific and legal standards of proof in relation to evidence within occupational disease adjudication in Ontario. The background to this case is that

⁷⁴ As noted in the submission by the Canadian Federation of Independent Businesses (September 30, 2004): "Diseases have long latency periods and are multi-factorial, making causation difficult – almost impossible – to establish. Our point is that if the WSIB gets it wrong, costs will escalate putting the entire system at risk." Labour-oriented submissions highlighted the challenges that occur when scientific certainty is problematically situated as the threshold for causation and non-occupational confounding factors become easily accepted by the WSIB. As submitted by the CEP of Canada (September 27, 2004): "Even when the Board decided that both exposure and causation hurdles have been cleared, the Board relies heavily on confounding factors to deny claims. The effect being that if a confounding factor is identified it tends to be paramount [...] It has been very clear to us in the instance of the Owen Corning claims. Despite clear and substantial exposures to 5 known carcinogens, and a lack of significant cardiovascular disease associated with smoking, without exception these claims have been denied due to the fact that the worker smoked cigarettes."

three women who worked as technicians at a hospital laboratory were amongst a cluster of seven women in that work environment who were diagnosed with breast cancer. Identifying their occupation as a significant contributing factor of their disease, each of the three women filed for compensation under British Columbia's Workers Compensation Act. Each of their claims were initially denied as "[t]he medical experts who provided evidence concluded that there was a lack of sufficient scientific basis to causally link the incidence of breast cancer to the workers' employment in the laboratory" (SCC 25, 2016: np). The workers then took their cases to the province's Workers' Compensation Appeal Tribunal, where the majority of the panel members decided that, in contrast to the Board's decision, the breast cancers are occupational diseases. The employer subsequently appealed this decision to the Appeals Tribunal, and the case ended up at the British Columbia Supreme Court (2013 BCSC 524) and then at the British Columbia Court of Appeal (2014 BCCA 499, 67 B.C.L.R. (5th) 213). The BC Courts of Appeal decided "that the Tribunal's reconsideration decision [of their original decision to accept the case as an occupational disease] was a nullity and that that Tribunal's original decision was patently unreasonable" (SCC 25, 2016: np). This decision ultimately led to the case moving up to the SCC for judgment.

In reviewing the case, the SCC considered whether the Workers' Compensation Appeals Tribunal made an error in its interpretation of causation as applied to the occupational disease claims for breast cancer. The majority decision reached by the SCC was that causation was inappropriately applied in the Tribunal hearing and that "the appeal of the worker should be allowed" (SCC 25, 2016: np.). The one dissenting member in this SCC decision did not believe the appeal should be allowed, arguing that

there was a lack of positive evidence to support a causal connection between workplace exposures and the development of breast cancer. A central area of contestation in this SCC decision was how certainty and standards of proof are to be interpreted and applied in the context of workers' compensation. The majority opinion in favour of the workers' appeal argues that:

Causation can be inferred – even in the face of inconclusive or contrary evidence – from other evidence, including merely circumstantial evidence. [...] In addition, according to the standard of proof set out in s.250(4) of the Act, where the evidence is evenly weighed on causation, that issue must be resolved in the workers' favour. This standard of proof contrasts sharply with the scientific standards employed by the medical experts in the case at bar. The majority of the Tribunal was right to consider that the experts thus imposed a too stringent standard of proof. In relying upon the inconclusive quality of the experts' findings as determinative of whether a causal link was established between the workers' breast cancers and their employment, the chambers judge and the majority of the Court of Appeal erred in law (SCC 25, 2016: np).

What this argument points to is how scientific evidence is not the only evidence required to establish a linkage between occupational factors and disease (evidence can be “merely circumstantial”), and that the interpretation of certainty should not be based on the scientific standard of proof. This argument further illustrates the epistemic “baggage” medical and scientific experts bring into decision-making processes that occur in accordance to legal principles. In trying to decide whether or not the breast cancer cases should be accepted as occupational disease claims, medical experts imported scientific notions of causality into the workers' compensation decision. This raised the level of certainty required in order to satisfactorily establish occupation as a significant contributing factor to the disease.

Contestations over epistemic divergences in defining certainty are seen throughout the SCC case, as well as the prior decisions occurring through the lower-level judicial bodies. For example, in deciding on issues related to the disease etiology of breast cancer, one key piece of evidence was an expert report from March 31, 2006 by the Occupational Health and Safety Agency for Healthcare in British Columbia (OHSAH) entitled the *Cancer Cluster Investigation within the Mission Memorial Hospital Laboratory*, along with two draft versions of this final report. These “reports contained a review of the scientific literature on factors associated with the risk of breast cancer, an epidemiological analysis of the cancer cluster among workers in the laboratory, and a field investigation into possible exposure among laboratory technicians to potentially carcinogenic substances” (SCC 25, 2016: np). The findings of this report include a statistically significant cluster of breast cancer amongst workers at this laboratory and a SIR showing that these workers were about eight times more likely to develop breast cancer than the general population. However, the authors of the report concluded that they “did not reach “scientific conclusions to support the association between work-related exposures and breast cancer” and were unable to support “a laboratory work-related etiological hypothesis regarding breast cancer” (citing the OHSAH Final Report, pp. iii-iv, in SCC 25, 2016: np). What this means is that although there is evidence that these workers experience a heightened risk of breast cancer in contrast to the general population, scientific certainty on the causal relationship between workplace exposures and breast cancer could not be achieved.

The Workers’ Compensation Board in BC initially interpreted the findings from the OHSAH report to mean that there was not enough evidence to meet the required

standard of proof necessary to determine causation between occupation and disease. However, the majority of the Workers' Compensation Appeals Tribunal decided that the standard of proof within the OHSAAH reports was too stringent as it reflected a standard of scientific certainty. The Board's decision exemplifies not only issues about how scientific certainty is interpreted in a legal framework, but also that the medical and scientific epistemic norm to favour a null hypothesis can be drawn on and applied, with the result of heightened barriers for the acceptance of an occupational disease claim. This may be seen in how there was not enough scientific certainty to suggest a causal connection between work exposures and breast cancer, which is translated in the scientific community to not supporting an etiological hypothesis between occupation and breast cancer. The issue arises when this scientific interpretation of causality is then brought into a legal framework, without sufficient consideration to differences in how certainty is defined. As noted by the majority decision in the SCC case, "the OHSAAH would only speculate that the increased incidence of breast cancer among the laboratory workers may have been due to non-occupational risk factors, to occupational risk factors such as chemical carcinogens or ionizing radiation, or to a statistical anomaly" (SCC 25, 2016: np). In other words, the position that non-occupational factors contributed to the development of breast cancer did not have sufficient evidence; it could only be speculated on. Based on scientific definitions of certainty, it could not be established whether occupational or non-occupational factors were connected with the breast cancers, but this should not be conflated with the notion that occupational factors do not contribute to the disease.

Conclusion

Attentiveness to not only what is known about occupational disease but also what is unknown (or claimed to be unknown) illuminates the multiple ways that particular types of unknowns can be strategically useful (whether intentional or not) in attempts to complicate the recognition of occupational diseases. As I aim to demonstrate through the discussion in this chapter, uncertainty has been drawn on in a manner that obscures connections between occupation and disease, thereby limiting opportunities to successfully recognize occupational disease compensation claims.

Acknowledging the complexity of uncertainty allows for the opportunity to take into account the multiple dimensions of this unknown. The regularity of uncertainty points to how not everything can be known in the absolute sense, while attention to the active construction of uncertainty emphasizes the importance of questioning the assumption that unknowns are natural and inevitable. A further insight is that these dimensions of uncertainty (and unknowns more generally) should not be conceptualized in a dualistic manner, as the regularity and active deployment of uncertainty intra-act with one another to influence what is deemed to be known and what is situated as an unknown. If we consider Alaimo's (2010) point about how the sheer number of chemical carcinogens in the environment belies attempts to attain knowledge about their health effects, we must also critically question the social and political processes that allow these exposures to be released in the first place. This critical questioning is especially important if there is limited knowledge and understanding of the potential health harms that may result from the exposures.

Chapter Five:

Absences

This chapter addresses another type of unknown: absences. It considers how absences complicate decision-making processes concerning occupational disease recognition. In some contexts absences may conjure meanings that overlap with those of ignorance, such as through the common usage of the term ignorance where the implication is a lack of knowledge. However, it is important to practice caution in simply conflating these two terms. This point is elaborated in the sociology of absences where, for example, Santos (2015) identifies five types of non-existence, only one that takes the form of ignorance.

In this chapter, I consider absences as a more complex social phenomenon than the negation of knowledge or the binary opposite of presence. In conceptualizing absences as comprised of multi-dimensional configurations, I take direction from literature that illuminates how absences are not situated to imply “mere empty spaces” (Rappert, 2014: 47). I am particularly influenced by Santos’ (2015) theorization on the sociology of absences, especially with regard to his discussions about what can be claimed to exist and how certain types of knowledge claims become positioned as legitimate, credible, and visible at the expense of others. While Santos primarily discusses the active production of absences, I aim to highlight how absences encompass interconnected components of both regularity and active production. There are regular characteristics of absences since not everything can be known, but what becomes situated as an absence and how this happens within a particular context may also be actively

produced (for example, by situating certain knowledges on an evidentiary pedestal at the expense of other types of knowledges).

I argue that when claims of absence are brought up in decision-making processes about occupational diseases, this should not be interpreted as a complete absence of knowledge or absence of evidence about the linkage between occupation and disease. Rather, a pertinent problem rests upon what kinds of knowledge become mobilized at the expense of other types of knowledge. We should also ask how knowledge becomes translated into evidence in these decision-making processes. In other words, it is important to consider how certain types of knowledge about occupational disease become legitimized and drawn upon in decision-making processes to provide evidentiary claims of the relationship between an occupation and a disease, even when such knowledge may not be the best available evidence within that particular process. As with uncertainty, absences have become a mechanism through which connections between occupational factors and disease become obscured, and this has problematically led to claims of absences of evidence as a way to deny compensation for occupational disease claims.

I organize this chapter in five sections. First, I delve into developing and clarifying my conceptualization of absences, especially with regards to insights stemming from Santos' (2015) sociology of absences. This formulation is helpful in understanding absences within the context of occupational disease recognition. Second, I take up the issue of absences in medical knowledge and practice, with specific attention to the significance of occupational histories as well as concerns about the consequences of such histories not being recorded sufficiently. Third, I focus on the role of, and epistemological limitations embedded within, epidemiological evidence in occupational

disease recognition, as epidemiological evidence holds a considerable amount of weight in decision-making processes about occupational disease. Fourth, I draw on David Hess' (2007; 2015) notion of undone science as a way to grapple with and unpack the issues around absence of scientific evidence more generally in the context of occupational disease. Finally, I argue that the issue at hand is not that there is 'no evidence' (it is not a matter of 'complete absence'), but rather we should attend to what kinds of knowledge and evidence are made to count, which ones are not, and why this is so. Although science in and of itself is not a monolithic field in relation to this phenomenon (for example, epidemiology and animal studies are accorded different levels of evidentiary value), I spotlight concerns over the role of non-scientific knowledges. While scientific knowledge can provide important and insightful evidence about the connections between an occupation and a disease, other types of knowledge (such as workers' own knowledge of their working conditions) are often, and inappropriately, cast aside.

Conceptualizing Absences

As previously discussed, the way in which a type of unknown becomes conceptualized is context specific. Absences take different configurations depending on the context in which they are situated. Santos' (2015: 173-174) typology of five "modes of production of nonexistence" is particularly useful in illustrating this point when trying to unravel the various strands of absences. He develops this typology in the context of his critical analysis of how epistemologies of the South become delegitimized in relation to Western epistemologies.⁷⁵ Santos' starting point is Euro-centric critical theory, which he argues serves to valorize universal and global ways of understanding, thereby reflecting Western worldviews and reinforcing positivist perspectives of social and political life. To

⁷⁵ Santos (2015) conceptualizes the South and the West in political, and not just geographical, terms.

counter such theories, Santos argues that ways of “understanding the world [are] much larger than the Western understanding of the world” (2015: 4). The underpinnings of Santos’ epistemology entwine the necessity for newer modes of theorizing that incorporate ‘impossibility’ (such as the impossibility to communicate the unsayable) with the need for transformative collective actions as a way to build “good living/*buen vivir*.” Santos also pushes beyond the ‘intellect’ and ‘affect’ binary to acknowledge that all of our experiences influence our knowledge. As he maintains: “Our life does not allow us to distinguish life from thought” (2015: 12).

Stemming from this epistemological standpoint, Santos (2015) connects nonexistence with his sociology of absences, arguing that it is a result of active production: “[n]onexistence is produced whenever a certain entity is disqualified and rendered invisible, unintelligible, or irreversibly discardable. What unites the different logics of the production of nonexistence is that they are all manifestations of the same rational monoculture” (172). Out of the five modes of production of nonexistence, the first mode (which Santos also positions as the most powerful one) is the “*monoculture of knowledge and the rigor of knowledge*” (ibid; emphasis in original). It takes “the form of ignorance or lack of culture,” and is shaped by processes that “[turn] modern science and high culture into the sole criteria of truth and aesthetic quality, respectively” (ibid.). This is accomplished through claims that such knowledge and culture constitute the “exclusive canon of knowledge of production and artistic creation. All that is not recognized or legitimated by the canon is declared non-existent” (ibid.). This, however, is not the only way that nonexistence (or absence) is produced, as Santos (2015) outlines four other

forms.⁷⁶ One of these is “*the monoculture of logic of the dominant scale*” where scales that are neither universal nor global become situated as irrelevant through Western modernity (173-4). This is particularly interesting to think about in relation to further discussions on abstracted knowledge and experiential knowledge, where the latter tends to be de-valued in processes of occupational disease recognition.

Absences cannot simply be taken for granted as knowledge that is ‘non-existent’ in the sense that it ‘does not exist’ (Santos, 2015). Rather, absences are actively produced as nonexistent through processes that render them as illegitimate or not worthwhile knowledge practices. In pointing to how Western knowledge is situated as the criterion of truth and of being capable of encompassing all the valuable knowledge, alternative (or other) ways of knowing that do not fit in with this paradigm or agree with its premises become dismissed as peripheral and largely irrelevant. To illustrate this point, Santos links this phenomenon with what he refers to as an “epistemology of trash” and a “political economy of waste making” as a way to draw attention to the processes by which alternative knowledges become discarded as ‘waste’ (151).

Although developed to address a different substantive context than explored in this thesis, Santos’ (2015) problematization of Western epistemologies is particularly useful in developing an understanding of the complexities of absences and the ways in which they are not complete. Alternative ways of knowing do exist but can be rendered

⁷⁶ The four other forms are: (1) the form of residuum in relation to “*the monoculture of linear time*, the idea that history has a unique and well-known meaning and direction” (173; italics in original); (2) the form of an insuperable stemming from “the logic of social classification, based on *the monoculture of the naturalization of difference*” which serves to “naturalize hierarchies”, for example, through racial and sexual classification (ibid); (3) the form of the particular and local in connection to “*the monoculture of logic of the dominant scale*”, where scales that are not ‘universal’ and ‘global’ become situated as irrelevant through Western modernity (173-4); and (4) the form of nonproductiveness produced through “*the monoculture of the capitalist logic of productivity*” which situates any form of labour that falls outside the formal labour market (such as socially reproductive forms of labour) as wasteful as they are not perceived as directly contributing to the accumulation of profit (174).

invisible by being discarded and rendered absent, thereby situating such knowledge as non-existent. This illustrates that it is important not to take absences for granted, but to consider the processes that situate some ways of knowing as admissible and present in a particular context at the expense of other forms of knowledge, and the social and political contingencies that influence such processes.

Absences in Medical Knowledge and Practice: Occupational Histories

To begin the discussion about absences in relation to occupational disease recognition, I first take up the issue of absences in the production of occupational histories. At a general level, occupational histories consist of the incorporation of occupational considerations when a patient is being examined by a physician and/or being checked into a health clinic. This could include clinical questions aimed at getting information about the occupation that the patient is employed in (and/or has previously worked in over the past few decades), what exposures they may have encountered through their employment, and whether or not their symptoms improve when they are not at their workplace. These histories may also be more in-depth and detailed, by getting into specifics of the work duties performed and the working conditions of current and previous workplaces, including questions about how exposures are controlled in the workplace and whether others in the workplace have experienced similar symptoms of ill health.

On the one hand, occupational histories are identified as an essential component of evidence in the adjudication of occupational disease claims as they are able to provide information about work processes and exposures that the individual encounters through the course of their employment and which could negatively affect his or her health. Such

histories are particularly important in producing knowledge about occupational factors that may contribute to diseases that are more multi-faceted, with increasingly uncertain and complex etiologies. Occupational histories are also particularly important when there is a lack of other technological tools available to provide insight into questions about causation. Furthermore, consideration of these occupational components may result in a more accurate and/or more readily arrived at diagnosis of the health condition being experienced. As Alex et. al. (2013) put it, “the link between occupation and disease has been difficult to establish, but provided a more comprehensive occupational history taking methodology, it can lead to better diagnosis of disease with occupational origins” (29). On the other hand, research participants note how occupational history taking is often overlooked in medical practice. When an occupational history is taken, it tends to be insufficient in terms of the information gathered. The lack of occupational histories therefore contributes to the underreporting and under-recognition of occupational diseases (Cimrin et al., 1999; Lax et al., 1998; Taiwo et al., 2010).

Some diseases, such as mesothelioma (a form of cancer that develops in the lining of internal organs such as the lungs and heart), have more certainty and clarity in terms of disease etiology as it is currently possible to identify a clear and singular causal agent (asbestos) that is known to be linked to this disease. If a worker has had exposure to asbestos and is diagnosed with mesothelioma, the connection between occupation and disease would (at least theoretically) be more readily recognized. The challenges of making a connection between occupation and disease intensify if a worker has been diagnosed with a more etiologically complex disease, such as lung cancer or asthma. In these cases, it becomes more difficult to make connections with their occupation,

especially if the physician does not take an occupational history. A lack of an occupational history in such circumstances feeds into what kind of evidence is available to support the claim that occupational factors were a significant contributing cause of the worker's disease.

A further complexity arises if there is a lack of information available to physicians about occupational factors to begin with, as there may be less rationale for the physician to consider an occupational component to the disease. One participant in the health-care field points out the circular effects these challenges present:

I think that that is part of the issue, is if there isn't any information out there to direct either clinicians or workers that their health problems may be work-related, that there won't be enough work done to be able to provide evidence that would be sufficient [to determine the diseases] either are or aren't [work-related]. (I 7)

As this participant highlights, the absence of evidence can have widespread effects in terms of knowledge production, where an initial lack of information hinders initiatives to produce further knowledge on the matter, thereby contributing to an absence of evidence.

Even for diseases such as mesothelioma where a connection has been established through scientific research pointing to the singular occupational cause of asbestos, this does not necessarily translate into the disease being recognized as occupationally related. The example of mesothelioma and asbestos epitomizes this point, as there is disconnect between the number of cases where an individual gets diagnosed with mesothelioma, and the number of claims put forth, and successfully adjudicated through, the WSIB (Payne and Pichora, 2009). One participant suggests that a contributing factor to this disconnect may be the 'levels of knowledge' within the medical community:

There's a massive disconnect! Massive, massive disconnect! So do you blame the person that's been diagnosed with a terminal illness and will

be dead in three months, or do you have to look at the medical, the one who diagnosed it. Think of all the people in the chain [...] the person who did the scan, read the scan, the person who did the biopsy, the specialist, the oncologist, the family doctor. Don't you think one of these would have told him, 'buddy, just go fill in this form, just send it in as a mesothelioma with your name on it'? Don't you think someone in the chain of command would tell him? (I 8)

As this participant identifies, since the diagnosis and treatment of mesothelioma requires the patient (and their file) to go through various levels of medical care in order to obtain diagnosis and treatment, there are many opportunities for health care practitioners to inquire if the individual has filed a workers' compensation form, especially since mesothelioma is known to be caused by asbestos exposure. Nevertheless, informing the individual about how to file a claim is not always done. This lack of information leads to a failure to make connections between occupation and disease, as there is a gulf between diagnosing mesothelioma and reporting it by filing an occupational disease claim.

A further matter that emphasizes the importance and necessity of collecting occupational histories is that, for diseases such as cancer, there is no way to clinically confirm what causes it to occur through the currently available medical and scientific technologies. As one participant succinctly put it, "I think that the tools we have today, you know for understanding what causes cancers, for instance, are relatively crude" (I 5). For example, it is not possible to understand what the causal factors of a cancer are by taking a biopsy and observing cell mutations in the body. A similar view is expressed by another participant. They emphasize that occupational histories are pivotal because of the lack of such technologies: "You can't tell causation from looking at the cancer, there is no difference, there is no marker. People will say 'well this, that, and other things'.

There's nothing out there right now and people are looking for those kinds of things but there's no smoking gun [...] So the only way to get it is an [occupational] history" (I 13).

While occupational histories are essential in producing knowledge that could contribute to better recognition of occupational factors that cause disease, barriers exist in medical education and practice to getting this done. To be sure, this is not a new problem. In the early 1980s, Yassi's (1983) report identified that a "lack of knowledge by the attending physician is a significant factor limiting the recognition and reporting of occupational disease" (12) and that "few medical graduates of Canadian medical schools are oriented toward the challenges of preventative medicine in occupational health" (237). These concerns are also raised by several interview participants and within the more recent documents reviewed, such as the submissions to the ODAP public consultation in 2004. More specifically, concerns include the overall lack of emphasis on occupational determinants of health in medical education and practice, as well as the lack of institutionalized incentives to encourage attentiveness to occupational factors when examining patients. As one participant with a scientific background explained to me:

physicians get very little training in general, general physicians do, in occupational health. There's no requirement that they include somebody's job even in the electronic records, right. And they don't really know how to elicit a work history that is useful for them and they get, and they're time stressed, they're basically pieceworkers – they get paid by the patient. (I 13)

This points to institutionalized factors that impede a physician's ability to collect strong occupational histories, rather than situating this issue as an individualized problem.

To a certain extent, absences of occupational histories may be understood as being situated within the systemic constraints of Ontario's health care system. As illuminated by the above quote, a notable barrier revolves around the structure of the

health care system, where physicians have neither the temporal (time availability) nor fiscal (OHIP billings) incentives and opportunities to take adequate occupational histories. If such histories are not taken, and occupational components that may have caused the disease are not identified, the worker is likely to encounter diminished opportunity to submit a claim for workers' compensation. As noted by a labour organization: "Because of the unique nature of occupational disease and the lack of resources, education and knowledge within the health care system, physicians do not file a form 8 [i.e., Health Professional's Report] on behalf of the worker".⁷⁷

Not only do the institutional aspects create barriers, but physicians' perceptions of the consequences of placing more attention on occupational factors and dealing with workers' compensation disease claims are also a noted challenge.⁷⁸ For example, one participant in the medical field discusses a further lack of incentive in diagnosing occupational diseases in general as this is perceived to have a potential negative impact on the physician. When asked why this may be so, the response was that physicians mainly focus on diagnosing and treating, not causation:

as soon as you enter that 'well what caused it' sort of thing, now you're entering the medical-legal realm [...] It takes a lot more time. They're [physicians] not on comfortable grounds because they're not sure if they're gonna have to, you know, 'am I gonna have to go to court, am I going to have some company breathing down my neck, am I gonna get sued, am I? (I 5)

The recent case of Dr. Brenda Steinnagel from Hamilton, Ontario, draws attention to such concerns. Dr. Steinnagel alleged wrongful dismissal after she was fired from her place of

⁷⁷ CEP Local 200-O submission to the ODAP Public Consultation (Sept. 2004). Retrieved from the WSIB Reference Library located at the WSIB Head Office in Toronto, ON.

⁷⁸ While not taken up in detail here, ideological barriers were also briefly alluded to, specifically conceptions amongst physicians that workers' were embellishing their stories in order to try to scam the workers' compensation system (i.e., that such workers were 'malingerers').

employment, arguing that this was because she had written a medical opinion in favour of recognizing an occupational factor for a hospital worker's head injury – a perspective that did not seem to sit favorably with the WSIB. Dr. Steinnagel claims that the WSIB (along with her employer) put pressure on her to change her medical opinion, and then fired her when she refused to do so. At the time of writing, the media are directing attention to the WSIB over concerns of fraud in relation to medical reports and Dr. Steinnagel is planning to sue the Board for these reasons.⁷⁹

In sum, absences in relation to occupational histories are due to a constellation of factors, including systemic barriers entrenched in the medical education/training system and Ontario's health care system (which are also influenced by broader political factors, such as funding allocations and budgetary restraints). These absences then become further reinforced by medical paradigms and practices. The consequence of this situation is that if a health care professional does not take an adequate occupational history, the disease claim may not be put forward. If a disease claim is made but is lacking a sufficient occupational history, it affects the workers' compensation decision-making process since a potential piece of evidence (a detailed occupational history) in support of the claim would be weakened. This encompasses particular challenges for diseases that lack a clear diagnosis, as the absence of such knowledge may become interpreted as inadequate evidence when an adjudicator reviews the occupational disease claims.

⁷⁹ See for example:

Church, E. (2015, Sept. 24). "Ontario doctor's suit claims pattern of fraud at workplace safety board." *The Globe and Mail*. Retrieved from: <http://www.theglobeandmail.com/news/national/ontario-doctors-suit-claims-pattern-of-fraud-at-workplace-safety-board/article26493780/>

Gallant, J. (2015, Sept. 23). "MD claims WSIB fired her over medical opinion." *The Toronto Star*. Retrieved from: <https://www.thestar.com/news/gta/2015/09/23/md-claims-wsib-fired-her-over-medical-opinion.html>

Gallant, J. (2016, April 21). Hamilton-area doctor gets green light to sue WSIB, employer. *The Toronto Star*. Retrieved from: <https://www.thestar.com/news/gta/2016/04/21/doctor-sues-wsib-employer-after-refusing-to-change-medical-opinion.html>

Entangling absences with uncertainties, for example, employers may argue for clear diagnoses when adjudicating disease claims. As one employer submission to the ODAP public consultation argued: “We believe that diagnosis is the foundation for a claim and as such, needs to be deliberated, decided and validated before causation can be determined. We would argue that attempting to establish causation where the diagnosis is unconfirmed or not validated is not responsible adjudication”.⁸⁰

Absences and Epidemiological Evidence

WSIAT Decision No. 600/97 is often referred to as a key decision where the role of epidemiological evidence is taken up. Epidemiology is defined here as the “discipline concerned with the patterns of events affecting the health of human populations and the factors influencing these patterns. ... Epidemiologic studies may demonstrate a statistical association between a disease and an exposure or risk factors” (Ginzburg, 1986 as cited in WSIAT Decision No. 600/97, p. 12, para. 71). There are different types of epidemiological studies, including case-control studies (where cases are controlled and exposure histories are traced) and cohort studies (longitudinal studies that observe exposure outcomes for a group of people). As indicated in the definition of epidemiology, the method of statistical analysis is central in epidemiological studies as it “identif[ies] statistical associations between particular exposures and an increased incidence of disease” (WSIAT Decision No. 600/97, p. 13, para. 73). Measures such as the Standardized Incidence Ratio (SIR) are used to quantify comparisons of disease incidences between the general population and the specified sub-group of study by measuring the Relative Risk (RR). The epidemiological study in this Tribunal case found

⁸⁰ Dr. S. Williams and M. Medine, INCO Ltd. submission to the ODAP Public Consultation (September 2004, p. 9). Retrieved from the WSIB Reference Library at the WSIB Head Office in Toronto, ON.

an SIR of 161 for rectal cancer amongst underground miners. What this means is where 100 indicates the expected cases of diseases in the general population, anything above this is identified as “excess risk.” So with an SIR of 161 there is an excess risk of 61 for this disease amongst miners compared to what is expected in the general population.

In WSIAT Decision No. 600/97, the issue at hand was whether a deceased worker’s cancer was related to his occupation, or in other words, “whether the cancer that resulted in the worker’s death “arose out of and in the course of” or was “due to the nature of” his employment” (WSIAT Decision No. 600/97, p. 12, para. 71). The worker had spent about thirty-one years primarily employed as an underground miner, and shortly after retiring in 1985 he was diagnosed with cancer of the rectum (in 1986) and lung cancer (in 1991). He died in August of 1991, and his widow submitted a claim to the WSIB where the decision was made to deny the claim, as the worker’s death was not considered to be related to his occupation. This led to an appeal claim submitted to the WSIAT. In challenging the claim, an epidemiological study by Julian and Muir on an underground mining cohort at INCO, Ltd. was submitted as a core piece of evidence to the WSIAT. Here, it was found that “[f]or the category of underground miners with years of employment that are similar to that of the worker (30-34 years), the Julian and Muir Study reported a standardized incidence ratio (“SIR”) of 161” (WSIAT Decision No. 600/97, p. 7, para. 41).

The Tribunal engaged in a detailed discussion on the issue of causation, especially with regards to the divergences between the meanings of causation in relation to the legal standard of proof (which is based on a 50 percent threshold, where if the evidence is approximately equal in weight then the benefit of the doubt goes to the worker) and the

scientific standard of proof incorporated through the epidemiological studies (statistical significance). The Tribunal highlighted the “but for” principle,⁸¹ as well as how “significant contribution” should be interpreted through workers’ compensation. With the latter, reference is made to tort law cases that were adjudicated at the level of the Supreme Court, especially *Athey v. Leonati* [1996] and *Snell v. Farrell* [1990]. While these tort law cases differ from the specific legal context of workers’ compensation,⁸² they nevertheless are perceived as providing important interpretive insights around the application of significant contribution. Specifically, occupation does not necessarily need to be the major or primary cause of disease in order to establish causation but the evidence must demonstrate that it is significant, which is interpreted as a “necessary” contributing causal factor.⁸³

Based on this discussion, the Panel notes that evidence should be considered with respect to the legal standard of proof premised on the principles of balance of probabilities and benefit of doubt. With regards to epidemiological evidence in particular, the Tribunal’s legal interpretation of an SIR of 161 was that it indicated that the worker was more likely than not exposed through other exposures, i.e., that he would have developed cancer and died from it in the absence of workplace exposure. An SIR of 200 (i.e., a RR of 2.0) was interpreted as the required criteria to meet the threshold of the balance of probabilities that could tip in favour of the worker, as it may then be inferred that there is a 50% chance that workplace exposures contributed to the onset of the

⁸¹ “But for” refers to “[e]vidence that a disease would not have occurred when it did “but for” the employment exposure” (WSIAT Decision No. 600/97, p. 24, para. 135).

⁸² For example, a key distinction is that workers’ compensation is a no-fault system while tort law requires that fault (negligence) is proven.

⁸³ As the Panel notes, “Even if the employment contribution was minor in comparison to other non-occupational causes, if it was a *necessary* contributing cause it can be concluded that employment was a “significant contributing factor” – that it made a “material contribution” to the development of the injury/disease” (WSIAT Decision No. 600/97, p. 26, para. 141; italics in original).

disease. In considering other evidence presented in this claim (such as how the level of exposure to asbestos was not seen to meet the threshold requirement in the WSIB policy on gastro-intestinal cancer), the adjudicators decided that this appeal should be denied.

The criteria of an SIR of 200 (or RR of 2.0) has been contested, especially in cases where a worker is exposed to multiple exposures that measure at an SIR of over 100 (but under 200) and may have synergistic effects. The interactions amongst multiple chemicals present a notable barrier to the recognition of occupational disease, as they defy the notion that each exposure can be studied in isolation from another, which is in tension with epidemiological methodologies and legislative frameworks where focus is concentrated on a singular exposure variable. As one participant in the legal field notes: “one of the big issues is the world of occupational disease in general, and cancer in particular, is that the structure of our legislation does not facilitate recognition if you have multiple exposures to carcinogens that operate in synergistic ways” (I 14). Such scientific and legislative approaches disconnect with the material conditions that workers have to work in, where there is more than one hazardous substance they may be exposed to. Another participant elaborates on the challenges these approaches encompass when occupational disease claims are adjudicated:

you have to be very careful in not pigeonholing yourself into one exposure. We used to be able to say, hey it was like a variable carcinogen soup that this person worked in. But now you’ve got to be, even the Tribunal, they will ‘well what exposures exactly?’ (I 1)

As this illustrates, through the practice of having to identify one exposure and separate it from its “variable carcinogen soup,” absences are produced in how the interactions between exposures as a whole, and their effects on the human body, are overlooked and discarded.

This was the issue with a more recent decision, i.e., WSIAT Decision 78/14, where four exposures (radiation, silica, arsenic, and diesel exhaust) were all measured to have a RR above 1.0 (1.75, 1.88, 1.50, 1.41 respectively) but the appeal was nevertheless denied.⁸⁴ This was because the worker was a smoker and the accepted RR measurement for his smoking history was measured at 2.0, which was interpreted to mean that smoking held a 50% probability of causing cancer.⁸⁵ The adjudicators concluded that the RR for the occupational exposures were insufficient as they were “well below the threshold for entitlement pursuant to Board policy” (10).

A notable issue with the decision in WSIAT Decision 78/14 was how the RR of each exposure was measured in a silo manner, with the underlying assumption being that these multiple exposures did not biologically interact within one another within the body, and there was not a specific epidemiological study that focused on the interaction of these exact exposures. As was noted in a document provided to me through personal correspondence, these were faulty assumptions premised on biologically implausible arguments where an absence of evidence was falsely interpreted to imply the evidence of absence. Just because there is not an epidemiological study on these interactions does not mean the health effects from these interactions are nonexistent.

In addition, multiple concerns were raised by interview participants and through my research over how epidemiological studies were being used and interpreted with regards to the criteria that an RR of 2.0 for an exposure should be met in order to reach the legal standard of proof (i.e., is it more likely than not that the occupational factor

⁸⁴ See discussion in Chapter Four.

⁸⁵ It is important to recall that the RR is calculated as an average (for example, the estimated RR range for radiation is 1.5 to 2.0, with the average being 1.75) and premised on one set of calculations (by Dr Bozek) which the Tribunal decided to accept.

significantly contributed to the disease). An example of such a concern is in reference to WSIAT Decision 600/97:

So for an SIR (or RR) of 161 (or RR=1.61) for every 100 cases of cancer among the unexposed, there will be 161 cases of cancer among the exposed, which means there will be 61 excess cases of cancer! Now, why shouldn't these 61 lung cancer cases get compensated (just because there aren't 100 excess cases?!)? Obviously it will be a task to distinguish those who have significant occupational contributions and those who don't [...] but this is why we have the "conditional priors" based on exposure. And given the current rate of acceptance (<5% of expected cancer claims actually recognized), one could say that these conditional priors are quite efficient at severely restricting WSIB acceptance.⁸⁶

As previously noted, an epistemological limitation with epidemiology is that it uses the level of analysis of populations. In the legal context of workers' compensation, the decision is made around an individual's case, as the adjudicator must decide whether or not a workplace exposure or condition had a significant contributing effect on the health of the worker. WSIAT Decision No. 600/97 notes that adjudicators should be cautious about placing too high of a reliance on epidemiological studies:

Epidemiological studies can identify statistical associations between particular exposures and an increased incidence of a disease – but a statistical association does not in itself prove that there is a causal relationship between the studied exposure and the disease. [...] since epidemiology studies populations, not individuals, it cannot prove that a particular worker's cancer was caused by the studied exposure (WSIAT Decision 600/97, p. 13, para. 73).

Jain's (2013) analogy of a "firing squad of statistics" is particularly useful in capturing this disjuncture, as well as some of the broader difficulties encompassed within disease recognition such as the long latency period between exposure and disease. Jain's poignant analysis also captures the adverse effects of abstraction that such methods inevitably encompass. With specific reference to asbestos exposure and mesothelioma,

⁸⁶ Personal document obtained through participant correspondence.

Jain acknowledges the history of industry cover-up around the health effects of asbestos (in other words, the active construction of unknowns over the dangers of asbestos exposure) and raises concern over what she refers to as “the impersonality of aggregates”: “it is as if a gun was shot into a crowd and fifty years later someone from that crowd keeled over and died. Given this cloak of anonymity (who was it who had the gun all that that time ago?), a would-be assassin might well be more likely to shoot” (35). Through this metaphor, it is important to acknowledge that if that bullet was shot out into a large crowd of people (the population) and one person was shot (the individual), then the metaphorical gun would be the cause of death, even if an epidemiological study did not show a statistically significant association between the gun and the death.

To reiterate, these epistemological limitations are not something new. They are repeated throughout the documents and archival records reviewed for this research, as well as through the interviews conducted (including interviews with individuals who have an epidemiological background). As with other issues in the realm of occupational disease recognition, concern over the weight given to, and interpretation of, epidemiological studies in adjudication processes can be traced to arguments made decades ago. The adage of “absence of evidence is not evidence of absence” is often linked to the discussion within the Weiler Report (1983) where he emphasizes how an absence of scientific proof in a claim should not simply translate to the denial of that claim (see Weiler, 1983 at pp. 36-42). Yassi’s (1983) report, which provides information on the scientific issues around occupational research for the Weiler Report, argues that while epidemiological evidence is “key to the recognition of diseases as work-related”, nevertheless “even epidemiological evidence is often considered unsatisfactory for

adjudication purposes in Ontario” (525). For example, as there is “reluctance on the part of the WCB to generalize findings from one plant to others” (ibid.). Specific epidemiological studies may reveal important insights, but they may not always be readily available and this is due to a multitude of reasons. One general reason is that a specific and strong epidemiological study on a particular workplace may not have yet been done, especially regarding the particular mix of exposures that a worker may have been exposed to within this workplace. As one participant put it: “I think the real problem is there are all sorts of epidemiology which has not been undertaken” and furthermore, when studies are done “the interactions between factors so seldom seems to be addressed” (I 11).

As previously noted, the reasons behind the lack of epidemiological studies on mixes of exposures are often due to methodological limitations. Such limitations are not because of inherent methodological incapacity to produce such studies but rather because multiple exposure studies are more complex and difficult to conduct, and would take more funding resources in order to accomplish. This, in turn, contributes to the production of absences and how they become mobilized in decision-making processes, where workers face heightened difficulties in attaining successful compensation claims:

It’s very difficult to study mixtures. It can be done, you have to throw a lot of resources at it and right now people are just not investing in research into occupational hazards [...] We’re not producing any evidence, therefore that’s playing into the hands of people who are saying since there’s no evidence that’s evidence against. (I 3)

The issue of the interpretation and application of epidemiological evidence is also a key point of contestation in the ODAP public consultation process in 2004. Many labour and community submissions perceived the Chair’s draft report as placing too

much of a reliance upon scientific evidence in general, and epidemiological evidence more specifically, with concerns raised over the impacts that may stem from this. For example, in one submission a hypothetical example was given of a small workplace where workers were experiencing dermatitis predominantly during the workweek, but no scientific studies were done on this exposure within this particular workplace. Waiting around for enough scientific proof to come into existence is not a feasible option in a legal setting where a decision has to be made:

A scientific study would have taken years to organize and conduct. It may have been criticized as too small a cohort or poorly done for various reasons. It is likely that, even if it had found an elevated risk of dermatitis, it would have been considered not strong enough evidence because it would have been only one study.⁸⁷

The impacts of such an approach could erroneously reinforce the assumption that a lack of particular types of studies equates to evidence of absence of harm. As was put more critically of the practices occurring at the WSIB, a related labour submission argued that: “The WSIB mind set is that of an insurance company. It is in its interest to deny claims. Thus, there can never be enough “scientific evidence” to prove cause.”⁸⁸ In contrast to the labour and community submissions, the employer representatives emphasized the necessity for strong scientific studies to be used in decision-making processes. As one mining company stated: “The principle that both adjudication and policy making must be based on expert medical and scientific advice is imperative. In addition we agree the value of epidemiological and toxicological studies cannot be underestimated.”⁸⁹

⁸⁷ CAW Canada submission to the ODAP Public Consultation (Sept. 20, 2004). Retrieved from the WSIB Reference Library located in the WSIB Head Office, Toronto, ON.

⁸⁸ CAW Local 599 submission to the ODAP Public Consultation (Sept. 14, 2004). Retrieved from the WSIB Reference Library located in the WSIB Head Office, Toronto, ON.

⁸⁹ Falconbridge Ltd. Sudbury Operations submission to the ODAP Public Consultation (Sept. 13, 2004). Retrieved from the WSIB Reference Library located in the WSIB Head Office, Toronto, ON.

Absences around scientific evidence and the impacts experienced from this in decision-making processes are also not evenly distributed amongst workers. Workers who experience marginalization in the labour market, such as those without union (or strong union) representation and those without secure citizenship status in Canada (such as migrant workers), encounter increased precariousness in relation to matters of occupational health more generally. This precariousness is compounded by the difficulty that there are fewer studies that focus on the specific health concerns of marginalized workers for a variety of reasons, including basic methodological considerations, as it is easier to study a workplace where there is more permanence, stability and a singular site location.

The occupational health issues that women workers experience, while gaining more attention in recent years have nevertheless remained a relatively understudied area. An intersectional lens to women's experiences of occupational health has been particularly neglected. This lack of attention was acknowledged at multiple points throughout my research. As one ODAP submission highlighted:

For women workers, the information regarding possible health effects to their bodies is almost non-existent. The majority of research conducted in possible health effects due to occupational exposures looks at male workers (usually white males). Few researchers have investigated the possible occupational link with health problems specific to women workers. Health problems that could include breast cancer or cervical cancer or reproductive problems, such as getting pregnant, staying pregnant or having healthy babies, among others.⁹⁰

To sum up the discussion thus far, there has been and continues to be a notable emphasis and reliance placed on epidemiological studies within the context of

⁹⁰ OFL submission to the ODAP Public Consultation (Sept. 2004). Retrieved from the WSIB Reference Library located in the WSIB Head Office, Toronto, ON.

occupational disease recognition. This has led to the concern that the absence of such evidence may be misinterpreted to indicate evidence of absence: that is, evidence of no health harms occurring. There is further unease over the lack of attention to the material realities of working lives as workers do not work in an environment where they are exposed to a singular exposure but rather there are multiple exposures that interact biologically and have health effects on the worker.

Despite the material realities of multiple exposures in working conditions, the existence of an epidemiological study on the particular interactions of exposures is often not feasible, as such studies tend to focus methodologically on one exposure at a time (while controlling for confounding effects). In many respects, the discussion so far has been notably technical as I outline the indicators used in epidemiological studies to quantify excessive risks and how this is interpreted in the legal context. The issue of absences in epidemiological evidence is not solely a technical one, but also encompasses social and political dimensions. With this in mind, I now turn to a discussion of how to understand such absences in scientific knowledge, with particular influence from David Hess's (2007; 2015) notion of "undone science".

Absences in Scientific Knowledge and Evidence: "Undone Science"

In relation to issues of absences of particular types of scientific knowledge, David Hess (2007; 2015) highlights what he conceptualizes as "the problem of undone science", which refers to:

a situation of unequal power that is associated with absent knowledge and that involves a conflict between reformers, such as social movement leaders, and industrial and political elites. It is based on a situation in which reformers look to "science" for answers to questions but find a lack of research, whereas their better funded adversaries often have much more research available to support their claims (2007: 22).

Hess further highlights that the distinction between undone science as “negative knowledge” or “positive knowledge” is hinged on one’s social location and accompanying perspective. For example, “industrial elites that shape the contours of research agendas through their preferences may not be as eager to have more evaluation of X, and they may view additional research that addresses undone science as negative knowledge” (2015: 142). There are various mechanisms to maintain undone science, such as underfunding, suppression and more subtle processes such as the way through which “first-order undone science” creates “second-order undone science” (2015: 143).

The uneven power relations in the realm of scientific knowledge production were certainly alluded to throughout my research, as well as the accompanying frustrations over undone science when trying to establish evidentiary knowledge claims to occupational diseases. One noted challenge faced by occupational epidemiology is that there “is a direct economic impact” affiliated with it, which is not the same for some other lifestyle and genetics factors: “Let’s say sun safety is really easy to accept – it’s nobody’s fault. It’s the sun. Cool, you know” (I 13).⁹¹ Epidemiologists studying excess risks that stem from occupational factors may face particular tensions with employer interests, as such research could disrupt practices of business as usual. As another participant succinctly puts it with references to processes of defunding occupational health institutions, such as NIOSH, in the United States: “Let’s face it, it’s not cool to fund these things [...] Anything that can hurt the best interests you don’t fund” (I 8).

⁹¹ It was acknowledged, however, that factors often classified under lifestyle – such as smoking cigarettes – are more contentious, as exemplified through the tumultuous historical trajectory of the tobacco industry in its attempts to disconnect tobacco from the health effects it causes.

A particular case of ‘done science’ that got ‘undone’ is that of the Occupational Disease Panel (ODP), which was originally named the Industrial Disease Standards Panel (IDSP). Recall how the ODP came into existence through the uptake of Paul Weiler’s recommendations in his report, *Protecting the Worker from Disability: Challenges for the Eighties* in 1984, and for which Annalee Yassi produced her report, *Occupational Disease and Workers’ Compensation in Ontario*, as a way to research the scientific issues around the compensation of occupational disease. Based on his research experiences on occupational disease in relation to workers’ compensation in Ontario, Weiler (1983) “was struck by the large gaps in basic information about industrial disease in Canada” (52). He also recognized that “[t]here is no statutory formula which provides an easy, across-the-board solution” to recognizing occupational diseases (50). These factors led him to realize the necessity of a participatory forum that could produce comprehensive information about occupational diseases and inform decision-makers about the existence of occupational hazards. Such a forum, which he envisioned as taking form through an IDSP, would “focus on the specific type-situations which present real difficulties, e.g., respiratory disabilities and heart fatalities” (1983: 50) and would also “educate the community about current scientific learning regarding the scope (and the limits) of the industrial disease problem in Ontario” (1983: 51).

On October 1, 1985, the IDSP was established by the provincial Conservative government as an independent body from the WCB, which included a legislative subsection aimed at keeping their funding separate from the WCB in order to be able to maintain such independence in practice.⁹² Its purpose was “to make the process, by

⁹² Subsection 95 (10) of the WCA, stated that the Panel “shall determine its own priorities, practices, and procedure” and subsection 95 (6) stated that Panel expenses “shall be paid by the Ministry of Labour and

which occupational diseases are recognized, public and to ensure that occupational diseases are given due attention by the workers' compensation system".⁹³ It was specifically oriented to the scientific study of potential linkages between specific occupational factors in relation to a disease, and within ten years they had produced about 20 Reports of Findings, as well as additional occasional papers and research papers.⁹⁴ While the production of scientific evidence for work-relatedness was its goal, the Panel was more diversified, as representatives from labour, management, and community were appointed throughout the years to offer their perspectives on issues of occupational disease.

While the ODP held an important role in generating information on occupational disease for the WCB, it faced challenges in meeting its objectives and purposes. Funding concerns, at least throughout the first half of the 1990s, were a notable issue that the ODP encountered, and such concerns were interconnected with continuous actions to defend its independence from the WCB. In response to what at the time was the proposed amendment Bill 165, one hesitation raised was that this amendment would not provide adequate funding for the ODP. Without the security and availability of such funding, the ability of the ODP to produce knowledge about occupational diseases would be stifled:

shall be chargeable by the Ministry to the Board". It was noted, however, that this did not necessarily occur in practice: "the role of the Ministry has become somewhat confused. Initially the Ministry was interposed between the Board and the Panel so as to protect the Panel from interference from the Board. What has happened over the years, however, is that the Ministry has attempted to give instructions to the Panel. The Panel, as an independent agency, has resisted this." ("Submissions of the Industrial Disease Standards Panel to the Legislative Assembly of Ontario Standing Committee on Resources Development, In the Matter of Public Hearings Conducted by the Standing Committee on Resources Development during August and September 1994 and in the Matter of Bill 165, entitled 'An Act to amend the Workers' Compensation Act and the Occupational Health and Safety Act'. (File RG 7-168, B817706: "Industrial Disease Standards Panel – correspondence and memorandum of understanding". Retrieved from the AO in Toronto, ON.)

⁹³ ODP Annual Report, 1995/96. Toronto, ON.

⁹⁴ See the ODP Electronic Library, which can be accessed at: <http://www.canoshweb.org/odp/#annual>

The Panel has a need for guaranteed long-term financing so that it may conduct long-term studies. One of the reasons why the Panel requires long-term financing is because research on disease issues often spans many years. As well, the initiation of new research projects may vary from year to year. In the past, both labour and management groups have been frustrated by the Panel's inability, because of inadequate funding, to proceed with needed research.⁹⁵

Such frustrations were noted, for example, in the ODP's February 1995 meeting minutes, where the Panel discussed having to reduce the number of planned research projects from five to two during 1995/96 due to receiving a lower budget from the MOL than they initially requested.⁹⁶

As previously noted, after the Harris Conservative government took provincial office, the ODP ended up being abolished in 1998 through Bill 99 (Workplace Safety and Insurance Act, 1997). While other research centers for occupational health and safety continue to exist, the ODP was unique in its focus on occupational disease recognition in relation to workers' compensation in Ontario. Unfortunately, the numerous reports that were produced did not mean that they were drawn on by the WSIB to better understand linkages between occupational exposures and disease. When the Board was asked in the early 2000's to re-consider the ODP reports, the response received was that they would not do so as these reports were now considered outdated. A respondent notes: "whose fault was it that they were outdated? The Board – that's where they went to die. That's why the process has to be outside the Board" (I 10). This underscores how the issue at hand in recognizing occupational diseases is not simply due to a lack of knowledge, but

⁹⁵ "Submissions of the Industrial Disease Standards Panel to the Legislative Assembly of Ontario Standing Committee on Resources Development, In the Matter of Public Hearings Conducted by the Standing Committee on Resources Development during August and September 1994 and in the Matter of Bill 165, entitled 'An Act to amend the Workers' Compensation Act and the Occupational Health and Safety Act' (pp. 9-10) (File RG 7-168, B817706: "Industrial Disease Standards Panel – correspondence and memorandum of understanding". Retrieved from the AO in Toronto, ON.

⁹⁶ ODP Minutes of Meeting No. 80. February 14 and 15, 1995. Toronto, ON.

how existing knowledge becomes situated as non-existent. Even when knowledge exists and is known to exist, such knowledge may not necessarily be mobilized on by administrative bodies into decision-making processes, as exemplified with the ODP research reports. In line with Santos' (2015) conceptualization of absences in relation to a political economy of waste, such knowledge becomes, in his words, tossed away.

The case of the ODP illustrates the social and political contexts that situate knowledge and absences. As Hess (2007) emphasizes, undone science is not apolitical; rather, it stems from broader power relations. Some participants raised concern over the general impression that the Ontario Mining Association played a role in influencing the Harris government's actions to dissolve the ODP. These actions exemplify how science that has been 'done' can also become 'undone' if the conditions for its existence become diminished (e.g., funding cuts) or outright removed (e.g., abolishing the organization). And although labour- and community-oriented submissions to the ODAP public consultation process in 2004 emphasized the necessity to re-instate an independent organization such as the ODP, such recommendations were never taken up.⁹⁷ This further points to how progress in occupational disease matters is not because of an influential individual, but rather a constellation of factors that play out through a particular social and political context.

Hess's (2015) more recent work on undone science aims to develop more nuanced understanding of this phenomenon, with an important key point being that there are

⁹⁷ The case of the ODP also illustrates how absences become entangled with other types of unknowns, such as ambiguity. For example, a key concern with the WSIB was its arbitrariness and lack of transparency, and the ODP was one institutionalized response intended to counter such issues through a more open and publicly accountable research process. This concern was also highlighted in the Dupre Royal Commission on Asbestos (1984), as attention was pointed to how the Board's policy guideline process and broad discretion offered through the Act serve to fuel the perspective of the arbitrariness of the Board.

“several areas of complexity that have moved the analysis beyond the first-level binary of movements versus industrial and political elites” (143). To exemplify this point, Hess draws attention to three areas of complexity: first, that undone science does not necessarily imply that it is technologically feasible to get this science done; second, that it is not only elites who produce undone science but social movements may do so as well; and third, “social movements and reformers themselves are often divided, and consequently there may be different articulations of undone science” (143).

The first area of complexity (the feasibility of getting undone science done) is exemplified by the regulation of chemical hazards used in occupational settings. There is currently a significant volume of chemicals released into use, without adequate knowledge about the potential long-term health effects of these substances. Not only would it take an enormous amount of time and resources to test these chemicals, but also the political and economic barriers in doing so are paramount. To illustrate this difficulty, one interview participant makes the analogy of chemicals being given the presumption of innocence until proven guilty as exemplified through regulatory practices that release chemicals into use with the assumption that they are safe until proven harmful. This ties in with the previously noted perception that there is an uneven balance of power when deciding whether or not a chemical is ‘guilty’ of causing ill health, as the burden of proof falls onto workers and communities to prove its toxicity.⁹⁸ This view was expressed in the Yassi Report (1983) as well: “The rapid proliferation of new chemicals and processes is cause for concern, particularly considering that many occupational diseases have a latent period of years or decades. Hence, the ill-effects of these often completely untested new chemicals can only be speculated upon” (13).

⁹⁸ See details presented in Chapter Four, pp. 128-9.

The challenge of speculation over the potential harms of an exposure is that speculation would not be accepted as sufficient evidence in a legal framework. As one participant notes, “when it’s speculative then it becomes a problem when you’re trying to apply the law” (I 2). Consequently, even though a plethora of chemicals are released without substantial knowledge about their potential health risks, concerns over their health effects are not granted a substantive enough status, as they have not been ‘proven’. The speculative status of such concerns further points to how chemicals are presumed innocent until proven guilty, as well as how human bodies become used as ‘guinea pigs’ in the processes of developing evidence on its harmful effects beyond a level of speculation.⁹⁹

Hess’s (2015) second and third areas of complexity of undone science are also pertinent in the context of occupational disease recognition where power relationships exist between labour, state, and capital. As emphasized in several interviews, it is important to keep in mind that labour is not a monolithic entity, and the practices of political and economic elites are not static. One example is the fact that both the establishment and abolition of the ODP were carried out by the same political party (the Progressive Conservative Party of Ontario), demonstrating different interests at play in relation to the existence of this research body.

How to take up issues around occupational disease is also a contentious matter in the labour community, as organized labour varies in terms of levels of conservativeness, including in their perspectives about the role of labour in relation to capitalism. While these internal conflicts are not specific to (or new in) an era of neoliberalism, such a

⁹⁹ The discourse of humans as guinea pigs is commonly used to denote how the social sphere becomes a type of laboratory experiment where the living being is exposed to certain exposures, and then government and industry actors ‘wait and see’ what happens (see Penrose, 2007).

political economic climate nevertheless fuels such divisiveness as capital currently has a considerable amount of relative power and global mobility in relation to labour. Concerns over job loss may eclipse considerations about occupational health as the latter gets into the very crevices of control in the workplace, i.e., how labour is to be performed and under what conditions. As one participant notes, situations where a union leader tells union members to keep quiet about health issues as otherwise they will lose their jobs happen more often than many would like to think.¹⁰⁰ Another participant emphasizes the current challenges for efficient occupational health activism:

Workers are afraid to launch any conflict between labour and capital because it's seen as a no-win situation. The [workers] will turn their back on this issue if they think it puts them in conflict because they think as soon as that happens the companies can just pick up and move. It's not just that they imagine this is what could happen, that's actually what's been going on (JB).

As these divisions within labour exemplify, while one segment of labour may push for undone science to get done, another segment of labour may prefer for such science to remain undone, at least for the moment.¹⁰¹

“There’s No Such Thing as No Evidence”: Best Available Evidence, Knowledge Mobilization, and Workers’ Knowledge

The previous sections focused on absences in medical and scientific knowledges, with a spotlight on how these are produced and used strategically. In this section, I draw attention to another way in which the absence of evidence does not mean no evidence

¹⁰⁰ It was also noted that while a critical approach to some unions in how they’ve handled occupational health matters is important, it is also necessary to question why is this happening and what are the underlying conditions that reinforce such approaches.

¹⁰¹ While divisions between labour may impede undone science from getting done, other social movements – such as the animal rights movement – may also create pressure for undone science to remain undone. While occupational health groups may support the use of animal studies to produce knowledge on harmful exposures (especially in consideration of the limitations of epidemiology), animal rights movements would oppose such practices.

exists, but rather can be an issue of what kinds of knowledges become mobilized and how much weight different forms of knowledge are accorded.

As pointed out often in the research interviews, the legal principles of the workers' compensation system support the notion that if there is a lack of strong evidence about the potential linkage between occupation and disease, then the best available evidence should be taken into consideration. Another way of putting it is that if there is an absence of a particular type of evidence, such as specific epidemiological studies, this should not simply be translated as evidence of the nonexistence of occupational harms. In practice the scenario is quite different, as concerns are repeatedly raised over how the best available evidence is often not being considered and that an absence of strong scientific evidence is being problematically used to deny compensation claims.¹⁰² As one participant notes, "the fact that a study failed to achieve statistical significance is not evidence of the absence of a relationship between the product studied and the disease developed, but is often treated as such and it's a common error" (I 14). In discussing these issues, I first examine the notion of "best available evidence" and then spotlight one type of non-scientific evidence that is often 'tossed aside' in decision-making processes, i.e., workers' knowledge of their own working conditions.

When interview participants note that 'an absence of evidence is not evidence of absence', they often referenced Paul Weiler's (1983) report. In this report, Weiler puts forth a detailed overview of his position on how a lack of strong, clear scientific proof is being taken up in disease compensation claims. Weiler argues that this "absence" should not be inferred to mean that there is proof against the causal relationship; rather what is

¹⁰² As well, it was noted that a difficulty encountered was in convincing the adjudicators that the evidence presented within the case was the best available evidence, i.e., they would be questioned about how they know there is not some better evidence out there.

required is that the best available evidence be brought into deliberation to establish whether or not a linkage can be made. If the evidence is considered equally for or against a causal connection, the benefit of doubt goes to the worker. He elaborates:

Another way to put this point is that the Board must avoid the trap of (figuratively) seeing the workplace as the criminal defendant in the dock, identifiable as the culprit only if there is strong proof to this effect. Rather, the WCB has to make up its mind about which is the more likely source, the workplace or some other factor. And in the final analysis, the fundamental principle of workers' compensation is that if the relative probabilities are reasonably in balance, the doubt about the cause – even the cause of a disease – must be resolved in favour of the claimant (Weiler, 1983:42).

A few years following the release of the Weiler Report, Terence Ison was commissioned by the IDSP (ODP) to review matters of occupational disease adjudication through Ontario's WCB. While his perspective differs from Weiler, he also emphasizes the importance of avoiding a heavy reliance on one form of knowledge in relation to occupational disease recognition and that attention must be placed upon what the best available evidence is:

Let me reiterate that I am not questioning the propriety of the methods used in epidemiological research for other purposes. The point being made is that if an epidemiological study does not "prove" or "verify" a hypothesis of employment causation as those terms are used in the natural sciences, it does not logically follow that such a study should be cast aside from the purposes of claims adjudication. The legally relevant question is: "What is the best available hypothesis about the causes of the disease among the workers being studied? (Ison, 1989: 33)

Both Weiler and Ison recognize the potential contributions of epidemiological knowledge in matters of occupational disease recognition, while simultaneously acknowledging that by only shining the light on this form of knowledge, other types of relevant and useful knowledges get put off to the side or discarded completely.

The lack of attention to other forms of knowledge is a particular issue when there are epidemiological absences, including when epidemiological studies may be available to some extent but they are not necessarily the best source of evidence for the case at hand or when the epidemiological studies are available but they are not necessarily methodologically strong studies. Labour and community groups also voice concerns over the high level of evidentiary weight given to epidemiological studies without adequate consideration of the appropriateness of such studies for specific case. For example, as noted in a labour submission to the ODAP consultation: “We are, therefore, concerned that an elevation of epidemiological evidence above other evidence may lead to decision-makers preferring flawed epidemiological evidence over more reliable evidence that is not derived from epidemiological studies”.¹⁰³

Therefore, it is not simply that knowledge of occupational disease does not exist, but that there are multiple ways of knowing about connections between occupation and disease, not of all which garner sufficient attention and deliberation when examining the evidence available to determine whether a causal connection could be proven to exist. As emphasized throughout my research interviews, if there really was an impetus to strengthen knowledge around occupational hazards, a broader range of scientific studies could be brought into the realm of consideration. More comprehensive attention could be paid to the scientific research already being done by institutions in other national and continental jurisdictions – for example, the knowledge that exists around chemical exposures in European countries – and that this could be better mobilized into the Ontario

¹⁰³ Submission to the ODAP Draft Report from the Ontario Federation of Labour (OFL) (Sept. 12, 2004). Retrieved from the WSIB Reference Library located at the WSIB Head Office, Toronto ON.

context.¹⁰⁴ There could also be a broader range of types of scientific studies being drawn upon more generally:¹⁰⁵ “to widen out the scientific viewpoint, for example, look at toxicology and animal studies and those sorts of things and mechanisms of carcinogenesis, for example, as opposed to just epidemiology” (I 11). The importance of doing is also because epidemiological studies take a notable amount of time to be produced and reliance on the existence of epidemiological studies could be used as a tool through which to obscure the recognition of occupational diseases: “it’s easy to deny something if all you’re looking at is epidemiological studies, which can take a long time and there might not be any of what you’re looking at and so and so” (I 11).

While the scientific range of studies could be expanded, it is also important to acknowledge that scientific knowledge is not the only form of knowledge to draw on when attempting to establish a connection between an occupation and a disease. As one participant succinctly notes: “scientific evidence is only one part of the picture” (I 1). One form of non-scientific knowledge that has been emphasized as needing more adequate incorporation into decision-making processes is that of workers’ knowledge, including workers’ knowledge of their own working conditions as they are the ones who

¹⁰⁴ Barriers in doing so, however, were also emphasized – such as competition between research centers due to factors such as funding, as well as employers being dismissive of the relevance of such findings when such efforts become crystallized, with the argument that ‘more proof is needed’.

¹⁰⁵ There was notable discussion around the need to pay more attention to animal studies (such as animal experimental studies and wildlife studies) as a way of knowing about the connections between occupation and disease, and knowledge around toxicity and human/animals will be taken up in more detail in the next chapter. The role of animals in knowledge production around diseases is a contentious one, especially with regards to animal experiments (see, for example, Birke et. al. 2007). In one regard, it points to Hess’ (2015) second point of complexity around undone science, i.e., that social movements also produce undone science. While I have noted how certain segments of organized labour may not be enthusiastic in producing knowledge around occupational health matters, another social movement which may oppose the production of such knowledge would be the animal rights movements (Birke et. al., 2007; Hess, 2015). Furthermore, while the dismissal of animal studies may be understood as a politically motivated strategy to defuse connections between toxic exposures and ill-health (e.g., Langstan, 2010), there are also calls to move beyond human-centric approaches in understandings of ill-health and environmental and occupational hazards (e.g., Alaimo, 2010).

do the work in these settings on a daily basis. This is exemplified in responses to the ODAP public consultation in 2004, where some labour- and community-submissions point to the lack of consideration given to workers' knowledge at the expense of scientific (especially epidemiological) knowledge as forms of evidence:

We strongly believe the statements of workers, co-workers, and other witnesses must be given substantial weight when adjudicating claims. The knowledge workers have of their own work environment is, in many cases, the best historical data that exists [...] [but] this information is not given much weight at all, especially when there is conflicting information from the employer.¹⁰⁶

This concern is further emphasized in the research interviews as well, especially in the context of knowledge over exposures and hazardous materials, as some participants noted a tendency for adjudicators to more readily accept employers' accounts of exposure levels rather than workers' accounts of their working conditions.

Karen Messing (2014), a biologist with expertise in matters of occupational health, makes the argument that scientists could become more knowledgeable about occupational health if they were more open to listening to what workers have to say about the work that they do. This is especially so since scientists often do not have work experience in the workplaces they study. In illuminating the importance of this, Messing is careful to note that there are systemic barriers to enabling such scientific knowledge production practices due to epistemological (claims to objectivity), political economic (funding; employer interests and resources), and social (class position and the work experiences that stem from it) factors.¹⁰⁷ As she argues, it would be

¹⁰⁶ Submission to the ODAP Draft Report from Office of the Worker Advisor (OWA), Hamilton (Sept. 24, 2004). Retrieved from the WSIB's Reference Library located at the WSIB Head Office, Toronto ON.

¹⁰⁷ Messing (2014) argues that there is an "empathy gap" between scientists and the workers/working conditions that they study, as scientists often do not relate to the work processes (such as repetitive motions) that they examine due to class differences. As she elaborates: "many medical scientists suffer

considered scientific to come in and sample workplace temperatures, air quality, or working postures at specific sites for a few hours and then generalize about them to the working environment without checking with the workers to see whether the sampled period is typical of the work week, whether the sites sampled are representative of all sites, whether working conditions have recently changed, or whether the list of sampled conditions is complete. On the other hand, many people think it is unscientific to ask the worker who has been in the workplace all year to report on environmental quality (2014: 116).

While the technical knowledge about the working conditions may not be available to the workers as they are doing the work they do (especially if they were exposed before legislative and regulatory changes, such as WHMIS, were introduced), there nevertheless may be an understanding amongst workers of the hazards that they are working with. This was the case with the WSIB occupational disease hearing I attended, where the worker knew the substances they worked with through factors such as shop talk (which included talk about the health effects and illnesses being experienced by fellow workers), but was never formally or explicitly told at the time what exactly these substances were.

Recall Shotwell's (2011) discussion of the importance of 'implicit understanding': "background, taken-for-granted understanding of being in the world" (x) which constitute ways of knowing that may not be verifiable in the way propositional knowledge is. Shotwell outlines four types of implicit understanding: (1) knowing that stems from practice (e.g., knowing how to swim); (2) "somatic or bodily knowledge" (xi); (3) knowledge that could become propositional, but currently cannot be easily expressed in words; and (4) knowing that ties with affect, and the experiences that come from this (see pp. xi – xii).

from an empathy gap. They play tennis and go to museums, so they can understand tennis elbows and museum fatigue. But they have gone to school for years and years so as to avoid doing repetitive physical labour at work – how can they sympathize with the problems of wire strippers? Often, they just don't believe their stories" (111).

In the context of occupational disease recognition, some of the ways of knowing that workers encompass and bring forward may be understood as forms of implicit understanding. For example, in September 1994 the ODP released a report, entitled *Report to the Workers' Compensation Board on Cardiovascular Disease and Cancer Among Firefighters*, based on its research into occupational hazards encountered by firefighters. This report found that many diseases (including cardiovascular disease, brain cancer, colon cancer, and kidney cancer) had a probable connection to the occupation of firefighting. The fact that so many diseases were found to have a probable connection to firefighting was not necessarily a surprise to firefighters, as they suspected their work encompasses notable health risk regardless of whether these risks were formally recognized or not. Many firefighters wrote into the WCB after the release of this report in order to support it by urging the Board to recognize the findings and adopt the recommendations. As one letter clearly exemplifies, while the scientific knowledge adds legitimacy to the health problems firefighters experience, such knowledge is not news to this group of workers: "I find these conclusions somewhat alarming and disturbing; however, it is something that we, who are connected with this profession have long suspected to be true".¹⁰⁸

More adequate attention to and credibility for workers' implicit understanding is a significant consideration. Yet, at the same time it is important to note that such knowledge is enmeshed in a web of complexities that does not straightforwardly translate to enhanced recognition of occupational diseases. Certain forms of implicit understanding (such as the bodily knowledge that something is not quite right in how a worker feels or

¹⁰⁸ File RG 7-12, B409864: "Industrial Disease Standards Panel – General." Retrieved from the AO. Toronto, ON.

the potentially propositional knowledge in the sense of a worker knowing they are working with some kinds of hazardous substances but cannot concretely identify them yet) could provide important contributions to adjudication processes and better recognition of occupational disease. However, it is also important to acknowledge that there are aspects of implicit understanding that may complicate these processes. One example of this is if the worker's knowledge is situated in a gendered context that deters them from voicing concerns about their health in relation to the work that they do. Wolkowitz (2006) draws upon Bourdieu's theoretical insights on capital and habits in her discussion of "the formation of the traditional male working-class habitus" to refer to a gendered and class culture that celebrates bodily strength, toughness, and the ability to provide a livelihood through paid work, thereby minimizing the dangers of occupational risks (65). Workers in such workplaces may be hesitant to bring up occupational health matters, for, as noted by one participant, in these situations "it's not the culture to complain about disease, [for] most of the workers" (I 8). This workplace culture is further compounded by political economic concerns, such as fear of losing one's job and/or of the effects from the power and mobility of global capital, such as capital's ability to relocate to another jurisdiction where labour concerns over health are not being pressed.

Conclusion

The focus of this chapter was to illustrate how absences, as another type of unknown, complicate processes of recognizing diseases as occupationally related in multiple ways. I problematized the taken-for-grantedness of absences; while there are components of regularity to absences in the sense that not everything can be known, absences are also actively produced where some forms of knowledge exist but

nevertheless are positioned in a realm of nonexistence. In framing this understanding, I drew on Santos' (2015) sociology of absences to illustrate how certain forms of knowledge become situated as "existent" and other types of knowledge become rendered "nonexistent." In the context of occupational disease recognition, epidemiological studies are generally granted a status of existence by being given a high level of evidentiary weight and workers' knowledge about their working conditions is often de-valued. Of particular importance, the evidentiary role of various types of knowledge in decision-making processes should not be over-simplified. Although some types of scientific studies may be more readily accepted as evidence in decision-making processes, other scientific studies may be disregarded, as exemplified by the lack of uptake of the ODP reports.

The key point in this chapter is that there exist concerns over how claims to "evidence of absence" continue to complicate occupational disease recognition. Such claims tend to imply that there is a complete absence of knowledge about the occupational factors in relation to disease. Rather than misinterpreting such absences as complete absences, what needs further attention is how evidentiary absence is framed. There is knowledge that exists, but it is often not granted the status of existence in how it is taken up as evidence in decision-making processes around occupational disease. Even though Paul Weiler (1983) cautioned against using the "absence of evidence" as "evidence of absence" over three decades ago, this issue continues to persist to the present day.

Chapter Six:

Closure

The focus of this chapter is on closure as a process that creates boundaries between what is known and unknown, and how this complicates the recognition of occupational diseases. I begin from the insight that there is an unpredictability, or what I identify as an openness, concerning potential health effects that could emerge from the exposures and conditions that one encounters through their occupation. Such openness becomes further convoluted when moving beyond a mono-causal framing of disease etiology to recognize multifactorial causes and synergistic effects between exposures. To address openness, there are also administrative and epistemological strategies to deal with decision-making requirements regarding the occurrences of occupational diseases. These strategies employ closure mechanisms to pragmatically delimit knowns from unknowns. Such mechanisms include practices of simplification, standardization, and abstraction, which are carried out through actions of defining and classifying. In other words, as a way of reducing the presence and impact of unknowns due to the messiness and complexity of diseases, boundaries are constructed concerning the health problem thereby reigning in the multitude of possibilities for how it can be known and, in turn, addressed. It is important to emphasize that while these boundary strategies identify what will be for pragmatic purposes regarded as known, they at the same time identify, and contribute to, what is unknown. These processes have significant impacts on occupational disease recognition.

To be sure, there is a necessary practicality espoused through practices of defining and classifying as ways to make sense of occupational disease and organize knowledge around it. We put such practices into effect and encounter them in other contexts of our daily life, including mundane activities like organizing paperwork into files or walking into a grocery store with the expectation that the merchandise will be sorted based on the type of food. In the context of occupational disease these practices are also important as they can promote the identification of factors that contribute to the occurrence of diseases, and this identification could open up the potential to develop preventative and regulatory strategies aimed at minimizing exposure. As Beck (1995) acknowledges in his analysis of ecological politics in risk society, the absence of defining and classifying hazardous substances also means the absence of thresholds such as maximum pollution levels and could lead to an opening of “the floodgates of poison” (10). So, while defining and classifying as closure processes are not in themselves a hindrance to making the link between occupational working conditions and disease, they are open to being used in ways that deny or mask the connections.

While keeping in mind the multi-dimensionality of defining and classifying, the primary focus of this chapter is on the dynamism of these practices and how they could be amendable to alternative frameworks of knowing, rather than assume their neutrality or to view them as static entities. I also aim to illuminate the significance of social and political contingencies of closure, as this helps to demonstrate how there is not only one framework for understanding the problem at hand (Bowker and Star, 2000; Guthman, 2010; Santos, 2016; see also Epstein, 1996). As Santos (2016) reminds us, “[t]here is no

essential or definitive way of describing, ordering, and classifying entities and relationships in the world” (196).

Premised upon the conceptualization of closure developed in this chapter, I argue that closure creates a type of unknown as it delimits what is known in terms of what becomes defined and classified as occupationally related (or not). This creates tensions in recognizing occupational diseases, especially at an individual level where there is a broad range of variances in how disease is experienced. Also it is influenced by the role of standardized and abstracted requirements which, when applied, tend to take on a “life of their own” - for example, by being applied in a checklist type of manner rather than one based on adequate investigation and inquiry. Closure can become another mechanism through which connections between occupation and disease become obscured, with increased difficulty for workers to successfully claim compensation if their experience of disease does not align well with requirements set out by the existing definitions and classifications of an occupational disease.¹⁰⁹

I organize this chapter into two main parts. In the first part I set the framework for further discussion by drawing on relevant literature to put forth a conceptualization of closure in the context of occupational disease recognition. I then highlighting how the practices of defining and classifying diseases constitute two key pillars in strategies to enact closure. In the second part, I shift attention to outlining examples of how closure is enacted by spotlighting three strategies: (1) by constructing parameters around safety and risk, with a specific focus on occupational exposure limits; (2) through the spatialization

¹⁰⁹ It should be noted that the analysis here is at the broad level as there is not one specific occupational disease of focus, and therefore it must be acknowledged that the experience is not the same for all diseases – some are (in principle) more readily recognized based on how they are currently defined and classified (e.g., mesothelioma; noise-induced hearing loss), while others encounter increased difficulty in attaining recognition amongst some working groups (e.g., breast cancer).

of boundaries between ‘occupational’ and ‘non-occupational’ factors; and (3) by standardizing disease requirements through the WSIB operational policies.

Part One: Setting the Framework

In this part, I put forth a conceptualization of closure that acknowledges the open-endedness of health outcomes that could potentially result from one’s occupation. I identify defining and classifying as two key components in enacting closure. In conceptualizing closure as a process that pragmatically delimits the known and unknown, I draw on literature that highlights the complexity of health problems that could flow from exposure to hazardous substances, as well as how responses to such complexity have tended to simplify the problem of disease in attempting to manage risks. By emphasizing the significance of definitions and classifications of disease, I point out that these are not solely technical matters but contested processes situated in social and political contexts. This acknowledgement builds to the key point that the form that closure takes is not inevitable. Tensions underpin the dynamic boundaries around what is known and unknown about a disease as there are multiply-situated voices that contest the configuration of these parameters, thereby subjecting boundaries to the possibility of reconfiguration.

Conceptualizing Closure

In looking at the open-endedness of health outcomes in relation to matters of compensation, I find Petryana’s (2013 [2003]) ethnographic study on the shift towards biological citizenship to be particularly insightful.¹¹⁰ Petryana focuses on how citizens in

¹¹⁰ Petryana (2013 [2003]) conceptualizes ‘biological citizenship’ as a shift in the rights and responsibilities of citizenship claims in the post-Soviet era: “The traditional concept of citizenship casts citizens as bearers of natural and legal rights that are (and must be) protected as a matter of birthright. Such rights were indeed extended to all inhabitants of Ukraine, regardless of nationality, at the time of independence. Yet the issue

Ukraine attempt to claim compensation from the state after the Chernobyl nuclear disaster in 1986, pointing out how exposures to radiation encompass an “open-endedness of the disaster’s health effects” (12), which include constantly “changing dynamics between the known and unknown” (26). This openness of health effects, however, comes into tension with Ukraine’s governance of nuclear disaster where scientific processes are geared towards “easy answers and simple closures” (12). Biomedical criteria become entwined with state models and narratives, resulting in a reinforcement of binary framings of disease claims (‘authentic’ versus ‘inauthentic’) as well as the knowledge about them (‘legitimate’ versus ‘illegitimate’). Importantly, Petryana highlights the inextricable interconnections between local and international systems in supporting such processes. She finds that international classification systems and the expertise embedded within these systems influence local scientific knowledge and practice through the “use [of] their authority and control of technological resources” to strengthen these binary categorizations of scientific knowledge (167). These processes work together to reify rules of inclusion, exclusion, and recognition (Petryana, 2013 [2003]).

With regards to state involvement in enacting closure, these rules of inclusion, exclusion, and recognition are important as they produce and determine the necessary requirements that need to be met in order for radiation exposure to be linked with one’s health conditions when submitting a compensation claim. People exposed to radiation make biological claims to the state in order for their bodily harms to be seen as ‘deserving’ of compensation. In order to make such claims, people have to turn their

of birthright as it relates to state legal protections remains vexed, particularly given the fact that persons born in some parts of Ukraine are arguably disadvantaged on the basis of intractable environmental and health threats. For these groups, the very idea of citizenship is now charged with the superadded burden of survival” (7).

complex experiences of suffering “into numbers and codes fitting standard categories” (Petryana, 2013 [2003]: 20). With focus on the Bhopal disaster in 1984,¹¹¹ Mukherjee (2010) emphasizes how such quantification and abstraction processes create further suffering for those attempting to obtain compensation for their ill-health:

In its attempt to gather evidence, GOI had to identify patterns of injuries that were then classified under broad categories of severe, mild, and no injuries. The victim’s suffering had to become a quantifiable unit of injury that could be compensated in monetary terms. As a result, the victim became a disembodied object without a name, face, gender, or sense of self-worth (34).

Nash’s (2006) study is useful to draw on in order to further delve into the dynamism of knowledge about disease, especially with regards to how the open-endedness of health effects presents difficulties and tensions in trying to enact closure and how responses to such complexities focus on epistemologically and ontologically simplifying it. Nash identifies an ongoing shift towards increasingly reductionist toxicological approaches where the dominant paradigm becomes centered upon situating *specific* chemicals as *the* focal point of interest. This approach is done at the expense of developing broader knowledge of the interconnectedness of environmental factors. As a consequence, a predominant focus on single chemicals situates multiple interactions between various chemicals as an unknown. The impact of chemical interaction effects on workers’ health is positioned outside the parameters of what is known. Nash argues that a key moment in this shift was a decrease in fieldwork as a methodological source of knowledge production with a move towards (and legitimization of) the sterile laboratory

¹¹¹ In the Bhopal disaster there was over forty tons of methyl isocyanate (MIC) that was released from the Union Carbide plant in 1984. While the numbers of affected individuals are contested, Mukherjee (2010) points to over half a million people having their health adversely affected (e.g., cardiovascular diseases, intergenerational reproductive health problems) and approximately 20,000 deaths. Drawing upon oral history and critiquing existent knowledge frameworks around the effects of this disaster, Mukherjee’s study aims to emphasize alternative ways of knowing.

setting. She identifies this as particularly significant as the precision and control of the laboratory setting claims to be a means of dealing with the messiness and unpredictability of the natural environment.

More specifically, using the case of migrant farmer workers, Nash (2006) illustrates the impacts of such epistemological shifts on how occupational disease is understood by highlighting the particular difficulties that such labour entails for occupational health specialists. These difficulties include factors such as the insecure and constantly mobile aspects of this work, and the nebulous and indeterminate boundaries of the workplace. As Nash points out, “the unpredictability of the natural world continually frustrated those who sought to describe and manage the agricultural environment” (143). The lack of material workplace boundaries (i.e., walls) ties in with the challenges of attempting to measure a worker’s exposure to harmful substances such as pesticide application. This is especially so due to the multitude of substances the workers are exposed to, unknown interactions between these exposures in open environments, and the divergences in bodily responses to them.

Nash’s (2006) analysis is useful in that it problematizes assumptions embedded in dominant occupational health models, such as those underpinning Threshold Limit Value’s (TLVs) and the premise that exposures can necessarily be quantified with variables controlled for. Such issues have also been taken up by others as they emphasize the difficulties of drawing attention to low-level cumulative exposures which run counter to the toxicological paradigm of “the dose makes the poison” (Langstan, 2010; Raffles, 2010). Nash’s discussion further illuminates the significance of spatialization in relation to the enactment of closure; spatialization presents difficulties in reinforcing constructed

boundaries between ‘occupational’ and ‘non-occupational’ factors that contribute to disease. As she argues, “given the social and environmental realities of farm labor, the notion of the body as a discrete entity permeated by narrow “pathways” began to breakdown. Migrant bodies and toxic chemicals both challenged public health experts’ control of space” (2006: 150).

Guthman’s (2011) notion of problem closure brings further consideration to the difficulties of breaking through epistemological boundaries about how health problems come to be understood and interpreted. Guthman defines problem closure as “occur[ing] when a specific definition of a problem is used to frame subsequent study of the problem’s causes and consequences and thus precludes alternative conceptualizations of the problem” (15). Through a political ecological lens, and with a focus on problematizing the dominance of the energy balance model (the input and output of calories) in framing understandings of the body and obesity, Guthman discusses the difficulties of moving beyond the parameters of this closure to allow for an “opening up the conversation to other ideas” (188). Such difficulties are particularly evident when attempting to incorporate knowledge around chemicals (and not just calories) and their effects on hormonal responses within the body (111). For example, when trying to establish proof of chemical harm on the body, economic interests may delimit such efforts: “trying to establish proof means going up against the very powerful chemical industry – an industry that has the resources to commission many studies designed to prove no harm from these chemicals” (2011: 114).

Guthman highlights how problem closure can occur in multi-faceted ways, such as through epistemological paradigms in medical and scientific knowledge, as well as

when solutions by social movements are bounded by what is considered to be “politically feasible”.¹¹² This acknowledgement of a multiplicity of factors is important, for as others have also pointed out there are a plethora of challenges in pushing the parameters of epistemological boundaries, including issues around legitimacy, credibility, and authority – all of which are entwined in dynamic power relations (Epstein, 1996).

In sum, the conceptualization of closure that I draw on and develop throughout this chapter begins from the acknowledgement of open-endedness as a chronic characteristic of health effects that may result from one’s work exposures and practices. This is significant, especially if we consider the plethora of chemicals released into North American markets and the dearth of knowledge produced about their long-term health effects.¹¹³ Once ill-health concerns begin to arise, there are lengthy hurdles to overcome in order to establish proof of harm and to attain better regulatory control. As a way of dealing with the complexity and messiness of these chemicals, there are bureaucratic, epistemological and ontological attempts to simplify responses to them as a way of enacting closure in order to create conditions for how these problems can be understood and interpreted. Through these practices, certain components of health-related problems become enclosed in the realm of what is known, while other aspects are demarcated as unknowns. My objective in this chapter is to demonstrate that the strategies for enacting

¹¹² A central component of Guthman’s (2011) discussion is that the significance of systemic influences upon our understanding of problems tend to become overlooked through social movements such as the alternative food movement, which in turn stop short of “challenging powerful economic interests” (17). She problematizes the practice of neoliberal individualized responsibility to matters of food and health, arguing for the necessity to critically engage with a broad range of policies and regulations (not only related to food), as well as the legitimacy of the global capitalist system.

¹¹³ In the Canadian context, legislative oversight for chemical management falls under the Environmental Protection Act (EPA). As Scott and Lewis (2015) explain, the EPA “includes specific requirements for assessing and managing approximately 23,000 substances currently used in commerce or being released in Canada in significant quantities” (79). In the United States, there are approximately 80,000 chemicals released into the market, many which have not been adequately tested. As noted in the 2008-2009 Annual Report of the President’s Cancer Panel (2010): “Only a few hundred of the more than 80,000 chemicals in use in the United States have been tested for safety” (ii).

closure rest upon two key pillars: defining and classifying. I turn to these aspects in the next section.

Defining and Classifying Disease

The language used in defining a disease, and the subsequent classificatory systems that the disease becomes situated within, are significant in terms of how that disease is understood. In the context of occupational disease specifically, not only is the definition of “disease” important, but also that of “occupation”. In other words, what becomes defined and classified as occupational has implications for what becomes defined and classified as an occupational disease which, in turn, impacts whether or not such claims become recognized and compensated (see Barth, 1980; Yassi, 1983). This section discusses the significance of defining and classifying diseases and how these tie into enacting closure by identifying boundaries between the known and unknown.

Defining Disease. The language used to define a disease frames how that disease is understood, and such language also reflects the social context that the disease is situated within. This may be seen with examples such as the shift in usage of the informal term “gay related immune disease” (GRID) to “acquired immunodeficiency syndrome” (AIDS) in 1982. The former terminology links sexual practices between men with a disease, reflecting medical perspectives that have historically situated homosexuality as a type of illness, while the latter aims to take on more neutral language (Epstein, 1996). Such language is important not only in terms of how disease is understood, but also how it is responded to at individual and institutional levels (Rosenberg, 1997).

The use of informal and popularized language is also important as it could serve to delegitimize and stigmatize particular diseases. As one participant discussed with me,

this has been done with the Australian use of the term ‘kangaroo paw’ in relation to Repetitive Strain Injury (RSI). As Bohle and Quinlan (2000) state, when there was an increase in workers’ compensation claims for overuse injuries in the 1980s, people erroneously believed that RSI was an ‘Australian disease’ and this “gave rise to the stigmatising appellation ‘kangaroo paw’” (149). In response, there was increased legitimization for the denial of compensation claims, with language as a pivotal component used to justify such approaches:

What you see in countries that don’t want to start compensating for diseases [...] is collectively stigmatizing the people who have those diseases, which starts by putting a popular term for the disease, like RSI [...] and then putting labels on it like ‘kangaroo paw’. And then the discourse that goes with ‘kangaroo paw’ is people are, you know, malingers who want to get off work (I 14).

It is also important to keep in mind that while the definition of a disease is commonly perceived as the exclusive domain of scientific and medical knowledge, and while workers’ compensation boards may draw heavily upon scientific literature in developing an understanding of diseases, disease is not solely a biological and physiological entity. There is a constellation of factors that influence how we define a disease and, in turn, how we understand its existence. As Rosenberg (1997) elaborates,

disease is at once a biological event, a generation-specific repertoire of verbal constructs reflecting medicine’s intellectual and institutional history an occasion of and potential legitimation for public policy, an aspect of social role and individual – intrapsychic – identity, a sanction for cultural values, and a structuring element in doctor and patient interactions. In some ways disease does not exist until we have agreed that it does, by perceiving, naming, and responding to it (xiii).

With regards to occupational disease, Dembe’s (1996) identification of numerous interacting social factors (such as systemic inequalities, media attentiveness, and labour activism), draws attention to how knowledge about occupational disease moves beyond

exclusively scientific and medical boundaries. Dembe focuses on the medical recognition of occupational diseases, understood as the recognition of work-relatedness by physicians and other health care professionals. He connects the significance of social factors to medical uncertainty, arguing that these social factors have a notable impact on how health care professionals frame their understandings of disease. Gender bias in relation to conceptualizations of paid work, for example, influence whether or not the work carried out by women, and the ill-health effects that may follow, will be understood by physicians as something that falls within the parameters of what is understood as an occupational disease.¹¹⁴ As Petryana (2013 [2003] elaborates, “[d]efinitions of health and disease move far beyond calculable physiological dimensions and become deeply entangled with historical and political determinations” (62).

How a disease is defined and framed, as well as the multiplicity and fluidity of its meanings, is not only an epistemological matter but an ontological one as well. While the definition of a disease hinges on the knowledge produced about it in a particular social and political context, it is also connected with how disease is understood as an object of biomedicine (Mol, 2002). Mol’s (2002) work on how disease is enacted through medical *practice* (and not just medical *perspective*) illuminates the significance of looking at diseases as active objects that are “done in practice” (13). Rather than situating ontologies as given, Mol emphasizes how they “are brought into being, sustained, or allowed to

¹¹⁴ For example, Dembe (1996) provides a historical example of how the gendered and sexist framings of Dr. George S. Phalen, an influential physician in relation to carpal tunnel syndrome, influenced what was understood as occupationally related. In contrary to prevailing knowledge, Dr. Phalen took the position that occupational factors were not related to carpal tunnel, a view that was amplified by having many women in his samples, as he argued that men’s work was more strenuous and traumatic to the hands than the work done by women. Gendered framings of occupational disease continue to persist in adjudicating claims for overuse injuries. In looking at compensation claims for musculoskeletal disorders (such as carpal tunnel syndrome and tendonitis) in Quebec, Lippel (2003) found that female claims were less likely to be accepted than male claims. One key reason was the implication in decisions that women’s less forceful, but more repetitive work could not be attributed to their musculoskeletal disorders (see pp. 266-7).

with away in common day-to-day, sociomaterial practices. Medical practices among them” (6-7). This is illustrated through Mol’s ethnography of disease, where she looks at how atherosclerosis is enacted in a university hospital in the Netherlands. This disease becomes practiced in multiple ways through different areas within the hospital - neither the hospital, the patient’s body, nor the disease itself constitute a singular entity.¹¹⁵ This multiplicity can be seen *between* units of the hospital (in the differences between what the reality of the disease is for the pathologist versus the clinical physician), as well as *within* a particular unit (within the clinic, with the potential differences between a patient’s account of their pain and what the physician feels upon physical examination). As Mol observes:

[t]he practices of enacting clinical atherosclerosis and pathological atherosclerosis exclude one another. The first requires a patient who complains about pain in his legs. And the second requires a cross section of an artery visible under the microscope. [...] In the outpatient clinic and in the department of pathology, atherosclerosis is *done* differently. (2002:35-6)

Since a disease is not a singular entity, this situates disease as a site of contestation in relation to the parameters of how it is defined and framed. The definition of a disease also feeds into how that disease becomes classified, which further creates and embeds boundaries between what is regarded as irrelevant to or unknown about a disease, and how a disease is known, understood, and responded to.

¹¹⁵ The ways in which diseases do become enacted vary based upon the disease and the established medical practices in a given context. While Mol observed the primacy of clinical practice over pathology in diagnosing atherosclerosis, she points out how when diagnosing cancers pathology would take the foundational position (see pp. 40-1). In arguing that there is a multiplicity of disease ontologies through medical practice, Mol is not advancing the idea that there is a fragmentation between them, but rather that they all ‘hang together’.

Classifying Disease. Bowker and Star (2000) put forth a broad definition of classification,¹¹⁶ which they conceptualize as “*a spatial, temporal, or spatio-temporal segmentation of the world*”. A “classification system” is a set of boxes (metaphorical or literal) into which things can be put to then do some kind of work – bureaucratic or knowledge production” (10; emphasis in original). They further highlight how classificatory systems become taken-for-granted, invisible and universalized, especially in terms of their role in maintaining social order and influencing human interactions. One of the key aims of their analysis is to emphasize the social, political and moral dimensions of classifications, rather than reducing them to solely technical matters. As Bowker and Star highlight: “standards and classifications, however dry and formal on the surfaces, are suffused with traces of political and social work” (2000: 49). In other words, choices have to be made about what becomes classified and how it becomes classified, and this has political and ethical implications, which have both symbolic and material impacts on people’s lives. Here, it is also useful to draw upon Lamont and Molnar’s (2002) distinction between “symbolic boundaries” and “social boundaries”. Symbolic boundaries “are conceptual distinctions made by social actors to categorize objects, people, and even time and space”, while social boundaries “are objectified forms of social differences manifested in unequal access to and unequal distribution of resources (material and nonmaterial) and social opportunities” (168). Lamont and Molnar argue that the development of symbolic boundaries leads to the construction of social boundaries, as a category is initially constructed and this creates parameters around who is included or excluded from recognition through this category.

¹¹⁶ Bowker and Star (2000) are careful not to conflate classifications with standards, arguing that while they are interconnected and although standards are a component within classifications, they are nevertheless not the same thing (pp. 13-14).

Of particular interest is Bowker and Star's (2000) focus on the International Classification of Diseases (ICD), a statistically-based classificatory system that is used as an epidemiological tool and published by the WHO. As such, they highlight that the aim is not to classify all diseases, but rather the ones that current knowledge finds to be statistically significant (12). By analyzing the work done to classify diseases through the ICD, Bowker and Star highlight the tension between the messiness of diseases and the decisions made about how they should be classified. Tuberculosis provides one such example due to the constantly changing knowledge about this disease and its multifactorial etiology. As they elaborate,

[t]he ICD cannot contain this protean disease. It is oriented toward a cause-and-effect that resembles a set of slots, bins, or blanks on a form, even where it is multivalenced and multislotting; it is not, like disease and diagnosis, messy, leaky, liquid, and textured with time. (2000:172)

Similar difficulties can be observed in other areas of medical and scientific approaches towards classifying health matters, such as the potential difficulties physicians encounter on death certificates when trying to distinguish between the primary cause and contributing causes of death (Betz, Kelly, and Fisher, 2008; Lakkireddy et al., 2004)

It is important to note that Bowker and Star (2000) do not propose an overly simplified and one-sided conceptualization of classifications, and do not overlook their use as an important way to make sense of the world. Their emphasis is directed to problematizing the invisibility attached to classificatory systems and the work that goes into constructing them. They further point to the multi-dimensionality of classificatory systems and how the parameters set up within these systems can result in exclusion as well as inclusion. If we understand classifications as encompassing socially and

politically situated work that goes into their production, we can better understand the dynamism of classifications rather than accept the reification of an accepted classificatory system. This also allows us to consider how classifications have material impacts on people's everyday lives. In the context of occupational disease, the way in which occupational disease becomes defined and classified has important consequences for whether or not one's disease becomes recognized as occupationally related.

Defining and Classifying Diseases as Components of Enacting Closure. As indicated previously, the definition and classification of a disease encompass elements of closure. It is through these mechanisms that provisional parameters are drawn around how a disease can be understood within a particular social, political, and historical context. The definitions of occupation and disease feeds into their classification, and the classificatory process is inevitably faced with simplifying the complexity of many diseases – although there is not one definitive and constant way of doing so.

Definitions and classifications do not operate solely in terms of enacting closure as they have the potential for inclusivity as well, but what gets *included* and *excluded* within a classificatory system is a site of contestation premised upon competing claims (Bowker and Star, 2000). These practices of inclusion and exclusion also tie into boundary strategies over what becomes situated as a known or an unknown. One example of this is how IARC classifies the carcinogenic likelihood of agents in groups ranging from Group 1 (“carcinogenic to humans”) to Group 4 (“probably not carcinogenic to humans”) (see Table 6.1). The inclusion and exclusion of agents into one (if any) of these groups is a source of contestation, and it also holds political relevance, with the classifications affecting people's material lives. On the one hand, such classifications

can be drawn on to support claims of health harms if one has been exposed to an agent as identified. On the other hand, if IARC has not researched an agent in relation to a specific disease or does not have enough scientific studies to review in order to support a stronger classification of carcinogenicity, this could then be used by social actors who have an interest in denying connections between the agent and the ill-health experienced, as the potential for these linkages can be more easily dismissed and delegitimized.

Table 6.1: Agents Classified by the IARC Monographs, Volumes 1-120

Group 1	Carcinogenic to humans	120 agents
Group 2A	Probably carcinogenic to humans	81
Group 2B	Possibly carcinogenic to humans	299
Group 3	Not classifiable as to its carcinogenicity to humans	502
Group 4	Probably not carcinogenic to humans	1

Source: IARC (<http://monographs.iarc.fr/ENG/Classification/index.php>)

It is also important to highlight that the largest number of agents is classified into Group 3 (not classifiable as to its carcinogenicity to humans). IARC defines this category as “used most commonly when the evidence of carcinogenicity is inadequate in humans and inadequate or limited in experimental animals. Limited evidence in experimental animals means that the available information suggests a carcinogenic effect but is not conclusive.”¹¹⁷ What this means is that there *is evidence* of a connection between the agent and the exposure (“available information suggests a carcinogenic effect”) but that *the evidence available* does not meet the threshold for scientific certainty (“is not conclusive”). If an agent is classified in this manner, issues arise if the lack of conclusive

¹¹⁷ See “IARC Monographs Questions and Answers”:
https://monographs.iarc.fr/ENG/News/Q&A_ENG.pdf

evidence (as defined by standards of scientific certainty) becomes misinterpreted to mean that there is an absence of a connection between the agent and cancer. As we see with this example, multiple processes of unknowns complicate knowledge claims about disease.

In terms of classifications as a site of contestation, class conflict between capital and labour is certainly one key site of contestation. Labour interests tend to emphasize the need for more inclusionary classificatory systems while employer interests push for more stringent criteria around incorporation. However, it is important to keep in mind that tensions *within* these groups exist as well. While some labour-oriented actors may be pushing for more open classificatory systems as a way to make gains in recognizing occupational health issues, others may not want to bring heightened attention to such issues as they feel it may threaten job security. While class conflict is an important site of contestation, it is not the only one, as there are also competing epistemological claims within and between disciplinary fields (Sellers, 1997). Such contestations point to how closure is something that is achieved (Petryana, 2013 [2003]), with the parameters of inclusion and exclusion always being susceptible to change based on social and political influences.

Part Two: Enacting Closure

Having contextualized the concept of closure and identified the significance of defining and classifying as two key components of enacting closure, in this part I discuss three examples of how closure works in practice to delimit the known and unknown, and the implications it has for occupational disease recognition. The first (occupational exposure limits) and second (boundaries around occupational and non-occupational) examples are at a broader level of discussion that feed into the third example, which

focuses specifically on the policy-making practices of the WSIB. These examples illuminate the difficulties that occur when there is a lack of flexibility in understanding occupational disease (for example, if one's exposure falls below the standardized limit), and the tensions and power dynamics at play in processes of contesting the dimensions of inclusion and exclusion in how a disease is framed.

Competing Claims about Safety and Risk: Constructing Occupational Exposure Limits

A pivotal issue in relation to occupational disease is determining what kinds of exposures a worker encountered throughout the course of his or her employment, as well as the duration of these exposures. More specifically, consideration is placed upon whether the exposures constitute a hazard and what kind of risk they present to the workers. In Ontario, the MOL is the governmental agency responsible for setting limits around occupational exposures, and it defines 'hazards' as "a thing or situation with the potential to harm a worker", with health hazards being those that "result in the development of a disease".¹¹⁸ Within this definition, hazards are connected to risks but are conceptually separated – while hazards have the potential to cause harm, risk is defined as "the probability, or chance that it will actually harm someone".¹¹⁹

Occupational exposures are interlinked with the decision-making processes of the workers' compensation system. For example, when looking at occupational disease claims adjudicators need to decide if the exposures that the worker encountered exceeded a safe level and could be a significant contributing factor to the disease. However, what is

¹¹⁸ The MOL distinguishes between safety hazards (results in injury) and health hazards (results in disease).

¹¹⁹ See Ontario MOL, 'Workplace Hazards: FAQs'. Retrieved from: <https://www.labour.gov.on.ca/english/hs/faqs/hazards.php>

defined as ‘safe’ and as a ‘risk’ in this context is highly contentious. In looking at the contestations surrounding the definition of safety over bisphenol A (BPA) in the United States, Vogel (2013) emphasizes the dynamic and unstable characteristics of such definitions, pointing out how “[c]hemical safety is a human construct” (3). She also identifies how multiple actors (along with their shifting positions of power) are involved in these complex and tumultuous processes of defining chemical safety, and that these processes are premised on questions that encompass not solely scientific dimensions, but political ones as well. Such questions include: “How safe is enough?”, “How certain must we be of the risks?”, “Safe for whom?”, “Safe in which context”, and “Safe on the basis of which values and preferences?” (Vogel, 2013:3,14). Speaking to risk more specifically, Beck (1995) highlights a similar point by stating that “[r]isks are social constructions disposing over technological representations and norms” (92).

Occupational exposure limits (OELs) are a significant component in the occupational disease recognition process, but are embedded in controversial sites where there are competing claims of what should be defined and classified as ‘safe’ or as a ‘risk’. One revealing example of how such contestations manifest is in relation to the American Conference of Government Industrial Hygienists (ACGIH) and their threshold limit values (TLVs). The ACGIH was established in 1938 under the original name of the National Conference of Governmental Industrial Hygienists (NCGIH) in Washington, DC before it changed its name in 1946. Despite the incorporation of the word ‘government’ into its name, the ACGIH is not actually a governmental organization but rather a voluntary registered charitable operation in the United States. In 1941, it set up “[a] special committee for the setting of threshold limits values (TLVs) for acceptable

occupational exposure to chemicals and physical agents”, with the first list of about 150 TLVs being released in 1946 and its first TLV documentation published in 1962 (Ruden, 2003: 207). Currently, the ACGIH website proclaims itself as “defining the science of occupational and environmental health”¹²⁰ and offers a host of publications (monographs, textbooks, guides, etc.) and TLV guideline documentations, which are available for purchase.¹²¹ It has fifteen committees, one of which is the ‘TLVs for Chemical Substances Committee’ and another is the ‘TLVs for Physical Substances Committee’.¹²² To date, the ACGIH has established TLVs for over 600 chemical and physical substances, and these threshold limits are influential and often referred to in relation to policy and regulatory decisions around OELs in the United States and internationally. The Canadian federal government and many provinces follow ACGIH recommendations, with Ontario having their own table under OHSA and also referring to the ACGIH Table.¹²³

While some highlight the benefits of having an influential organization that is focused upon knowledge production about OELs and how this could have a preventative impact in terms of reducing physical and chemical exposures to workers, others express

¹²⁰ ACGIH website, home page: <http://www.acgih.org/>

¹²¹ The US Occupational Health and Safety Administration does list publically available ACGIH TLV limits in Annotated Table Z-1, accessible at: <https://www.osha.gov/dsg/annotated-pels/tablez-1.html>

¹²² Interestingly, the ‘Committees’ webpage consists of two paragraphs of textual information, the second which specifically focuses in on emphasizing that: “Committee members are not authorized to speak with stakeholders or distribute information about TLVs®, BEIs®, and other ACGIH® guidelines that are under development. Committee members are not authorized to speak as representatives of ACGIH® about ACGIH® and/or the TLVs®, BEIs®, and other ACGIH® guidelines at scientific meetings, symposia, etc. without consent from ACGIH®.” Retrieved from: <http://www.acgih.org/about-us/leadership/committees>

¹²³ As outlined on the MOL webpage: “Employers are required under section 4 of Regulation 833, Control of Exposure to Biological or Chemical Agents (the “Regulation”), to limit the exposure of workers to specified hazardous biological or chemical agents in accordance with the values set out in the “Ontario Table” (which is Table 1 in the Regulation) or, if the agent is not listed in the Ontario Table, the 2013 ACGIH Table that is incorporated by reference in the Regulation.” Retrieved from:

https://www.labour.gov.on.ca/english/hs/pubs/oel_table.php

See also OHSA, R.R.O 1990, regulation 833, ‘Control of Exposure to Biological or Chemical Agents’ available at: <https://www.canlii.org/en/on/laws/regu/rro-1990-reg-833/latest/rro-1990-reg-833.html#history>

skepticism over the role of economic interests in producing these levels and how corporate influence may impact what becomes defined as a ‘safe’ and ‘acceptable’ level (Castleman, 2006). How the ACGIH mobilizes knowledge, and what kinds of knowledge, into its decision-making processes is another area of concern. For example, one study published in the *American Journal of Industrial Medicine* analyzed how risk assessments were carried out on the chemical solvent trichloroethylene (TCE) by various agencies, including the ACGIH, in the 1990s. Ruden (2003) found data bias from the ACGIH as they did not incorporate relevant and available scientific data and then claimed that TCE is not carcinogenic to humans or animals (contrary to animal studies that showed serious health issues such as liver tumors). This position was contrary to other agencies such as the IARC, which in 1995 classified TCE in Group 2A (probable human carcinogen). Such bias led to a higher threshold level for TCE in comparison to other agencies; the ACGIH TLV for TCE was 50ppm, while a Swedish agency set their exposure level at 10ppm. Ruden concludes that “the data presented by the ACGIH do not adequately reflect the available scientific knowledge about TCE toxicity and carcinogenicity” and that the ACGIH position on this matter is “conspicuous when compared to contemporary TCE risk assessments” (212).

The divergent perspectives about the role of the ACGIH were also touched upon in my discussions with interview participants. One participant noted how the role of the ACGIH (alongside other agencies, such as IARC) could be beneficial in the preventative sense as the classifications produced encompass the opportunity to restrict exposure. Another participant problematized the corporate influence in developing TLVs and the use of TLVs in practice. This participant expressed particular concern about the use of

TLVs when a worker is exposed to an occupational hazard at a level below the set standard, as this leads to the connection between the exposure and a disease to become obscured.

More generally, there was unease expressed over how OELs (ACGIH TLVs included) are being put into practice and how this impacts the recognition of occupational diseases in the context of workers' compensation. The Ontario MOL is further responsible for enforcing the OHSA and fulfilling an investigatory role, where occupational hygienists inspect workplaces through air quality surveys to ensure that the exposures remain within the acceptable limits.¹²⁴ As mentioned, they are guided by Table 1 in regulation 833 under OHSA and also reference the ACGIH table.¹²⁵ The extent of inspections taking place and how they apply OELs is one area of concern:

The Ministry of Labour will like kid gloves with these guys [...] it's like they were timid and always go by the book – 'it wasn't above the TLV so these guys aren't at risk'. These guys were dropping dead, I mean they were getting sick – vomiting and everything else – and [it was determined that] there was no risk to the workers (I 12).

Other participants elaborate on the difficulties that exposure limits present when trying to get occupational disease claims successfully compensated through the WSIB:

The biggest problem or the biggest obstacle I think is that the Ministry of Labour and NIOSH and all of that, they have acceptable levels, exposure levels, for a lot of carcinogens. So claims are denied very, very often because 'oh the employer did air monitoring two years ago and it's below the threshold limit'. So that's the biggest problem I think, or the biggest obstacle is these threshold limits and that the Board determines that because of the air testing they wouldn't be subjected to enough of the exposure to cause whatever cancer (I 1).

¹²⁴ See MOL's webpage, Occupational Hygiene Services:

<https://www.labour.gov.on.ca/english/hs/sawo/sectorplans/sps/hygiene.php>

¹²⁵ The Ontario table lists over 725 agents, with a corresponding column for the time-weighted average limit (TWA) and the short-term exposure limit (STEL)/ceiling limit (C) (not every agent has limits set for both). There is a wide range of agents covered, such as benzene, nitrous oxide and different types of asbestos (e.g., amosite, chrysotile, etc.).

Commonly a big issue is the exposure history [...] So sometimes the technical requirements, how much these policies say that you have to be exposed to before it becomes problematic. But often just establishing what the worker was exposed to and how much they were exposed to is quite difficult. Again, when you take into consideration that a lot of these things have long latency periods -so that could be hotly contested and difficult to prove (I 4).

One key issue that these concerns point to is the tendency to apply standardized and abstracted practices in relation to enforcing OELs at the expense of more in-depth investigation. Once an agent becomes defined and classified in a particular manner, it becomes increasingly difficult to accept that exposures below a certain level may also cause adverse health effects, even though the history of occupational exposure limits shows the constantly changing definitions of what level is considered safe. In noting the concreteness given to exposure levels once they are defined and classified in a particular manner, it is important to acknowledge that this is not a one-sided concern. Employer interests have mobilized similar arguments, albeit in order to increase the exposure or deny that it should be classified in the first place. For example, in a 1982 letter to the MOL Criteria Project, a representative from the Aggregate Producers Association of Ontario, contests the notion that exposure to limestone dust or calcium carbonate dust constitute a health hazard and submitted these substances should not be included in the Exposure Criteria Guidelines. In making this claim, they emphasize the difficulties in changing exposure limits once they are set:

Once a numerical value is established in a guideline or is used in an assessment procedure, it tends to become entrenched, and is in essence (sic) given stature and credibility simply by appearing in print. We are therefore, deeply concerned with the identification and the numerical

exposure criteria of a number of substances that have been included in the guidelines.¹²⁶

While the MOL has (at least historically) acknowledged individual variances to exposures of occupational health hazards,¹²⁷ concerns continue to be raised about how such acknowledgement has not been applied in practice. Echoing the questions raised by Vogel (2013) over the multiple perspectives around what is ‘safe’, one interview participant suggests that a way to improve the recognition of occupational diseases is not to abide so closely to OELs:

what I would like to see is not so much weight put on the acceptable levels of exposure because everybody’s different. Something may affect me is not going to affect you. So to say that there’s an acceptable level of whatever the carcinogen is, my question is acceptable to whom? (I 1)

Reinforcing standardized and abstracted criteria around what is understood as safe makes it more difficult to recognize the openness of ill-health effects, especially when they occur below the constructed criteria of exposure.

Spatialization of Closure: Boundaries between ‘Occupational’ and ‘Non-Occupational’

As previously highlighted, what becomes defined and classified as ‘occupational’ has implications for what becomes recognized as an occupational disease. Determining and constructing boundaries around what is ‘occupational’ (and what falls outside this

¹²⁶ Letter to Exposure Criteria Project, from R. P. Cook, General Manager, Aggregate Producers Association of Ontario. March 15, 1982. (File RG 7-1, b221114: “Occupational Health & Safety – Exposure Criteria Potentially Harmful Agents and Substances in Workplaces.” Retrieved from the AO in Toronto, ON).

¹²⁷ Through a MOL announcement, R.G. Elgie, M.D. from the MOL acknowledged how there are conflicting views on exposure limits, and that additional factors aside from the numerical values should be considered in deciding whether an exposure has an adverse health effect and how to protect such workers from health risks. One such consideration was individual variances in experiences to hazardous exposures: “Some workers may experience discomfort or adverse health effects following exposure to the agents at levels at, or below, the stipulated criteria, whereas others may experience no such effects when exposed to concentrations higher than those specified.” (Ministry of Labour Announcement, by R. G. Elgie, M.D. MoL. November 24, 1981. File RG 7-1, b221114: Occupational Health & Safety – Exposure Criteria Potentially Harmful Agents and Substances in Workplaces.” Retrieved from the AO in Toronto, ON.

definition) presents challenges in multiple ways. For example, what constitutes the material workplace is sometimes quite nebulous, as may be seen in occupations (such as truck drivers or process servers) where one has to drive on public roads and/or commute between places as part of their employment duties. And as Nash (2006) points out in her case of migrant farm workers in California, for those working outdoors the lack of concrete physical boundaries creates increased complexities in trying to quantify exposures (and their interactions) and determine what falls on one side of the line as ‘occupational’ and what becomes situated on the other side as ‘non-occupational’.

Even within the confines of a more physically defined worksite, the spaces between occupational and non-occupational are not necessarily clear and neatly separated. It is not as if the exposures are stopped from exiting the workplace and that they cease to exist in the broader environment – their reach is wide ranging. In addition to research that has shown remote communities having traces of banned substances in their ecosystems and within the bodies of those who reside there, substances such as polybrominated diphenyl ethers (PBDEs) (a flame retardant banned in the 1970s) are evident even in the deep trenches of the Pacific Ocean (Jamieson et. al, 2016).¹²⁸

Industrial towns have been particularly affected due to the proximity of the hazardous substances and the constant cumulative exposure to them. The city of Sarnia in Southwestern Ontario is one prominent example as it is centered around the petrochemical industry, with occupational exposures such as benzene affecting not only those who work in the refineries, but also impacting the health of those who reside around them. The industrial hub of Sarnia is often known by its popular name – Chemical

¹²⁸ The discussion by Jamieson et. al (2016) points to the porosity between occupations and the environment, for example, by recognizing that “POPs were released into the environment through industrial accidents and discharges, leakage from landfills, or incomplete incineration” (1)

Valley – where one could come visit to take a Toxic Tour of the landscape.¹²⁹ The fact that about 850 Aamjiwnaang First Nation members live on a reserve (Sarnia Reserve 45) close to these industrial facilities and are mobilizing to bring attention to the environmental destruction and ill-health effects they experience is also of critical importance (Weibe, 2016). The impacts experienced by the Aamjiwnaang community illuminate how the privilege of health intersects with ‘race’ as a site of systemic oppression and how such industrial practices (along with the governmental role in allowing and supporting them) reinforce environmental racism. The penetrable divisions between occupational and non-occupational therefore mediate other sites of oppression and reinforce inequalities, as can be seen through Weibe’s (2016) description of the Chemical Valley landscape. In this description, Weibe illustrates how the chain-link fence that separates industry from community represents (both symbolically and materially) the porosity of boundaries between occupation and environment:

[o]ne facility amongst many, Suncor’s activities can be smelled and felt at every angle of the reserve’s perimeter. Separated only by a chain-link fence, this facility, with its sirens and junkyards, encircles the traditional burial grounds, making it landlocked in by the neighbouring chemical plants. (2016:23)

It is useful to understand the construction of this binary division between occupational and non-occupational as constituting what classical sociologist Max Weber referred to as ideal types. Ideal types are understood as an item that is conceptualized in its “pure form” but this is not the form that it takes in material life (Shils and Finch, 1949). Understanding occupational and non-occupational factors in this way points to

¹²⁹ The Toxic Tour is an annual event hosted by Aamjiwnaang and Sarnia Against Pipelines (ASAP). In 2016, water gathering was also included in this event. It is a two-day event that features a tour of the toxic markers of the landscape, ceremonies, and traditional teachings, as well as sharing knowledge on how to identify and report chemical spills. See ‘Aamkiwnaang Water Gathering and Toxic Tour 2017’: <https://aamjiwnaangsolidarity.com/2017/03/31/aamjiwnaang-water-gathering-toxic-tour-2017/>

how exposures are more fluid in their ontological existence, as they cannot be neatly demarcated into two distinct categories. Steingraber (2010 [1997]) clearly captures this point in her ecology of cancer, and acknowledges the importance of occupational health research on workers for knowledge about the environment more broadly:

Just as cancer is not scattered uniformly across the physical landscape, neither does it afflict with an even hand the landscape of work. Understanding occupational cancers is important not only because people spend so many hours of their lives in the workplace but also because it yields critical clues about cancers beyond the factory wall and the office door. Released into air or water, hauled away as toxic waste, or mixed into consumer products, most cancer-causing agents in the workplace ultimately become part of the general environment in which we all live. Workplace carcinogens are largely identical to those agents that cause cancer in the general population. Indeed, the near half of the substances now classified as known human carcinogens by the International Agency for Research on Cancer were first identified in studies of workers (65).

A binary understanding of occupational/non-occupational also presents difficulties in matters of disease etiology, as illustrated by the inability to biologically distinguish between occupational and non-occupational factors. Cancer mutations of the cell, for example, will manifest as cancer cells without indicators of what caused that cancer (and, as discussed in Chapter Five, this is why it is important to take occupational histories). As one interview participant with a scientific background put it,

You can't tell causation from looking at the cancer, there is no difference, there is no marker. People will say 'well this, that, and other things'. There's nothing out there right now and people are looking for those kinds of things, but there's no smoking gun. So if you look at a lung cancer, you don't know what the hell caused it. (I 13)

In highlighting this challenge, Ison (1989) took the position that occupational disease is based on an etiological fallacy: "the [workers' compensation] system assumes the

feasibility of determining the etiology of disease, not just in general, but case by case”
(38)

In terms of knowledge production, one important theme throughout my research is how studies outside of the occupational field have pointed to the hazards of occupational exposures. A common referent is to the use of laboratory animal studies, but other types of studies – such as traffic studies and wildlife studies – also bring insight into the ill-health effects resulting from hazardous agents, even if the focus is not specific to a particular workplace. In discussing the difficulties of recognizing cancers as occupational diseases, one interview participant brought up how the health hazards of certain exposures are better understood through previously conducted wildlife studies:

The people who are working on wildlife actually found these diseases long, long before people were working on them in relation to human health. And there are all sorts of examples where the people working on birds particularly would clue into something really important going on in bird populations and in bird physiology, and they even get down to this mechanistic side and have really sort of elaborate stories, when the people who are working on human health were sort of barely aware that there might be something going on (I 11).

Interview participants also identify how a further contemporary challenge in building awareness and activism around issues of occupational health is that it tends to be narrowly framed as a workplace issue. While this may have been an adequate approach in previous political economic eras, the period of global capitalism challenges the efficiency of this narrow framing. One participant emphasizes the necessity to bring broader social awareness to issues of occupational health and safety:

To tell you the truth you know Mothers Against Drunk Driving, to me, those women who started it up were geniuses, what they’ve done. Geniuses! Now can you think of, can you imagine if you would’ve done a consistent public service announcement on workers’ rights on occupational health – right to know, right to report – how much better

off we'd be as a society, presumably it would be societal change. So if you're driving in an area and you see guys working on a roof with no vest – 'Oh my! What are they doing?' – and already in your mind – 'oh there's a number I can call to make sure this guy doesn't die'. It becomes a societal issue. Right now what happens with safety and prevention it's work-place based, and I think that's a real big issue. It needs to be more societal (I 8).

Participants also emphasize how a strategy for addressing occupational health issues could be to make stronger linkages with the environmental movement. This connection is particularly relevant as the environmental movement currently has stronger social traction, including increased public awareness of and attention to issues such as climate change and the impacts of the industrial agricultural system on food production and health. This, however, presents a notable challenge as environmental activists place primacy upon environmental matters (such as preservation of land) while labour activists have traditionally focused upon matters of production and job security, even when this jeopardizes the health of workers and the environment. These conflicting interests are captured in what is often referred to as the "blue-green divide" (Mayer, 2009; Obach, 2004; Senier et. al, 2007).

The complexities of forming a coalition between the labour and environmental movement in health-related matters may also be seen in relation to how employers often emphasize environmental factors in a way that separates them from occupational factors, rather than recognizing the porosity between occupational and environmental hazards (for example, by acknowledging that environmental hazards stem from industrial processes). Emphasizing environmental factors at the expense of occupational ones creates boundaries between the broader environment and the specific occupation. Not only do environment and occupation become ontologically separated, environmental hazards are

perceived as relevant and legitimate, while occupational factors tend to be cast aside and delegitimated through framings as unknowns.

One way these boundary strategies between environment and occupational factors are mobilized is by viewing health predominantly through a consumerist lens rather than paying adequate attention to those working with hazardous substances and producing products. Such a stance ignores the daily cumulative effects that workers encounter and the higher concentration levels of exposures they experience due to being in closer proximity with the hazardous substances. Blanc (2016), for example, recounts the types of conversations he has with others when he tells them that he researches the toxic history of rayon viscose production. Viscose rayon is a common synthetic clothing textile that is often presumed to be a ‘green product’ as it is sourced from wood pulp, but the toxic chemical agent carbon disulfide is used in the production process. As Blanc observes, people become worried when they hear this, wondering if the clothing they own will cause them to experience ill-health effects. Once Blanc reassures them that it will not as “[i]t’s only the workers who make it that suffer, and maybe the surrounding environment” (2016:vii), concern over rayon’s toxicity diminishes and the person usually turns the conversation to another topic. Similar trends may be viewed on a broader societal level, with one revealing example being the response to bisphenol A (BPA), an industrial chemical compound used in plastics production. In 2010, the Canadian government officially recognized the toxicity of this compound, especially with regards to risks for babies and fetuses.¹³⁰ While BPA has been banned from baby bottles, and while there is push from environmental groups to have it banned from all food packaging, what became largely overlooked was the health risks it poses to those working in the

¹³⁰ For example, see: <http://www.cbc.ca/news/technology/bpa-declared-toxic-by-canada-1.873250>

plastics industry. In acknowledging the tensions and complexities of connecting occupational concerns with the environmental movement, the importance of moving beyond the workplace is nevertheless emphasized: “I think that the environmental movement is a significant social force that workers need to connect with in order to secure the protections they need. Their overall class power has so diminished that this idea that they’ll just tackle capital at the workplace is a bit of a myth” (JB)

There is a fine balance in strategizing how to identify broader environmental impacts of hazardous substances, while also ensuring that the health of workers is sufficiently incorporated into these narratives rather than cast into the shadows or rendered invisible. By pointing out the openness and porosity of occupational health issues in relation to matters of environmental health, there is the unintended possibility that the problem could be defined in a way that leaves occupational components closed off and situated outside the frame of understanding.

Adjudication through Disease Guidelines: Workers’ Compensation and Operational Policies

This section focuses on WSIB disease operational policies in relation to mechanisms of closure and boundary-making strategies. Although the criteria outlined in the occupational disease policies are intended to be used as guidelines, a concerning issue is how occupational disease claims are more easily denied if they do not precisely fit within the boundaries of the policy description. The criteria used in the policy guidelines demarcate what is known about the disease. If aspects of the disease (such as the age of the worker or number of years of exposure) fall outside of these guidelines then they become situated in the realm of unknowns, complicating the decision-making process.

The tendency to use policies in an exclusionary manner is further exacerbated by the lack of openness on the part of the WSIB in the production of occupational disease policies, as this is an internal process that lacks transparency and public communication. This lack of openness stimulates ambiguity, as it becomes unclear how the WSIB is applying policy criteria to decisions about occupational disease compensation claims. As I argue in the following discussion, these mechanisms of closure tend to lead to increased challenges in recognizing diseases as occupationally related.

One of the ways a disease claim may be adjudicated by the WSIB is through their occupational disease policies; that is, if a policy exists for the particular disease at hand.¹³¹ The WSIB has an operational policy manual that is identified as “the source of operational policy for the WSIB”¹³² and this is where occupational disease policies, amongst others,¹³³ are outlined. These policies outline guidelines for the adjudication of the disease claim, including policy definitions and specified criteria (type and duration of exposure, latency periods, etc.). For example, there is a policy for laryngeal cancer and asbestos exposure (23-03-03), with the policy definition of this occupational disease stating: “workers exposed to asbestos fibers in industrial processes which generate asbestos fibers is an occupational disease under the Workplace Safety and Insurance Act (the Act).” Drawing on the International Statistical Classification of Diseases (ICSD)

¹³¹ Recall from chapter three that there are three main avenues through which a disease may become recognized as occupationally related: 1) the legislative Schedules (Schedule 3 and Schedule 4); 2) policies; and 3) on a case-by-case basis.

¹³²

http://www.wsib.on.ca/WSIBPortal/faces/WSIBManualLandingPage?fgUID=835502100635000476&_afLoop=614612825558000&_afWindowMode=0&_afWindowId=null#%40%3F_afWindowId%3Dnull%26_afLoop%3D614612825558000%26_afWindowMode%3D0%26fgUID%3D835502100635000476%26_adf.ctrl-state%3Decgiahufe_4

¹³³ The operational policy manual includes policies on an array of related workers’ compensation areas, such as adjudication principles, benefit payments, return to work, and employer premiums. The focus here is specifically on their occupational disease policies.

(Ninth and Tenth Revisions), the criteria for the disease to be considered as occupational is outlined as “workers diagnosed with cancer of the larynx (ISCD09 or ISCD10 C32) who have been employed in an industrial process which generates airborne asbestos.” In order to establish the connection between asbestos exposure and laryngeal cancer, the policy outlines three guidelines that, if met, can provide “persuasive evidence” of work-relatedness: 1) “the worker has been employed in an industrial process which generates airborne asbestos at least 15 years before the diagnosis of disease, and” 2) “the worker has worked for at least ten years in an environment which has been documented to have generated asbestos in respirable form, or” 3) “the worker has been diagnosed with asbestosis in accordance with 16-03-05, Asbestosis.”

In developing these policies, the WSIB claims to strive for policies that “are clear, up-to-date and provide appropriate guidance as to how they are applied”, and “[t]o fulfill this commitment, the WSIB engages in a transparent, consistent and comprehensive policy development process guided by [...] policy development principles” (WSIB Framework for Operational Policy Development and Renewal, 2016: 6). More specifically, the WSIB lists six policy developmental principles:

- 1) Policies will be grounded in the fundamental objectives of the WSIA and its supporting regulations.
- 2) Policies will be consistent with the WSIB’s strategic direction.
- 3) Policies will provide clear direction to users.
- 4) The WSIB will consider stakeholder input received through consultation regarding new and/or substantially revised policies.
- 5) Policies will be fair, practical and effective to ensure they can be applied with timeliness, transparency and consistency.
- 6) Policies will be fiscally responsible and ensure the long-term sustainability of the system (ibid.).

While the WSIB outlines these commitments in principle, there is a climate of frustration and distrust over how these policies become mobilized in practice. In this

section, I aim to discuss and understand why this skepticism is occurring by looking at how diseases are classified through the WSIB's operational policies, and the impacts this has on recognizing diseases as occupationally related. I highlight three specific key concerns, which lead to an overarching concern about how claims tend to be more easily denied if they do not meet policy requirements: (1) issues around transparency; (2) issues of interpretation; and (3) issues of "rule-like" and "checklist" approaches.

While the WSIB emphasizes a commitment to transparency, there are notable concerns surrounding their lack of transparency in relation to policy guideline development and the use of adjudication practice documents. Again, this is not a new concern, although one that seems to have intensified in an era of neoliberalism. For example, in March 1982 concerns were expressed over the closed process of WSIB guideline development, with a communication prepared for the Dupré Royal Commission pointing out how "[i]t is very difficult to understand how an agency that has lived so much under public scrutiny has avoided becoming more open than it has in the matter of these guidelines in so controversial a field as industrial disease."¹³⁴

A frequently raised issue with the WSIB policy development process is the lack of adequate openness and communication over the internal processes through which these policies are created. A frequently mentioned concern is how it is not clear what kind of research and scientific literature is being drawn on in developing WSIB policies. In discussing with one interview participant how improvements could be made to the

¹³⁴ WCB Communications Division Synopsis of Workers' Compensation and Asbestos in Ontario: A Study Prepared by Peter S. Barth for the Royal Commission on Matters of Health and Safety Arising from the Use of Asbestos in Ontario. March 1982. (File: RG 7-1, bb221116: "Workmen's Compensation Act Review – Weiler Report General Corresp./Submissions – December." Retrieved from the AO in Toronto, ON).

workers' compensation system, they identify how a lack of transparency creates issues for recognizing occupational diseases:

more transparency, because [...] you can't know whether or not somebody used this question or whether or not there's a questionnaire for a specific disease or when was the last time they looked at the literature or what did their review say. So everything at the Board is still very murky and part of that comes down to there's no stakeholder involvement in ongoing occupational disease policy-making (I 10).

Another participant expresses interest in working in a more collaborative manner with the WSIB in developing these policies, which would entail providing more public access to the documents produced. This participant also identifies the need for increased openness from the Board and how this could be a practice that leads to improvements in the administration of the workers' compensation system:

One of the things that might be helpful is sometimes they'll have internal reviews done – either systemic or meta-analysis, more systemic reviews, but they'll have expert reports written on particular conditions and those tend to be internal documents not available to the public [...] I would certainly support a collaborative approach to scientific reports or materials being created (I 7).

The lack of transparency surrounding the development of policies contributes to a frustration of, and skepticism towards, how the Board is producing and using these disease policies. As Yassi (1983) observes, this issue has led policy guidelines to become situated in a site of contestation: “because this exercise of judgment takes place away from public scrutiny, the resulting guidelines are suspect. Consequently the very existence of numerical guidelines, as well as their particular criteria are understandably contentious” (259). It is evident that these concerns continue to persist, with many raising the question of how diseases become classified in the way that they do through these guidelines:

There's very little public review of it [policy guidelines]. So you have to ask yourself where did they come up with this thing where you have to establish a relationship between asbestos exposure and lung cancer, where you have to have it in excess of over 15 years of exposure. Why? How much asbestos should one be exposed to and for how long to create disease? (I 12).

This lack of clarity is further compounded by what many perceive as a continuing trend of arbitrariness in Board decisions. Dupré, for example, referred to the Board as a “breeding ground of arbitrariness” in the 1984 *Report of the Royal Commission on the Matters of Health and Safety Arising from the Use of Asbestos in Ontario* (17-18). Current trends are magnifying such issues. Concerns have been raised over the lack of evidence provided by the WSIB when they decide to deny a claim (Yachin, 2017). While this is not a new issue, one interview participant notes that the WSIB is revealing even less information about what evidence it is premising its decisions on.

This arbitrariness points to the second interrelated issue of how the Board is interpreting its own policies. One policy provides an illuminating example of the difficulties in clearly understanding the Board's interpretations. In this case, the WSIB had developed a policy for gastrointestinal cancer and asbestos exposure (16-02-11) and incorporated esophagus cancer within the definition of gastrointestinal cancer. When workers with esophagus cancer met the policy guidelines, their claims were nevertheless being denied. These workers and their advocates were left with a lack of understanding about how this could be happening, especially since there is a lack of public insight into WSIB's decision-making processes. One interview participant explains that the original policy was developed in 2004, but then the WSIB subsequently conducted a literature review and decided that there was a lack of scientific evidence to support occupational factors for esophagus cancer. Although the WSIB began using this research as the basis

for the denial of claims, they did not publically communicate this shift in policy interpretation: “So they take the position then that they’re entitled to ignore their policy when it comes to esophageal cancer because of this document that they’ve created” (I 10).

The issue of internal WSIB interpretation is strongly connected with concerns over transparency, as there is a lack of clarity over the detailed criteria that the Board is basing its interpretations on and these practices make it difficult to put together a strong occupational disease claim. In reference to the disjuncture between what the policy outlines and how the WSIB interprets it, another participant emphasizes how “it’s tough because those things [interpretations] keep changing and they don’t make them public so they’re not transparent, and so you’re fighting something that sometimes you don’t even know the content of” (I 3). Closure can become enacted when opportunities for publically informed discussion and debate are limited (Petryana, 2013 [2003]: xxvi). If there is lack of information made available about the production of a policy and how it is interpreted, it becomes increasingly difficult to contest these practices. As the research participant notes above, it is challenging to be “fighting something that sometimes you don’t even know the content of”.

A third key area of concern is the tendency for policy guidelines to be applied in an exclusionary manner, where they take the form of rules and checklists at the expense of sufficient investigation and inquiry. In 1989, Terence Ison critiqued such practices, arguing that they constitute “rules of exclusion”, as “the guidelines have the character of rules, not policies” (16) which sway in the direction of denying claims. He elaborated upon this by emphasizing that policies have become simplified and exclusionary

mechanisms, based on an inflexible approach to adjudicating occupational disease claims (despite the flexibility afforded to the WCB/WSIB through the WCA/WSIA). If a worker's disease does not meet the listed criteria outlined in the policy, this could problematically be used as a way to simply dismiss the claim. As Ison (1989) argues, "[i]n cases lying outside the guidelines, claims are often denied without further enquiry or consideration. Where the cause of causes of a disease are unknown, it is the responsibility of the Board to determine etiology on the best available hypothesis" (17). The tendency for policies to be applied in an exclusionary manner continues to persist. One participant points out the difficulties that "checklist adjudication" through the WSIB's adjudication creates for recognizing occupational disease:

The problem with the WSIB, to be very frank with you, is they do checklist adjudication. They're trained but not to the extent that they actually do that reasonable analysis of the case with what meets the legal test [...] they do checklist adjudication, that means 'does it meet this test, does it meet this one, does it meet this one? Yes, no, yes, no - and out the door' (1 2).

The metaphor of an exit door captures the exclusionary framework that is supported by using a rules-like and checklist approach to adjudication by the WSIB. As another participant succinctly put it, if components of one's disease claim do not fit with the policy then "they've [the WSIB] got a door to get out of" (JB). A particular frustration is how sometimes claims are dismissed, even if they fall only slightly below the requirements in a guideline:

If someone has a 17 year latency period, the Board will automatically deny it because it didn't make that 20 year. So it's a fight, you know. Because that 20 year, it's based on research obviously, but research is really a balance of probabilities, right. I mean it's not set in stone. So they're very, very, very, very challenging. (I 1)

This discussion points to the social and political influence on developing policies, and the tendency for problem closure to occur when current medical and scientific knowledge becomes accepted (by some) and therefore becomes difficult to amend. Such policies tend to become “set in stone” despite the dynamism of knowledge in relation to what is unknown (or claimed to be unknown). As noted, while this is not a new phenomenon, there are nuances in the contemporary period due to the influences of global neoliberal capitalism. A key influence is the heavy emphasis the WSIB has placed on reducing its unfunded liability,¹³⁵ which many have critiqued as occurring on the backs of workers since the ability to attain successful compensation has become much more complex.¹³⁶ As one participant emphasizes, it would be practically impossible for a worker to represent themselves in an occupational disease claim nowadays:

I would say it would be careless for a worker, no matter how sophisticated they were, to take on their own case anymore. They would run into minefields they didn’t even know existed, and why would they [...] It never was designed to be like that but now it is. (I 2)

This heightened attention and significant urgency placed on the unfunded liability can also be observed in the discourse of the WCB/WSIB annual reports, where a strong emphasis is placed on financialization starting from the 1980s onwards.

¹³⁵ The WSIB’s unfunded liability started becoming a dominant focus of WSIB operations in the 1980s (as evidenced by the discourse of the WCB annual reports), with the WSIB making it an operational priority to eliminate the unfunded liability. Although there is contestation over how to understand and interpret the unfunded liability and its implications, the WSIB defined the unfunded liability as “the shortfall between the money needed to be in the WSIB’s Insurance Fund to pay the benefits owing to workers and the money that is there”. See “News Release: WSIB on track to eliminate unfunded liability” available at: http://www.wsib.on.ca/WSIBPortal/faces/WSIBDetailPage?cGUID=WSIB015537&rDef=WSIB_RD_ARTICLE&_afLoop=966278180232000&_afWindowMode=0&_afWindowId=8lwpzzoac_56#%40%3FcGUID%3DWSIB015537%26_afWindowId%3D8lwpzzoac_56%26_afLoop%3D966278180232000%26rDef%3DWSIB_RD_ARTICLE%26_afWindowMode%3D0%26_adf.ctrl-state%3D8lwpzzoac_84

¹³⁶ While the WSIB has reduced its unfunded liability by cutting benefits to workers, they simultaneously announced recent reductions in employer benefits as in 2017 there is a 6.2% premium reduction for Schedule 1 employers (WSIB Economic Statement, 2016). As was discussed with some interview participants, if the primary concern is to reduce the unfunded liability, then the WSIB would not be reducing premiums for employers; rather, this points to class interests and class conflicts.

Conclusion

The parameters around how a disease is framed and responded to are fluid and dynamic, and these parameters yield important symbolic and material consequences, especially for those who are most affected by the likelihood of being diagnosed with a disease. When closure is constructed and practiced around disease knowledge, what becomes positioned outside the boundaries is situated as an unknown. The problem with this positioning is in the response that follows; specifically, when focus becomes predominantly fixated on what is known at the expense of what is situated as an unknown, resulting in a lack of effort to address the unknowns (Petryana, 2013 [2003]). In the case of the WSIB and its use of occupational disease policies, this is exemplified by the concentrated focus on the application of existing policy criteria at the expense of sufficient inquiry into aspects of an occupational disease claim that may not meet these guidelines. This further connects with other processes of unknowns, as when there is more uncertainty (a disease does not meet the specific requirement) or if there are any absences (for example, a lack of exposure data), providing more opportunity for the WSIB to have “a door to get out of” and deny the claim.

The way a disease is defined and classified is a site of contestation; there is always a possibility for alternative language and classifications to be developed in ways that either enlarge the parameters to allow further inclusion or constrict them as a way to attempt to keep the boundaries tightened. A key point in all of this is the importance of questioning the purported naturalness of a definition or classification, and avoiding the fallacy of reifying these components and situating them as static entities. Included in this is the acknowledgement that closure is something which is enacted; it is something that

needs to be *done* (Mol, 2002) and *achieved* (Petryana (2013 [2003])), with variously positioned actors and power dynamics at play in the process of establishing which definition becomes accepted as legitimate and how something becomes classified (or excluded from classification all together).

Focusing on the potential openness of health problems also directs attention to the possibility and opportunity of flexibility in understanding and addressing disease. A common frustration with the WSIB has been that despite the flexibility afforded to the Board through the Act, there continues to be a relatively rigid application of rules and checklists that tend to lead to the denial of occupational disease claims. As multiple participants told me, at times it feels as if the Board is looking for an item that does not fit with their adjudicative criteria as a way to simply dismiss the claim, rather than apply sufficient inquiry and common sense to the situation at hand. It is therefore useful to consider the central argument presented by Bowker and Star (2002) on how a good classification system makes visible the work that goes into it and is open to constant changes: “a key for the future is to produce flexible classifications whose users are aware of their political and organizational dimensions and which explicitly retrain traces of their construction [...] The only good classification is a living classification” (326). Taking into account the skepticism and frustration directed to the WSIB in terms of how difficult it is to recognize certain diseases as occupationally related, a reminder of the legislative flexibility afforded to them in administering the Act would be beneficial in addressing some of these concerns. Power dynamics are important to keep in mind, as this is not a straightforward or simple process due to competing social and political interests and the tensions in constructing closure in relation to what is situated as known and unknown.

Chapter Seven:

Conclusion

In conceptualizing unknowns as more intricate processes than the simple negation of knowledge, we can better acknowledge the multi-dimensionality of unknowns and the constellation of configurations that they take – phenomena I refer to as the complexity of unknowns. This dissertation examines the complexity of unknowns in knowledge contestations by specifically looking at processes of uncertainty, absences, and closure in the case of occupational disease recognition as it operates through Ontario’s workers’ compensation system. I also consider the ways in which scientific and medical knowledge about disease and the body are entangled with these unknowns, and the impacts this has on recognizing diseases as occupationally related. By drawing on the theoretical resources of new materialism, sociology of knowledge, and ignorance studies, I aimed to address four central research questions: (1) how do unknowns complicate knowledge contestations; (2) how do various types of knowledges and unknowns become mobilized in these recognition processes; (3) what counts as evidence in recognition processes, and what role does evidence play in supporting various knowledge claims; and (4) how do social and political factors influence the recognition of occupational disease?

In response to these questions, I develop four key arguments. First, multiple dimensions of unknowns influence the occupational disease recognition process, and this occurs both subtly and explicitly. Unknowns, such as uncertainty, can be mobilized explicitly when social actors actively contest any science that suggests a product or substance may cause ill health effects, as exemplified with the practices of the Chrysotile

Institute (CI) and their defense of chrysotile asbestos. More subtle processes of unknowns are also evident, such as deciding whether or not to take up occupational epidemiology as a field of academic study and professional practice. These subtle factors are important as they influence the type of knowledge that gets produced (or not), as well as how such knowledge becomes mobilized.

Second, how unknowns become identified, mobilized, and responded to is highly contested, with divergences occurring between different social actors. An important consideration in making this argument is that social groups are not monolithic entities, and that social actors within a group (such as labour) may have different perspectives and interests in relation to the recognition of occupational disease.

Third, certain types of scientific evidence become positioned at the top of an evidentiary hierarchy, with epidemiological knowledge holding a considerable amount of evidentiary weight even when it may not be the most appropriate type of evidence to use in a particular case. Workers' knowledge about their own working conditions is often devalued as evidence in decision-making processes. Evidence in the context of occupational disease also ties in with how the body is medically conceptualized. The contemporary and dominant biomedical model that perceives the body to be relatively impermeable to its environment presents challenges in developing and legitimizing knowledge about how environmental and occupational exposures can affect the health of bodies.

Fourth, whether an unknown is perceived to be positive or negative is dependent on context and one's social position. In the context of Ontario's workers' compensation system, unknowns have been largely mobilized in ways that benefit employer interests

while being disadvantageous to workers trying to obtain compensation for their occupational disease claims. This is because unknowns tend to be used as mechanisms to obscure the recognition of a connection between disease and occupation, resulting in the denial of compensation claims.

These four arguments connect with the broader contributions of my research to the sociological analysis of knowledge and ignorance, and occupational health and disease. I turn now to a discussion of the contributions, where I will also elaborate on my central arguments.

Contributions of Research to the Sociological Analysis of Knowledge and Ignorance, and Occupational Health and Disease

This dissertation aims to contribute to research in the sociology of knowledge and ignorance, as well as to the development of sociological analyses of occupational health and disease. In this section, I first discuss my theoretical and methodological contributions to the sociology of knowledge and ignorance. I then identify my contributions to sociological approaches of occupational health and disease.

This research contributes to the sociology of knowledge and ignorance by untangling the complexities of unknowns and tracking how such unknowns are mobilized in knowledge contestations about occupational health problems. My work moves beyond studies such as Michaels' (2008a; 2008b) pivotal analysis of manufactured uncertainty by theoretically developing a more nuanced conceptualization of unknowns. I demonstrate that this more nuanced perspective leads to in-depth and context-specific understandings of practical mobilizations of unknowns. The notion of manufactured uncertainty has been influential in demonstrating that uncertainty is not a simple by-product of incomplete

knowledge, but is actively constructed and maintained. In acknowledging the importance of active constructions of unknowns, through my dissertation I tie these insights in with more recent developments in ignorance studies that take into account the multiplicity of unknowns. These developments are evident in the production of numerous taxonomies of unknowns, where scholars try to unravel the array of types, processes, and characteristics of unknowns (e.g., Croissant, 2014; Gross, 2007; Tuana, 2006; Smithson, 1989). Attentiveness to the multiple dimensions of unknowns involves being cognizant of conceptual confluences between unknowns, as well as considering nuanced variations and how unknowns are defined in relation to particular contexts. A detailed analysis of the many processes of, and entanglements amongst, unknowns recognizes the complexity of unknowns by acknowledging their multi-dimensionality. Unknowns can have positive and negative features, encompass regular and deviant characteristics, and occur both in subtle and explicit ways. Importantly, identifying these multiple dimensions avoids ontologically situating unknowns as monolithic and simplified. The conceptual development concerning unknowns in this thesis has more than theoretical interest. An understanding of unknowns as multi-faceted phenomena can provide enhanced opportunities to respond to and challenge dominant deployments of unknowns that delegitimize social justice concerns, as it would be more manageable to address specific forms of unknowns and the ways that they are being mobilized. What these insights have is the potential to illuminate the myriad practices and complexity of unknowns in knowledge contestations about health related issues.

This dissertation further contributes to sociological research by identifying the salience of social and political factors in relation to scientific and medical knowledge

about occupational health (Dembe, 1996; Phillips, 2015). While scholars in other disciplinary fields, such as history (e.g., McIvor, 2012; Murphy, 2006; Rosner and Markowitz, 2006), have studied how social and political factors influence the recognition (or lack thereof) of occupational diseases, there is a lack of inquiry that does so through a sociological perspective. Contributing to, and sociologically building on, the impacts of social and political dimensions of occupational disease recognition is particularly important as it allows for the opportunity to analyze how occupational disease is responded to by various social actors. As I argue, the issue is not a ‘lack of knowledge’ where more scientific knowledge needs to be produced and this knowledge will then fluidly translate to better capabilities to recognize occupational contributors of disease. As the trajectory of occupational disease recognition in Ontario has illustrated, the recognition of occupational disease is closely connected with the organization of societal interests and values, and the social and political will to address occupational health issues.

The contributions of this dissertation to the sociology of knowledge and ignorance are also methodological, as I developed a research design that moves between levels of analysis where connections are made between theoretical conceptualization and empirical specification. Researching unknowns is a challenging undertaking due to the many forms that unknowns take, how they are presented, and the potential difficulty of obtaining data to support the claims made. A theoretical framework that recognizes unknowns as entangled with, rather than the binary opposite of, knowledge acknowledges that when researching unknowns the focus is not on a ‘complete lack’ of knowledge (Frickel, 2014). Tied in with a multiple method qualitative research design (Siltanen et al., 2017), I was

attentive to different forms of unknowns, the complications that the deployment of unknowns creates, and the impact of unknowns on occupational disease recognition through the operation of Ontario's workers' compensation system. This kind of research design helps to connect theoretical and practical interests by looking at the operation of theoretical concepts and identifying their practical consequences in a particular context. This research design element is incorporated throughout each of the unknown chapters, as I begin by conceptualizing a process of unknowns and then identify the mobilization of this conceptualization in practice and how it impacts the recognition of occupational diseases.

The second contribution of this dissertation is to the development of sociological approaches to occupational health and disease, specifically by building on interests in the field of new materialism through a focus on the materiality of disease. While occupational factors in understanding disease constitute a relatively small field in scientific disciplines such as epidemiology, there is a noticeable lack of consideration given to occupational disease in sociological research on health. One component of this is a common epistemic perception that matters of biology and physiology, as they relate to the materiality of bodies, are outside of the parameters of social scientific inquiry. Sociological studies of health-related issues have largely focused on experiences, perspectives, and sense-making activities of health, as well as how meanings of illness become inscribed on the surface of human bodies. For example, a common research concern focuses on patient experiences of their interactions with health care professionals, including the 'lay' knowledge about illness that the patients develop through these experiences (e.g., Whelan, 2009; Gill, Pomerantz, and Denvir, 2010).

These research problems are important, but what tends to be overlooked is the materiality of disease. The result is that disease becomes epistemologically and ontologically separated from illness, with illness being situated in the domain of social sciences and disease cast as the object of biomedical inquiry and practice (Mol, 2002: 9-13). Fortunately, there has been a relatively recent uptake in social scientific interest in the materiality of disease, and this thesis stands as a contribution to this more integrated and holistic understanding.

The epistemological and ontological division between illness and disease is also closely related to the production of binaries between social and biological. This was a notable tension in my research as the recognition of occupational disease is inextricably intertwined with the manifestation of biological and physiological bodily harms. While discursive practices such as the definition and classification of disease are pivotal in relation to how diseases become recognized (or not), so is the recognition of corporeal materiality when a person is being diagnosed with a disease that may be occupationally-related. The recognition of occupational disease therefore diverges from sociology of health research that critiques phenomena such as medicalization, where regular processes of everyday life become problematically transformed into medical issues that then require medical intervention and treatment (Conrad, 2007). In contrast, in the context of occupational disease recognition, there is a practical objective to want to get the disease medically recognized and accepted as likely to be associated with one's occupation, as this situates one in a better position for a successful workers' compensation claim. Attention to the materiality of disease allows us to be attentive to the intra-connections

between society and biology, as the social organization of work impacts the very composition of bodily matter.

There has been an increase of invigorating scholarly discussions in the new materialism literature about the importance of studying disease from a social science approach and the necessity to make “matter matter”. It is these insights that I take as my starting point and build on through my doctoral research. Mol’s (2002) ethnography of disease has been influential in developing theoretical and methodological approaches to social scientific studies of the ontology of disease, while highlighting the significance of materiality in doing so. More recently, sociologists have been arguing for the opportunity to move “towards a sociology of disease” by better accounting for the biological and physiological materiality of disease and its social connections (Timmermans and Hass, 2008). This includes overcoming sociological aversions to biology, and considering how to move forward in addressing biology in a way that remains cognizant of the problems of biological reductionism and biological essentialism (e.g., Alaimo, 2010; Timmermans and Hass, 2008; Williams, Birke, and Bendelow, 2003).

In building on these interests about materiality in relation to disease, I contribute by focusing specifically on occupational disease as an object of inquiry. When literature argues for the importance of focusing on disease from a social scientific perspective, attention is often on disease in a more general sense (as with Mol’s (2002) ethnography of disease and the focus on atherosclerosis). What is often overlooked are occupational factors in relation to disease, and, in turn, how a disease may be occupationally related. This may, in part, be perpetuated by the erroneous assumption that the study of occupational disease lays outside the boundaries of sociological research and belongs in

fields such as toxicology, epidemiology, and public health. As has occurred with disease more generally, occupational disease becomes situated as a medical-scientific-technological problem rather than a sociological one. By drawing on theoretical insights from the field of new materialism, I offer a contribution to sociological literature on health and disease by spotlighting occupational disease and being attentive to discursive practices and material processes that present difficulties in recognizing diseases as occupationally related.

Overall, I contribute to sociological research more generally by taking sociological insights from the fields of knowledge and ignorance and connecting them with new materialism literature to develop a sociological analysis of occupational health and disease.

Directions for Further Sociological Research

In this section I identify four suggestions for further research on unknowns, knowledge contestations, and occupational disease recognition. One direction for further research is engaging in more depth with the complexities of unknowns in legal epistemology and practice. In this dissertation, I examined some of the tensions that unknowns encompass when being mobilized into a legal-medical-scientific nexus of decision-making, but attention was primarily directed to epistemic divergences in defining and applying unknowns. When unknowns were discussed within an epistemic discipline, the focus was primarily on unknowns in scientific-medical knowledge and practice. Literature in the field of ignorance studies also highlights the necessity for better understanding the legal dimensions and implications of unknowns (Gross and McGoey, 2015), and this would be a fruitful line of further inquiry.

A second area for research development is connecting theoretical insights from the field of ignorance studies to that of risk studies, especially in examining the complex role of uncertainty in the context of occupational disease recognition. As Ericson and Doyle (2004) discuss, attempts to manage and control uncertainty are connected with efforts at prediction when trying to cope with risk. Uncertainty and risk are closely intertwined: “[b]ecause risk is a probability statement, it is always surrounded by uncertainty” (ibid: 6). The entwinement of uncertainty and risk would be particularly interesting and important to research in more detail as the contemporary corporate governance framework of the WSIB is based on a risk assessment and risk management approach. As identified in the WSIB’s (2015) Corporate Risk Management Policy, “[t]he Workplace Safety and Insurance Board (“WSIB”) is committed to establishing enterprise wide risk management systems and processes to increase our likelihood of success for the achievement of our strategic goals and ensure corporate governance responsibilities are met” (2). A focus on risk and uncertainty could also engage with debates over the precautionary principle in relation to occupational disease, including closer examination of how (and whether) workers affected by occupational disease, their advocates, and occupational health experts try to emphasize uncertainty in positive ways as a way to achieve progressive goals. An example of this would be emphasizing the regularity of uncertainty in scientific knowledge about hazardous exposures as a way to support claims for precautionary approaches in understanding the potential ill-health effects that could result from these exposures, especially with chronic and cumulative low-level exposures.

A third opportunity for further research is more in-depth focus on the internal practices of the WSIB in relation to occupational disease. This could include doing

interviews with WSIB and WSIAT adjudicators, as well as individuals with medical and scientific backgrounds working for the Board in the capacity of occupational disease issues. In the research conducted for this dissertation, I aimed to study the occupational disease as it operates through the workers' compensation system through multiple methods, including participation in a WSIB occupational disease hearing as an observer and through a substantial amount of historical and contemporary documents. A limitation, however, was that I did not have the methodological opportunity to directly ask WSIB representatives about their perspectives on occupational disease recognition. While some of the interview participants in this study have considerable experience in working with Ontario's workers' compensation system, I did not receive a response to the invitation sent to the WSIB to have representatives (who work on issues of occupational disease) participate in this study. In a similar vein, a research focus on the WSIB as an institution would be useful to examine through other methods, such as an institutional ethnography. I believe this is particularly important due to the lack of sociological attention workers' compensation receives as a social institution, despite a historical epistemic trajectory of sociological interest in bureaucracies and the impacts of bureaucratic rationalities and governance in social life.

The aim of this dissertation was to examine the phenomenon of occupational disease in general as an initial way to understand the broader contestations and complexities in recognition processes. A fourth direction for further research would be to study a specific disease in order to identify and analyse the complexities of unknowns and how they affect the recognition of that particular disease. Social science literature has identified the challenge of recognizing diseases that closely tie in with industrial

processes, such as silicosis (Rosner and Markowitz, 2002) and byssinosis (Levenstein et al., 2002). Focus has also been directed to the challenges of unknowns in recognizing diseases that challenge the premise of biomedical knowledge, as they can happen through low-level chemical exposures and the physiological effects are not readily observable or quantifiable. These diseases include MCS (Phillips, 2015) and Sick Building Syndrome (Murphy, 2006). What warrants more research are the potential types of diseases that may be occurring in relation to emerging industries, such as nanotechnology. European occupational health agencies have identified the necessity to pay attention to the impacts that occupational exposures can have from these fields, and it would be important to study the complexities of unknowns and how they manifest in knowledge contestations over health problems in relation to these newer industries and work processes, especially in the Canadian context.

Complexities of Unknowns, Knowledge Contestations and Occupational Disease

Recognition: A Final Word

A central insight about occupational disease recognition is that despite the existence of knowledge (including scientific and medical knowledge) about occupational factors that contribute to the development of a disease, there is a lag between such knowledge and the subsequent recognition of diseases as occupationally related. There is an even wider gap between knowledge about disease and political action aimed at sufficiently addressing the problem of occupational disease to ensure social justice for affected workers, and in taking precautionary measures to ensure that workers are not unnecessarily exposed to hazardous substances. This is illustrated in the case of the former GE Peterborough workers, introduced in the Preface of this dissertation. Despite

decades of knowledge about harmful exposures in GE operations, workers were continuously exposed to hazardous substances. When they started becoming sick from decades of exposures, the workers encountered many barriers in trying to successfully obtain workers' compensation for their occupational disease claims.

In multiple ways, claims to unknowns have been pivotal components of the challenges workers, their families, and their advocates encounter in trying to get the occupational diseases recognized through workers' compensation and as a political issue. Attention to the complexity of unknowns should not be conflated with arguments that knowledge about disease is too complex as to allow occupational factors to be recognized as contributors to the development of diseases. Indeed, that is the very deployment of unknowns that this dissertation problematizes. I hope my analysis in this dissertation helps to understand how addressing the mobilization of the complexity of unknowns in the context of occupational disease recognition is central to overcoming the challenges faced by workers and their advocates.

Appendix I:

Contextual Overview of Interview Participants

A total of fourteen individuals participated in the in-depth semi-structured interviews for this research study. To provide some context to the discussions in this dissertation, I categorize participants based on their primary field of expertise. Five participants are in the field of science and medicine (I 3; I 5; I 7; I 11; I 13), four are in law (I 4; I 6; I 10; I 14), and five are in research, organized labour, and/or professional advocacy (I 1; I 2; I 8; I 9; I 12). Eleven of the participants are male, and three are female.

Table A I.1: Categorization of Participants based on Primary Field of Expertise

Primary Field of Expertise	Participants
Science and Medicine	I 3 I 5 I 7 I 11 I 13
Law	I 4 I 6 I 10 I 14
Research, Organized Labour, and/or Professional Advocacy	I 1 I 2 I 8 I 12 Jim Brophy (JB)

Appendix II:

Archival Files and File Groupings accessed through FOI Requests

- 1) Ham Commission – Occupational and Environmental Health Royal Commission
RG 1-526, box 1
- 2) Ham Commission. Report of the Royal Commission on the Health and Safety of
Workers in Mines.
RG 7-22, b235803
- 3) Ham Commission. Report of the Royal Commission on the Health and Safety of
Workers in Mines [Report of the Implementation Team on the Ham
Recommendations]
RG 7-22, b235803
- 4) Workmen’s Compensation – Workmen’s Compensation Act Review – Weiler
Study – Phase 1 Report
RG 7-1, b220804
- 5) Workmen’s Compensation Act Review – Weiler Report – General
RG 7-1, b221116
- 6) Workmen’s Compensation Act Review – Weiler Report – White Paper
RG 7-1, b221116
- 7) Workmen’s Compensation Act Review – Weiler Report General
Corresp./Submissions – December
RG 7-1, b221116
- 8) Workmen’s Compensation Act Review – Weiler Report General
Corresp./Submissions – November
RG 7-1, b221116
- 9) Workmen’s Compensation Act Review – Weiler Report General
Corresp./Submissions – October
RG 7-1, b221116
- 10) Workmen’s Compensation Act Review – Weiler Report General
Corresp./Submissions – September
RG 7-1, b221116
- 11) Workmen’s Compensation Board – Weiler Study Report Phase II
RG 7-1, b221113

- 12) Workmen's Compensation Board – Weiler Study Report – Phase I – An Overview
RG 7-1, b221113
- 13) Workmen's Compensation Board – Weiler Study Report – Phase I – Management and Business Responses
RG 7-1, b221113
- 14) Workmen's Compensation Board – Weiler Study Report – Phase I – Misc. Groups
RG 7-1, b221113
- 15) Workmen's Compensation Board – Weiler Study Report – Phase I – Cost Implications of Recommendations
RG 7-1, b221113
- 16) Workmen's Compensation Board – Weiler Study Report – Joint Consultative Comm. Response to Phase I
RG 7-1, Accession 19693, box 19
- 17) Workmen's Compensation Board – Weiler Study Report – Phase OFL Brief Jan 27/81
RG 7-1, Accession 19693, box 19
- 18) Workers Compensation Board – Weiler Report
RG 74-30, B383124
- 19) BA. 015.1 Weiler Report
RG 2-215, B725771
- 20) Workers Compensation – Weiler Report
RG 9-124, B385156
- 21) Weiler Report Correspondences
RG 1-355, B321103
- 22) Workmen's Compensation – Workmen's Compensation Board – Advisory Council on Occupational Health & Safety – WCB Comments and Responses
RG 7-1, b220804
- 23) Advisory Committee on Carcinogens – Task Force – Women and Occupational Health and Safety
RG 7-1, b221114
- 24) Occupational Health & Occupational Safety – Exposure Criteria Potentially Harmful Agents and Substances in Workplaces

RG 7-1, b221114

25) Occupational Health and Safety – Cancer.

RG 7-1, b220769

26) Occupational Disease

RG 7-125, B367922

27) Proclamation – Bill 165 – ss. 25 (2) (Occupational Disease Panel)

RG 7-14, B729472

28) Government Reforms – RC on Workers Compensation Board (WCB)/ Workplace Health and Safety Agency (WHSA)/ Occupational Disease Panel (ODP)

RG 7-12, B409854

29) Occupational Disease Panel (formerly Industrial Disease Panel)

RG 7-12, B716687

30) Occupational Disease Panel

RG 7-12, B432800

31) Workers Compensation – Occupational Disease Task Force

RG 7-168, B817706

32) Occupational Disease Task Force (ODTF) – general

RG 7-168, B817724

33) Occupational Disease

RG 7-168, B817718

34) Report of the Occupational Disease Task Force (ODP)/ Annual Report of the Industrial Disease Standards Panel (IDSP)

RG 7-168, B817719

35) Chairman's Files of the Industrial Disease Standards Panel

RG 7-177

36) Industrial Disease Standards Panel minutes, research findings and reports

RG 7-190

37) Industrial Disease Standards Panel – General

RG 7-12, B707177

38) Industrial Disease Standards Panel – General

RG 7-12, B409864

- 39) Industrial Disease Standards Panel
RG 7-12, B716695
- 40) Industrial Disease Standard Panel (IDSP) – Report
RG 7-12, B409849
- 41) Government Reforms – RC on Worker’s Compensation Board (WCB)/
Workplace Health and Safety Agency (WHSA)/ Occupational Disease Panel
(ODP)
RG 7-12, B409854
- 42) Industrial Disease Standards Panel – correspondence and memorandum of
understanding (MOU)
RG 7-168, B817706
- 43) Industrial Disease Standards Panel (IDSP)
RG 7-168, B817722
- 44) Canadian Council on Occupational Medicine
RG 7-125, B175830
- 45) Third Thursday Seminars (Occupational Medicine)
RG 7-140, B173862
- 46) Occupational Medicine – Recommendation by Mr. C. R. May that it be added to
the List of Specialties by the Royal College
RG 7-125, B175810
- 47) Workmen’s Compensation Board – Ontario Medical Association
RG 7-1, b221113
- 48) Workmen’s Compensation Board – Asbestosis
RG 7-1, B214290
- 49) Workmen’s Compensation Board – Asbestosis
RG 7-1, B214295
- 50) Asbestosis (Paper)
RG 7-140, B156177
- 51) WCB – Silicosis
RG 7-5-1, B294320
- 52) Silicosis of Miners in Ontario
RG 8-20, B224159

- 53) Workmen's Compensation Board: Concerning an amendment to Regulation 92
respecting silicosis
RG 4-32, B247966
- 54) A.G.O: Correspondence regarding provision for silicosis under the Workmen's
Compensation Act
RG 4-32, B247970
- 55) Legislation – Silicosis Act
RG 10-6, B397349
- 56) Silicosis I
RG 13-13, B225712
- 57) Silicosis II
RG 13-13, B225712
- 58) Silicosis III
RG 13-13, B225712
- 59) Silicosis IV
RG 13-13, b237405
- 60) Silicosis
RG 13-27, b222096
- 61) The Silicosis Amendment Act
RG 10-26, B214592

Appendix III:

Timeline of Occupational Disease and Workers' Compensation in Ontario (as Referenced in the Dissertation)

- 1886:** Introduction of the WCIA in Ontario
- 1910:** Sir William Ralph Meredith appointed to head a Royal Commission on workers' compensation
- 1913:** Meredith submits the *Final Report on Laws Relating to the Liability of Employers to Make Compensation to their Employees for Injuries Received in the Course of their Employment which are in Force in Other Countries, and as to How Far Such Laws are Found to Work Satisfactorily*
- 1914:** WCA of Ontario passed
- 1915:** WCA of Ontario comes into effect (January 1)
- 1926:** "Silicosis" added to Schedule 3
- 1928:** Ontario Mining Act passed, making testing for silicosis amongst miners a mandatory process
- 1932:** Middleton Royal Commission report released, *Report of the commission in the Matter of the Workmen's Compensation Act*
- 1943:** Decision to allow aluminum powder dust to be administered in silicosis-affected mines in Ontario
- 1947:** Amendment to WCA, occupational disease recognition no longer has to be solely through Schedule 3
- 1950:** WCB gains authority to define industrial diseases and make amendments to Schedule 3
- 1950:** Roach Royal Commission report released, *Report of the Hon. Justice Roach, Commissioner Appointed to Inquire Into and Report Upon, and to Make Recommendations Regarding the Workmen's Compensation Act upon Subjects other than Detail Administration*
- 1950s:** Uranium mining commenced in Ontario
- 1963:** Amendment to WCA, definition of accident expanded to include "disablement arising out of and in the course of employment"

- 1967:** McGillivray Royal Commission report released, *Report of the Royal Commission in the Matter of the Workmen's Compensation Act*
- 1974:** Elliot Lake hard-rock miners go on a wildcat strike
- 1976:** Ham Royal Commission report released: *Royal Commission on the Health and Safety of Workers in Mines*
- 1979:** OHSa came into effect
- 1980:** Professor Paul Weiler appointed by MOL to conduct an inquiry into workers' compensation in Ontario
- 1980:** Weiler's first report submitted to MOL, *Reshaping Workers' Compensation for Ontario*
- 1982:** Name change from 'Workmen's Compensation Board' to 'Workers' Compensation Board' and from 'Workmen's Compensation Act' to 'Worker's Compensation Act'
- 1983:** Annalee Yassi submits report to MOL, *Occupational Disease and Workers' Compensation in Ontario: Report Prepared for Paul Weiler in his Study of Workers' Compensation in Ontario.*
- 1983:** Weiler's second report submitted to MOL, deals specifically with occupational disease: *Protecting the Worker from Disability: Challenges for the Eighties*
- 1984:** Dupré Royal Commission report released, *Report of the Royal Commission on matters of health and safety arising from the use of asbestos in Ontario*
- 1984:** Bill 101 (An Act to Amend the Workers' Compensation Act) passed on December 14.
- 1984:** Schedule 4 (irrebuttable presumption) introduced to WSIA, but no diseases listed
- 1985:** Bill 101 into effect on April 1st; includes major reforms to workers' compensation in Ontario. The reforms include the establishment of an appeals tribunal (WCAT), the IDSP, and the Office of the Worker Advisor and Office of the Employer Advisor (under the MOL).
- 1988:** WHMIS established
- 1989:** Ison report, *Compensation for industrial disease under the Workers' Compensation Act of Ontario.*

- 1993:** Occupational Disease Task Force submits report to the MOL:
- 1994:** Royal Commission on Workers' Compensation announced (abolished in 1997)
- 1996:** Cam Jackson (Minister without Portfolio, responsible for workers' compensation reform) submits the *Report on New Directions for Workers' Compensation Reform*.
- 1996:** Bill 99 passed, 'Workers' Compensation Reform Act, 1996'.
- 1997:** Bill 99 comes into effect, includes name change from 'Workers' Compensation Board' to 'Workplace Safety and Insurance Board'; from 'Workers' Compensation Appeals Tribunal' to 'Workplace Safety and Insurance Appeals Tribunal'; and from 'Workers' Compensation Act' to 'Workplace Safety and Insurance Act'.
- 1998:** ODP disbanded
- 2000:** WSIB adopts an Occupational Disease Response Strategy
- 2001:** ODAP established
- 2004:** *Draft Report of the Chair of the Occupational Disease Advisory Panel* released for public consultation
- Since 2004:** former GE Peterborough workers file 650 occupational disease claims
- 2005:** *Final Report of the Chair of the Occupational Disease Advisory Panel* released by the Chair, Brock Smith.
- 2017:** Submission to UNIFOR of *The report of the advisory committee on retrospective exposure profiling of the production processes at the general electric production facility in Peterborough, Ontario 1945-2000*.
- 2017:** WSIB announced that it would re-examine about 250 GE occupational disease compensation claims that were previously denied

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