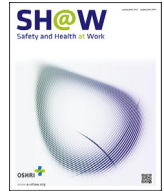




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### Original Article

# Establishing a Policy Framework for the Primary Prevention of Occupational Cancer: A Proposal Based on a Prospective Health Policy Analysis

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### ABSTRACT

**Background:** Despite our knowledge of the causes of cancer, millions of workers are involuntarily exposed to a wide range of known and suspected carcinogens in the workplace. To address this issue from a policy perspective, we developed a policy framework based on a prospective health policy analysis. Use of the framework was demonstrated for developing policies to prevent cancers associated with diesel engine exhaust (DEE), asbestos, and shift work, three occupational carcinogens with global reach and large cancer impact.

**Methods:** An environmental scan of existing prospective health policy analyses was conducted to select and describe our framework parameters. These parameters were augmented by considerations unique to occupational cancer. Policy-related resources, predominantly from Canada, were used to demonstrate how the framework can be applied to cancers associated with DEE, asbestos, and shift work.

**Results:** The parameters of the framework were: problem statement, context, jurisdictional evidence, primary prevention policy options, and key policy players and their attributes. Applying the framework to the three selected carcinogens illustrated multiple avenues for primary prevention, including establishing an occupational exposure limit for DEE, banning asbestos, and improving shift schedules. The framework emphasized the need for leadership by employers and government.

**Conclusion:** To our knowledge, this is the first proposal for a comprehensive policy framework dedicated to the primary prevention of occupational cancer. The framework can be adapted and applied by key policy players in Canada and other countries as a guide of what parameters to consider when developing policies to protect workers' health.

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## 1. Introduction

Millions of workers are involuntarily exposed to a wide range of known and suspected carcinogens in the workplace. It has been estimated that approximately 2 million deaths occur globally every year due to occupational diseases, with 32% attributable to occupational cancer [1]. A study is currently in progress in Canada that will quantify the proportion of cancers attributed to occupational exposures and the economic costs associated with these cancers. This Canadian study, which includes 44 known or suspected carcinogens and 27 different cancer sites, addresses an important

research gap and its results will be used to inform primary cancer prevention policies [2].

In general, primary prevention policies aim to prevent the incidence of disease or injury before it occurs. A policy framework, broadly defined as a tool to help guide decision-making and set future directions, is integral to policy development [3,4]. Some frameworks (i.e., conceptual frameworks) theorize the policy process. For example, the advocacy coalition framework examines how opposing communities advance their distinct policy goals through advocacy [5]. There are also frameworks based on policy analyses, which organize parameters in a systematic way to influence

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decision-making. A policy analysis can be retrospective and applied to help describe, critically interpret, and evaluate a particular policy that is already in place. Alternatively, it can be prospective and used to plan for future policy by identifying key issues, policy options, and players [6,7]. Prospective policy analyses are especially valuable for establishing evidence-informed policies, but there is a need for greater applied research in this area [7], especially pertaining to occupational cancer.

In Canada, as in some other countries, there are policies related to the primary prevention of occupational cancer. However, these have not necessarily been the result of a concerted or deliberate effort to reduce the incidence of occupational cancer. Moreover, there are complexities regarding jurisdiction over occupational health and safety (OHS). For example, in the USA and Canada, OHS is both a federal and state/provincial responsibility. These layers of jurisdiction for OHS make it challenging to develop and implement policies for the protection of workers and can result in inequalities and gaps in coverage of hazards, industries, and occupations. Primary prevention policies and investment in OHS in general are less apparent in many countries primarily due to competing social, economic, and political challenges [8].

There is a lack of comprehensive policy frameworks that can be used to guide the prevention of occupational cancer in Canada or other countries. A framework based on a prospective health policy analysis could support a systematic, robust examination of how various factors affect occupational carcinogen exposures and what can be done to reduce or prevent occupational cancer. The purpose of this study was to provide an applied analysis of how to develop occupational cancer primary prevention policies. To do this, key parameters from the literature were identified, described, and organized into a framework. The use of the framework for developing policies to prevent occupational cancer was demonstrated using three occupational carcinogens of global importance: diesel engine exhaust (DEE), asbestos, and shift work.

## 2. Materials and methods

An environmental scan of existing prospective health policy analyses was conducted to identify potential parameters for a framework that can be used to develop occupational cancer primary prevention policies. An environmental scan was chosen given its usefulness in examining social, economic, technological, and political contexts and its importance in supporting the development of evidence-based policies [9].

The environmental scan consisted of a targeted search for prospective health policy analyses. Given the deficiency of literature in this area, searches were not limited by year, health issue, or country of study. Only opinion pieces were excluded. In order to account for any existing occupational cancer prevention policy frameworks in the literature that were based on a prospective health policy analysis, a search using the terms “occupational cancer” and “policy framework” was also conducted. All searches were conducted using PubMed, Canadian Research Index, Muniscope, and PolicyFile, as well as online search engines (Google and Google Scholar). The reference lists of selected studies were also reviewed to identify any relevant studies that may have been missed.

Cancer sites associated with occupational exposure to DEE, asbestos, and shift work were chosen as examples of how primary prevention policy options may be devised and implemented in real-world contexts because of the high number of workers exposed to each of these carcinogens in Canada and other countries, the strength of evidence of their known or suspected associations with these carcinogens, and the feasibility to eliminate or reduce exposure. Additional targeted searches were conducted in order to

collect data on some of the parameters for these carcinogens. Resources included websites of Canadian federal and provincial government agencies, advocacy organizations, academic research organizations, and OHS groups. For illustrative purposes, this framework included predominantly Canadian policy examples, but it was intended to be robust and applicable to other settings.

## 3. Results

### 3.1. Framework development

A few prospective health policy analyses were found through the environmental scan [6,7,10–18]. There were several elements that appeared repeatedly throughout this literature. These were: problem statement, context, evidence, and actors. However, these elements were not systematically organized across all analyses and only one analysis developed policy options based on an applied consideration of these elements [17]. Furthermore, only one policy framework for the prevention of occupational cancer was found [19]. Although consideration was given to the proposed prevention policies in this latter study, it was not a prospective health policy analysis and lacked a systematic and comprehensive consideration of parameters in order to develop its prevention policies. It is also important to note that some of these analyses discussed the policy process, referred to as the process of policy change from agenda setting to policy evaluation [6,7,10,11]. The current study focused on policy formulation rather than the entire policy process and found that the commonly appearing elements were appropriate.

The *problem statement* helped define the key issues to consider [12,14,16,17]. In this case, the problem statement focused on the individual cancers and associated occupational carcinogens of study. *Context* was an important part of many of these analyses and was generally considered as systemic factors of the policy setting that may have an effect on policy change [6,7,10–13,16–18]. These systemic factors were commonly categorized as situational, structural, cultural, and external [6,7,10–13]. Collecting evidence on how policy problems have been mitigated or solved in other jurisdictions (*jurisdictional evidence*) was also an important part of these analyses [12,14,15]. These parameters were considered to develop *primary prevention policy options* for cancers associated with exposures to DEE, asbestos, and shift work.

Given that policy options help determine who would be involved, it was also important to consider the actors (*key policy players*), who were defined as the individuals, institutions, or organizations interested in or directly involved in implementing a particular policy [6,7,10,11]. We also chose to consider *key policy players' attributes*, such as their positions, resources, and perceptions of policy options [7,11].

The elements that routinely appeared in the literature and that were most applicable to occupational cancer primary prevention were ultimately chosen for inclusion. Therefore, the final framework incorporated the following parameters: problem statement, context, jurisdictional evidence, primary prevention policy options, and key policy players and their attributes.

### 3.2. Parameters of the framework and application to selected carcinogens and associated cancer sites

#### 3.2.1. Problem statement

As the starting point of the framework, the problem statement situates evidence so that it appeals to key policy players and the context [6]. The problem statement can include a quantitative component, such as the problem's magnitude or scope [14]. For example, it can include facts about the prevalence of exposure to

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