



National Collaborating Centre  
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# Case Study of a Persistent Landfill Fire and Community Health Impacts

## Introduction

This case study explores the issue of health impacts in the community from persistent landfill fires and covers a number of topics including: outdoor air pollution; waste management; health equity; health surveillance; environmental surveillance; and occupational health.

Although written from a broad public health and medical health officers' point of view, this case study may be helpful to other environmental public health practitioners with an approach to population exposure to environmental contaminants through risk assessment, risk management, and risk communication. This case study frames questions in the context of such an approach.

## The Case

You are the medical health officer for a northern health authority. Two months ago, a spontaneously ignited fire erupted in a municipal landfill located in Iqaluit with a population of 7000. While there have been fires in the landfill before, this is the largest and longest burning fire to date.

Initial efforts were made to put out the fire. The local fire crew dug trenches in order to isolate the burning section from the rest of the landfill. However, due to resource constraints, the local fire service capacity was quickly overwhelmed by this event and significant safety concerns for firefighters arose due to the compromised structural integrity of the landfill. In addition, many homes in this community relied on trucked water for their drinking water supply. Since local drinking water supply vehicles were being used to supply water for the fire, the ability to deliver drinking water to residences was compromised. Consequently, the municipality decided to let the fire burn itself out. This fire has been an eyesore for the community and has resulted in complaints about odour and smoke. The situation is receiving a significant amount of media attention. As the medical health officer, your public health expertise is required to assess any potential health impacts and advise accordingly.

## Background

### The landfill

The dump contained mostly household solid waste and construction waste, with metals and tires. Hazardous waste was not disposed of at this landfill. The landfill is not separated into layers with dirt/gravel and no liners were used. There is no leachate collection system, methane capture/release system, or carbon monoxide (CO) detection

system. In order to keep fresh trash out of the burning landfill, a temporary landfill was created, which is already 1.5 metres tall. Both surface and underground fires were burning at the landfill.

The local fire service in the surrounding community is minimal. The local health authority in this case study does not have regulatory requirements for leachate collection systems, gas-monitoring systems, or composite liners. The public health act in this region is outdated and does not provide clear authority over landfill operations. Municipal, territorial, and federal government agencies such as Aboriginal Affairs and Northern Development Canada, Health Canada are all involved in regulating this region, which makes it very challenging to know with which regulatory framework to work.

## Questions for Consideration

### Risk assessment, management, and communication

#### Initial Approach

1. What information would you need to begin approaching this problem?
2. What further information would you want to know?

#### Potential Health Hazards

3. What are the potential health hazards resulting from landfill fires?
4. This scenario involves both a surface fire and an underground fire. What are the differences between surface and underground landfill fires, and what are some hazards associated with them?
5. Smoke exposure is a major concern as a result of the landfill fire. However, many of the homes in this community are of poor quality, making them less effective as home clean air shelters. What might you propose to accommodate vulnerable people living in these conditions?
6. What might be some of the potential challenges with community clean-air shelters?

#### Risk Communication

7. Air samples taken through the National Air Pollution Surveillance Network indicated that the some of the levels of dioxins over 24 hours is  $0.2 \text{ pg/m}^3$  (picograms per cubic metre), which exceeds the Ontario health standard for 24-hour average exposure of  $0.1 \text{ pg/m}^3$ . Long-term exposure to high levels of dioxins is known to increase cancer risk; however, the current levels of dioxins are well below the health standard for cancer.

- a) As the medical health officer, how would you communicate the relative risk to the citizens of this community?
- b) What advice would you give to the community?

8. Air quality data shows that most air pollution concentrations, such as fine particulate matter, have been low and do not pose a threat to public health. Usually the prevailing winds do not blow the smoke towards town. However, meteorologic forecasts suggest that winds are predicted to move smoke towards town.

- a) As the medical health officer, how would you communicate the relative risk to the citizens of this community?
- b) What advice would you give to the community?

9. There was significant community outrage over this fire. What are some of the factors influencing outrage in this scenario?

10. What strategies can you employ to increase community responsiveness to your risk communication approach?

### **Occupational Health Concerns**

11. As the chief medical health officer, you are asked to work with your occupational health and safety authority to develop advice on occupational exposure groups. Expressed concerns and requests for advice came from office workers and school staff wanting to know if masks should be worn or workplace/school closures should be issued, as well as from the firefighting crew concerned about dioxin exposure.

- a) With whom would you consult and work for occupational health advice on issues as they arise?
- b) Who might be in the high- and low-risk occupational exposure groups in this scenario, and what are the issues to consider around their potential risk/exposure routes?
- c) What are some things people can do in each of the higher-risk occupational groups to reduce their exposure to the smoke?

### **Future Considerations**

12. What types of surveillance would you want to have?

13. List important strategies to mitigate the risk of a landfill fire occurring.

## **Scenario Shift**

Under immense pressure from the community and lobbyist groups, the city decides to put out the fire instead of continuing to let it burn out. The solution proposed by an external contractor is to create a large pond filled with seawater. Specialized industrial firefighting crews and personal protective equipment will be flown into the community. High extension excavators will also be brought in to carry loads of burning waste to be submerged and extinguished in the water pool. The waste will then be drained, flattened, and stored in a new area. Water from the pond will be pumped onto the burning section of the landfill to douse flames that arose during the excavation process. Anti-corrosion measures will be implemented for all machinery handling saltwater. This effort is estimated to cost millions of dollars and take several weeks to execute.

14. What is your role, as the medical health officer, in reviewing this proposal?

15. What would be your recommendation for the future of this landfill?

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200 – 601 West Broadway  
Vancouver, BC V5Z 4C2

Tel.: 604-829-2551  
[contact@ncceh.ca](mailto:contact@ncceh.ca)



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