

Factors that led to the Walkerton tragedy

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In May 2000, bacterial contamination of municipal water in Walkerton, Ontario, resulted in the worst public health disaster involving municipal water in Canadian history. At least seven people died and 2300 became ill. A public inquiry led by judge Dennis O'Connor examined the events and delineated the causes of the outbreak, including physical causes, the role of the public utilities operators, the public utilities commissioners, the Ministry of the Environment (MOE), and the provincial government. Improper practices and systemic fraudulence by the public utility operators, the recent privatization of municipal water testing, the absence of criteria governing quality of testing, and the lack of provisions made for notification of results to multiple authorities all contributed to the crisis. The MOE noted significant concerns 2 years before the outbreak; however, no changes resulted because voluntary guidelines as opposed to legally binding regulations governed water safety. The inquiry concluded that budgetary restrictions introduced by the provincial government 4 years before the outbreak were enacted with no assessment of risk to human health. The ministers and the cabinet had received warnings about serious risks. Budgetary cuts destroyed the checks and balances that were necessary to ensure municipal water safety.

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In May 2000, contamination of municipal water by bacterial pathogens in Walkerton, Ontario, resulted in one of the world's largest outbreaks of *Escherichia coli* (*E. coli*) O157:H7 disease. This was the worst public health disaster involving municipal water in Canadian history. At least seven people died and 2300 others became ill. A public inquiry was called to make findings and recommendations to ensure the safety of Ontario's water supply. Judge Dennis O'Connor detailed the events and causes that led to the outbreak.¹ As with many public health disasters of catastrophic proportion, multiple unfortunate events occurred that resulted in the disaster. By examining the events in May 2000, one can evaluate the physical causes, the role of the public utilities commission (PUC) operators, the role of the Walkerton public utilities commissioners, the role of the Ministry of the Environment (MOE), and how government budget reductions and policy affected the events.

Walkerton is a rural agricultural area. Between 8 May and 12 May 2000, heavy rainfall (134 mm) resulted in surface runoff containing *E. coli* O157 and *Campylobacter jejuni* entering a well supplying drinking water. The bacteria came from manure that had been spread on a nearby farm (using accepted best management practices). Although the well was chlorinated, the amount of chlorine used was routinely less than the amount required, and bacteria and organic matter overwhelmed the system. The chlorine residual level should have been monitored manually; however, for more than 20 years, it had been the practice of PUC employees to make fictitious entries in their daily operating sheets. On 15 May, samples were taken with false labeling. Another town well was knowingly being run without a chlorinator. Although that water was not contaminated, the PUC manager did not know this. As the outbreak became apparent, he tried to conceal the operation of the unchlorinated well. Despite widespread illness in the community, the PUC general manager assured public health authorities that the water was safe. The scope of the outbreak grew very quickly. Students were ill from school, a long-term care facility noted the enteric outbreak, and physicians and the emergency department were overwhelmed. On 17 May, a private laboratory advised the general manager of coliform counts in the water samples; however, these results were not disclosed to the health unit,

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despite repeated inquiries made to the PUC. Soon after, a PUC employee who knew of the adverse water results placed an anonymous call to the MOE. The health unit was now getting reports of positive results of *E. coli* O157 from patients and issued a 'boil water' advisory. On 21 May, water samples taken by the health unit tested positive for *E. coli*. By this time, more than 2300 people had experienced gastroenteritis.

The culture of fraudulence at the PUC included a host of improper operating practices, such as misrepresenting locations at which samples were taken, operating wells without chlorination, making false entries into daily operating sheets, failing to monitor daily chlorine residuals, inadequate chlorination, and submitting false annual reports to the MOE. The two men who ran the PUC had been grandfathered into their positions and lacked formal training. They had little understanding of how chlorination worked, or of the health risks associated with improper treatment and monitoring. They believed that Walkerton's water was safe and frequently drank it in its untreated form. Although they were required to have 40 h of training each year, this training did not take place and no system was in place to enforce it.

In Ontario, the MOE is the ministry primarily responsible for promulgating and enforcing regulations and policy that apply to municipal water systems. The MOE had inspected the Walkerton system in 1991, 1995, and 1998 and identified many problems. *E. coli* was detected in treated water, the chlorine residuals were low, and there were repeated failures to submit the required number of samples. One of the most important deficiencies within the MOE was the lack of a computerized information system to make critical historic information accessible to those responsible for monitoring. An inspection report detailing these problems was given to the Walkerton public utility commissioners; however, the commissioners were largely concerned with the financial side of the operations and did not address the MOE report. No follow-up occurred. Enforcement was made difficult given that the regulatory responsibilities were governed by guidelines as opposed to legally binding regulations.

Many of the deficiencies identified in the MOE operations resulted from budgetary reductions. In 1996, government laboratories stopped testing municipal water samples and there were no criteria to govern the quality of testing or provisions made for notification of results. Government

budget reductions resulted in laboratory privatization and in budget reductions to the MOE approvals and inspections program. The ministry lost more than 750 employees (over 30%). Although government officials, ministers, and the cabinet had received warnings of the possibly increased risk to the environment and human health, there was no assessment of risk and no preparation of a risk management plan.

The tragedy in Walkerton resulted in seven deaths and 2300 ill people. However, the true reach of this tragedy cannot be measured in numbers. The impact of the outbreak had adverse effects on people's mental health and sense of security and on the community. Many Canadians wonder how this could have happened in a developed nation. An unfortunate set of largely preventable circumstances culminated in disaster. The most important lesson remains that the many layers that are put in place to protect public health cannot be peeled away without consequences. In all work that deals with human safety, experience is important but formal training is fundamental. Legally binding regulations are more effective than voluntary guidelines. It is clear that no one person should ever be responsible for information or decisions that affect the welfare of populations. Even if those involved in operating the PUC had been honest in their daily work, this catastrophe might still have occurred. The checks and balances were grossly affected by cost cutting, with no follow-up or risk assessment. Budgetary cuts came from programs that were put in place for a reason, and we are led to ponder that there is really no such thing as a free lunch or free drinking water with your lunch.

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