

West Virginia Chemical Spill, 2014: A Case Study

Introduction: A significant chemical spill occurred in Charleston, West Virginia, in January 2014, resulting in prominent contamination of water and raising significant challenges to public safety and well-being. This case study demonstrates the effectiveness of drinking water screening levels and the evaluation of prospective long-term health impacts by emphasizing the reaction and results of the National Toxicology Program (NTP) about the toxicity of chemicals dumped into the Elk River.

Facts of the Case: About 10,000 gallons of chemical substances utilized for coal processing were spilled in West Virginia in January 2014. The Elk River, a crucial municipal water source for approximately 300,000 residents in the Charleston region, was contaminated as a result of the spill, which had a storage tank as its source.¹ 4-Methylcyclohexanemethanol (4-MCHM) comprises the majority of the combination, with minor levels of dipropylene glycol phenyl ether (DiPPH) and propylene glycol phenyl ether (PPH) also present.² Residents in the nine counties that were impacted by the leak were strongly urged not to use the municipal water supply for consumption, cooking, bathing, or washing owing to potential health risks.

Following the incident, local, state, and federal public health officials worked collectively to establish short-term drinking water screening levels for MCHM and PPH. These levels were set at 1 part per million (ppm) for MCHM and 1.2 ppm for PPH, with the assurance that they were unlikely to have a negative impact on health. Later, in July 2014, the CDC/Agency for Toxic Substances and Disease Registry nominated the National Toxicology Program (NTP) for conducting additional toxicity investigations on the primary chemicals implicated in the leak. The goal of this cooperative research project was to reduce the degree of uncertainty surrounding the set screening limits for the impacted drinking water.

The analysis included 584 data from patients who visited urgent care facilities between January 9 and January 23, 2014, for ailments associated with the chemical spill.³ The analysis comprised 369 of these patients. Among them, 13 patients (3.5%) required hospitalization, while the remaining 356 patients (96.5%) were treated in the emergency department and subsequently released. The most common complaints disclosed by these individuals encompassed nausea (37.9%), rash (28.5%), vomiting (28.2%), abdominal pain (24.4%), diarrhea (24.4%), headache (21.9%), itching (19.8%), sore throat (14.9%), eye pain (14.6%), and cough (12.7%).³ As of February 12, 2014, West Virginia has spent \$3.04 million overall in response to the chemical accident and associated water pollution, according to representatives from the state Division of Homeland Security and Emergency Management.⁴

Epidemiological aspects of the event: The 2014 chemical leak in West Virginia provided crucial information about the effects such an occurrence might have on public health. The chemical leak resulted in 584 people visiting emergency rooms for treatment of ailments; nausea, rash, vomiting, stomach discomfort, and diarrhea were the most frequently reported symptoms. 3.5% of patients needed to be hospitalized, although the majority were treated at the emergency room and were thereafter discharged.³ In order to mitigate feasible health hazards, short-term drinking water screening limits for substances like MCHM and PPH were established. Subsequent toxicity studies were then started to thoroughly evaluate these values. This incident demonstrated the significance of an organized and proactive public health response to chemical spills, which includes thorough monitoring of health effects and ongoing research that ensures the safety of impacted populations.

Management of the event: The public health response to the West Virginia chemical spill tragedy in 2014 was highlighted by swift and coordinated efforts by state and federal authorities. It started when neighbors who lived close to the chemical tank farm where the spill happened complained odor problems. Emergency response measures were launched as soon as the leakage was discovered to control it and protect the environment. A "Do Not Use" order was promptly issued to protect a sizeable population from exposure to potentially polluted tap water. The state activated its Emergency Operations Command Center, proclaimed a "State of Emergency," and asked for help from the federal government. Limited scientific data and popular distrust presented problems. Despite this, a thorough water testing effort and a progressive relaxation of the usage limitations based on tight criteria evolved as the reaction. The state of emergency persisted for 50 days, and it lasted 8 days for water service to be restored to the whole impacted population.⁵ The episode served as a reminder of the value of open communication, sensible health regulations, interagency cooperation, and academic research in responding to chemical catastrophes. Legislative measures were subsequently established to improve the protection of the environment and public health in such circumstances.

Communications of the event: Public communications during and soon after the West Virginia chemical spill event encountered significant difficulties because of the initial lack of knowledge regarding the scope of the leak and the kind of pollutants. The restricted and frequently generalized communication was caused by the urgent need to warn the public of potential risks. Local government agencies and first responders believed they were not properly informed prior to public statements, which resulted in their displeasure. Inaccurate information that was aired by the media also caused problems, confusing both the public and government authorities. A few proposals were made to improve emergency communications to solve these issues, including the creation of alert systems, consolidated contact information, unified command structures, and improved media access and accuracy. The tragedy demonstrated how crucial clear, accurate, and prompt communication is to ensuring public safety and trust in government actions.

Summary: The 2014 West Virginia chemical spill disaster provided an invaluable lesson in managing public health and emergency response. As seen by the prompt implementation of containment measures and the "Do Not Use" edict, this incident served as a reminder of the need of quick and coordinated response in the case of a chemical disaster. It also emphasized the value of open communication, particularly when there is a lack of information, and the necessity of conservative health standards to safeguard the public's health. As a result of the event, extensive water testing, usage limitations that were gradually lifted, and later legislative steps to improve chemical emergency preparation were all implemented. While highlighting the critical need of timely and reliable data in safeguarding public confidence and security during emergencies, it also highlighted communication issues, both in terms of interagency collaboration and media transmission.

References:

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