

Chemicals and Materials

Cytotoxic Drugs - Overview

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What are cytotoxic drugs?

Cytotoxic drugs are commonly used to treat cancer cells by preventing rapid cell growth and division. You may also hear cytotoxic drugs being referred to as chemotherapy or antineoplastic drugs. Cytotoxic drugs generally target cells that divide quickly, such as cancer cells. However, these drugs can also negatively impact other quickly dividing cells, such as hair follicles.

Cytotoxic drugs can be administered in many forms, including intravenous (IV), injections, topical creams and ointments, and oral medication.

This document covers the health hazards of cytotoxic drugs and how workers can be exposed in healthcare and community care settings. Potential exposure during manufacturing is not discussed.

For more information about measures to minimize exposure, please see [Cytotoxic Drugs – Control Measures](#).

What health effects are associated with exposure to cytotoxic drugs?

Studies have associated worker exposure to cytotoxic drugs with acute health effects, including skin, eye, and mucous membrane irritation, as well as nausea, headache, and dizziness. Hair loss and stomach pain may also occur. Workplace exposure to cytotoxic drugs can increase the chance of developing long-term health effects, including damage to genetic material, which could lead to cancer. Exposure has also been linked to reproductive effects, including infertility, miscarriage, low birth weight, and birth defects. The degree of risk for developing health effects depends on the toxicity of the drug and the amount of exposure.

How can cytotoxic drugs enter my body?

Sources of exposure to cytotoxic drugs include inhalation, skin contact, ingestion, and needlestick injuries.

Inhalation – Cytotoxic drugs can be inhaled via droplets, particulates, and vapours. Many procedures can generate aerosols, including injecting the drug into an IV line and removing air from a syringe.

Skin contact – Studies have found that most surfaces in areas where cytotoxic drugs are handled often contain traces of the drug, including countertops, floors, and equipment. These traces can be absorbed through unprotected skin. There could also be direct skin contact following a spill or leak.

Ingestion – Food or beverages prepared, stored, or consumed in areas where cytotoxic drugs are stored or used may easily become contaminated.

Needlestick injuries – Sufficient care must be taken to ensure aseptic technique and the disposal of contaminated sharps to prevent contact with contaminated needles or sharps.

Learn more about [How Workplace Chemicals Enter the Body](#).

Who can be exposed to cytotoxic drugs?

Anyone who works with cytotoxic drugs or provides care for patients receiving these drugs is at risk of exposure and must be protected while working. Individuals who do not work directly with cytotoxic drugs but who work in the area where the drugs are handled could also be at risk.

Exposure can happen to workers involved in:

- shipping and receiving of cytotoxic drugs, including receiving clerks and storeroom clerks
- preparing cytotoxic drugs for administration, including pharmacists and pharmacy and laboratory technicians
- transporting the prepared cytotoxic drug to the areas where it will be administered to patients, including porters

- administering cytotoxic drugs to patients, including nurses, patient care aids, administrative clerks in the unit, and physicians
 - caring for patients who are receiving cytotoxic drugs, including personal support workers, home care workers, and long-term care workers
 - performing housekeeping and waste disposal in areas where cytotoxic drugs are handled
 - cleaning up a spill of cytotoxic drugs
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Are there health and safety legal requirements for cytotoxic drugs?

In Canada, some jurisdictions specifically cover protection against workplace exposure to cytotoxic drugs. For example, part 6 of British Columbia's *Occupational Health and Safety Regulations* contains specific requirements for working with cytotoxic drugs. The required safe work program for protecting workers who may be exposed to cytotoxic drugs must include work procedures, emergency procedures, control measures following the hierarchy of controls, and relevant training and record-keeping. Similar requirements are found in section 97 of Ontario's *Health Care and Residential Facilities Regulation* (made under the *Occupational Health and Safety Act*) and section 471 of Saskatchewan's *Occupational Health and Safety Regulations*. Consult your jurisdiction's health and safety legislation to understand the requirements that apply to your organization.

In jurisdictions without legislation specific to cytotoxic drugs, employers have a general duty to maintain a safe workplace by assessing and controlling foreseeable hazards.

Currently, there are no established [occupational exposure limits](#) (OEL) for cytotoxic drugs because even a small amount of these drugs could cause harm. Because of the serious negative health effects associated with exposure, precautions must be established to limit occupational exposure to all cytotoxic drugs.

What are some good practices for working with cytotoxic drugs?

Cytotoxic drugs play a critical role in medical treatment, so it is often not possible to replace them with less hazardous substances. Despite this, workplaces should still apply the hierarchy of controls, starting with efforts to minimize risks at the source. Common protective strategies include using physical barriers to separate workers from the drugs, implementing safe handling procedures, providing thorough training, and using appropriate personal protective equipment (PPE). Dedicating specific areas and equipment only for handling cytotoxic drugs is one way to reduce the spread of contamination. For more detailed guidance, please refer to our [Cytotoxic Drugs – Control Measures](#) factsheet.

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