



Chemical Exposures Following the East Palestine Train Derailment: Potential Health Effects & Ways to Protect Your Health

On February 3, 2023, 53 Norfolk Southern freight train cars [derailed and caught fire](#), releasing toxic chemicals into the environment in East Palestine, Ohio. Five of these train cars were carrying a cancer-causing chemical called vinyl chloride, which was released into the air during a planned [vent and burn](#). Other chemicals were also spilled or released into the atmosphere from other train cars.

The chart below describes these hazardous substances and the potential health impacts that can be associated with exposure, which generally occurs through inhalation or absorption through the skin. Symptoms will vary with extent and duration of exposure, as well as individual sensitivity and other risk factors, which may be based on genes, underlying health conditions, environmental factors, social or economic factors, etc.

Chemical	What is it?	What is it used for?	What are the health impacts?
Vinyl chloride (carcinogen) Source: transported in train cars	Colorless gas or liquid that has a mild but sweet odor	Manufactured substance (not naturally occurring) used to make polyvinyl chloride (PVC) for plastic products, pipes, packaging, etc.	Exposure can lead to dizziness, sleepiness, loss of consciousness, or lung irritation. Long-term exposure can lead to changes to the liver, nerve damage, compromised immunity, angiosarcoma (a kind of cancer of blood vessels of the liver), or hepatocellular carcinoma (liver cancer).
Butyl acrylate Source: transported in train cars	Clear and colorless liquid that has a strong fruity odor	Organic compound used as a raw material in adhesives, coatings, plastics, etc.	Exposure can lead to irritated eyes, headache, nausea, upper respiratory symptoms (such as pulmonary edema or fluid buildup in the lungs), difficulty breathing, or dermatitis (sensitive, irritated skin).
Ethylhexyl acrylate Source: transported in train cars	Colorless liquid that has a pleasant odor perceptible at very low concentrations	Organic compound used in the making of paints and plastics	Exposure can lead to headache, drowsiness, convulsions, or severe respiratory irritation. Prolonged exposure can cause irritation of the eyes and skin.
Ethylene glycol monobutyl ether Source: transported in train cars	Colorless liquid with a mild and pleasant odor	Used for paints and inks, as well as dry cleaning solutions	Exposure can cause headaches, nausea, vomiting, dizziness, or irritation of the eyes and nose. Limited evidence from animal studies also suggests the risk of cancer, however evidence is not available for humans.
Isobutylene Source: transported in train cars	Colorless gas that smells faintly like petroleum	Component of natural gas and crude oil used in the production of isooctane, a high-octane aviation gasoline	Exposure can lead to dizziness, drowsiness, or loss of consciousness. Contact with eyes or skin can cause irritation or frostbite.

Chemical	What is it?	What is it used for?	What are the health impacts?
<p>Dioxins</p> <p>Source: potential byproduct from burning of other toxic chemicals</p>	<p>A class of over 100 chemicals that already exist at low levels in the environment and have different levels of toxicity</p> <p>A commonly known dioxin of historical concern is Agent Orange, an herbicide used during the Vietnam War.</p>	<p>Individuals can be exposed to dioxins through a variety of industrial activities like incineration and trash burning as well as through forest fires and volcanoes. People may also be exposed through food, primarily animal products, if the food is produced in contaminated areas.</p>	<p>Many dioxins are considered to be significantly toxic and can lead to various diseases, including some kinds of cancer, immune system disorders, and others.</p> <p>The dioxin TCDD is known to cause cancer.</p>
<p>Acrolein</p> <p>Source: probably a byproduct from burning of other toxic chemicals</p>	<p>A colorless or yellow liquid with a bad odor, which dissolves in water easily and evaporates when heated</p>	<p>Manufactured substance that comes from propylene. It is mainly used as a chemical to break down or build other chemical compounds, however it is also used to modify food starches and as an herbicide.</p>	<p>Exposure can lead to eye or nasal irritation, eye blinking, shortness of breath, chest tightness, or nausea and vomiting. Long-term exposure, or exposure to large amounts, can lead to chronic respiratory disease and delayed pulmonary edema.</p>
<p>Particulate matter (PM)</p> <p>Source: byproduct from burning toxic chemicals, petroleum products, paints, and other materials at the site of the fires</p>	<p>Tiny liquid and solid particles</p>	<p>Found in the air we breathe, PM comes from a variety of sources like dirt, pollen, animals, fires, cooking, and many industrial sources. Fossil fuel combustion is a major source.</p>	<p>Short-term exposure can lead to asthma attacks, acute bronchitis, or heart attacks in individuals with cardiac disease. Long-term exposure can cause reduced lung function, lung cancer, chronic bronchitis, or neurodegenerative diseases.</p>
<p>Volatile organic compounds (VOCs)</p> <p>Source: In addition to the VOCs mentioned above, others were undoubtedly produced as byproducts from burning of chemicals and other materials in the fires.</p>	<p>Class of chemicals that are volatile (can evaporate easily) and organic (contain carbon). Examples of VOCs include benzene, toluene, ethyl benzene, xylene, polycyclic aromatic hydrocarbons, formaldehyde, and methylene chloride.</p>	<p>Humans manufacture many VOCs and many are used or produced in the manufacturing of paints, plastics, pharmaceuticals, and refrigerants. Products that release VOCs include paints and lacquers, cleaning supplies, pesticides, fuel, plastics, etc.</p>	<p>Long-term and short-term health effects from exposure to VOCs depend on the specific chemical in question. For details on health impacts from common VOCs released from industry, see this chart.</p>
<p>PFAS or per- and polyfluoroalkyl substances</p> <p>Source: used in firefighting foam to put out fire</p>	<p>Class of over 9,000 toxic, human-made chemicals. Some common PFAS include PFOA (perfluorooctanoic acid) and PFOS (perfluorooctanesulfonic acid).</p>	<p>These chemicals persist in the environment and are used in a variety of industries around the world, including firefighting foam, food packaging, cleaning products, personal care products, water and stain resistant coatings, etc.</p>	<p>Health impacts can depend on the specific PFAS chemical. They have been linked to kidney and testicular cancers, increased cholesterol levels, changes in liver enzymes, increased risk of high blood pressure, pre-eclampsia in pregnant individuals, decreases in infant birth weights, and reduced effectiveness of vaccines in children.</p>

* All information provided by PubChem, National Library of Medicine (NLM), and Toxicological Profile, Agency for Toxic Substances and Disease Registry (ATSDR)

Ways to Protect Your Health

Industrial activities, including the transportation of chemicals and accidents involving them, can pollute the air, water, and soil around nearby homes, schools, and workplaces. If you are worried about your health or your community's air and water, consider the suggestions below to limit or control your exposure. Don't wait for test results or illness to confirm your suspicion that your exposure to chemicals may result in health risks. You can act now by keeping a health diary, talking with a trusted healthcare professional, monitoring air and water/soil quality, and taking special precautions as a worker.

Protecting Your Health

Many people, at one time or another, have had difficulty talking with a health professional. While these discussions can be difficult or even intimidating, it is important to remember that you are your own advocate, and you deserve to receive medical care in a supportive and healthy environment. This collection of information serves as a tool for both you and your health professional to work together in the best interest of your health and wellbeing.

ENVIRONMENTAL HEALTH PROJECT
DEFENDING PUBLIC HEALTH SINCE 2012

Health Diary

Date _____ Time _____

Symptoms
Nosebleeds, headaches, breathing problems, skin irritations, etc.
Pictures to document

Weather Conditions
Cloud coverage, temperature, rain (light, moderate, or strong), and wind (direction and speed).

Environmental Conditions
Air: odors, or fine dust collecting on windows.
Water: color, odor, taste, or sand residue.
Industrial activities: increased truck traffic or new drilling site.

Keep track of any **symptoms** associated with SGD activity. Note what the symptoms are, how long they last, and whether they occur indoors or outdoors.

Weather conditions can affect how pollution travels through the air and may affect certain health problems like allergies and asthma.

Record changes in **air and water quality**. Also make note of changes with **industrial activity** near your home and any increases in **light or noise** pollution.

© Environmental Health Project 2022

A health diary is one way for you to keep track of the patterns you observe in your health and the factors that might impact it. Keeping a health diary may help you and your health professional determine if there are connections between environmental conditions and your health. Take your health diary to any medical appointments to jog your memory and facilitate the conversation.

There are many options available to record your health information. You can write it in a notebook or journal, use an [online health diary](#), or use a smartphone app such as [Symple](#) for Apple products and [Medicalog](#) for Android.

It's good practice to take notes in your health diary every day, and doing so is especially important any time you notice a change in your health or in the surrounding environmental conditions.

Overall, a health diary is a great way to start a conversation with a trusted health professional. For other tips on talking to a health provider, check out this [resource](#).

Air

In addition to monitoring your health on a daily basis and noting any changes, there are many steps you can take to protect yourself from the potentially harmful effects of air pollution, including the following:

- **Use an air purifier:** There are many types of air filters for home use. EHP recommends air purifiers like the Austin Air Healthmate because it removes chemicals, small particles, odors, and dust from the air inside your home. Although an air filtration system like the [Austin Air HealthMate](#) are optimal, there are other low-cost options available. Reducing Outdoor Contaminants in Indoor Spaces (ROCIS) offers a DIY, low-cost fan/filter to remove particles in the air. To learn more about assembling your own fan/filter, [click here](#).
- **Remove avoidable indoor air pollutants:**
 - Avoid bringing contaminated dirt and dust into your home by taking off your shoes and wiping off pets' paws and fur before going inside. Remove contaminated clothing before entering the home to reduce family exposures.
 - Keep windows and doors closed and use an air conditioner, if you have one, to help keep outdoor air outside. Make sure you replace your filters as needed and have your HVAC system serviced annually. The more pollutants being filtered out, the more you will need to change your filters.
 - If you use well or spring water, vent indoor air to help reduce exposures to volatile organic compounds (VOCs) that could be in your water.
 - Use a vacuum with a HEPA filter inside your home instead of sweeping. Sweeping could stir any particles that may be on the ground and spread them around. Vacuuming is more likely to remove them.
 - Pay attention to the weather. Use resources like [AirNow](#) to understand whether upcoming days will have good, moderate, or poor air quality. On days when bad air quality is likely, close your windows and go elsewhere if possible. If you are home when the air is unhealthy, limit your outdoor activities. During very unhealthy conditions, stay indoors.

Understanding the **AIR QUALITY INDEX (AQI)**

Good

No health impacts expected.
AQI 0-50

Moderate

Very sensitive people may wish to limit outdoor exertion.
AQI 51-100

Unhealthy for Sensitive Groups

Sensitive people should limit outdoor exertion.
AQI 101-150

Unhealthy

Everyone should limit exertion outdoors.
AQI 151-200

Very Unhealthy

Sensitive people should avoid all outdoor activity.
AQI 201-300

Hazardous

Everyone should avoid all outdoor activity.
AQI 301-500

weather.gov



Water/Soil

Different levels of water contamination call for different plans of action

- If your water experiences a change in odor or appearance, consider getting it tested, and in the meantime seek out a different water source. [Well owners](#) who want to get their own sampling done can go to a variety of labs around Ohio and Pennsylvania that are certified to test for volatile organic compounds, including vinyl chloride:



- Alloway Marion Laboratory, Marion, OH; 740-389-5991 or 800-873-2835
- Aqua Pennsylvania Inc., Bryn Mawr, PA
- Cardinal Environmental Lab, Youngstown, OH; 330-797-8844 or 800-523-0347
- Coshocton Environmental Testing, Coshocton, OH; 740-622-3328 or 800-870-6570
- CWM Environmental Inc., Cleveland, OH; 216-663-0808
- Dayton Central Water Quality Laboratory, Dayton, OH; 937-333-6093
- Jones & Henry Laboratories, Northwood, OH; 419-666-0411
- MASI Laboratory, Plain City, OH; 614-873-4654
- Pace Analytical Services, Englewood, OH; 800-723-5227
- Ream & Haager Laboratories, Dover, OH; 330-343-3711
- Summit Environmental Technologies, Cuyahoga Falls, OH; 330-253-8211

- If your water is contaminated with VOCs or other chemicals, avoid using your normal water source and consider using bottled water for drinking and cooking, and especially for making drinks like baby formula. Consider [long-term water treatment options](#).
- Consider using an alternative source of water when showering (such as a shower bag), since VOCs can become airborne when water sprays from a showerhead.
- If you must drink or cook with your spring or well water, leave it uncovered in a pitcher or bottle overnight before using it to allow VOCs to evaporate. If possible, also vent the air.
- Ventilate rooms where you are using water. Be sure your bathroom is effectively vented with an exhaust fan to pull steam and air out while the water is running, until all water vapor is out of the air. If possible, vent the air in your laundry area and kitchen as well when you use the water.
- Filter your water. There are many options for home water filters, but no filter will remove all possible contaminants. At a minimum, you can filter your tap water for drinking and cooking with a filtered water pitcher, available at many stores or online. Other devices attach to faucets, fit under the kitchen sinks, or even filter all household water. Only filters with activated carbon or reverse osmosis have been shown effective at removing PFAS from water.
- Stop drinking your water if you or someone in your family has stomach pain or discomfort, muscle pains, or other unusual symptoms. Follow up with a trusted health professional as soon as possible.
- If your water burns your skin or causes a rash, take showers and baths somewhere else if you can. See your health professional and call your state environmental protection agency:
 - Ohio Environmental Protection Agency's main line: (614) 644-3020. Additional contacts are available at: <https://epa.ohio.gov/help-center/contact-list/contact-list-landing>

Some of the steps you can take for soil contamination include:

- Test your soil, especially in areas where children play or food is grown.
- Build raised beds to grow any foods you will eat.
- Wear gloves when handling soil as well as other protective equipment such as a mask.
- Wash fruits and vegetables thoroughly and remove outer leaves before eating.
- Remove shoes upon entering your residence to reduce the spread of contamination.



Additional Resources for Residents

Water Testing

If you live in Ohio near East Palestine and have a private well, you should have it tested before using water from it. To request free, private well testing, call 330-849-3919.

If you live within two miles of the incident in PA call 412-442-4000. The Southwest Regional Office of the PA Department of Environmental Protection is offering testing.

Farmers & Producers

Ohio farmers and producers who are impacted or have questions can call the Division of Animal Health, Ohio Department of Agriculture at 614-728-6220.

Pennsylvania farmers and producers who are impacted or have questions can call the PA Department of Agriculture hotline 855-777-6735.

EPA Information Line

For information related to the train derailment, call: 866-361-0526.

EPA Community Welcome Center in East Palestine, located at 25 North Market St., is open Monday through Saturday - 8 a.m. to 8 p.m., Sunday 1 to 6 p.m.

To submit an inquiry regarding the EPA's response, go to: <https://www.epa.gov/oh/forms/east-palestine-resident-inquiry-0>

For additional information, see: <https://www.epa.gov/east-palestine-oh-train-derailment>

Mental and Emotional Assistance

SAMHSA Disaster Distress Helpline 1-800-985-5990

Ohio's CareLine: 1-800-720-9616

For additional mental health resources in Ohio, see the second page of:

<https://ema.ohio.gov/static/Documents/EastPalestineResources.pdf>

PA Support & Referral Helpline 1-855-284-2494

National Suicide Prevention and Crisis Line 988

[How Can I Help My Child Cope with Stress and Anxiety](#)

Health

The Cincinnati and Central Ohio Poison Centers are partnering with the Pittsburgh Poison Center to provide a 24/7 toll-free hotline for medical questions related to the train derailment. Call (877) 603-0170 to speak to a specialist.

Norfolk Southern Assistance Center

1-800-230-7049 or media.relations@nscorp.com

You can also submit a [claim](#) to request assistance at the Family Assistance Center

Toxicologists (for Questions): 234-542-6474

Toxicologists (for Testing): 330-849-3919