

HEALTH RISKS FROM VOLCANIC ASH

Guidelines for the public



Rauði krossinn



RIKISLÖGREGUSTÓRNINGUR



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This aim of this booklet is to describe the possible effect of volcanic ash on your health and explain how you can protect you and your family from ash fall.

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What is volcanic ash?

Volcanic ash is made up of fine particles less than 2 mm in diameter. It is generated by explosions during a volcanic eruption where gas (and/or water vapour) rises up from the hot magma and carries particles into the atmosphere.

The properties of volcanic ash depend on the type of eruption. It can be anywhere between light grey and black.

It can be rough like sand or fine like talcum powder. The finer the ash (fly ash), the greater the risk of it getting into your lungs. Fly ash obscures sunlight, reduces visibility and sometimes causes complete darkness during the day.

Volcanic eruptions can also cause thunder and lightning generated by the friction between fine floating particles, which are often found above the volcano or in large ash jets carried by the wind. The wind direction and other factors determine where ash falls.

Advice issued by the Chief Epidemiologist on avoiding the health risks posed by volcanic ash are based on the size of the ash particles and the results of the chemical analysis of the ash carried out by the Institute of Earth Sciences. The Environment Agency of Iceland monitors gas pollution.

A significant amount of ash was emitted from the Eyjafjallajökull eruption in 2010. This ash was made up of particles of various sizes. Around a quarter of the particles were small enough to get into people's lungs.

The chemical analysis of the ash carried out by the Institute of Earth Sciences revealed low levels of fluorine in the first days of the eruption but significantly higher levels later. Another major element detected in the ash was silicon dioxide (SiO_2).

Freshly fallen ash particles are often covered in a coat of acid which can irritate lungs and eyes. Contaminated ash fall can be expected if the eruption plume is dry. This coat of acid is easily washed away by rain and then contaminates water sources.

Acidic ash can also damage vegetation and cause crops to fail.

In most eruptions, volcanic ash causes relatively few health problems but is often very worrying. People are often more afraid of the health risks posed by volcanic ash and gas than the risk of dying in more serious disasters, such as pyroclastic flow. Ash fall can also affect a very large area around the volcano and can cause major disruption to daily life.

Hospitals can expect the number of patients with respiratory and eye symptoms to rise during and after ash fall.

Can volcanic ash have a serious impact on people?

Volcanic ash can cause symptoms in:

Respiratory system:

- Running nose and irritation.
- Sore throat and cough.
- People with heart and lung conditions may see the symptoms of their underlying diseases get worse. These effects can last for many days and manifest themselves as coughing, bloating, difficulty breathing and chest tightness.

Eyes:

- Feeling of foreign objects in the eye.
- Eye pain, itching, bloodshot eyes.
- Discharge and tear flow.
- Scratches on retina.
- Acute eye inflammation, sensitivity to light.
- Volcanic ash is especially dangerous for people who wear contact lenses.

Skin:

- Irritation, burning, redness and itching.



Indirect effects of volcanic ash on health

In addition to risks to health, the indirect effects of considerable ash fall should also be considered. These are mainly additional consequences of ash fall, for example:

Impact on roads

Poor visibility due to ash can cause road accidents. Ash on roads also increases the risk of accidents. Ash can obscure road markings. A thin layer of ash – whether wet or dry – can reduce traction. A thick layer of ash can make certain roads unpassable and cut off communities' access to essential items.

Impact on electrical systems

Ash fall can cause power cuts. Wet ash can conduct electricity, so it is essential to closely follow safety procedures when cleaning power supplies and other electrical equipment.

Impact on water supply

Ash fall can contaminate water and clog or damage water-supply equipment. Small, open water sources are particularly vulnerable to ash fall. Even a small amount of ash can make the water undrinkable. Although the risk of poisoning is low, the acid levels of the water may rise. The chemical content of the ash affects water, and you should follow the advice issued by health authorities as regards the risk of poisoning.



Sewage and waste disposal

A temporary halt in municipal sewage and waste disposal services may cause disease among people in areas affected by ash fall.

Risk of roof collapse

- 1) Roofs may collapse under the weight of ash and injure or kill people underneath.
- 2) The weight of people on roofs clearing ash away also means of risk of collapse.
- 3) People have died during volcanic eruptions after falling off a roof when clearing ash away.



What can you do to protect yourself from ash?

Limit driving

Immediately after ash fall – even small quantities – driving conditions, visibility and air quality can deteriorate significantly, particularly when traffic throws ash up into the air. Rain quickly improves air quality, but this is only temporary until the ash dries again.

In the event of ash fall, you should avoid driving and remain indoors if possible. If you must drive, keep a good distance from the vehicle in front of you and drive slowly. After significant ash fall, road users in densely populated areas are urged to limit their speed and drive according to conditions.



High levels of air pollution can be caused by ash being thrown up into the air.

Reduce the risk of ash entering your home

Keep all doors and windows closed if possible.

Protective equipment

Those taking part in cleaning operations should always wear a mask and dust guard when ash fall is imminent. If no masks are available, you can fashion one from a piece of cloth, e.g. a bandana. This blocks the larger ash particles that can irritate the throat and eyes. Moistening the fabric improves its filtering properties. People with chronic lung and heart conditions are advised to remain indoors and avoid unnecessary contact with ash.

Eye protection

If the ash is fine, you should wear protective glasses. People who usually wear contact lenses should refrain from doing so. They should instead wear normal glasses with protective glasses over them. Ash can find its way under contact lenses and cause eye irritation.

Families living in the vicinity of active volcanoes are encouraged to put together an 'ash pack' containing protective glasses, dust masks and water.

Drinking water

Those who are connected to water utilities should keep abreast of information from health authorities and water utilities on the safety of drinking water. Those using their own water source should ensure that ash and surface water do not reach the water source. Where surface water is used as drinking water, the quality of the water should be closely monitored. It is safest to keep several days' worth of drinking water in reserve (assume 3–4 litres per person per day).

Home-grown food

It is safe to eat vegetables grown outside if you rinse off the ash with clean water.

Cleaning

Wet the fallen ash slightly before clearing it with a spade. Do not wet ash on roofs too much in order to ensure that it does not become excessively heavy and cause the roof to collapse under the weight. You should avoid sweeping ash, as this can cause it to be thrown up into the air.



Safety goggles with side shields



Ski goggles



Dust mask

Precautions for children

Children are just as vulnerable to ash as people in other age groups. In fact, the impact on them can be greater, as they are physically smaller and less likely to take usual sensible measures to avoid contact with volcanic ash unnecessarily. Although the health effects of inhaling small amounts of ash are not long lasting, the following measures are recommended when there is a risk of ash fall or when ash is observed:

- In the event of ash fall or ash dispersion, children should go outside only if absolutely necessary. Never leave your child asleep outside in their pram in the event of ash fall or ash dispersion.
- Physical activity brings about faster breathing, and faster breathing enables small particles to penetrate deeper into lungs. Children are advised not to play or engage in any other physical activity outdoors while there is ash in the air.
- Where ash fall is significant, daytime childcare may need to be organised for children to enable their parents to participate in cleaning activities.
- If children need to be outdoors when ash is in the air, they should wear a dust mask (bandana).
- Take special care to ensure that children do not play in areas with thick layers of ash or where ash has drifted.

Sources and further information

This booklet has been produced by the Chief Epidemiologist, the National University Hospital of Iceland, the National Commissioner of the Icelandic Police, the Environment Agency of Iceland, the University of Iceland Institute of Earth Sciences, the Icelandic Food and Veterinary Authority, the Icelandic Red Cross and the Association of Health Inspection Areas in Iceland. It is based on a booklet produced by the International Volcanic Health Hazards Network (IVHHN), the Cities and Volcanoes Commission, GNS Science and the United States Geological Survey (USGS).

Website: www.ivhhn.org



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