



## Children's Health and Volcanic Ash

Volcanic ash consists of tiny pieces of rock and glass that is spread over large areas by wind. During volcanic ash fall, people should take measures to avoid unnecessary exposure to airborne ash and gases.

Short-term exposure to ash usually does not cause significant health problems for the general public, but special precautions should be taken to protect susceptible people such as infants and children. Most volcanic gases such as carbon dioxide and hydrogen sulfide blow away quickly. Sulfur dioxide is an irritant volcanic gas that can cause the airways to narrow especially in people with asthma. Precaution should be taken to ensure that children living close to the volcano or in low-lying areas (where gases may accumulate) are protected from respiratory and eye irritation.

While children face the same health problems from volcanic ash particles suspended in the air as adults (namely respiratory and irritation of the nose, throat, and eyes), they may be more vulnerable to exposure due to their smaller physical size, developing respiratory systems, and decreased ability to avoid unnecessary exposure. Small volcanic ash particles - those less than 10 micrometers in diameter - pose the greatest health concern because they can pass through the nose and throat and get deep into the lungs. This size range includes fine particles, with diameters less than 2.5 micrometers, and coarse particles, which range in size from 2.5 to 10 micrometers in diameter. Particles larger than 10 micrometers do not usually reach the lungs, but they can irritate your eyes, nose, and throat. The volcanic ash may exacerbate the symptoms of children suffering from existing respiratory illnesses such as asthma, cystic fibrosis, or tuberculosis.

### Precautions for Children if Ash is Present

- 1. Always pay attention to warnings and obey instructions from local authorities.**
  - Check the Air Quality Index forecast (at [www.airnow.gov/index.cfm?action=airnow.local](http://www.airnow.gov/index.cfm?action=airnow.local)) for your area.
  - Stay alert to news reports about volcanic ash warnings.
- 2. Keep children indoors.**
  - Children should avoid running or strenuous activity during ash fall. Exertion leads to heavier breathing, which can draw ash particles deeper into the lungs.
  - Parents may want to plan indoor games and activities that minimize activity when ash is present.
  - If your family must be outdoors when there is ash in the air, they should wear a disposable mask. If no disposable masks are available, make-shift masks can be made by moistening fabric such as handkerchiefs to help to block out large ash particles.
  - Volcanic ash can irritate the skin; long-sleeved shirts and long pants should be worn if children must go outdoors.
- 3. Children should not play in areas where ash is deep or piled-up, especially if they are likely to roll or lie in the ash piles.**
- 4. Children should wear glasses instead of contact lens to avoid eye irritation.**
- 5. Create a "clean room" where children sleep and play to help to minimize exposure to ash in indoor air.**
  - Keep windows and doors closed. Close any vents or air ducts (such as chimneys) that may allow ash to enter the house.
  - Run central air conditioners on the "recirculate" option (instead of "outdoor air intake"). Clean the air filter to allow good air flow indoors.
  - Avoid vacuuming as it will stir up ash and dust into the air.

- Do not smoke or burn anything (tobacco, candles, incense) inside the home. This will create more indoor pollutants.
  - If it is too warm or difficult to breathe inside with the windows closed, seek shelter elsewhere.
- 6. A portable room air filter may be effective to remove particles from the air.**
- Choosing to buy an air cleaner is ideally a decision that should be made *before* a smoke/ash emergency occurs. Going outside to locate an appropriate device during an emergency may be hazardous, and the devices may be in short supply.
  - An air cleaner with a HEPA filter, an electrostatic precipitator (ESP), or an ionizing air cleaner may be effective at removing air particles provided it is sized to filter two or three times the room air volume per hour.
  - Avoid ozone generators, personal air purifiers, “pure-air” generators and “super oxygen” purifiers as these devices emit ozone gas into the air at levels that can irritate airways and exacerbate existing respiratory conditions. These devices are also not effective at removing particles from the air.

## For More Information

### **Pediatric Environmental Health Specialty Units (PEHSU)**

To access children’s environmental health issues experts, please contact the Pediatric Environmental Health Specialty Unit (PEHSU) in your area: [www.pehsu.net](http://www.pehsu.net). PEHSU in EPA Region 10 - Alaska, Idaho, Oregon, Washington, and Native Tribes—<http://depts.washington.edu/pehsu/>, (877) 543-2436

### **Anchorage Air Quality Volcano Information**

Available online: [www.ci.anchorage.ak.us/healthesd/airqualityvolcano.cfm](http://www.ci.anchorage.ak.us/healthesd/airqualityvolcano.cfm)

### **Centers for Disease Control and Prevention (CDC) Key Facts About Volcanic Eruptions**

Available online at: <http://emergency.cdc.gov/disasters/volcanoes/facts.asp>

### **Alaska Division of Homeland Security and Emergency Management: Protecting Children From Volcanic Ash Related Health Hazards**

Available online at: [www.muni.org/iceimages/oem/children.pdf](http://www.muni.org/iceimages/oem/children.pdf)

### **Air Quality Index (AIR Now) Local Advisories**

Available online: [www.airnow.gov/index.cfm?action=airnow.local](http://www.airnow.gov/index.cfm?action=airnow.local)

### **U.S. EPA Guide to Air Cleaners in the Home**

Available online: [www.epa.gov/iaq/pdfs/aircleaners.pdf](http://www.epa.gov/iaq/pdfs/aircleaners.pdf)

### **The Health Hazards of Volcanic Ash: A Guide for the Public**

Available online at: [www.dur.ac.uk/claire.horwell/ivhhn/pamphlets/health\\_lowres.pdf](http://www.dur.ac.uk/claire.horwell/ivhhn/pamphlets/health_lowres.pdf)

### **Guidelines on Preparedness Before, During and After an Ashfall**

Available online at: [www.dur.ac.uk/claire.horwell/ivhhn/pamphlets/preparedness\\_lowres.pdf](http://www.dur.ac.uk/claire.horwell/ivhhn/pamphlets/preparedness_lowres.pdf)

### **Wildfire Smoke: A Guide for Public Health Officials**

Available online at: [www.arb.ca.gov/smp/progdev/pubeduc/wfgv8.pdf](http://www.arb.ca.gov/smp/progdev/pubeduc/wfgv8.pdf)

### **Hawai'i State Department of Health: Frequently Asked Questions and Answers on Vog and Volcanic Emissions from Kilauea**

Available online at: [http://hawaii.gov/health/about/reports/vog\\_ga.pdf](http://hawaii.gov/health/about/reports/vog_ga.pdf)

For more information, contact the Office of Children's Health Protection and Environmental Education at (202) 564-2188