

Threats to Human Health from Coal Ash

Breathing or ingesting the toxic chemicals in **coal ash** can harm **every major organ** in the human body over time. Short-term exposure to the chemicals in coal ash can lead to dizziness, nausea, vomiting, irritation of the nose and throat, and shortness of breath. Long-term exposure can lead to organ damage and a variety of cancers.



Nose and throat

Impacts include damage to nose and throat, irritation, and damage to septum, in addition to eye irritation.

Sb

Cr

B

Se

Tl

Ni

Heart

Damage to the heart including heart disease, heart attacks, cardiac arrhythmia, and cardiovascular harm.

Sb

Tl

As

Pb

PM_{2.5}

Co

Organs

Damage to the organs, including damage to the intestines, liver, kidneys, as well as stomach and intestinal ulcers, and cancers of the urinary tract, stomach, intestines, and prostate.

B

Va

Mn

Mo

Ni

Tl

Co

Pb

Sb

Cr

As

Cd

Blood

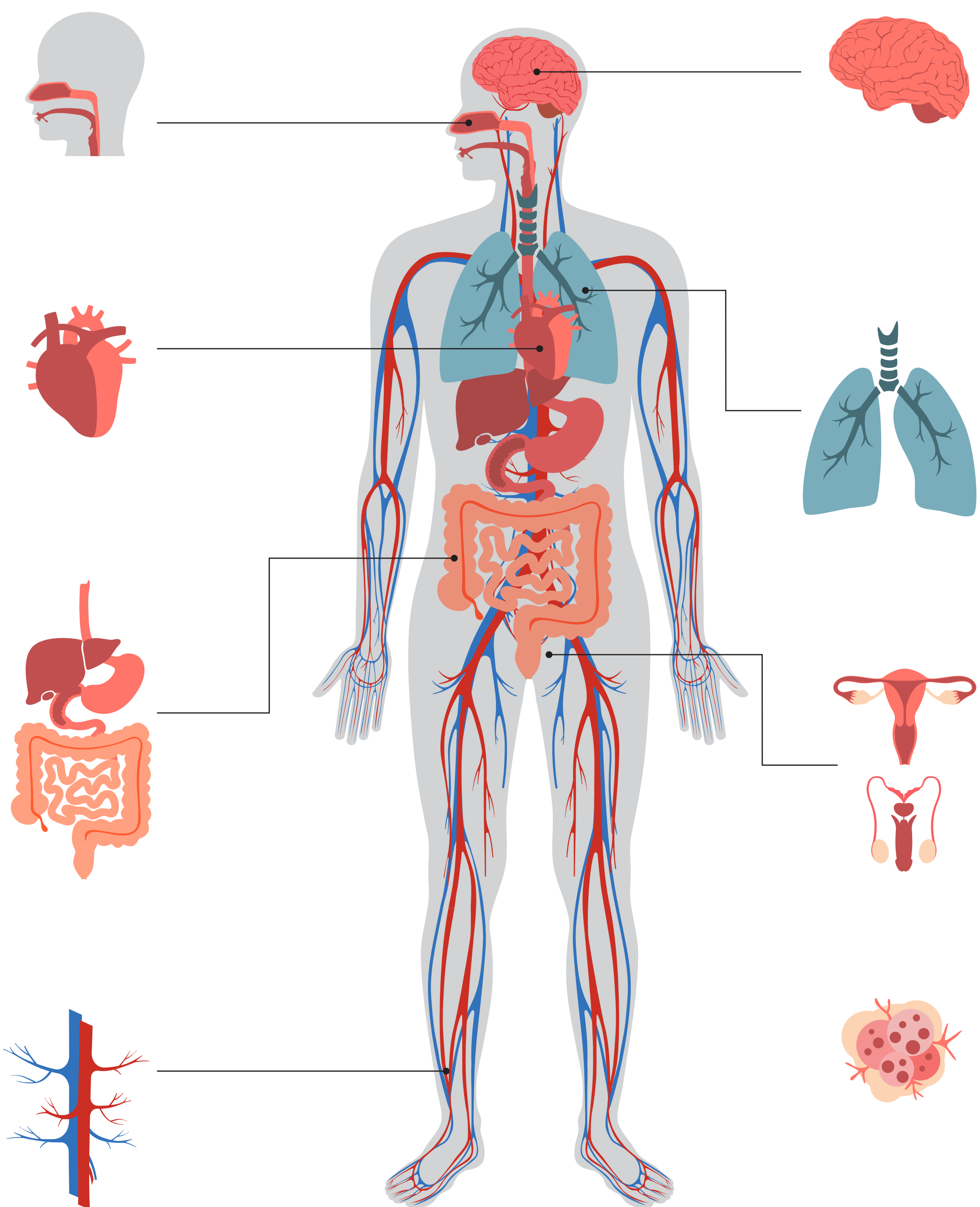
Risks include anemia, high blood pressure, and increased blood uric acid levels (hyperuricemia), as well as gout.

Cr

Va

Tl

Mo



Brain

Damage to the brain including swelling and developmental harm, such as reduced IQ, in addition to nervous system damage.

B

Mn

Pb

Hg

As

Tl

Lungs

Damage to the lungs including cancer, scarring (pulmonary fibrosis), as well as irritation, inflammation, chronic bronchitis, and asthma.

Al

Co

Ni

Se

Sb

Tl

PM_{2.5}

As

Cd

Cr

Ra

Va

Reproductive

Damage to the reproductive system including the testes, may harm female fertility and decrease fertility in males.

Zn

Sb

Cd

B

Mn

Cancers

Cancers linked to exposure include lung cancer, skin cancer, prostate cancer, stomach cancer, urinary tract cancers, and bone cancers.

Ra

As

Cr

Cd

Ni

What Makes Coal Ash So Harmful

Al **ALUMINUM** Long-term exposure to dust can cause scarring of lungs (pulmonary fibrosis) with symptoms of cough and shortness of breath. May be linked to dementia.

Sb **ANTIMONY** Long-term inhalation can cause a hole in the septum dividing the inner nose and lead to permanent lung damage. May harm female fertility and damage liver, kidneys and heart.

As **ARSENIC** Ingestion can lead to nervous system damage, cardiovascular harm, and urinary tract cancers. Inhalation and absorption through skin can cause lung cancer and skin cancer, respectively.

B **BORON** Inhalation can lead over the short term to eye, nose, and throat irritation. Ingestion of large amounts can result in damage to the testes, intestines, liver, kidneys, and brain, and eventually lead to death.

Cd **CADMIUM** May cause lung and prostate cancer and damage the reproductive system. Inhalation can irritate lungs. Ingestion can cause nausea, vomiting, diarrhea and abdominal pain.

Cr **CHROMIUM** Ingestion can cause stomach and intestinal ulcers, anemia, and stomach cancer. Frequent inhalation can cause asthma, wheezing, and lung cancer. Inhalation can also irritate the nose and throat, resulting in asthma-like symptoms and damage the nose's septum.

Pb **LEAD** Exposure can result in brain swelling, kidney disease, cardiovascular problems, nervous system damage, and death. It is accepted that there is no safe level of lead exposure, particularly for children.

Mn **MANGANESE** Long-term exposure can cause permanent brain damage. Inhalation irritates nose, throat and lungs, causing coughing, wheezing and shortness of breath. May cause harm to the liver and testes and decrease fertility in males.

Hg **MERCURY** Impacts include nervous system damage and developmental harm, such as reduced IQ. Poses particular risk to children, infants and fetuses.

Mo **MOLYBDENUM** Ingestion causes gout (joint pain) and increased blood uric acid levels and is linked to high blood pressure and liver disease. Slowed growth, low birth weight and infertility found in animals.

Ni **NICKEL** Inhalation can irritate and damage the nose, throat and lungs. Acute exposure can cause headache, dizziness, nausea and vomiting. A probable carcinogen for lung cancer. Can cause chronic bronchitis and scarring of the lungs. Long-term exposure may harm liver and kidneys.

PM_{2.5} **PM2.5** Particles less than 2.5mm can lodge deep in the lungs and cause premature death, as well as lung and heart disease, decreased lung function, asthma attacks, heart attacks and cardiac arrhythmia.

Se **SELENIUM** Inhalation can irritate the nose, throat, and lungs, causing coughing, wheezing, and shortness of breath. Can also cause nausea, diarrhea, abdominal pain, and headache. Repeated exposure can cause irritability, fatigue, dental cavities, loss of nails and hair, and depression.

Tl **THALLIUM** Ingestion causes nervous system damage and lung, heart, liver and kidney problems. Main ingredient in rat poison.

Va **VANADIUM** Lung irritant. Long-term exposure can cause asthma attacks with shortness of breath, wheezing, cough, and chest tightness. May damage the kidneys. Repeated high exposure may cause anemia.

Zn **ZINC** Inhalation can irritate the nose and throat, and cause wheezing and coughing. Appears to affect the male reproductive system, including sperm count.

Co **COBALT** Frequent inhalation irritates the lungs, causing asthma and wheezing. Exposure to high levels of cobalt can also result in heart, liver, and kidney damage.

Ra **RADIUM** Regular exposure to the gamma radiation released by radium can increase the risk of many types of cancer, including lung, thyroid, liver, bone, skin, as well as other tissues.

Source: Agency for Toxic Substances and Disease Registry (ATSDR), U.S. Department of Health & Human Services. Toxicological Profiles. www.atsdr.cdc.gov/toxprofiles