Health and the Environment

for Health Care Providers

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We believe that everyone has a right to clean water, clean air, and toxic-free food.

Coal Mining and Public Health

Community Public Health Disparities

Epidemiological studies in coal mining areas indicate that proximity to coal mines is correlated with negative health outcomes such as higher rates of birth defects, cancer, kidney disease, and cardiovascular and respiratory disease.[1,2,3,4] The affected populations included those who had never worked in a mine, but whose disease rates were still positively correlated with proximity to coal mining operations. These correlations remain significant after adjusting for covariates such as poverty, smoking, access to medical care, education and obesity.[1,2,3,4] Correlation should not be equated with causation, however several likely exposure pathways exist through air and water pollution caused by mining operations.[1,4]

Air Pollution

Coal dust and diesel exhaust are known workplace health hazards. Black lung (coal workers' pneumoconiosis) and chronic obstructive pulmonary disease (COPD) are well-documented causes of illness and death among coal miners, despite decades of regulations protecting workplace health.[5] Pulmonary disease rates have actually increased over the past decade for both surface and underground coal miners.[5,6] A recent survey attributed higher rates of ischemic heart disease (IHD) among coal miners to chronic coal dust inhalation, and noted that:

"The association of increased risk of IHD with cumulative particulate exposure is consistent with air pollution studies, which have shown that long-term cumulative exposures to particulates are strongly related to IHD mortality".[7]

Workplace exposure to diesel exhaust in other occupations, such as truck drivers, dockworkers and railroad workers is likewise correlated with significantly higher rates of lung cancer, COPD, and heart disease.[8]

Coal dust and diesel exhaust exposure pose health risks beyond the mines as well. Trucks and trains hauling coal are a major source of traffic-related air pollution, and also release fugitive coal dust into the air along their haul route[1,9]—up to a pound of coal dust per mile per train car.[10] Numerous studies link traffic-related air pollution (specifically $PM_{2.5}$, particulate matter smaller than 2.5 µm in diameter) with diabetes, asthma, pulmonary disease, cancer, stroke, heart disease, and cognitive disorders such as dementia.[1,8,11] Once inhaled, $PM_{2.5}$ not only inflames the alveolar membranes, but the smallest particles can pass from the nasal passages directly into the brain along the olfactory nerve.[1] Controlled trials (on animals and *in vitro*) have elucidated some of the complex mechanisms by which $PM_{2.5}$ provokes oxidative stress and inflammatory responses throughout the body.[1,8,11] This evidence, along with epidemiological data, strongly supports links between particulate matter exposure and a host of pulmonary, cardiovascular, metabolic and neurodegenerative diseases.[1,8,11]

Emerging science shows that particulate matter can cause significant harm even at doses below the regulatory standards. Researchers comparing the effects of air pollution on lung cancer and cardiovascular mortality reported that cardiovascular risk was evident starting at the lowest dose measured.[12] Other studies attribute acute negative health outcomes, such as myocardial infarction, stroke, and hospitalizations for asthma, with only short-term

exposure to increased particulate matter.[8,11] The Scientific Statement of the American Heart Association states:

"Exposure to PM 2.5µm in diameter (PM2.5) over a few hours to weeks can trigger cardiovascular disease–related mortality and nonfatal events; longer-term exposure (e.g., a few years) increases the risk for cardiovascular mortality to an even greater extent than exposures over a few days and reduces life expectancy within more highly exposed segments of the population by several months to a few years."[11]

The American Lung Association's 2013 "State of the Air" report cites a large number of air pollution studies and concludes that traffic-related particle pollution is "increasing the risk of harm to people who live or work near busy roads."[8] Given this body of evidence, the increase in heavy truck or train traffic (and the accompanying diesel exhaust and fugitive coal dust) through communities that would be necessary for transporting coal from mine to market should be included in any analysis of future coal development projects.

Water Pollution

According to a 2011 review in the journal Environmental Health Perspectives, "contaminated drinking water is one of the chief health concerns for communities surrounding [coal] mining".[13] At the mine site, exposed rock from rubble deposits (stockpiles) and mining waste in slurry ponds release heavy metals and other pollutants that contaminate both surface and ground water.[1,13] The wastewater from the process of washing the impurities off the coal before shipment is a slurry of those impurities, coal dust, and the flocculent chemicals used in the process. The slurry is either injected into underground mine workings, or captured in slurry ponds (large unlined catchment basins) and allowed to seep into groundwater.[1,13] Typical constituents in coal and overburden that have contaminated local drinking water include: arsenic (a known carcinogen), sulfate, iron, manganese, selenium, mercury, and chromium.[1,13,14]

Toxic gases, such as methane, radon, and carbon monoxide, released by coal mining pose an immediate explosive hazard to mine workers, and can also migrate offsite to contaminate groundwater.[1,13,14] Coal mining is the fourth largest anthropogenic contributor to atmospheric releases of methane gas.[15] The United States Geological Service (USGS) detected high levels of radon in many wells near coal mines in the Eastern U.S., and 7% of homes in one area had enough methane in their wells to make their drinking water potentially flammable.[1,16] Cases of carbon monoxide poisoning in homes have been traced to CO migrating through fissures in the rock from newly blasted coal mines to the well casings of nearby houses.[17]

Conclusion

Numerous peer-reviewed studies in medical journals show that coal mining and transportation-related air and water pollution are associated with a range of serious health problems, including cardiovascular disease, lung disease, cancer, stroke, heart attacks, diabetes, asthma, and cognitive degeneration. The risks to public health should be fully assessed and considered by the regulatory agencies before any large coal mine is permitted in Alaska.

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Health Impact Assessment (HIA)

"A combination of procedures, methods and tools by which a policy, programme or project may be judged as to its potential effects on the health of a population, and the distribution of those effects within the population."
--World Health Organization 1999

What does a Health Impact Assessment do?

- Compiles demographic and health data on a population
- Reviews relevant studies on possible health impacts
- Identifies and quantifies positive and negative effects of a proposed project on public health
- Provides recommendations based on risks and benefits to health

What does a Health Impact Assessment not do?

- Stop development projects
- Force regulatory change

Currently, Health Impact Assessments are underway on two of the six proposed coal mines in Southcentral Alaska, Wishbone Hill and Chuitna, but there is no explicit requirement to consider human health in the State of Alaska permitting process for coal mines.

More information on the HIA program in Alaska can be found at the State of Alaska Department of Health: http://www.epi.hss.state.ak.us/hia/

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Please Join Us!

Rx: HIAs for Coal Mines

*More than 80 of your colleagues invite you to join them in requesting a comprehensive Health Impact Assessment for all coal projects in Alaska. Please sign on to the Alaska Medical Professionals position statement at **www.protectakhealth.org**.*

“We understand that the risks to human health from coal mining and transportation are significant, and the most vulnerable populations—children, infants, the elderly, those with pre-existing conditions, indigenous communities, and the economically disadvantaged—will be disproportionately affected. As health care providers, we do not want to see our communities bear the burden of the increased mortality and morbidity, as well as the increased health care costs associated with living near or along the transportation route of coal strip mines. These burdens should be fully assessed and considered by the regulatory agencies throughout the permitting process. To this end, **we are requesting a comprehensive Health Impact Assessment to be required for every future coal mining project in Alaska**.”

--Alaska Medical Professionals Position Statement