Episode 56DW, May 2, 2023. The “Rural health can be improved by elimination of residential wood burning” issue.

United States

Websites

https://www.facebook.com/profile.php?id=100066828625433
Facebook Page
One Million Better Moms for Clean Air
sick and tired of breathing wood smoke , a place for education , resources, and hope.
#AxeDrax stop all #carcinogenic #toxic wood burning in BC Gulf Islands, too!!! #ExtinctionRebellion #southerngulfislands #saltspringislandbc
It’s an environmental injustice to promote the dirtiest, most health-damaging heat you can have to a demographic at highest risk, like the elderly... Gulf Island daycares!!! and people with young children #bcpoli #communitymatters #southerngulfislands #adamolsen #ElizabethMay #saltspringislandbc
Here’s a discussion of what that “low cost” firewood really costs: Everyone Pays
The Real Cost of Wood Burning
The perceived lower cost of heating with wood is often cited as a reason to tolerate its use. However, when we look at the whole picture, it is clear that the price of wood heating is actually quite high.
Air Pollution Is Expensive
When air pollution levels rise, even by a small amount, health-related costs go up.
For example, US researchers have estimated that a nationwide reduction of only 1µg/m3 in PM2.5 would reduce costs related to asthma by nearly $350 million annually.
A 2013 review in the Lancet estimated that a mean reduction in PM2.5 of 3.9 µg/m3 in the US would prevent 7,978 heart failure hospitalizations and save a third of a billion dollars a year.
The authors of a 2021 study that linked indoor solid fuel burning in Ireland with reduced cognitive function, noted “The costs of dementia, which include direct medical costs, social care costs, and the costs of informal care, are very large.” They pointed out that the worldwide dementia cost was 1.1% of World GDP in 2015, and likely rising. “Thus, public health policy should aim to reduce exposure to risk factors such as open fires in the home.”
“A Catastrophic Downward Spiral”
In testimony to the Multnomah County (Oregon) Board of Commissioners in 2022, pulmonologist Dr. Erika Moseson described how wood smoke pollution can cause a “catastrophic downward spiral” for patients’ health and financial wellbeing, leading to greater costs for the whole community.
When people can’t breathe, they can’t go to work or to school. Students fall behind academically, potentially affecting their future earning ability. Workers without paid sick leave lose wages while being faced with growing medical expenses. “Whatever dollars we invest in clear air,” she said, “will have a beautiful magnifying effect on our health and economic productivity, both for the individual and the entire community.”
Large Health Costs in Metro Vancouver
A 2019 report prepared for Metro Vancouver, Health Impact Scale for Air Quality Improvements in the Canadian Lower Fraser Valley Airshed, ranked the restriction of wood-burning appliances as the “highest priority,” with an estimated C$438M each year in potential health-related savings.
Any scheme that replaces wood heaters with less polluting forms of heating will pay for itself within a year and provide ongoing savings from the avoided additional disease and death associated with woodsmoke.”
F. Johnston, quoted in Pollutionwatch: the solvable problem of home wood burners, The Guardian, Oct 22, 2021.
Economic Impacts in Australia and New Zealand
A study of the New South Wales town of Armidale that was published in 2007 concluded that 38% of respiratory-related visits to primary care doctors were directly attributable to wood smoke-related pollution, adding an extra A$1,666 daily in medical costs. The study concluded that “there is a need in rural towns to consider the health impacts of planning decisions related to wood heating.”
Another study that was published the same year suggested that wood stoves increase annual mortality in Armidale by approximately 7%, with an estimated hidden cost of about A$4,270 per wood stove each year.

A more recent study that was published in the Medical Journal of Australia in 2021, found that wood heating increased medical costs in the town of Armidale by an average of A$32.8 million, or A$10,930 per stove.
A 2023 NSW government report estimated that wood stoves contribute to 269 premature deaths each year in the greater Sydney metropolitan region, and add an estimated A$2 billion extra annually in costs to the region's health system.
In Tasmania, each wood stove is estimated to raise health costs by an average of A$4,232 annually. Altogether, wood stoves are estimated to cost A$293 million each year in added health costs in Tasmania.
A New Zealand study found that wood smoke pollution cost the city of Christchurch alone an added NZ$127 million in increased health-related costs just in 2001.
According to Australian researcher Dr. Fay Johnston, "Any scheme that replaces wood heaters with less polluting forms of heating will pay for itself within a year and provide ongoing savings from the avoided additional disease and death associated with wood smoke."
Wood Burning Costs EU and UK Billions
In 2022, researchers found that wood-burning appliances are a major source of air pollution in the European Union and UK, increasing health-related costs by €13 billion each year (PDF). In an article about the study in New Scientist, it was pointed out that "burning wood has high health costs relative to the energy it generates."
Residents of rural and low-income communities are more likely to be affected by adverse public health outcomes associated with exposure to wood smoke.
A. Marin, et al. Residential wood heating: An overview of US impacts and regulations, Journal of the Air & Waste Management Association, 2022.
Huge Air Pollution-Related Costs in Denmark
In Denmark, pollution from wood burning now contributes approximately 50% "of all health damages from Danish pollution sources (PDF)" according to a 2016 report by the Danish Ecological Council.
The Danish Centre for Environment and Energy at Aarhus University has estimated that wood stoves cost that country 5.7 billion kroner annually (approximately US$840 million) in annual air pollution-related costs. It was proposed that a tax on wood stoves, based upon the amount they are used, could save 300 lives a year. According to the Danish Ecological Council, pollution from wood burning is now "the most health damaging and expensive environmental problem in Denmark," causing several times more harm than fine particles from domestic road traffic.
More Wood Burning, More Illnesses and Deaths
In the city of Thessaloniiki, Greece, use of wood heating rose dramatically during that country's economic crisis, causing a large spike in wood-associated particulate air pollution. It was estimated that the switch to wood heating from fuel oil resulted in 200 excess deaths, or 3,540 years of life lost, corresponding to an economic cost of almost €200–250 million.
The majority of increased illnesses during the winter of increased wood burning were cases of chronic bronchitis, along with additional new cases of cardiovascular disease and other respiratory problems, at a monetary cost of €30 million.
An analysis of the data suggested "significant public health and monetary benefits (up to €2 billion in avoided mortality and €130 million in avoided illness) might be obtained" by limiting the burning of wood and other biomass. Providing incentives so that people can transition to cleaner heating options and away from wood was strongly advised, in order to avoid more excess deaths and avoidable illnesses.
And More Medical Costs
A study from 2001–2003 by the San Joaquin Valley Air Pollution Control District in California estimated that excess illnesses caused by residential wood burning resulted in an added $11 million to $26.6 million annually in medical expenses in the Fresno/Clovis area and an added $5.7 million to $14.1 million in the city of Bakersfield. (The lower figures reflect restrictions on burning that were implemented during the course of the study.) Added expenses from premature deaths caused by residential wood burning (PDF) were estimated to cost up to $430.6 million when there were no limits on wood burning in Fresno/Clovis and up to $239.9 million in the city of Bakersfield.
The study's authors noted:
Wood burners as well as the general public must understand that these localized spikes in wood smoke inhalation create an unjustifiable concentration of risk, particularly to vulnerable groups such as elders and children, i.e. environmental injustice. Furthermore, the public and those most vulnerable would benefit from a greater public recognition of the particularly harmful effects triggered by the various chemical species found in wood smoke.
Other Financial Burdens for Neighbors
Neighbors of wood-burning households often spend large sums of money trying to protect the health of their families and cope with the smoke. Common expenses not only include extra medications and medical bills, but also HEPA air

purifiers and the energy to run them, air pollution monitors, and house modifications in an attempt to limit how much smoke gets in.
Ultimately, some families are driven from their homes and also have moving expenses.
Rural and Low-Income Communities
These added financial burdens can fall on neighbors who struggle to afford them, if they can afford these added expenses at all.
It has been pointed out that residents of rural and low-income communities are more likely to suffer health effects due to wood smoke pollution due to their greater exposure.
Wood Burning Is Not a Bargain
When all the costs are considered, wood burning is clearly no bargain.

Residents Against Wood Smoke Emission Particulates' review of an article in The Week, The best of U S and International Media, (a weekly news magazine aggregator site), print version May 5, 2023, page 11 "When (rural) Hospitals go broke". The Week, a news agreggator site, summarized why rural hospitals in the United States are going out of business, and summarized the effects on the rural population of loss of their hospitals. RAWSEP concludes by seeing and pointing out connections between heartless wood stove advertising to a rural audience that ignores the health effects on wood burners and their neighbors, and heartless refusal of 10 Republican-led states to expand Medicaid, when expanding Medicaid in those states would strengthen rural hospitals economically and most probably allow them to stay open.
Lack of Medicaid expansion leads to rural hospitals closing. Excerpts from "The Week" edited by RAWSEP for brevity and clarity and relationship to Residents Against Wood Smoke Emission Particulates: "The Affordable Care Act (Obamacare) offers federal funds to cover 90% of each state's cost of widening Medicaid eligibility to Americans just over the poverty line. (In 2023, people with incomes up to $20,120 qualify.) 10 states, all with Republican-controlled legislatures, still haven't expanded Medicaid, despite evidence that their healthcare systems stand to gain financially. In Mississippi, without Medicaid expansion, only a handful of rural hospitals are not losing money. In a recent poll, 80% of Mississippians, including 70% of Republicans, support Medicaid expansion. But the Mississippi Governor continues to oppose "expansion of Obamacare, welfare and socialized medicine".
Not implementing Medicaid expansion can be the tipping point causing each rural hospital to close its doors. Two other contributing reasons to rural hospital closures are 1)the rural population is older and sicker than suburban and urban populations and 2)rural people are moving away to suburban and urban areas.
Solutions
1)Expand Medicaid to the remaining 10 U S states.
2)Transport rural patients to suburban and urban hospitals for overnight stays.
Another Federal government program that rural hospitals are considering utilizing is the Rural Emergency Hospital program. If struggling rural hospitals reduce overnight inpatient stays, in exchange the federal government will give $3.2 million a year and a boost in Medicare payments. Participating hospitals would prioritize emergency and outpatient treatment and would transfer patients who need extended stays to bigger facilities, which would tend to be suburban or urban hospitals. There is some resistance to this because the delay created by transporting very sick patients can be hazardous.
3)Improve rural health with preventive health care.
4)Create incentives to keep people from moving away from rural areas.
RAWSEP feels that stopping residential wood burning for heat can contribute to the solutions of 3)improving rural health and 4)preventing some rural exodus.
Stopping residential wood burning for heat in rural areas will stop hyper-localized air pollution that affects near neighbors of residential wood burners. Wood burning is 90% PM2.5, particulate matter of 2.5 micrometer size, the perfect size to infiltrate the human lung, setting off a cascade of human health problems and early deaths. The solution. Governments, probably government health departments, should hand out PM2.5 monitors to any near neighbor of a residential wood burner who complains of wood smoke entering the near neighbors' yards and infiltrating his or her home. Data from those PM2.5 monitors, hanging from the eaves of homes of near neighbors, showing PM2.5 levels exceeding Environmental Protection Agency "safe" limits of PM2.5 could be used as evidence to shut down residential wood burners polluting yards and homes of near neighbors. Since PM2.5 from residential wood burning has been shown to cause illness and early death to near neighbors over many years of studies, there is ample evidence that this will reduce medical problems in rural areas.

The first practical reason for using PM2.5 monitors is that historical data is available online to the general public 24 hours a day 7 days a week, and therefore data on weekend and overnight wood burning pollution is available to government officials during normal working hours, with no need for government officials to enter wood burning residences nor check certification of wood stoves to prove that PM2.5 pollution above E P A levels is being produced, evidence enough to shut down each residential wood burner. Another practical reason is that low cost ($249) PurpleAir PM2.5 monitors are now being used on U S E P A Airnow Maps of Smoke and Fire alongside $100,000 official E P A PM2.5 monitors, with PurpleAir monitor data correlated to the E P A monitor data using a simple mathematical formula. The Office of the Inspector General (O I G), watchdog of the E P A issued a report in February 2023 stating that the certification of wood stoves was flawed and therefore polluting wood stoves were being manufactured and sold, because of lobbying by the wood stove industry to allow loopholes that allowed non-compliance with E P A's own limits on emissions from residential wood stoves. RAWSEP believes that PM2.5 monitoring should replace wood stove certification, since there is no "safe" level of PM2.5 pollution, according to the American Lung Association. Wood burning produces more PM2.5 (and CO2) than coal burning. Wood burning produces 450 times the PM2.5 as natural gas burning. Wood burning for home heating can be replaced by use of Heat Pumps that now work at temperatures well below zero Fahrenheit. There are now U S government incentives for Heat Pumps, and there are many wood stove changeout programs across the U S now that require replacement with government-subsidized or government-paid Heat Pumps. If electric Heat Pumps are powered from an electric grid expanded even into rural areas, and powered by wind, solar or geothermal, little or no PM2.5 will be generated for home heating. Near neighbors of residential wood burners have already had costs to their health and costs in purchasing their own PM2.5 monitors in the past to prove the pollution levels caused by residential wood burning. The federal government is now in a position to pay for PM2.5 monitors for near neighbors who complain of pollution from wood burning which affects the health and life of near neighbors.

Washington State

RAWSEP view: Wood burning produces more particulates and more CO2 than coal burning. Hopefully Washington Governor Jay Inslee will veto this bill to give tax incentives for hog fuel (wood) burning. If Inslee vetoes the bill, the current hog fuel tax break will expire in June 2024. Wood burning produces more PM2.5 and CO2 than coal burning. Washington State Representative Tharinger's comment on hog fuel (wood) burning, that it is recycling hydrocarbons, may have sounded environmentally neutral to him, but looking up what recycling hydrocarbons by wood burning is, gave RAWSEP this result: "Parts of the wood are barely hot enough to burn at all, but still can thermally break down the hydrocarbons into shorter, volatile organics which are carried away by wind or convection from the fire before the complete combustion to C O2 and water can be completed." That description of recycling hydrocarbon does not seem environmentally friendly.
On April 19, 2023, a bill passed in the Washington State Legislature. It has sat on Washington Governor Jay Inslee's desk, awaiting a signature, since then.
Washington House Bill 1018 passed 96-0 in the state House on March 16. It passed 37-12 in the Senate on April 19. Republican Mark Schoesler opposed the bill, which will extend tax breaks for Washington businesses that use or sell hog fuel, a mixture of wood waste until 2034. The Washington State Bill extending tax breaks to Washington businesses that burn wood waste for energy awaits Governor Jay Inslee's signature for final passage.
1)Against the Bill.
1a)Roskelley. Former Spokane County Commissioner John Roskelley was opposed to the hog fuel bill. He worked with Sherri Dysart, Forest Issues chair of the League of Women Voters of Washington, urging Inslee to veto the bill. "Tax exemptions should not be given to industries that generate a high rate of emissions," Dysart wrote in an email to Inslee dated April 22, 2023. "The hog fuel industry has been shown to degrade air quality and health, in addition to contributing significantly to Greenhouse Gas emissions. It is actually inconsistent with your Earth Day comments." Roskelley said if the Legislature won't kill the bill, he hopes it will change the language. "Direct that money that these 14 businesses are saving to clean up their stacks and implement new technology," he said in an interview .
1b)Nguyen. One "nay" vote came from Sen. Joe Nguyen, D-White Center.
"I'm generally opposed to tax breaks for companies and hog fuel," Nguyen said "I get it, it's more sustainable and safer than other options, like fossil fuel, but it's still burning wood, right? So, you're still emitting (carbon dioxide.) I don't want to incentivize that behavior." Nguyen, who is chair of the Senate Environment, Energy and Technology Committee, said he does not believe the beneficiary companies need the tax breaks to stay afloat, adding that the intent language

(regarding the hope that companies will provide employee benefits in exchange for receiving payments for hog fuel burning) in the bill is meant to "soften the blow" (to environmentalists) of the (hog fuel burning) write-offs. "If you're a profitable business, you should be providing benefits to your employees," he said. "You shouldn't need a tax exemption to provide things you should be providing anyways."
This State of Washington bill will "extend tax breaks for Washington businesses that use or sell hog fuel, a mixture of wood waste until 2034." That is bad news for air pollution affecting the health of Washington State citizens. Washington House Bill 1018 passed 96-0 in the state House on March 16. It passed 37-12 in the Senate on April 19, 2023.

2)For the bill. Democratic Representative Steve Tharinger, the bill's primary sponsor, said the bill "recycles and reuses hydrocarbons. Taxing hog fuel burning was excessive, so this bill just continues that tax exemption. He said the tax breaks like the hog fuel bill help mills to continue operating in Washington State. "We're going to use wood and paper products." A Washington state climatologist and professor at the University of Washington, said otherwise wood would rot. "I'm not exactly sure where hog fuel (burning) fits in the ledger of carbon emissions," he said in an interview. But he admitted, "I'm not sure if (hog fuel burning) is the most efficient or most carbon-friendly use (of wood waste)."
The Bill's sponsors predict, but don't require that the bill will result in increasing employee benefits. If mills close, resulting in lost jobs, each company must pay back two years' worth of hog fuel exemptions. A Republican State Senator sponsored the bill because he has prided himself as a friend of the timber industry. In 2019, the state Joint Legislative Audit and Review Committee reviewed previous hog fuel tax breaks and estimated they saved companies a total of $5.6 million every two years.

Washington, Spokane and Olympia
Bill extending tax break to Washington business that use wood waste for energy awaits ...
The Spokesman-Review
At the time, the plant burned about 70 tons of wood waste per hour during full operation ... like fossil fuel, but it's still burning wood, right?
May 1, 2023.
Wood waste, called "hog fuel," is fed into a seven-story furnace at Avista's Kettle Falls Generating Station in 2010. At the time, the plant burned about 70 tons of wood waste per hour during full operation.
Excerpts edited by RAWSEP for brevity and clarity and relationship to Residents Against Wood Smoke Emission Particulates.
Lawmakers in Olympia have voted to reinstate tax breaks for Washington businesses that use or sell hog fuel, a mixture of wood waste that is burned to produce energy. The legislation passed last month with majority support across party lines and was delivered to Gov. Jay Inslee's desk where it has sat unsigned. The bill would continue for an additional 10 years, until June 2034, the current sales and use tax exemptions for businesses that buy hog fuel and burn it to produce electricity, steam, heat, or biofuel. If Inslee vetoes the bill, the current hog fuel tax break will expire in June 2024.
According to the state Department of Revenue, 12 energy and timber companies in the state received tax breaks in 2021 for their use of hog fuel. Avista Corp. saved the most that year with a $567,000 tax reduction. Other beneficiaries included wood giants Boise Cascade Wood Products, McKinley Paper and Weyerhaeuser. The hog fuel passed in the House 96-0 and in the Senate 37-12. An opponent of the bill thinks Washington Governor Inslee is likely to sign the bill. "If he vetoes it, I would not be shocked," Nguyen said. "But also I would bet that he doesn't do that. It's been going on, and it's not big enough where I think he'd be upset by it. But he could."

Canada

Canada, Alberta, Calgary

Weapons, stolen property recovered by Calgary police from encampment
CTV News Calgary
Some of the encampment police found were complex, with weather-proof shelters and wood-burning fireplaces. (Supplied).

Canada, British Columbia

B.C. policy stifled fire safety concerns to promote mass timber highrises, documents show
CBC
A column of flames bursts toward a wooden ceiling also covered in flames in a cinder. Flames fuelled by burning wood cribs ignite the timber ceiling ...

Canada, Canadian Medical Association Journal

RAWSEP View: Health impacts (of air pollution) extend beyond heart disease, with research showing that particulate air pollution is driving up rates of lung cancer, by awakening dormant mutations that trigger the growth of tumours.
Hourly air pollution exposure and the onset of symptomatic arrhythmia - CMAJ
CMAJ
Particulate matter (PM2.5 and PM10), ozone, nitrogen dioxide, sulfur dioxide and carbon monoxide. Geneva: World Health Organization; 2021. Google ...
Air pollution spikes linked to irregular heartbeats, study finds - The Guardian
The Guardian
Wood burning air pollution in UK has doubled in a decade ... Rise in UK wood-burners likely to be creating 'pollution hotspots' in affluent areas.
Air pollution spikes linked to irregular heartbeats, study finds
Spikes in air pollution increase the risk of cardiac arrhythmias, a large study has found. The research, based on nearly 200,000 hospital admissions in China, found a significant increase in risk of arrhythmias in the first few hours after an increase in air pollution levels. Heart arrhythmias can …

The Guardian - Hannah Devlin Science correspondent • 18h
Read more on theguardian.com
Air pollution spikes linked to irregular heartbeats, study finds
Study of 200,000 Chinese hospital admissions finds acute exposure to air pollution raises risk of heart arrhythmias.
Excerpts edited by RAWSEP for brevity and clarity and relationship to Residents Against Wood Smoke Emission Particulates.
May 1, 2023.
Spikes in air pollution increase the risk of cardiac arrhythmias, a large study has found.
Study 1)The research, based on nearly 200,000 hospital admissions in China. Heart arrhythmias can increase the risk of heart disease and sudden cardiac death. “Acute exposure to ambient air pollution was associated with increased risk of symptomatic arrhythmia. The risks occurred during the first several hours after exposure and could persist for 24 hours.”
Study 2)A study last year reported a link between fine particulate air pollution and cardiac arrhythmias in otherwise healthy teenagers. The study included 190,115 patients admitted to hospital in 322 Chinese cities. Patients suffer3ed from sudden onset arrythmia, including atrial fibrillation, atrial flutter, premature beats and supraventricular tachycardia.
Study 3)A previous study found that on high pollution days in England hundreds more people are rushed into hospital for emergency care after suffering cardiac arrests, strokes and asthma attacks. In 2020, the British Heart Foundation estimated more than 160,000 people could die in the coming decade from strokes and heart attacks linked to air pollution. Health impacts extend beyond heart disease, with research showing that particulate air pollution is driving up rates of lung cancer, by awakening dormant mutations that trigger the growth of tumours.
The findings were published in the Canadian Medical Association Journal.

Australia, Victoria, Shepparton

Private and planned burn-offs to increase as restrictions ease | Shepparton News
Shepparton News
Smoke from wood heaters will often settle in the local area, which Mr Heffernan said could often be misinterpreted as coming from planned burns.

New Zealand

New Zealand, Northland

Northland mum and three kids suffer burns as homestead razed by fire, sparking smoke ...
NZ Herald
... which was burning fiercely when the first firefighters arrived. ... way but it appeared the fire had started in the area of the wood burner.

New Zealand, Southland

Air quality monitoring season begins - Environment Southland - Voxy.co.nz
Voxy.co.nz
"Burning wet wood produces a large volume of smoke and does not produce anywhere near as much warmth as dry wood. Wood needs to have a moisture ...

Vietnam

Projects Open for Public Comment: 1 May, 2023 - Verra
Verra
Installation of high efficiency wood burning cookstoves in Vietnam – Project 2 – closes 24 May; HESHAN AWMS GHG Mitigation Project in GUANGDONG ...

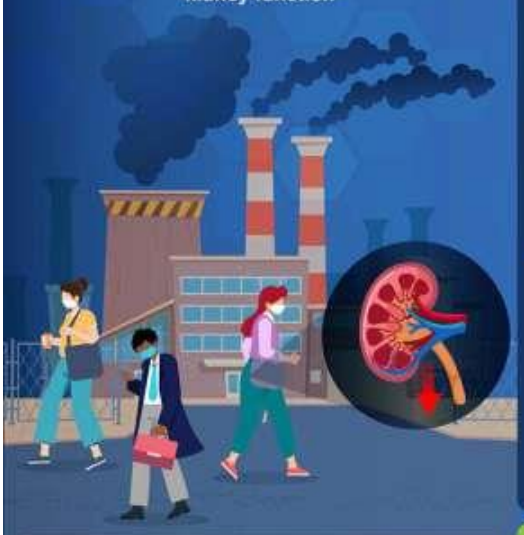
South Korea, Pusan National University

RAWSEP View: The study below provides scientific evidence that the public health benefits of stricter air pollution standards may alleviate the risk of Aculte Kidney Infection (AKI).The findings were made available in Environmental Health Perspectives.

Air pollution linked to acute kidney injury hospital admissions: study | Mirage News
Mirage News
Inhaling air pollutants, including gases like nitrogen dioxide (NO2), ozone (O3), and fine particulate matter (PM2.5) that remains suspended in ...
Study suggests that hospital admissions for acute kidney injury may be linked to air pollution.
by Pusan National University
Excerpts edited by RAWSEP for brevity and clarity and relationship to Residents Against Wood Smoke Emission Particulates.
Scientists find the link between exposure to air pollution and the risk of the first hospitalization for AKI, and this link persisted even at low concentrations of fair pollution. Acute kidney injury (AKI) is a clinical syndrome characterized by a decrease in kidney function. AKI is very common in the United States' Medicare population, particularly among hospital intensive care unit (ICU) admissions. AKI is associated with the incidence of end-stage renal disease, which increases the burden of long-term care, higher health-care costs, and increased mortality. Kidney diseases have been linked to air pollution exposure. Inhaling air pollutants, including fine particulate matter (PM2.5) that remains suspended in the air, can cause a decrease in kidney function, damaging the tissues and increasing the risk of AKI. Long-term exposure has been linked to DNA damage in renal tissue sepsis, which leads to AKI. Studies on the effects of air pollution on AKI are lacking. Pusan National University performed a population-based study to find out if increased air pollution exposure was responsible for the first hospital admissions of patients with AKI in the United States. "Our study investigated the association between air pollution and first hospital admission for AKI using a national retrospective cohort of more than 61 million Medicare beneficiaries. " The team analyzed data for over 61 million patients (aged >65 years) who lived in the continental United States from 2000 through 2016 and were enrolled to receive support from Medicare and confirmed that exposure to PM2.5, NO2, and O3 was associated with an increased risk of first hospital admission for AKI. This association existed even at annual exposures lower than the current National Ambient Air Quality Standard. Older adults (>75 years), White people, and those not eligible for Medicare, were more affected by air pollution. The most frequent first hospital admissions for AKI were recorded in the southeastern region, which had the highest levels of PM2.5.

Association Between Exposure to Air Pollution and First Hospital Admissions for Acute Kidney Injury

Recent studies suggest that exposure to air pollution may be associated with reduced kidney function



Does air pollution increase the risk of acute kidney injury (AKI)?

Nationwide population-based longitudinal cohort study (2000–2016)

61,300,754 beneficiaries enrolled in Medicare

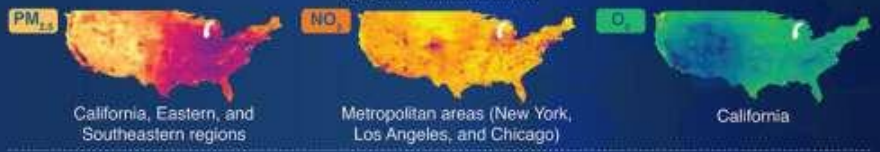
≥65 years of age

From continental United States

Exposure to:
- Fine particulate matter ($PM_{2.5}$)
- Nitrogen dioxide (NO_2)
- Ozone (O_3)

Increased risk for first AKI hospital admission

Highest concentrations



California, Eastern, and Southeastern regions

Metropolitan areas (New York, Los Angeles, and Chicago)

California

Most frequent admissions in the Eastern United States

Associations were better observed when lower than NAAQS criteria

NAAQS: National Ambient Air Quality Standards

The risk of first hospital admission for AKI, even at low levels of air pollution, suggests that public health policies and air pollution guidelines can alleviate health care expenditures and the disease burden associated with AKI

Air Pollution and Acute Kidney Injury in the U.S. Medicare Population: A Longitudinal Cohort Study
Lee *et al.* (2023) | *Environmental Health Perspectives* | DOI: 10.1289/EHP10729

Lab website:
https://www.ahanheelee.com/
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PUSAN NATIONAL UNIVERSITY