

Air pollution costs Utahns billions annually and shortens life expectancy by two years

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Air pollution has been a problem in Utah since before the territory was officially recognized as a state. The mountain valleys of this high elevation region are particularly vulnerable to the buildup of air pollution from vehicles, household heating and power production. Together with high per-capita energy use, this has resulted in periods of poor air quality. However, with so many types of pollution and regional conditions, determining the overall effects of air pollution on Utah's health and economy has been a major challenge. A new study from 23 Utah-based researchers, including five from the University of Utah, sought to do just that.

The study estimated that air [pollution](#) shortens the life of the average Utahn by around 2 years. And pollution costs Utah's economy around \$1.9 billion annually. But many state-level actions, such as increasing vehicle and building efficiency, could reduce air pollution by double-digit percentages while benefitting the economy, the researchers found.

The team used an approach called expert assessment, which combines all available research

and experience from published and unpublished scientific studies. Combining expertise from [public health](#), atmospheric science and economics, the researchers assessed what types of disease and [economic harm](#) could stem from Utah's air pollution. The study was published in the peer-reviewed journal *Atmosphere* in a [special issue on air quality in Utah](#).

They estimated that air pollution in Utah causes between 2,500 and 8,000 premature deaths each year, decreasing the median life expectancy of Utahns by 1.1 to 3.6 years. This loss of life expectancy is distributed across most of the population, they found, rather than only affecting "sensitive groups." For example, 75% of Utahns may lose 1 year of life or more because of air pollution and 23% may lose 5 years or more.

This substantial health burden is caused by many illnesses and conditions that most people might not associate with air pollution. For example, exposure to particulates and other pollutants increases occurrence of heart and lung diseases, including congestive heart failure, heart attack, pneumonia, COPD and asthma. These conditions account for 62% of the pollution impact on health, according to this study. The remaining 38% of health effects are associated with stroke, cancer, reproductive harm to mothers and children, mental illness, behavioral dysfunction, immune disease, autism and other conditions—all exacerbated by exposure to dirty air.

On the economic side, the researchers estimated that the direct and indirect costs of air pollution cost Utahns around \$1.9 billion dollars (in the range of \$0.75-3.3 billion) annually. This economic damage results from direct effects such as healthcare expenses, damage to crops and lost earning potential, in addition to indirect costs such as loss of tourism, decreased growth and regulatory burdens.

"It was a real eye-opener to see quantitative

estimates of how serious the health and economic costs of air pollution are for the people of Utah," said Isabella Errigo, lead author and a graduate student at Brigham Young University. "The consequences of dirty air can seem very abstract until you read the medical research connecting the quality of our environment to our personal health."

Even though the estimates of cost in this study are on the low end of national estimates, which range up to \$9 billion a year for Utah, they are still much higher than figures commonly discussed in the legislature. For example, approximately \$10 million was appropriated to clean Utah's air this year, representing only 0.1% to 0.5% of the costs of air pollution.

"Utahns understand that air pollution imposes large hidden costs on our communities which is why it's consistently ranked as a top concern," said Logan Mitchell, a research assistant professor at the U and a co-author of the study. "Thankfully, innovation has made [clean energy technologies](#) cost competitive on the market, without even considering those hidden costs. The coming energy transition will mean being good stewards of the environment will also protect our economy."

The mismatch between the size of the problem and the proposed solutions emphasizes one of the central findings from the study: cleaning the air could have immense health and economic benefits for Utah. The authors combined their estimates of cost with the air pollution goals from the recent [Utah Roadmap](#) to Clean Air, produced by the U's Kem C. Gardner Policy Institute. If Utah achieves the roadmap's pollution reduction targets, they estimate, Utah could save \$500 million per year by 2030 and \$1.1 billion per year by 2050.

"The payoff of reducing pollution would be huge in economic terms and the benefits would be incalculable in terms of human life and health," said senior author Ben Abbott, an assistant professor at BYU. "It's a question of choice. Are we going to settle for incremental progress in air quality or take advantage of this immense opportunity to improve the health of our communities and remove this enormous drag on our economy?"

"When I read these results, my thoughts immediately turn to my friends and family who live in Utah," said co-author Rebecca Frei, a graduate student at the University of Alberta. "My grandmother goes walking and my niece plays on the playground every day. Changing some simple things about how we operate means added years of life. To me, that's a no-brainer. This isn't about pushing an agenda, this is about assessing the evidence and acting out of love for our families and community."

The researchers ranked more than 30 recommendations of how to best reduce the amount of air pollution in Utah. At the top of the list: increase efficiency of vehicles and buildings, invest in awareness, remove subsidies for nonrenewable energy, require payment for pollution and expand alternative transportation. They estimated that each of these interventions could result in double-digit decreases in [air pollution](#). The researchers suggested that changes at the state level and community level as the most effective and tractable.

The researchers cautioned that no single change would achieve the desired improvement in air quality alone. "We need long-term implementation of proven pollution control measures," Errigo said. "It's going to take commitment from multiple groups at city to state levels to clean up our air and prepare for future growth."

The findings of this study are directly in line with the recommendations of the Utah Road Map to Clean Air and add quantitative estimates of the health and economic costs. The researchers hope that these estimates provide additional context for state legislators and concerned citizens who want to enact positive change.

"In our efforts to clear the air there are no perfect answers, but there are practical solutions," said Thom Carter, Executive Director of the Utah Clean Air Partnership (UCAIR) and co-author on the study. "When looking at how poor air quality impacts our region, it is important to know that we are making progress and that each person, family, organization, and community can find ways to reduce emissions and improve our quality of life."

More information: Isabella M. Errigo et al, Human Health and Economic Costs of Air Pollution in Utah: An Expert Assessment, *Atmosphere* (2020). [DOI: 10.3390/atmos11111238](#)

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