My name is Greg Pratt. I worked 32 years at the Minnesota Pollution Control Agency, and since 2000 I have been a faculty member in Environmental Health in the School of Public Health at the University of Minnesota. Thank you for the opportunity to speak here today.

My work concerns air pollution: the sources, the amounts and chemical composition of emissions, the dispersion in the atmosphere and resulting concentrations, and people's exposure with resulting adverse health effects.

Globally, some 2.4 billion people are exposed to dangerous levels of indoor and outdoor air pollution resulting in 7 million premature deaths. In the United States an estimated 102,000 premature deaths result from air pollution. The Minnesota Department of Health found that 1,588 premature deaths were caused by airborne particles in 2015. They further estimated that a 10% decrease in air particles would have prevented 185 of those deaths. They did not include other air pollutants in their estimates. Deaths are an extreme example. Other health impacts are far more common.

Mobile sources (cars, buses, trucks) emit pollutants near where people live and breathe and account for the majority of exposure to air pollution with resulting adverse health effects. These burdens are not borne uniformly across the population. Freeways and major roadways are disproportionately located in in areas with lower land values and thus tend to have a greater impact on people at the lower end of the socio-economic spectrum.

My first graphic shows clearly one health outcome and its relationship to traffic and other demographic features. The second graphic shows cancer risk by source category and various demographic metrics. Clearly, those at the upper end of the socio-economic scale have lower risks.

The last graphic illustrates that air pollution affects more than the respiratory system. Gases and small particles can enter the bloodstream and affect multiple organ systems. Recent studies have shown that small particles can also directly affect the brain via the olfactory system, an outcome that has been linked to dementia.

In conclusion, transportation sources, particularly internal combustion engines, create health risks that have significant impacts on individuals and society. I believe measures to address air pollution from transportation would greatly benefit our state and our nation.

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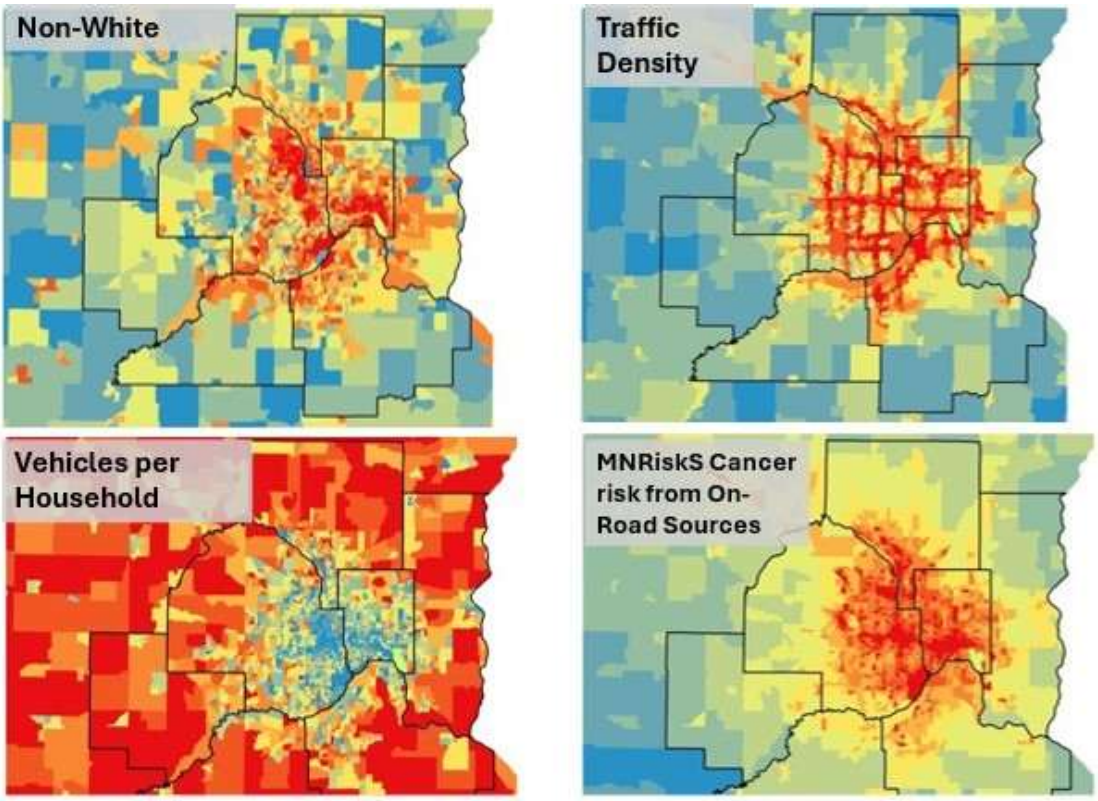
Figure 1.



Traffic-related air pollution risks are higher at residences of non -drivers, and primarily caused by drivers who have lower risk at their residences

Figure 2.

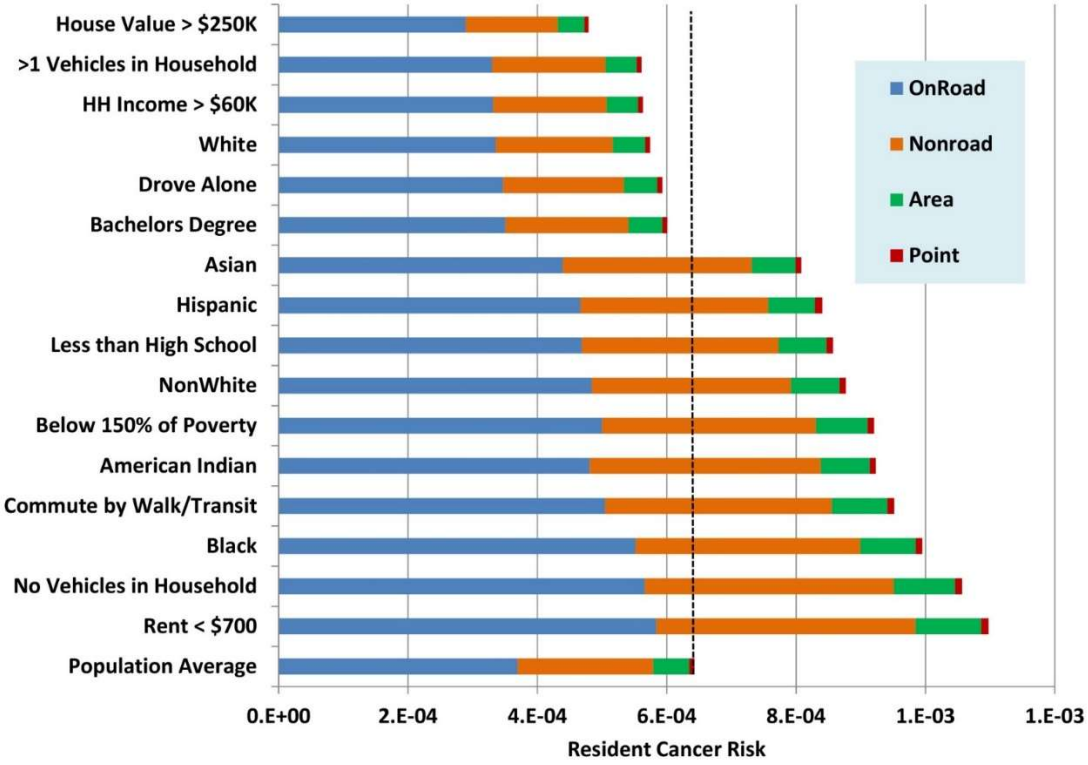
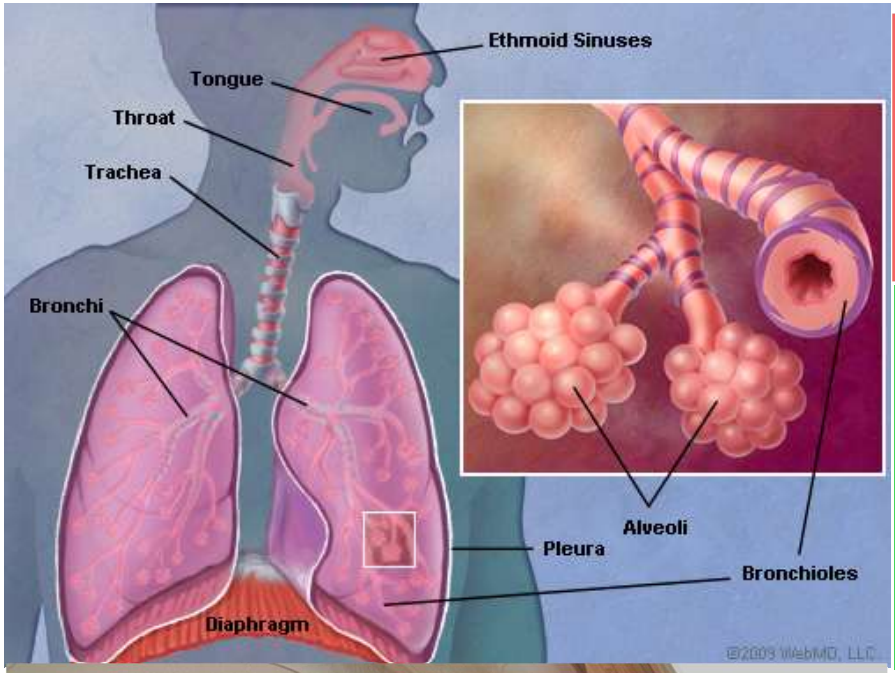


Figure 3.

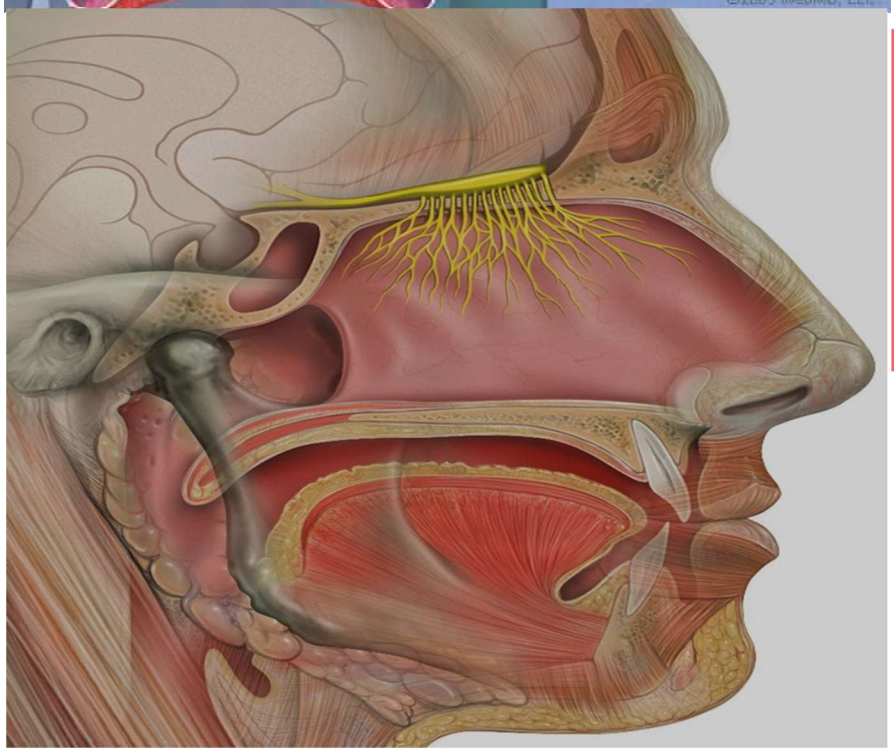


Classic exposure route through lungs—we now know there are systemic effects

Nanoparticle Mass Transfer From Lung Airways to Systemic Regions—Part I: Whole-Lung Aerosol Dynamics

Arun V. Kolanjiyil and Clement KleinstreuerJ Biomech Eng 135(12), 2013

Respirable cutpoint generally ~1,000 nm



Recent studies show transfer of nanoparticles via the olfactory bulb with subsequent brain inflammation

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Traffic-Related Air Pollution and Dementia Incidence in Northern Sweden: A Longitudinal Study

https://ehp.niehs.nih.gov/doi/10.1289/ehp.1408322