June 21, 2021

Dear Westport Representative Town Meeting,

I am an Associate Professor at Yale School of Medicine, trained in internal medicine and emergency medicine, and currently work in the emergency department at Yale-New Haven Hospital. I have provided information about the dangers of gasoline-powered leaf blowers (GLBs) to communities around the country, many of which have decided on partial or full bans, based on the risk/benefit ratios showing multiple health and environmental hazards. Growing dependence on GLBs for cleanup and routine landscape maintenance in Connecticut is contributing to a public health emergency. The main argument of the landscaping industry is that they need these powerful, polluting, noisy machines to do their job. The truth is that, in Spring and Summer, there are few leaves to be blown. Grass clippings are actually good for the grass, and those that fall on patios and sidewalks can be taken care of with brooms, rakes, or left as is. Cities and towns in NY, NJ, CA and most recently, Washington DC and Burlington, Vermont have restricted or banned GLBs without any cost increases to homeowners. Much of California has had GLB bans going back as far as the 1970's, when GLBs became popular. Some state medical societies, including New York and Massachusetts, have submitted position statements against GLBs, due to their multiple harmful health effects, and are lobbying to engage the American Medical Association (AMA) at the national level as well.

The major health and environmental hazards of gas leaf blowers are: 1) Noise pollution, 2) Exhaust pollution (out the back end), 3) Fine particulate pollution (out of the front end), 4) Environmental degradation, including water pollution and animal habitat destruction. Social justice concerns, in terms of protecting low-paid workers from noise and air pollution, must also be important considerations in the equation.

Noise from gas-powered leaf blowers can range from 95–115 decibels at the ear of the operator. Anything over 85 decibels can permanently injure a person's hearing in as little as 2 hours. Even at 50 feet, GLB noise is typically rated at 65-75 decibels. These levels are orders of magnitude – because decibels are on a logarithmic scale. An increase in decibels is perceived by humans as twice as loud, so that the difference between 50 and 60 decibels is that we hear the noise as twice as loud. The noise from GLB is beyond that deemed safe by WHO, CDC, OSHA and NIOSH for workers and the public[i]. In many neighborhoods, even the quietest GLB will affect 23 homes at greater than 55 decibels, whereas many louder GLB will impact as many as 91 homes with a noise that can be heard at greater than 55 decibels. The common practice of using multiple GPLBs at the same time is particularly toxic.

The EPA recommends that sound levels be kept to less than 45 decibels indoors and less than 55 decibels outdoors in order to prevent interference with normal speech and relaxation. The definition of noise is "unwanted or disturbing sound" that interferes with normal activities such as sleeping, conversation, or disrupts or diminishes one's quality of life.

Noise is more than just an annoyance; exposure to high levels of noise can cause countless adverse health effects. These include stress-related illnesses including impaired immune systems, high blood pressure, learning and communication disabilities, speech interference, tinnitus (ringing in the ears), hearing loss, sleep disruption, impaired child development as well as lost productivity. There is even evidence that excess noise in the environment above 60 decibels can contribute to coronary artery disease, which leads to heart attacks. The EPA states that "noise degrades quality of life by impairing communication and social interaction; reducing the accuracy of work, particularly complex tasks; and creating stressful levels of frustration and aggravation that last even when the noise has ceased." [ii,iii] Even moderate noise levels can increase anxiety, decrease the incidence of helping behavior, and increase the rise of hostile behavior in experimental subjects. GLB noise is particularly toxic, as its low frequency component travels through walls and windows and can travel long distances. The effects of noise particularly impact children, seniors and those with neurological conditions, including autism and veterans and others with Post-traumatic Stress Disorder (PTSD).

During the pandemic, many more people have been affected by the noise from GLB than ever before. People are working from home, teaching from home and learning from home. As a front-line worker, I know that front-line workers do not want kudos from the public – they want to rest between shifts. If the community expects nurses, doctors, paramedics, fire, police, and all of the other front-line workers to be awake and ready to take care of people no matter what time they have an emergency, that can only happen if these essential workers can sleep during the day. GLB anywhere in a neighborhood emit a grating, low frequency sound that makes sleep impossible. There is no question that the high levels of noise disturb most household pets as well.

Exhaust pollutants ("Back-end pollutants") released by GLBs include volatile organic compounds (VOCs). These are HAPS: Hazardous Air Pollutants (defined by the US EPA as pollutants that cause or may cause cancer) Gas leaf blowers are primarily 2-stroke engines which have no emissions controls, are inefficient at burning fuel, and are highly polluting. In one hour, they create the same amount of hydrocarbon pollution as driving a F-150 pickup from Connecticut to Texas[iv]. They have an air jet velocity of 150–280 mph, much higher than hurricane strength winds. Growing evidence implicates the 2-stroke engine in particular in increased risks of early death, heart attack, stroke, congestive heart failure, asthma, chronic obstructive pulmonary disease, cancer[v,vi,vii,viii,ix], and other serious health conditions.

Workers, children, seniors, and people with chronic illness are at greatest risk. Gasoline lawn and garden equipment accounts for 5%–10% of total US emissions of carbon monoxide, carbon dioxide, nitrogen oxides, hydrocarbons and small particulate matter[x]. These are considered "Criteria Pollutants" (harmful to public health and the environment)[xi,xii] Even low-level exposures have been associated with respiratory and central nervous system effects. GLB pollutants such as hydrocarbon vapors, nitrogen oxides, and carbon monoxide react in the presence of heat and sunlight to form ground-level ozone, the major component of smog, and a known respiratory irritant and risk factor for cardiovascular disease.[xiii] A recent report predicts that in a few years, if not already, the worst single ozone polluter in California will be gas garden equipment.[xiv]

Fine particulate matter $PM_{2.5}$ are under 2.5 microns, easily assimilated in the lungs (front-end pollutants), have been linked to all-cause premature death, myocardial infarctions, anxiety, strokes, CHF, and respiratory disease – including asthma attacks - and can increase the severity of chronic lung disease in the elderly. A recent study implicates particulates and exhaust pollutants of the type released by GLBs in an increased risk of dementia.[xv] Two-stroke engines account for the vast majority of $PM_{2.5}$ in landscape maintenance.[xvi,xvii,xviii,xix] $PM_{2.5}$ may contain animal fecal matter, fertilizers, pesticides, herbicides, allergens (fungal spores, pollen), diesel soot, brake dust, rubber tire particles, and/or heavy metals or other toxins (e.g. arsenic, chromium, lead, mercury). One hour of GLB use can blow up to 5 pounds of particulate matter into the air, and this particulate matter can be suspended up to 5-7 days. A recent Harvard study published in *Science* found that communities with high air pollution levels from $PM_{2.5}$ experienced significantly higher rates of covid death, even after controlling for other variables[xx].

Environmental degradation is another way that GLB impact a community. The high velocity air jets of leaf blowers – 150-280 mph – can destroy nests and small animal habitats; desiccate pollen, sap, and other natural plant substances; and injure or destroy birds, small mammals, and beneficial insects. High chronic noise levels decrease biodiversity in affected areas. [xxi,xxii] GLB damage plants, remove beneficial topsoil and mulch, desiccate and compact soil, diminish plant health and contribute to the spread of invasives. This increases dependence on use of fertilizers, herbicides and pesticides, all of which can be blown into storm drains and pollute water supplies.

A final word concerns social justice issues. Many of the landscapers who do the actual work are low-paid hourly workers, without adequate health insurance or a say in their working conditions. They are exposed to extremely high levels of noise and air pollution, including carcinogens, increasing their risk of losing their hearing, developing pulmonary diseases, or cancers. More than 200 cities and towns across the United States have enacted legislation to restrict or eliminate GPLB. Westport should be next.

Sincerely,

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[i] Fink D. 2017. What Is a Safe Noise Level for the Public? AmJPH January 2017: Vol. 107, No. 1, pp. 44-45. http://ajph.aphapublications.org/doi/abs/10.2105/AJPH.2016.303527

[ii] http://www.epa.gov/clean-air-act-overview/title-iv-noise-pollution

[iii] American Public Health Association; Noise Pollution Policy Statement http://www.apha.org/policies-and-advocacy/public-health-policy-statements/policy-database/2014/07/16/12/50/environmental-noise-pollution-control

[iv] https://www.edmunds.com/about/press/leaf-blowers-emissions-dirtier-than-high-performance-pick-up-trucks-says-edmunds-insidelinecom.html

[v] Brook R.D., et al.; Expert Panel on Population and Prevention Science of the American Heart Association. Air pollution and cardiovascular disease: a statement for healthcare professionals from the Expert Panel on Population and Prevention Science of the American Heart Association. Circulation. 2004;109:2655–2671.

[vi] Li S, Williams G, Jalaludin B, et al. Panel studies of air pollution on children's lung function and respiratory symptoms: a literature review. J Asthma. 2012 Nov;49(9):895-910.