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ARTICLE COMMENTARY

"Mama, I can't breathe." Louisville's dirty air has steep medical and economic costs

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ABSTRACT

The calls for greater racial equity also means cleaning up the air, water, and soil. Poor people needlessly suffer more in Louisville than the same low-income people in West Coast cites. If we adopted the same tough, environmental regulations as our West Coast Counterparts West Louisville would surely bloom instead of slowly die. The unfairness between black and white neighbourhoods is stark and vivid. As the great urbanist, Jane Jacobs, once said: "everyone hungers for a first class neighbourhood for both pride and dignity … nobody wants a second class neighborhood." First class neighbourhoods are safe, healthy, sustainable, and prosperous. It is a human right; a Worldwide right.

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"Mama, I can't breathe." were the last words of George Floyd. Yet 60,120 West Louisville residents who live, work and worship here have trouble breathing. And like George Floyd, their lives are cut short, by an average of ten years. The evening of May 28, seven people were shot and tear gas was used to disperse the crowd, in protest over the shooting death of Breonna Taylor, an EMT worker killed on March 13 by police in a botched drug raid. A few days later, David McAtee, the owner of a barbecue restaurant in Louisville, Kentucky was killed by Kentucky National Guard (June 1, 2020). In Louisville, they march chanting "whose streets, our streets." (Gilderbloom et al., 2020b).

Thousands of Black and White protestors got a taste in June of what it is like to feel the agony of being gassed by the police. It was painful, sickening and scary. However, citizens in West Louisville are regularly "gassed" causing long-term health problems. In other words, a disproportionate share of the community's folks living in West Louisville are gassed regularly and dying prematurely and most of them are African Americans. As you address "systemic racism" in Louisville look at pollution in black neighbourhoods and the institutions that profit from it. West Louisville's air, water and soil are so toxic and rank among the worst of American cities. In the words of Robert Bullard the founder of the environmental justice movement stated:

> The communities where police are shooting Blacks are the same communities with high asthma rates, greater incidences of diabetes, stroke, and more poverty, and deaths from COVID-19. Forty years ago, people saying "we can't breathe,", we are choking, you are killing us. We are seeing across the board, people are talking about dismantling this violent system of racism not just when a police officer kneels and chokes a person to death. Its violence when you have all this pollution pumped into a neighborhood and people are choking. (Bruggers 2020)

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West Louisville is unlivable. No wonder Louisville now has over 5,000 abandoned housing units most of them located in West Louisville – more than any other mid-size city in the U.S. In a new forthcoming article in Journal of Urban Affairs Gilderebloom and Meares (2021) found that cities with high levels of pollution have lower rents. And in Louisville the average price of a home is $37,500 for your typical bungalow in West Louisville. Block after block it looks like a war zone of bombed out buildings and empty lots where houses once stood in Muhamad Ali's neighbourhood.

The warnings had been stated; it is not if the next pandemic will come but rather when. Public health officials have been warning us about the next big health crisis for years (Luthra 2020). Then it came. Covid-19 has been a global pandemic the likes of which we have not seen in almost a century. However, some areas have been hit harder than others have. Minority and low-income neighbourhoods, such as the neighbourhoods in West Louisville, have been hit harder (Brooks 2020; Hauck et al. 2020).

The damage of unregulated pollution has been great; worldwide according to Lancet 9 million people mostly of colour die each year (Landrigan et al. 2018). In the United States, death by pollution occurs primarily in poor minority neighbourhoods. Louisville might be the most deadly city in the United States.

However, what if this is not the only health crisis facing West Louisville? Another large public health crisis has been brewing in the background for years. We have heard about it, we have even read about it, but the explanations for the crisis have focused almost exclusively on the choices of individuals (e.g. smoking, diet, exercise or lack thereof) rather than the primary direct contributing factors (Ungar 2014). We are of course talking about health disparities attributable to environmental degradation among neighbourhoods in cities. In Louisville there is significant disparity in life expectancy, where residents of West Louisville have a life expectancy roughly 10 years shorter than residents in other areas of the city (Gilderbloom, Meares, and Squires 2020a; Louisville Metro Department of Public Health and Wellness 2014). The differences can be as high as 13 years. One City of Louisville sponsored study found that the life expectancy in two West Louisville neighbourhoods was lower than war-torn Iraq (Greater Louisville Project 2013; Smith et al. 2011).

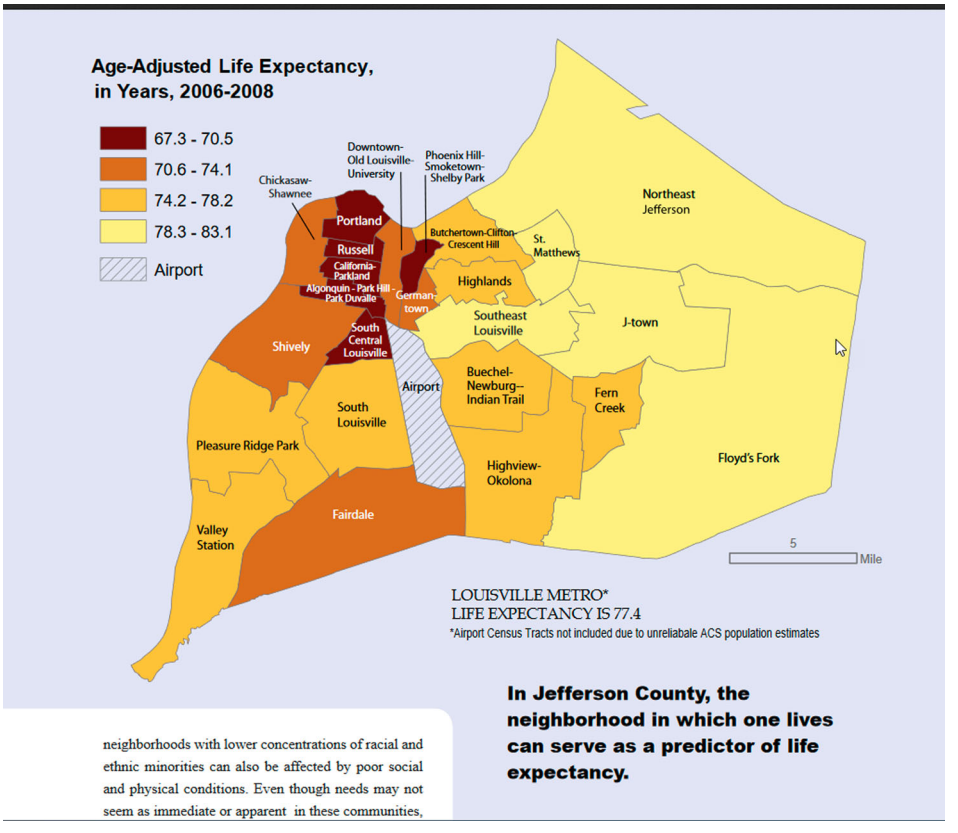
The impact of pollution is colourblind in West Louisville. While it is true that majority of people who die prematurely are Black in West Louisville, one nearly all White neighbourhood near the pollution plants have comparable reduced lifespan. In fact, the mostly all White neighbourhood in Portland is tied with the all Black California neighbourhood: 13 years reduction in lifespan. (Map 1)

While we do not argue against the importance of genetics and personal choices in terms of the life expectancy gap, we have found that the environment,(the soil, water and air), has a significant impact on health inequality, a fact denied by local leaders. Whether or not there is a political will to admit that proximity to pollutants impacts our health and life outcomes, the environment in which we live matters.

How do we know that Louisville has the worst air quality of any mid-size city? The EPA provides the most valid and reliable measures of poor air quality. We found that Louisville ranks number one when you average out the four EPA measures of pollution as we did in our analysis of air quality in 146 similar size cities.

A major reason for having the worst air pollution is the inordinate amount of toxic air coming out of West Louisville industries, particularly the chemical plants in an East Side neighbourhood known as Rubbertown. For example, the Center for Disease Control found that residents in neighbourhoods near the chemical industries compared to those on the East side clean air neighbourhoods 17 miles away are twice as likely to have asthma and high blood pressure, four times more likely to have COPD, seven times more likely to have heart disease, and four times more likely to have poor physical health.

Another stark measure is the comparison between West Louisville neighbourhoods near Rubbertown with United States averages and the five cities with the cleanest air in the United States. Similar to Table 1, it appears that those who live nearest chemical plants have the worst medical problems



Map 1. Life expectancies in Louisville based on where you live.

compared to U.S. national averages or America's cleanest cities like Santa Barbara, Evansville, IN or Columbus, GA. These differences are stark and vivid.

Scientists widely agree that pollution is a source for causing harm to the heart, lungs, and brains and a major pre-existing condition for contacting COVID-19. Maybe, "staying in place" is not such a

Table 1. Health outcomes: USA vs. west Louisville vs. clean air cities.

Health Outcomes	US	West Louisville	Clean cities average	Columbus GA	Evansville IN	Greenville NC	Lincoln NE	Santa Barbara, CA
Asthma	9	14.94	9.8	10	10.8	10.6	8.8	8.8
HBP	32.4	57.16	29.98	36	36.8	27.3	24.3	25.5
COPD	6.6	16.84	6.66	7.6	10.1	5.9	4.9	4.8
Heart Disease	6.4	12.76	5.64	6.3	7.8	4.4	4.9	4.8
Diabetes	10.8	23.18	9.76	12.6	12.1	8	7.8	8.3
Poor Mental Health	12.4	24.4	14.1	14.5	17.6	15.6	11.3	11.5
Poor Physical Health	12.3	26	12.24	13.2	16.2	11.7	9.6	10.5
Tooth Loss	14.5	46	15.86	19.6	21	18.9	10.4	9.4
Smoking	16.4	38.96	18.58	21.6	26	18.1	15.3	11.9
No Physical Activity	26.6	50.72	27.24	34.9	34.6	26.6	21.9	18.2
Obesity	30.1	52.2	32.24	37.7	35.7	32	30.1	25.7

*All data was compiled by Jeremy Chesler using information from https://www.cdc.gov/500cities/index.htm. They were constructed by Sait Sarr Ph.D. Student University of Louisville, Center for Sustainable Urban Neighborhoods.

Note: We selected all neighbourhoods that were adjacent to the chemical factories known as Rubbertown neighbourhoods in far west Louisville; 18 miles away is east side of Louisville's city limits which has the cleanest air.

good idea if you live in West Louisville especially when doctors are now telling patients to get out of West Louisville if they live, go to school, or work there. (Kim et al, 2015, Yang et al., 2020)

However, the problems were not just chemical plants spewing out toxic emissions. We also found Brown Fields wherever they are located are also a danger to the health of residents (Gilderbloom, Meares, and Squires 2020a). We found that one of the major causes of premature deaths was proximity to Rubbertown's toxic contaminants, an effect that ranked fourth after the risk factors of race, income, and crime. Brownfields also had an effect on neighbourhood life expectancy, although ranking below proximity to Rubbertown. Finally, we also found that when taken together, living near Rubbertown and near Brownfield sites, had an even bigger effect on life expectancy, explaining as much as 75 percent of the 10–13 year variance among Louisville neighbourhoods (Gilderbloom, Meares, and Squires 2020a). Put another way, the odds that Rubbertown is not a contributing factor to premature neighbourhood death rates are less than one out of a thousand, with brownfields one out of one hundred.

Why does poor air quality affect Louisville's residents? When Mayor Fischer convened an elite task force to study disparities in life expectancy, they blamed it on the lifestyle of the poor: again smoking, drinking, diet, obesity, and education, Environmental degradation was not listed as a cause for reduced life expectancy – industrial polluters were likely pleased to get a "pass" on pollution.

Scientists around the world have debunked this "blame the victim" explanation. Its pollution stupid. This is evident in comparing cities with different levels of pollution. Examining the bottom income quartile of Louisville citizens at the age at which they passed compared with similar residents of the five cleanest cities that heavily regulated air pollution poor men in Louisville died five years earlier and poor women died four years earlier than their counterparts in the cleaner cities did. More interesting is that if you look at the top income quartile of the rich in dirty cities, they live the same number of years as their counterparts in clean cities. Why? Because the rich move far away from these poisonous polluters. Poor air quality is not an issue for the rich and powerful to fight – they live, work and go to school many miles away from these polluters (Greater Louisville Project 2013; Smith et al. 2011)

Pollution does not only result in significantly lower life expectancy, but also results in other challenges found in dozens of scientific journal article including (Gilderbloom, Meares, and Squires 2020a; Yue et al. 2019):

Higher risks of: fetal damage; vascularisation of the placenta; miscarriages; dementia; cancer; asthma; lower birth rate; depression;

And a host of community ills such as; Lower school achievement scores; Reduced chances of college admission; Higher chances of home foreclosure; Higher crime rates; Greater greenhouse gasses/climate change; Significant reduction in homeowner's equity and appreciation; Reduced taxes to support essential neighbourhood services; Unwalkable neighbourhoods.

Add to this list: COVID-19. Scientists tell us that neighbourhoods with high pollution levels will cause more illness and death from this pandemic

Louisville is considered to have one of the worst cases of polluted air in America's hundreds of midsized cities, but all who live there do not share the burden equally. This takes on increasing significance in light of the current pandemic. We found that Rubbertown and the surrounding neighbourhoods of West Louisville are uniquely vulnerable to Covid-19, which hits those with certain preexisting conditions hardest (Chow et al. 2020). A CDC study found that about 75% of victims who needed hospitalisation had at least one such condition and their outcomes tend to be worse (Chow et al. 2020; Wu et al. 2020). West Louisville's high rates of respiratory diseases (such as asthma and chronic obstructive pulmonary disease (COPD)) are particularly worrisome, since Covid-19 can cause serious damage to the lungs (Chow et al. 2020). What's more, scientists believe exposure to air pollution is itself a risk factor for Covid-19: In a recent study of 3,080 U.S. counties, Harvard University researchers found that those with dirtier air had higher death rates from the disease (Wu et al. 2020).

In the aftermath when we are finally through this pandemic and a review on those who survived and who died because of Covid-19, the results will show that the adverse consequences will not have been equally distributed among races and places. Polluting industries are more likely to be sited in minority and low-income communities, just as Bullard (1990) found in his classic book "Dumping in Dixie" and several subsequent publications. Deaths have already been higher in poor neighbourhoods in cities like the Bronx, New Orleans, Washington D.C., Memphis and Detroit (Brooks 2020).

Of course, air pollution is a problem in virtually all cities. President Trump's administration has struck down 95 environmental regulations since taking office, making air, water and soil across the U.S. more vulnerable to pollution. In the wake of Covid-19, he has exempted industries from even a modicum of environmental oversight.

Locally, the fight to do environmental justice work has met with unprecedented attacks on scientists including, threats of violence, defunding of Centers, blocking email access of scientists, removal of websites from University of Louisville that contained $3.5 million dollars' worth of federally funded research reports, and refusing grants to continue this avenue of research.

Instead, UofL created a new centre that excluded scientists doing pollution research and pivoted to blaming lack of trees as the cause for reduced lifespan. Millions of dollars flowed in from donors connected to the polluting industries (Coffman 2019). Similarly, President Trump has also endorsed a trillion trees as the best way to combat pollution. (Irfan, 2020) The lack of trees in neighbourhoods is blamed for high pollution levels. As a USA. Today (2020) editorial declared, "tree planting to mop up, carbon pollution is important. But more important is cutting emissions, and this White House has a shady environmental record."

Trees do provide positive benefits such as shade that reduces energy costs of homes and makes walking more pleasant; reducing the threat of flooding, ponding, and sewage overflow by soaking up rainwater. Trees on properties also provide an economic benefit by increasing the value of homes and the neighbourhoods according to traditional economists who run hedonic housing equations (Gilderbloom and Appelbaum 1988). Trees help some but they are hardly the answer. Instead of spending much needed money on proven methods of reducing pollution these funds are being diverted to an ill-advised campaign to plant 8,000 trees hoping trees alone will fix the problem. However, this silver bullet is actually a blank because it ignores the real reason for dirty and dangerous air.

Unfortunately, a majority of these trees planting efforts is going into middle class neighbourhoods because they require neighbourhood participation and homeowners must pay a fee for each tree planted. Moreover, according to Russ Barnett who in the past headed up Kentucky's Department of Natural Resources and was the former Director of the University of Louisville Kentucky Environment and Sustainable Development you would need a full grown forest which would take 100 years to grow. However, even a full forest taking over the street and yards would only have a small impact on cleaning up life threatening pollution. These initiatives still do not address dangerous carbon released in the air by industries which is the biggest threat to neighbourhoods, the city, and to our small planet. Gilderbloom and Dwenger (2019) found no solid correlation between tree cover and lifespan in a regression equation and this is illustrated in the attached map. Gilderbloom, Meares, and Squires (2020a) found some of the cleanest air in the nation is in places like Yuma, Arizona, which has the lowest level of tree canopy of any city in their study. A tree on every lawn is not going to reduce rates of cancer, asthma or Covid-19. However, reducing pollution and implementing policy to create cleaner air will.

While the Louisville powerbrokers were trying to stop research on how pollution destroys lives and communities, covering up these truths in the process, most universities think such research is normal and welcomed around the world. The World Health Organization says pollution is the second leading cause of noncommunicable diseases. Sadly, we will see even more deaths caused by the toxic mixture of pollution and Covid-19. However, with many leaders at all levels focusing on public health this could be the opportunity to gain the political traction to address this health inequality and promote environmental justice.

Table 2. Health outcomes: west Louisville vs. east Louisville

	WEST	EAST
Health Outcomes		
Asthma	16.2	8.6
HBP	58.2	27.5
Kidney	6.8	2.1
COPD	17.2	4.2
Coronary Heart Disease	15.4	2.6
Diabetes	23.7	5.1
Mental Health	27.4	8.6
Physical Health	28.2	7.9
Tooth Loss	55.1	6.1
Stroke	8.9	1.7
Unhealthy Behaviours		
Smoking	42.2	10.5
Physical Inactivity	55.9	20.9
Obesity	55.5	22
Sleep <7 h	52.5	28.2

*All data was compiled by Jeremy Chesler using information from https://www.cdc.gov/500cities/index.htm. They were constructed by Sait Sarr Ph.D. Student University of Louisville, Center for Sustainable Urban Neighborhoods.

Note: We selected all neighbourhoods that were adjacent to the chemical factories known as Rubbertown neighbourhoods in far west Louisville; 18 miles away is east side of Louisville's city limits which has the cleanest air.

Back in Louisville, with the rise of Covid-19, the time has come for the city to look for real solutions for the public health crises. West Louisville industries get a political pardon because they produce jobs with middle class incomes, even though they pose significant and deadly health risks. Gone should be the days of bad science such as the fraudulent smoking studies of the 1960s (see Brenner (2004) and the 1999 film "The Insider") and lobbyist controlled policy. Science and public health officials should be setting the course for public health policy. Without science, data, and facts the poor are truly powerless to fight back. They have no valid and reliable information to fight for environmental justice.

Science and public health officials can show Louisville how to solve some of its most pressing problems – problems that are even more pressing due to Covid-19 – and other cities can learn from its example. If Louisville would find the will to address the pollution of West Louisville, it could prove to be a case study in best practices on how cities can confront environmental and health injustice.

The calls for greater racial equity also means cleaning up the air, water, and soil. Poor people needlessly suffer more in Louisville than the same low-income people in West Coast cites. If we adopted the same tough, environmental regulations as our West Coast Counterparts West Louisville would surely bloom instead of slowly die. The unfairness between black and white neighbourhoods is stark and vivid. As the great urbanist, Jane Jacobs, once said: "everyone hungers for a first class neighborhood for both pride and dignity … nobody wants a second class neighborhood." First class neighbourhoods are safe, healthy, sustainable, and prosperous. It is a human right; a Worldwide right.

Videos and documentaries that are based on this research can be found on:

(1) John Gilderbloom "Pollution in Louisville, Kentucky": https://www.youtube.com/watch?v=vvacxkfyNSQ
(2) "Rubbertown" which is currently on Amazon and one of the authors (Gilderbloom) is featured
(3) Julian Agyeman Editor of Local Environment gave a wonderful speech on Sustainability but things got a little wild between a panel of local government speakers and John Hans Gilderbloom at 1 h and 32 min mark when I told them pollution in Louisville's Rubbertown was a major issue. https://www.youtube.com/watch?v=467DocgXrJw
(4) "Dark Waters" which is available on Amazon is an excellent film of a negligent chemical company polluting a small West Virginia town near the Ohio River. It is a true story that is written by the lawyer who defended and won a major lawsuit. The residents were given $70 million settlement

from the chemical company on the manufacturing on Teflon that caused enormous negative health impacts (death, body disfiguration, heart and lung problems) on the citizens of a West Virginia town. This same company operates in Rubbertown.

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