

Environmental Racism in the Heartland

Fighting for Equity and Health in Kansas City

HIGHLIGHTS

As a result of a legacy of systemic racism, communities of color and low-income communities in Kansas City face a greater risk of exposure to environmental hazards. These hazards are associated with myriad negative health outcomes including cancer, respiratory illness, and shorter life expectancy.

The Kansas City community is experiencing cumulative exposures to hazardous pollutants from heavy freight and diesel-powered transportation and industrial emissions, and current policies are failing to keep people safe from harm. The local environmental justice movement, however, has been working to address these inequities through the establishment of an air monitoring network that provides real-time, local data that people can use to advocate for science-based protections. Local, state, and federal decisionmakers must take note of industry's environmental impacts throughout the city, engage the community in decision-making, and address systemic environmental justice concerns in Kansas City and across the country.

Introduction

Kansas City—which straddles Kansas and Missouri—faces multiple environmental health and safety threats from nearby polluters that together constitute dangerous “cumulative impacts” on the community’s health (Sheats 2017). Industrial facilities are contaminating the land, water, and air; diesel exhaust from truck traffic is raising harmful pollution levels; toxic emissions from one of the nation’s most important rail hubs continue to affect nearby neighborhoods—all in addition to extreme temperatures and flooding due to climate change.

The US Environmental Protection Agency (EPA) defines environmental justice as “the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies” (EPA 2020c). Fair treatment means that no group of people should bear a disproportionate share of the negative environmental consequences of industrial, governmental, and commercial operations or policies. Yet many communities of color and Indigenous, immigrant, and low-income communities across the country do bear disproportionate exposure to multiple stressors at once,



Residents of Kansas City, especially communities of color and immigrant communities, are facing the cumulative impacts of many sources of pollution, often sited in these areas as a result of structural racism. Policymakers and industry should work hand-in-hand with the residents to reduce pollution and address this legacy of harm.



including in Kansas City. These communities have been called “environmental justice communities.” Together, these stressors, known as cumulative impacts, refer to the risks communities face as a result of the interaction between multiple pollutants released by nearby polluting facilities (Morello-Frosch et al. 2011).

Kansas City has a legacy of systemic racism—including discriminatory planning practices used in redlining, zoning, land-use plans, and industry siting; lack of accessible green spaces; and inequities in health care (KCMO 2017; Norris and Baek 2016). Climate inaction will disproportionately harm the health and safety of environmental justice communities, who are least responsible for the climate crisis (USGCRP 2016). Such policies and practices that place disproportionate environmental burdens on people based on race are forms of environmental racism (Bullard 1994).

The Kansas City–based environmental justice organization CleanAirNow (CAN) and the Union of Concerned Scientists (UCS) developed this report to examine issues of environmental justice in the Kansas City area. We illustrate the cumulative exposures to air pollutants that the Kansas City community is experiencing on both sides of the state line, and we highlight how CAN and the local environmental justice movement have been working to address those inequities. Local activists are providing solutions to local, state, and federal decisionmakers so they can better engage the community in decisionmaking and address systemic environmental justice concerns in the Kansas City area.

Kansas City’s Legacy of Environmental Racism

Kansas City’s central location has been its defining feature throughout history. Placed at the meeting of the Kansas and Missouri rivers, it became a key location for trading posts, rail development, and warehouses and industrial development at the turn of the 19th century. The racial and ethnic makeup of the city changed rapidly in the 19th century as rail development in the area recruited Mexican immigrants for labor (Rodriguez 2014). Workers established communities in neighborhoods such as Rosedale and Armourdale. These communities’ nearness to the Kansas City railyard and interior port has exposed their residents to dangerous levels of fine particulate matter (PM_{2.5}) for generations, along with the transportation and industrial pollution that came with development nearby. Black carbon (BC) is ultrafine particulate matter—smaller in size than PM_{2.5}—that is produced when fossil fuels are burned; it is a contributor to climate change and exposure is associated with respiratory and cardiovascular disease and cancer (EPA 2011).

Indeed, many neighborhoods and communities in Kansas City are still dealing with pollution from industrial sites that are no longer active but released toxins into the air, water, and soil for more than a century and are persistent in the environment. The Kansas City, Kansas, neighborhood Argentine was named after the silver smelter that operated for more than a century on 20 acres next to the Kansas River beginning in 1880. It released lead and other heavy metals into the surrounding soil and water and was later designated an EPA Superfund site (KCKPL 2021). Nearby in Armourdale, Kansas, the Armourdale Refinery operated from 1910 to 1950 and was then converted to a coal-fired and now natural gas power plant; the Kansas Department of Health and Environment is investigating the site for cleanup because the plant contaminated groundwater and soil with industrial pollutants, including the cancer-causing gas vinyl chloride (KDHE n.d.; ATSDR 2006). A facility located on Armour Road manufactured arsenic-containing herbicides to spray along the railway, which resulted in contaminated soil and groundwater near the area. This facility was in operation from the 1920s until 1986, was placed on the EPA’s National Priority List as a Superfund site in 1999, and is still being cleaned up today (EPA n.d.b).

In addition to the persistent pollution, longstanding inequities stemming from the environmental racism of discriminatory government practices such as redlining have led to a division in socioeconomic standing, housing, health and wellness between Kansas City’s low-income and communities of color overburdened with cumulative impacts, and high-income white communities (Norris and Baek 2016). Historically, communities of color overburdened with cumulative impacts have resided closer to the industrialized sections of Kansas City because they have been blocked from living in other areas and because industries were allowed to be sited



In Armourdale, Kansas, the residential community is surrounded by industrial development. This means that normal daily activities like going to the store, playing after-school sports, or walking the dog can mean exposure to multiple pollutants. These cumulative exposures from different sources over time can have negative health consequences for people living in these communities.

“When the pollution is high, I have two asthmatics in my home who have struggled to breathe even inside an air-conditioned home. So, because we don’t live in a greatly structured building with great insulation, and all that pollution is out there, when the pollution is high . . . no matter if you have filters inside, you can’t filter everything out. Because of the structure, because if you’re low-[income], it makes it almost impossible to breathe even inside. So even your asthmatic medicines, or your bronchial dilators, or your nebulizers, or your breathing machines are not as effective.”

– Louise Lynch, Kansas City, Kansas, community member

in or near their neighborhoods. These unjust policies have slowed and sometimes even reversed wealth growth in these communities. They have also resulted in these communities having less access to mobility, quality housing, government investment, and other opportunities and more exposure to environmental contaminants associated with negative health outcomes (KCMO 2017). As one example, a 2016 study of health outcomes in Wyandotte County, Kansas, showed a stark 22-year difference between the lower life expectancies of people living in the heavily industrialized neighborhood of Armourdale, largely communities of color and communities with people overburdened with environmental impacts, compared with people living in other parts of the county. It is likely that underlying health issues resulting in part from long-term exposure to pollutants are involved in this gross health disparity (Norris and Baek 2016).

Cumulative Impacts and Health Risks for Environmental Justice Communities

Environmental justice communities disproportionately face the negative cumulative effects of exposure to different kinds of pollutants (Figure 1, p. 5) (Sheats 2017; APHA 2019). Hazardous air pollutants (HAPs), a category of confirmed or likely cancer-causing pollutants, are emitted from industrial facilities that tend to be located near Indigenous communities, low-income communities, and communities of color overburdened with environmental impacts (EPA 2019; Linder, Marko, and Sexton 2008; Chakraborty 2012), with the worst polluters far more likely to choose to site their industrial facilities in locations in or near these communities (Collins, Munoz, and Jaja 2016; Erickson 2016). EPA data from 2018 illustrated that, compared with the overall population, Black people are up to 54 percent more likely to live near facilities emitting PM_{2.5} (Mikati et al. 2018).

Industrial activities can have major health impacts on fenceline communities—neighborhoods next to industrial polluters. Exposure to air pollution, the majority of which is driven by industrial and heavy transportation emissions, which is concentrated in fenceline communities, can damage every organ in the body, leading to conditions such as asthma, heart disease, and cancer and even death (Landrigan et al. 2018; Carrington 2019). An analysis of transportation-related emissions in Newark, New Jersey, found that higher polluting vehicle routes have a direct impact on neighborhood air quality (Allen et al. 2020). A 2017 study found that race, far more than income level, was the strongest predictor in the United States of exposure to nitrogen dioxide (NO₂), a transportation-related pollutant that can lead to coughing, wheezing, and asthma attacks (Grineski and Collins 2018). Likewise, communities of color are disproportionately exposed to pollution and PM_{2.5} emitted from buses, trucks, and heavy-duty diesel vehicles, which is associated with increased illness and death, particularly from heart and lung diseases (Tessum et al. 2021; Bove, Xie, and Yan 2019).

Climate change exacts an additional health toll on residents of low-income communities, communities of color, immigrant, and Indigenous communities. They are at increased risk of impacts of extreme heat, storms, and flooding and are less able to cope with the resulting damage (Blatchford 2018; Fernandez Rysavy and Floyd 2016; USGCRP 2017; Dahl et al. 2018). When these factors combine with a lack of economic resources and unjust policymaking, fenceline communities continue to face significant threats to their overall health, livelihoods, and sustainability.

It is also common for many members of fenceline communities to be employed by the same polluting industries that are increasing health burden risks in the community. Community members are often put in a precarious situation, forced to choose between economic survival and their families’

health. Additionally, fence-line community residents are often unable to relocate, as their proximity to industrial pollution sources drives down home property values. It is nearly impossible to sell their homes at prices that would enable them to purchase property elsewhere (Taylor 2014; Bullard 2008).

Environmental justice communities have fought the numerous economic, health, and environmental impacts from decades of environmental racism across the county. The movement is grounded in two principles: that people and communities most affected speak for themselves, and that solutions address the impacts affecting their communities. These community-led efforts have resulted in significant progress, such as the removal of pollution sources; the creation of restrictions or prohibitions on new polluting sources; and investments in assets such as parks, affordable public transportation, and affordable housing (Bullard et al. 2014). In Kansas City, for example, a recent campaign led by CAN pushed the largest utility in Kansas, Evergy, to close its remaining coal-burning plants and begin the transition to clean energy (Grimmett 2021). Actions like these highlight another important aspect of the struggle for environmental justice: they help low-income communities and communities of color gain equitable access to environmental protections, investments, and other resources. Such access can address the uneven distribution of amenities along race and class lines that reflect long legacies of racism and discrimination.

Air Pollution Regulations Fail to Protect People against Cumulative Impacts

The current networks of federal- and state-operated air quality monitors include many geographic gaps in environmental justice communities and other places near sources of air pollution. Environmental justice communities often have no federal or state air quality monitoring nearby. If they do, they often have monitors that are not properly maintained or that fail to adequately capture industrial emission events that threaten public health—such as increased emissions from start-up, shutdown, and malfunction events—due to their locations or their ability to monitor only certain pollutants (Goldman et al. 2021; Coursen 2021; McLaughlin, Kearney, and Sanicola 2020). The Clean Air Act requires monitoring of six “criteria” air pollutants: ground-level ozone, PM_{2.5}, carbon monoxide (CO), lead, sulfur dioxide, and NO₂ (EPA 2020d). There are currently five EPA monitoring sites in the Kansas City area monitoring criteria air pollutants and two monitoring hazardous air pollutants (EPA 2021a). However, these monitoring networks have been shown to be insufficient for measuring local and short-term spikes in air

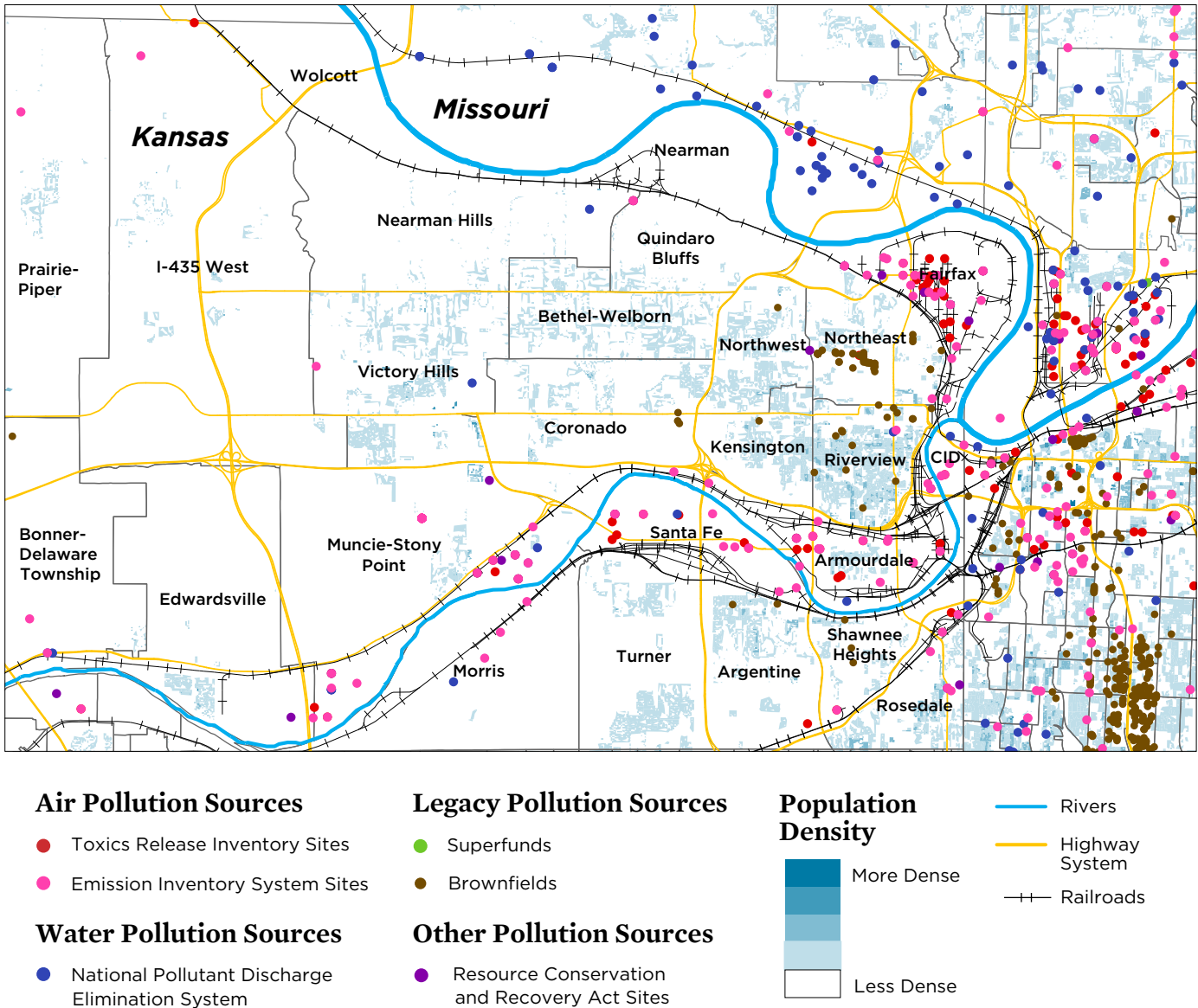
pollution because they do not capture pollution hot spots (Carlson 2018).

In addition to the lack of adequate air pollution monitoring, the EPA’s authority under the Clean Air Act does not include consideration of the cumulative impacts of multiple air pollutants, nor does it adequately hold polluters accountable for complying with existing standards. The Clean Air Act requires emissions standards and technology controls for facilities releasing hazardous air pollutants, but the EPA is mandated to consider the effects of individual chemicals on fence-line communities one at a time in its risk analyses. Further, fence-line monitoring is not required for most types of polluting facilities—apart from petroleum refineries—which means communities have no way of knowing how much they are exposed to a hazardous chemical or a combination of chemicals (EPA 2020e). EPA and state enforcement of emissions standards are weak, and even when companies are meeting standards, nearby communities could be at a higher risk of cancer or other health harms due to the cumulative exposure of many different facilities and chemicals that the EPA’s current regulatory approach does not capture (Schaeffer, Pelton, and Kelderman 2019).

These risks are compounded by the inevitability of accidents that occur at facilities that store hazardous chemicals, which are often located in or near communities of color. The EPA’s Risk Management Plan (RMP) program encompasses the nation’s most high-risk industrial facilities that produce, use, or store significant quantities of toxic and flammable chemicals. Among other requirements, these facilities must prepare plans for responding to a worst-case incident, such as a major fire or explosion that releases toxic chemical pollution into the surrounding community. The EPA estimates that approximately 150 serious accidents occur at regulated industrial facilities every year (EPA 2016). Improvements in the RMP program are needed so that facilities proactively notify communities about risks and emergency response plans, especially as extreme weather events that can cause these incidents increase in intensity and frequency.

The EPA delegates some air pollution permitting and enforcement authority to the states. This means transparency, opportunities for public engagement, and industry oversight vary by location. A recent EPA Region 7 analysis of Kansas’s air pollution permit program found that the Kansas Department of Health and Environment is the only state agency in the region failing to make its permits publicly available and has been issuing construction and operating permits without public notice (EPA 2020f). The Missouri Department of Natural Resources (MODNR) makes its permits and notices for comment publicly available; however, it reported no records for hearing requests or hearings held for

FIGURE 1. Sources of Pollution in Kansas City



Facilities that release toxic pollutants are often located near communities with high population density, including environmental justice communities. For example, the Armourdale neighborhood is a community with a large-percentage Latino and immigrant population that is also surrounded by industrial areas where Toxics Release Inventory sites and other facilities release harmful pollutants into the air. However, the Armourdale community is located far from any EPA air pollution monitor that would record the high pollution levels experienced by the community (see Figure 2).

Notes: Toxics Release Inventory (TRI) Sites are facilities that produce more than a specified amount of air emissions each year and so are required to report their emissions to the EPA. TRI sites shown above are listed as “Active” Emissions Inventory System (EIS) reports on criteria and hazardous air pollutant emissions. EIS sites included are those labeled as “Operating” in the database. Superfund sites are contaminated hazardous waste sites that require long term remediation, and are managed by the Environmental Protection Agency (EPA) under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). Brownfield sites are areas that are contaminated or potentially contaminated, preventing them from being utilized. All facilities labeled as “Brownfield Properties” in the Assessment, Cleanup and Redevelopment Exchange System (ACRES) and all sites listed in the Superfund Enterprise Management System (SEMS) are included. National Pollutant Discharge Elimination System (NPDES) is a permit program that captures point source water pollution. Included are all sites labeled as “Effective” or “Admin Continued”. We excluded those labeled as “NPDES Minor” or “NPDES Non-Major.” Other pollution resources include sites regulated under the Resource Conservation and Recovery Act (RCRA) manages hazardous and non-hazardous solid waste. RCRA sites included are those listed as “Large Quantity Generators” (LQG). We excluded those labeled as supermarkets, pharmacies, hardware and other big box stores.

SOURCES: EPA 2021A; IPUMS 2021; EPA 2020B; ESRI 2019; ESRI 2021; UNIFIED GOVERNMENT OF WYANDOTTE COUNTY 2016.



Beto Lugo-Martínez

CleanAirNow installed air monitors in Kansas City communities to measure pollution levels in residential areas. The results show that pollution levels are often higher than indicated by federal air monitors that don't capture spikes in air pollution near freight corridors and industrial facilities.

pollution permitting decisions in both Kansas and Missouri speaks to the need for increased public participation, especially by environmental justice communities, who have been historically excluded from government decisionmaking while bearing the brunt of the air pollution exposure burden.

CAN Air Monitoring Project Improves Accessibility of Data, Builds Community Power in Kansas City

To supplement the EPA's air monitors, CAN worked to create its own network of community air monitors to educate and build power among Kansas City community members to inform decisionmaking that affects their health (Figure 2, p. 7). These monitors provide hyper-local, real-time air pollution monitoring. While these monitors are not used for regulatory purposes, they are an important tool for creating public awareness and educating in real time about pollution not captured by EPA monitors. Using these air monitors and comparing them with EPA data is an ongoing area of research, and the utility of the monitoring data will only increase as time goes on and understanding of how to use these monitors along-side EPA monitors to hold industrial polluters accountable improves (Barkjohn, Gantt, and Clements 2021; Proma et al. 2021).

Beginning in 2013, CAN conducted air monitoring studies in Kansas City, Kansas, focusing on emissions from heavy diesel truck traffic and rail yards. CAN monitoring in 2013 detected high levels of diesel—black carbon—emissions surrounding the BNSF railyard in the Kansas City, Kansas, Argentine neighborhood.

In 2015, with EPA funding, CAN continued air pollution monitoring and began conducting public health training and advocacy. The group developed a training guide and trained over 300 community members. This work prompted the EPA to conduct its own study, called the Kansas City

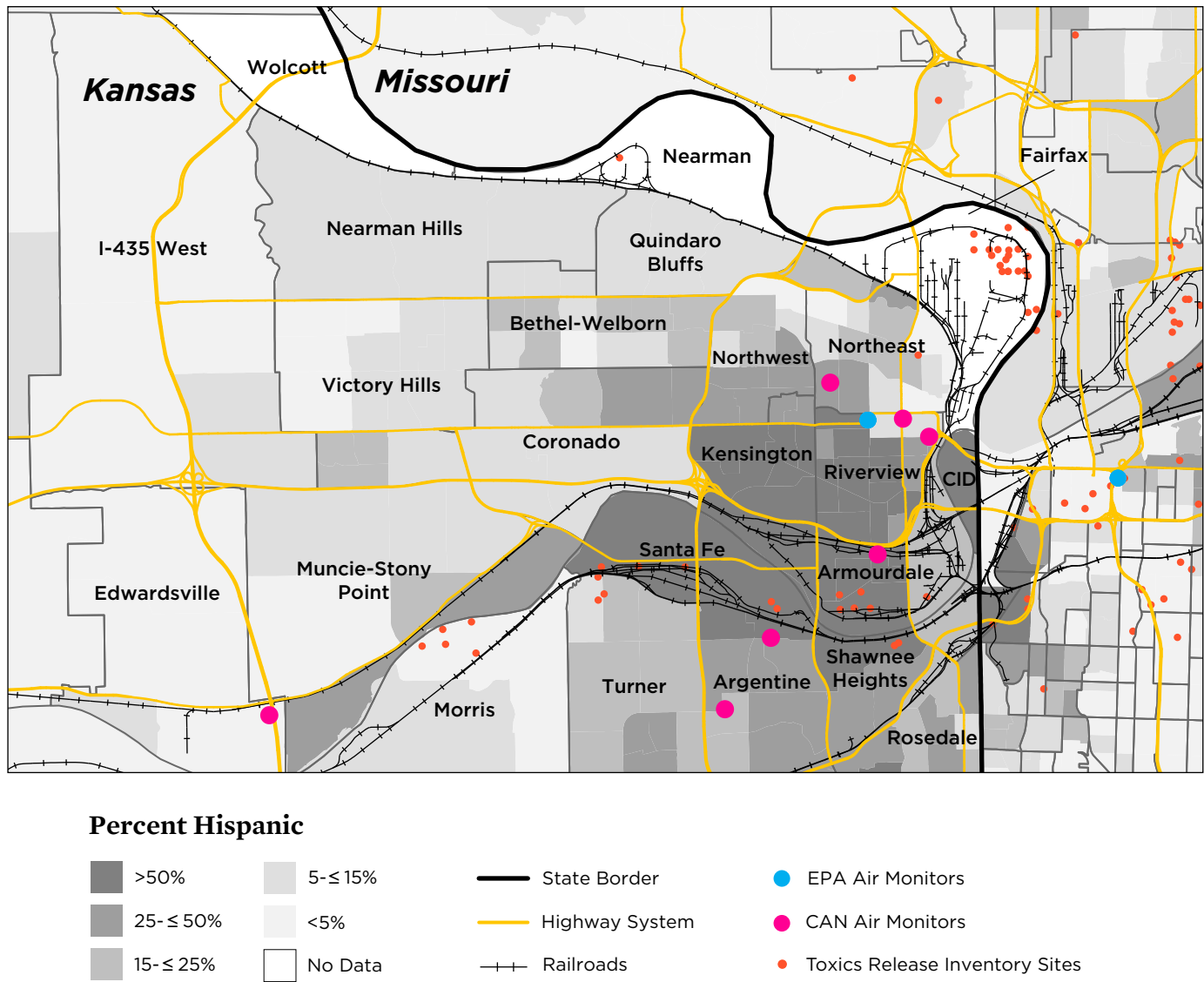
construction or operating permits between 2011 and 2020 (MODNR, email message to the author, January 11, 2021).

Both Kansas's and Missouri's air permitting programs compel the agencies to hold hearings for permitting decisions only if requested by members of the public, but this is seldom utilized, likely because outreach efforts are weak and most members of the public are not aware of the process for requesting a hearing. According to the Kansas Department of Health and Environment (KDHE), there was only one public hearing held on a construction or operating permit for a facility from 2011 to 2020 (KDHE, email message to the author, January 28, 2021). The lack of public hearings held for important air

“The air monitors give us the power of being informed. At first there wasn't much information about what's happening around us and we can't really see air pollution but it's there! There are people who are sick with asthma and children who are so young who have asthma it makes you wonder what their parents were breathing, what the mother was breathing during pregnancy, or what the kids were breathing when they were babies. We don't know what's around us and that's why I wanted an air monitor.”

— Ivonne Gutierrez, Kansas City, Kansas, community member

FIGURE 2. CleanAirNow Air Monitors Fill Gaps in EPA Monitoring



Toxics release sites in Kansas City are clustered in certain neighborhoods, such as Armourdale and Argentine. These facilities are most often located in neighborhoods with larger Latinx and Hispanic populations. CAN's monitors are located near these hot spots.

Note: Toxics Release Inventory sites are facilities that produce more than a specified amount of air emissions each year and so are required to report their emissions to the EPA.

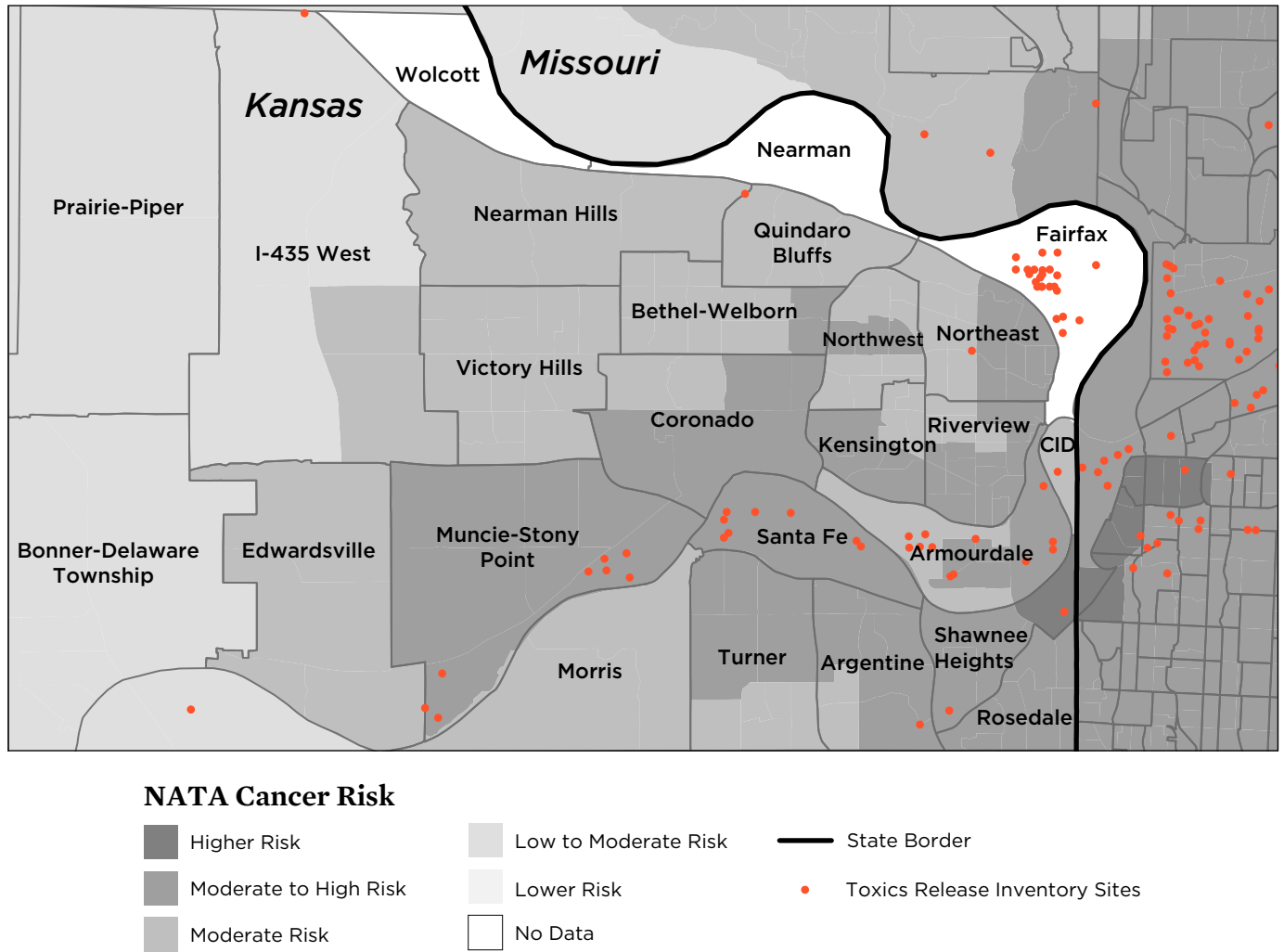
SOURCES: CAN 2021A; EPA 2021A; EPA 2020B; MARC 2008; IPUMS 2021; ESRI 2021; UNIFIED GOVERNMENT OF WYANDOTTE COUNTY, 2016.

Transportation and Local-Scale Air Quality Study (TRAQS) (Kimbrough et al. 2019). As part of the study, the EPA placed monitors to measure the air pollutants BC, PM_{2.5}, carbon dioxide (CO₂), and NO₂ throughout Kansas City, Kansas. At the same time, CAN deployed air monitors in additional locations. Both sets of monitors identified several occurrences of localized emissions that exceeded health thresholds that have

been linked to cardiovascular disease, respiratory disease, and death, likely due to the high levels of industrial pollution from facilities in Armourdale (CAN 2021b; Kimbrough et al. 2019; Volland 2016).

The network of permanent monitors provides the community with continuous data on PM_{2.5} air pollution at the neighborhood level. This work has allowed CAN to

FIGURE 3. High Pollution Neighborhoods Have High Cancer Risk



Block groups shaded in darker purple have populations with a higher probability of developing cancer in the course of their lifetimes in comparison to their neighboring communities.

Note: No neighborhoods in Kansas City are identified as having a “Lower Risk Rate.” Toxics Release Inventory sites are facilities that produce more than a specified amount of air emissions each year and so are required to report their emissions to the EPA.

SOURCES: ESRI 2021; EPA 2020A; UNIFIED GOVERNMENT OF WYANDOTTE COUNTY 2016.

build and advance environmental justice in Kansas City to reinforce the community’s lived experiences.

Health Risks from Industrial Pollution in Kansas City

A map of Toxics Release Inventory (TRI) sites in Kansas City shows the inequities in industrial air pollution exposure (Figure 3). TRI sites are facilities that produce more than a specified amount of air emissions each year and so are required

to report their emissions to the EPA. These facilities release a variety of potentially harmful chemicals along with pollutants such as CO₂ and methane, which contribute to climate change.

Especially on the Kansas side of the city, polluting facilities are densely clustered in neighborhoods in the north and south. Among one of these clusters on the south side of the city is the neighborhood of Armourdale. The neighborhood, home to a school, is surrounded by industry and bordered by a busy stretch of highway. EPA monitors are located far from this industrial area in the center of the city, but CAN has

“It all starts with the frontline communities—especially the people that have little to no income, people of color, women, children, and the elderly. People need to be aware of the environmental problems so they can hold people in power accountable. We as everyday people have to be able to say this is not right and have to call them out.”

— Magali Rojas, Kansas City, Missouri, community member

worked to place several monitors in the area with the goal of measuring the disproportionate amounts of pollution being experienced by the community.

Industry-reported TRI data from the biggest emitters in the area give an idea of the types of exposures experienced by the Kansas City community (Table 1, pp. 10–12). Emissions from these facilities are self-reported estimates. Outside investigations, including by the EPA’s Office of Inspector General, have found significant discrepancies in reporting, and emissions amounts are often underreported (Lerner 2021; EPA OIG 2019). Lack of reliability in industry emissions reporting speaks to the need for the EPA to require fenceline monitoring at polluting facilities across the country.

In the Kansas City area, even with enforcement actions taken by the EPA, certain facilities consistently violate federal laws and put the community at risk. For example, Harcros Chemicals, a chemical manufacturing facility located in a heavily industrialized area near the Kansas River in Kansas City, Kansas, is notorious for violating federal regulations. In 2016, the Occupational Safety and Health Administration fined the company \$80,000 after an inspection found 14 serious safety violations, including exposing its own workers to dangerous levels of chemicals, in particular ethylene oxide, which not only is a cancer-causing gas but also presents a significant risk of fire and explosion that could have resulted in injury or death in the workplace (OSHA 2016; NCEA 2016). In 2017, the EPA fined Harcros nearly \$170,000 for a failure to comply with RMP requirements. In January 2021, the company was found guilty of violating the Clean Air Act and fined \$1 million for a 2016 release of a chlorine gas cloud at a different facility in Atchison, Kansas, which hospitalized 140 people and forced 11,000 people nearby to shelter in place (DOJ 2020; CSB 2018).

Data released by the EPA’s National Air Toxics Assessment in 2018 revealed that long-term exposure to ethylene oxide is significantly contributing to higher cancer rates in some areas located close to facilities that emit the chemical (EPA 2018). Despite these risks to human health, the EPA has largely failed to ensure that companies keep ethylene

oxide emissions at a safe level. This is just one chemical in a long list of dangerous chemical exposures plaguing the Kansas City area.

Recommendations

Significant improvements in laws and public policy are needed immediately at the national, state, and municipal levels to protect the health and well-being of at-risk communities in the Kansas City area and elsewhere. Decisionmakers at the federal, state, and municipal levels need to work directly with environmental justice leaders and impacted communities to develop and implement policies and programs that aim to reduce pollution. Decisions should prioritize the health and well-being of environmental justice communities who are suffering from the generational cumulative impacts of industrial, transportation, and legacy pollution. The following reflect some of the recommendations that will aim to better protect the health and safety of people in Kansas City.

Develop science-based protections to safeguard people from chemical risks and cumulative impacts of pollution exposure and climate change.

- The EPA should require polluting facilities to conduct more comprehensive reporting, post-incident analysis, and preventive measures, including evacuation plans; enhance community outreach and education; and increase public access to information on site-specific industrial chemical risks, including by providing multi-lingual alert systems to notify communities in advance of potential incidents.
- The EPA and state regulatory authorities should require continuous, real-time, publicly available fenceline air monitoring near facilities emitting toxic air pollutants. Monitors must capture levels of pollutants traditionally excluded from the regulatory framework, and communities should play a significant role in deciding where monitors are located. Air monitoring should also be

TABLE 1. Ten Worst Polluting Facilities in the Kansas City Area, Health and Enforcement Data

Facility/ Industry Type	EPA Enforcement Record			Chemicals Released and Associated Health Effects			
	Days Since Last Inspection	Number of Enforcement Actions in Five Years	Quarters in Non-compliance	Chemical	Total Amount Released into Environment (lbs/year)	Health Effects (from inhalation)	EPA IRIS Evaluation
Amsted Rail— Kansas City, KS Steel Foundry	151	0	0	Lead	12,921	Not Assessed	Probable Human Carcinogen
				Manganese	623,360	Nervous System Effects	Not Classifiable
				Phenol	13,492	Decreased Maternal Weight Gain	Not Classifiable
				Zinc (Fume or Dust)	3,779	Immune and Hematologic	Not Classifiable
Bayer CropScience— Kansas City, MO Pesticide and Other Agricultural Chemical Manufacturing	903	1	8	Formic Acid	5,997	Not Assessed	Not Assessed
				Methanol	43,610	Nervous, Developmental	Not Assessed
				Methyl Tert-Butyl Ether	2,349	Hepatic, Urinary, Ocular, Other	Not Assessed
				Toluene	8,311	Nervous	Inadequate Information
				n-Butyl Alcohol	4,696	Not Assessed	Not Classifiable
BPU—Nearman Creek (Nearman Creek Power Station)— Kansas City, KS Fossil Fuel Electric Power Generation	300	0	4	Ammonia	217,544	Respiratory	Not Assessed
				Barium Compounds	1,837,173	Not Assessed	Not Classifiable
				Lead Compounds	9,713	Not Assessed	Probable Human Carcinogen
				Manganese Compounds	80,379	Nervous	Not Classifiable
				Vanadium Compounds	70,660	Not Assessed	Not Assessed
Cargill Incorporated— Kansas City, MO Soybean Processing	315	0	1	Cyclohexane	117,003	Developmental	Inadequate Information
				n-Hexane	427,041	Nervous	Inadequate Information

TABLE 1. Ten Worst Polluting Facilities in the Kansas City Area, Health and Enforcement Data (CONTINUED)

Facility/ Industry Type	EPA Enforcement Record			Chemicals Released and Associated Health Effects			
	Days Since Last Inspection	Number of Enforcement Actions in Five Years	Quarters in Non- compliance	Chemical	Total Amount Released into Environment (lbs/year)	Health Effects (from inhalation)	EPA IRIS Evaluation
CertainTeed Kansas City— Kansas City, KS Mineral Wood Manufacturing	586	9	7	Ammonia	98,700	Respiratory	Not Assessed
				Chromium	525,112	Respiratory	Human Carcinogen
				Lead Compounds	491	Not Assessed	Probable Human Carcinogen
				Mercury Compounds	12	Nervous	Not Classifiable
				Phenol	60,100	Decreased Maternal Weight Gain	Not Classifiable
General Mills (General Mills Operations LLC)— Kansas City, MO Flour Milling	3,428	0	0	Chlorine	22	Not Assessed	Not Assessed
				Sulfuryl Fluoride	19,375	Not Assessed	Not Assessed
General Motors (GM MLCG Fairfax Assembly)— Kansas City, KS Automobile Manufacturing	245	0	0	1,2,4- Trimethyl- benzene	68,408	Nervous	Inadequate Information
				Certain Glycol Ethers	63,101	Not Assessed	Not Assessed
				N-Methyl-2- Pyrrolidone	31,821	Not Assessed	Not Assessed
				Xylene	4,887	Nervous	Inadequate Information
				n-Butyl Alcohol	61,085	Not Assessed	Not Classifiable
Harcros Chemicals Inc.—Kansas City, KS Surface Active Agent Manufacturing	330	1	0	Certain Glycol Ethers	176	Not Assessed	Not Assessed
				Ethylene Oxide	612	Not Assessed	Carcinogenic to Humans
				Methanol	4,420	Nervous, Developmental	Not Assessed
				Propylene Oxide	279	Respiratory	Probable Human Carcinogen
				n-Butyl Alcohol	8,565	Not Assessed	Not Classifiable

TABLE 1. Ten Worst Polluting Facilities in the Kansas City Area, Health and Enforcement Data (CONTINUED)

Facility/ Industry Type	EPA Enforcement Record			Chemicals Released and Associated Health Effects			
	Days Since Last Inspection	Number of Enforcement Actions in Five Years	Quarters in Non-compliance	Chemical	Total Amount Released into Environment (lbs/year)	Health Effects (from inhalation)	EPA IRIS Evaluation
Hawthorn Generating Facility— Kansas City, MO Natural Gas Liquid Extraction	302	1	0	Ammonia	1,059	Respiratory	Not Assessed
				Barium Compounds	289	Not Assessed	Not Classifiable
				Copper Compounds	60	Not Assessed	Not Classifiable
				Hydrogen Fluoride	3,393	Not Assessed	Not Assessed
				Manganese Compounds	59	Nervous System Affects	Not Classifiable
Univar Solutions USA (Nexeo Solutions LLC)— Kansas City, KS Hazardous Waste Collection	272	0	0	Certain Glycol Ethers	584	Not Assessed	Not Assessed
				Methanol	8,299	Nervous, Developmental	Not Assessed
				Toluene	511	Nervous	Inadequate Information
				Xylene	349	Nervous	Inadequate Information
				n-Butyl Alcohol	166	Not Assessed	Not Classifiable

The 10 biggest polluters in Kansas City emit a wide variety of pollutants and chemicals, many of which the EPA Integrated Risk Information System (IRIS) has evaluated as harmful to human health. Despite the known hazards they emit, several of these facilities have gone more than a year without being inspected to make sure they are complying with the Clean Air Act and other environmental regulations. Some of the chemicals released by these facilities may not have sufficient health information to deem them cancer-causing, but the absence of information or EPA risk assessments does not necessarily equate safety.

SOURCES: EPA 2021B; EPA 2021C; EPA 2021D; EPA 2021E; EPA 2021F; EPA 2021G; EPA 2021H; EPA 2021I; EPA 2021J; EPA 2021K; EPA N.D.A.

- conducted along rail lines near places with vulnerable populations, such as public housing, daycare centers, senior centers, and parks.
- Federal and state agencies should develop the tools needed to measure and incorporate cumulative impact of chemical exposure for fenceline communities into environmental decisionmaking processes.
 - State agencies and local decisionmakers should not approve the construction of new or expanded chemical facilities near homes, schools, or daycare centers or the construction of new homes, schools, or daycare centers near hazardous facilities.
 - The EPA and state and local authorities should adopt and enforce strict emissions standards and limit heavy-duty truck traffic and idling in residential areas.
- Kansas City should plan for a rapid transition toward zero emissions for railyards/locomotives/trains, trucks, and industrial facilities, prioritizing the public health of fenceline communities (MFN 2021). This transition could include the following actions:
 - Require development of a truck inventory that creates a baseline for the age of the trucks currently on the road. Use this baseline to track the influence of policies and laws in order to create zero-emissions truck fleets.
 - Use zoning and planning to create “green zones” that divert traffic away from already overburdened communities. To ensure that these zones are effective, build accountability structures to support zone enforcement.

- Install and maintain air filtration systems in areas where rail emissions reach schools, senior housing, public housing, health clinics, recreation centers, community centers, and the like. These systems should not substitute for emissions standards or laws and strong polluter enforcement.
- State and local authorities should create climate action plans that include clean energy infrastructure and targets to reduce emissions that accelerate global warming, and should prioritize zero-emissions investment in environmental justice communities, with detailed actions on how they will meet these goals. These plans should not substitute for emissions standards and strong polluter enforcement. CAN is opposed to the greenwashing of local government climate action plans influenced by industrial polluters and utilities, or other policies that simply shift pollution from one community to another instead of eliminating pollution. Combating systemic racism requires aggressive climate action to address structures, policies, and practices, such as pollution offset programs, that further exacerbate climate change (Cushing et al. 2018).

Strengthen enforcement of current policies.

- The EPA and state regulatory authorities should enhance their own coordination to increase the number of inspections and enforcement of environmental laws and issue steeper penalties for facilities violating emissions standards and other health and safety requirements.
 - Involve community-based committees in oversight of environmental enforcement to help agencies hold polluting industries accountable if they fail to address identified hazards and emissions of toxic pollution.
- Congress should prioritize funding to the EPA so it can work with state agencies to implement unannounced inspections and improve enforcement of environmental and worker safety and health laws.

- The EPA should enforce the Emergency Planning and Community Right-to-Know Act, which is designed to help communities plan for chemical emergencies.
 - Ensure that local governments formulate chemical-emergency response plans utilizing Local Emergency Planning Committees. Plans should include port facilities and operations, especially trains transporting chemicals.

Provide environmental justice communities with direct funding to conduct community science and inform decisions.

- The EPA and state agencies should ensure environmental justice grant funds are made directly available to the people and organizations in environmental justice communities whose lived experiences make them the experts and, therefore, best suited to use the funds to bring direct benefit to public health in their communities.



The Kansas City railyard and railway have exposed residents to dangerous pollution for generations. Communities nearby (including this retirement center in Argentine, Kansas) are exposed to pollution from transportation-related diesel exhaust, toxic cargo, and herbicides manufactured in the area and sprayed along the rails.

“Decisionmakers should value community input and draw on local community-based solutions that are practical and effective. Taking into account community values and understanding the environmental impacts we face build trust within the community. Once they have earned the community’s trust and support, decisionmakers can start making meaningful change that is community-informed, rather than prioritizing their own agendas.”

– Atenas Mena, Kansas City, Missouri, community member

Make data accessible to the public, facilitate public participation, and meaningfully involve communities in decisionmaking.

- The EPA and state agencies should
 - enhance community-driven monitoring campaigns, validate community air monitoring systems, and prioritize addressing community needs;
 - make data based on validated continuous monitoring of toxic emissions coming from industrial facilities—and information about the emissions’ health hazards—easily accessible to people living in fenceline areas;
 - make enforcement data easily accessible to the public on government websites; and
 - ensure permit notices and full permits are posted on their websites.
- Outreach to and engagement with communities should be high-priority. Efforts should be made to ensure that communities are able to engage in public comment periods and that public hearings are held when requested and with adequate advance notice.
- State agencies and local decisionmakers overseeing permitting, zoning, and facility oversight should improve the frequency and quality of public input opportunities, such as through the formation of community advisory committees, listening sessions, meaningful community outreach, and more opportunities for ongoing dialogue between companies, regulators, and the public.

Genna Reed is the senior analyst in the Center for Science and Democracy at UCS. **Beto Lugo-Martinez** is the executive director of CAN. **Casey Kalman** is the researcher in the Center for Science and Democracy at UCS.

ACKNOWLEDGMENTS

The authors would like to thank the following Kansas City community members for their contributions: Ivonne Gutierrez, Louise Lynch, Atenas Mena, and Magali Rojas. We also thank CAN interns and community members for their research support, Kansas City physician and environmental health specialist Dr. Elizabeth Friedman for her expertise, and Molly Greenberg of the Moving Forward Network for her review and thoughtful input.

We also thank the UCS staff members who reviewed, edited, and otherwise helped shape the direction of this report: Allison Cain, Jacob Carter, Dave Cooke, Rachel Cleetus, Cynthia DeRocco, Anita Desikan, Gretchen Goldman, Seth Michaels, Paulina Muratore, Taofik Oladipo, Kathleen Rest, Andrew Rosenberg, Jessica Thomas, Heather Tuttle, and Bryan Wadsworth. Finally, we would like to thank Leslie Brunetta and David Gerratt for their editing and design, respectively.

Organizational affiliations are listed for identification purposes only. The opinions expressed herein do not necessarily reflect those of the individuals who reviewed the work. The Union of Concerned Scientists and CleanAirNow bear sole responsibility for the report’s contents.

REFERENCES

- Allen, Paul, Dana Lowell, Luke Hellgren, Jane Culkin, Dave Seamonds, and Grace Van Horn. 2020. *Newark Community Impacts of Mobile Source Emissions*. Boston: M. J. Bradley & Associates. https://www.njea.org/wp-content/uploads/2021/04/NewarkCommunityImpacts_MJBA.pdf
- APHA (American Public Health Association). 2019. *Addressing Environmental Justice to Achieve Health Equity*. Policy Statement 20197. Washington, DC. <https://www.apha.org/policies-and-advocacy/public-health-policy-statements/policy-database/2020/01/14/addressing-environmental-justice-to-achieve-health-equity>
- ATSDR (Agency for Toxic Substances and Disease Registry). 2006. “Public Health Statement: Vinyl Chloride.” Atlanta, GA: Centers for Disease Control and Prevention. <https://www.atsdr.cdc.gov/ToxProfiles/tp20-c1-b.pdf>
- Barkjohn, Karoline K., Brett Gantt, and Andrea L. Clements. 2021. “Development and Application of a United States-wide Correction for PM_{2.5} Data Collected with the PurpleAir Sensor.” *Atmospheric Measuring Techniques* 14 (6): 4617–37. doi: 10.5194/amt-14-4617-2021
- Blatchford, Laurel. 2018. “Climate Change Disproportionately Affects Low-Income Communities.” *Enterprise* (blog). December 7. <https://www.enterprisecommunity.org/blog/climate-change-disproportionately-affects-low-income-communities>
- Bowe, Benjamin, Yan Xie, and Yan Yan. 2019. “Burden of Cause-Specific Mortality Associated with PM_{2.5} Air Pollution in the United States.” *JAMA Network Open* 2 (11). doi:10.1001/jamanetworkopen.2019.15834
- Bullard, Robert D. 1994. *Dumping in Dixie: Race, Class, and Environmental Quality*. Boulder, CO: West View Press.
- Bullard, Robert D. 2008. *The Quest for Environmental Justice: Human Rights and the Politics of Pollution*. San Francisco: Sierra Club Books.
- Bullard, Robert D., Glenn S. Johnson, Denae W. King, and Angel O. Torres. 2014. “Environmental Justice Milestones and Accomplishments: 1964–2014.” Houston: Mickey Leland Center for Environment, Justice, and Sustainability at Texas Southern University.
- CAN (CleanAirNow). 2021a. CAN PurpleAir Monitors Locations. Kansas City, KS.
- . 2021b. *CleanAirNow’s Environmental Justice Recommendations: Comments on the Armourdale General Plan*. Kansas City, KS. <https://ucs-documents.s3.amazonaws.com/misc/armourdale-general-plan.pdf>
- Carlson, Ann E. 2018. “The Clean Air Act’s Blind Spot: Microclimates and Hotspot Pollution.” *UCLA Law Review* 65 (1036). <https://www.uclalawreview.org/the-clean-air-acts-blind-spot-microclimates-and-hotspot-pollution>
- Carrington, Damian. 2019. “Revealed: Air Pollution May Be Damaging ‘Every Organ in the Body.’” *The Guardian*, May 17, 2019. <https://www.theguardian.com/environment/ng-interactive/2019/may/17/air-pollution-may-be-damaging-every-organ-and-cell-in-the-body-finds-global-review>
- Chakraborty, Jayajit. 2012. “Cancer Risk from Exposure to Hazardous Air Pollutants: Spatial and Social Inequities in Tampa Bay, Florida.” *International Journal of Environmental Health Research* 22 (2): 165–83. doi:10.1080/09603123.2011.628643
- Collins, Mary B., Ian Munoz, and Joseph Jaja. 2016. “Linking ‘Toxic Outliers’ to Environmental Justice Communities.” *Environmental Research Letters* 11 (1): 015004. doi:10.1088/1748-9326/11/1/015004
- Coursen, David. 2021. “Environmental Justice Requires Adequate Air Quality Monitoring System.” *Bloomberg Law*, March 9, 2021. <https://news.bloomberglaw.com/environment-and-energy/environmental-justice-requires-adequate-air-quality-monitoring-system>
- CSB (Chemical Safety and Hazard Investigations Board). 2018. “Chemical Safety Board Releases New Safety Video, Mixed Connection, Toxic Result, Detailing Key Lessons from CSB Investigation into 2016 Chemical Release at MGPI Processing Facility in Atchison, Kansas.” Press release, January 3. <https://www.csb.gov/chemical-safety-board-releases-new-safety-video-mixed-connection-toxic-result-detailing-key-lessons-from-csb-investigation-into-2016-chemical-release-at-mgpi-processing-facility-in-atchison-kansas>

- Cushing, Laura, Dan Blaustein-Rejto, Madeline Wander, Manuel Pastor, James Sadd, Allen Zhu, and Rachel Morello-Frosch. 2018. "Carbon Trading, Co-Pollutants, and Environmental Equity: Evidence from California's Cap-and-Trade Program (2011-2015)." *PLoS Medicine* 15 (7). doi:10.1371/journal.pmed.100260
- Dahl, Kristina, Rachel Cleetus, Erika Spanger-Siegfried, Shana Udvardy, Astrid Caldas, and Pamela Worth. 2018. *Underwater: Rising Seas, Chronic Floods, and the Implications for US Coastal Real Estate*. Cambridge, MA: Union of Concerned Scientists. <https://www.ucsusa.org/resources/underwater>
- DOJ (US Department of Justice, US Attorney's Office, District of Kansas). 2020. "Harcros Chemicals Pleads Guilty to Violating Clean Air Act." Press release, January 31. <https://www.justice.gov/usao-ks/pr/harcros-chemicals-pleads-guilty-violating-clean-air-act>
- Erickson, Jim. 2016. "Targeting Minority, Low-Income Neighborhoods for Hazardous Waste Sites." *Michigan News*, January 19, 2016. <https://news.umich.edu/targeting-minority-low-income-neighborhoods-for-hazardous-waste-sites>
- EPA (US Environmental Protection Agency). 2011. "Black Carbon Research and Future Strategies." Washington, DC. https://www.epa.gov/sites/default/files/2013-12/documents/black-carbon-fact-sheet_0.pdf
- EPA (US Environmental Protection Agency). 2016. "National Enforcement Initiative: Reducing Risks of Accidental Releases at Industrial and Chemical Facilities (Fiscal Years 2017-19)." Washington, DC. www.epa.gov/enforcement/national-enforcement-initiativereducing-risks-accidental-releases-industrial-and
- EPA (US Environmental Protection Agency). 2018. "2014 National Air Toxics Assessment: Fact Sheet." Washington, DC. https://www.epa.gov/sites/production/files/2018-08/documents/2014_nata_overview_fact_sheet.pdf
- EPA (US Environmental Protection Agency). 2019. "What Are Hazardous Air Pollutants?" Washington, DC. <https://www.epa.gov/haps/what-are-hazardous-air-pollutants>
- EPA (US Environmental Protection Agency). 2020a. EJSSCREEN. Washington, DC. <https://gaftp.epa.gov/EJSSCREEN/2020/>
- . 2020b. "Facility Registration Service." Washington, DC.
- . 2020c. "Learn About Environmental Justice." Washington, DC. <https://www.epa.gov/environmentaljustice/learn-about-environmental-justice>
- . 2020d. "Overview of the Clean Air Act and Air Pollution." Washington, DC. <https://www.epa.gov/clean-air-act-overview>
- . 2020e. "Petroleum Refinery Sector Rule (Risk and Technology Review and New Source Performance Standards)." Washington, DC. <https://www.epa.gov/stationary-sources-air-pollution/petroleum-refinery-sector-rule-risk-and-technology-review-and-new>
- . 2020f. *Program Review of KDHE's Air Permitting Programs*. Washington, DC.
- EPA (Environmental Protection Agency). 2021a. "AQS Monitor_sites (FeatureServer)." Washington, DC. https://gispub.epa.gov/arcgis/rest/services/OAR_OAQPS/AQSmonitor_sites/MapServer/
- . 2021b. "Enforcement and Compliance History Online (ECHO) Detailed Facility Report: Amsted Rail." Washington, DC. Accessed August 25, 2021. <https://echo.epa.gov/detailed-facility-report?fid=110000445518>
- . 2021c. "Enforcement and Compliance History Online (ECHO) Detailed Facility Report: Bayer CropScience." Washington, DC. Accessed August 25, 2021. <https://echo.epa.gov/detailed-facility-report?fid=110000443226>
- . 2021d. "Enforcement and Compliance History Online (ECHO) Detailed Facility Report: Cargill Incorporated." Washington, DC. Accessed August 25, 2021. <https://echo.epa.gov/detailed-facility-report?fid=110000443191>
- . 2021e. "Enforcement and Compliance History Online (ECHO) Detailed Facility Report: CertainTeed-Kansas City." Washington, DC. Accessed August 25, 2021. <https://echo.epa.gov/detailed-facility-report?fid=110000445536>
- . 2021f. "Enforcement and Compliance History Online (ECHO) Detailed Facility Report: General Mills Inc.-Kansas City." Washington, DC. Accessed August 25, 2021. <https://echo.epa.gov/detailed-facility-report?fid=110017982432>
- . 2021g. "Enforcement and Compliance History Online (ECHO) Detailed Facility Report: General Motors-Kansas City." Washington, DC. Accessed August 25, 2021. <https://echo.epa.gov/detailed-facility-report?fid=110001307924>
- . 2021h. "Enforcement and Compliance History Online (ECHO) Detailed Facility Report: Harcros Chemicals Inc.-Kansas City." Washington, DC. Accessed August 25, 2021. <https://echo.epa.gov/detailed-facility-report?fid=110000531933>
- . 2021i. "Enforcement and Compliance History Online (ECHO) Detailed Facility Report: Hawthorn Generating Facility." Washington, DC. Accessed August 25, 2021. <https://echo.epa.gov/detailed-facility-report?fid=110017410942>
- . 2021j. "Enforcement and Compliance History Online (ECHO) Detailed Facility Report: Nearman Creek." Washington, DC. Accessed August 25, 2021. <https://echo.epa.gov/detailed-facility-report?fid=110000445340>
- . 2021k. "Enforcement and Compliance History Online (ECHO) Detailed Facility Report: Univar Solutions USA Inc." Washington, DC. Accessed August 25, 2021. <https://echo.epa.gov/detailed-facility-report?fid=110000445448>
- . n.d.a. "Integrated Risk Information System (IRIS)." Washington, DC. Accessed August 25, 2021. <https://cfpub.epa.gov/ncea/iris/search/index.cfm>
- EPA (US Environmental Protection Agency). n.d.b. "Superfund Site: Armour Road, North Kansas City, MO: Cleanup Activities." Washington, DC. <https://cumulis.epa.gov/supercpad/SiteProfiles/index.cfm?fuseaction=second.Cleanup&id=0702515#bkgound>
- EPA OIG (US Environmental Protection Agency Office of Inspector General). 2019. *Management Alert: Certain Toxic Release Inventory Data Disclosed to the Public Are Inaccurate*. Report No. 19-N-0115. Washington, DC. https://www.epa.gov/sites/default/files/2019-04/documents/_epaig_20190408-19-n-0115.pdf
- ESRI. 2019. "Flowlines" [polygon]. Scale Not Given. "NHDPlus21 (FeatureServer)." Accessed October 6, 2021. <https://services.arcgis.com/P3ePLMYs2RVChkJx/ArcGIS/rest/services/NHDPlusV21/FeatureServer>
- ESRI. 2021. "USA States" [polygon]. Scale Not Given. "USA States Analysis Trim (FeatureServer)." Last Edited July 28, 2021. Accessed August 25, 2021. https://services.arcgis.com/P3ePLMYs2RVChkJx/arcgis/rest/services/USA_States_analysis_trim/FeatureServer
- Fernandez Rysavy, Tracy, and André Floyd. 2016. "People of Color Are on the Front Lines of the Climate Crisis." *Climate Justice for All*, Spring 2016. <https://www.greenamerica.org/climate-justice-all/people-color-are-front-lines-climate-crisis>
- Goldman, Gretchen T., Anita Desikan, Richard Morse, Casey Kalman, Taryn MacKinney, Daniel S. Cohan, Genna Reed, and Juan Parras. 2021. "Assessment of Air Pollution Impacts and Monitoring Data Limitations of a Spring 2019 Chemical Facility Fire." *Environmental Justice*. doi: 10.1089/env.2021.003.
- Grimmett, Brian. 2021. "Evergy Plans Major Coal Shutdowns, But Environmental Groups Say It's Not Fast Enough." KMWU NPR, May 4. <https://www.kmwu.org/energy-and-environment/2021-05-04/evergy-plans-major-coal-shutdowns-but-environmental-groups-say-its-not-fast-enough>
- Grineski, Sara E., and Timothy W. Collins. 2018. "Geographic and Social Disparities in Exposure to Air Neurotoxics at US Public Schools." *Environmental Research* 161. doi: 10.1016/j.envres.2017.11.047
- IPUMS. 2021. "NHGIS: Version 16.0 [Total Population, B01003, 2013_2017_ACS5a; Race, B02001, 2013_2017_ACS5a; Hispanic or Latino Origin, B03003, 2013_2017_ACS5a; Poverty Status in the Past 12 Months by Household Type by Age of Householder, B17017, 2013_2017_ACS5a; US Block Group Boundaries, 2017]." Minneapolis, MN: University of Minnesota. doi: 10.18128/D050.V16.0
- KCKPL (Kansas City, Kansas, Public Library). 2021. "Know Your KCK History—The Argentine Smelter." Kansas City, KS. <https://kckplprograms.org/2020/12/11/know-your-kck-history-the-argentine-smelter/>
- KCMO (Kansas City, Missouri, Division of Community Engagement, Policy, and Accountability). 2017. "A Segregated Kansas City Is Not Good for Our Health." *KCMO Health Connection*, March. <https://www.kcmo.gov/home/showdocument?id=3477>

- KDHE (Kansas Department of Public Health and Environment Bureau of Environmental Remediation). n.d. "Identified Sites List Information: Armourdale Refinery." Topeka, KS. Accessed August 6, 2021. https://keap.kdhe.state.ks.us/BER_ISL/ISL_Pub_Detail.aspx?ProjectCode=C410572192
- Kimbrough, Sue, Stephen Krabbe, Richard Baldauf, Timothy Barzyk, Matthew Brown, Steven Brown, Carry Croghan, et al. 2019. "The Kansas City Transportation and Local-Scale Air Quality Study (KC-TRAQS): Integration of Low-Cost Sensors and Reference Grade Monitoring in a Complex Metropolitan Area. Part I: Overview of the Project." *Chemosensors* 7 (2): 26. doi: 10.3390/chemosensors7020026
- Landrigan, Philip J., Richard Fuller, Nereus J. R. Acosta, Olusoji Adeyi, Robert Arnold, Niladri Basu, Abdoulaye Bibi Baldé, et al. 2018. "The Lancet Commission on Pollution and Health." *The Lancet* 391 (10119): 462–512. doi:10.1016/S0140-6736(17)32345-0
- Lerner, Sharon. 2021. "Tracking the Invisible Killer: Trump EPA Invited Companies to Revise Pollution Records of a Potent Carcinogen." *Intercept*, March 18. <https://theintercept.com/2021/03/18/epa-pollution-cancer-ethylene-oxide>
- Linder, Stephen H., Dritana Marko, and Ken Sexton. 2008. "Cumulative Cancer Risk from Air Pollution in Houston: Disparities in Risk Burden and Social Disadvantage." *Environmental Science and Technology* 42 (12): 4312–22. doi:10.1021/Es072042u
- MARC (Mid-America Regional Council). 2008. "Highway System. GIS Datasets." Kansas City, MO. Accessed August 25, 2021. <https://www.marc.org/Data-Economy/Maps-and-GIS/GIS-Data/GIS-Datasets>
- McLaughlin, Tim, Laila Kearney, and Laura Sanicola. 2020. "US Air Pollution Monitoring Network Falling into Disrepair—GAO Report." *Reuters*, December 7, 2020. <https://www.reuters.com/article/us-usa-pollution-airmonitors-gao/exclusive-u-s-air-pollution-monitoring-network-falling-into-disrepair-gao-report-idUSKBN28H2MR>
- MFN (Moving Forward Network). 2021. *Making the Case for Zero-Emission Solutions in Freight: Community Voices for Equity and Environmental Justice*. Los Angeles: Occidental College. https://www.movingforwardnetwork.com/wp-content/uploads/2021/08/MFN_Making-the-Case_Report_May2021.pdf
- Mikati, Ihab, Adam F. Benson, Thomas J. Luben, Jason D. Sacks, and Jennifer Richmond-Bryant. 2018. "Disparities in Distribution of Particulate Matter Emission Sources by Race and Poverty Status." *American Journal of Public Health* 108 (4): 480–5. doi:10.2105/Ajph.2017.304297
- Morello-Frosch, Rachel, Miriam Zuk, Michael Jarrett, Bhavna Shamasunder, and Amy D. Kyle. 2011. "Understanding the Cumulative Impacts of Inequalities in Environmental Health: Implications for Policy." *Health Affairs* 30 (5). DOI:10.1377/hlthaff.2011.0153
- NCEA (National Center for Environmental Assessment). 2016. *Evaluation of the Inhalation Carcinogenicity of Ethylene Oxide: Executive Summary*. Washington, DC: Environmental Protection Agency, Office of Research and Development. https://cfpub.epa.gov/ncea/iris/iris_documents/documents/subst/1025_summary.pdf#nameddest=rfc
- Norris, David, and Mikyung Baek. 2016. *Health Equity Action Transformation HEAT Report*. Columbus: Kirwan Institute for the Study of Race and Ethnicity at The Ohio State University. http://wearewyandotte.com/wp-content/uploads/2016/12/CHC_HeatReport_1130.pdf
- OSHA (Occupational Safety and Health Administration). 2016. "Citation and Notification of Penalty: Harcros Inc." Wichita, KS: US Department of Labor. <https://www.dol.gov/sites/dolgov/files/legacy-files/newsroom/newsreleases/OSHA20160816.pdf>
- Proma, Rifat A., Matthew Sumpter, Humberto Lugo, Elizabeth Friedman, Khandaker T. Huq, and Paul Rosen. 2021. "CleanAirNowKC: Building Community Power by Improving Data Accessibility." In press.
- Rodriguez, Lisa. 2014. "State Line Hispanic Communities Have Deep Roots in Kansas City History." *KCUR*, October 28, 2014. <https://www.kcur.org/community/2014-10-28/state-line-hispanic-communities-have-deep-roots-in-kansas-city-history>
- Schaeffer, Eric, Tom Pelton, and Keene Kelderman. 2019. *Less Enforcement: Communities at Risk*. Washington, DC: Environmental Integrity Project. <https://environmentalintegrity.org/wp-content/uploads/2019/02/EIP-Enforcement-Report.pdf>
- Sheats, Nicky. 2017. "Achieving Emissions Reductions for Environmental Justice Communities through Climate Change Mitigation Policy." *William & Mary Environmental Law and Policy Review* 41 (2): February. <https://scholarship.law.wm.edu/cgi/viewcontent.cgi?article=1674&context=wmelpr>
- Taylor, Dorceta. 2014. *Toxic Communities: Environmental Racism, Industrial Pollution, and Residential Mobility*. New York: NYU Press. <https://www.jstor.org/stable/j.ctt9qg1v9>
- Tessum, Christopher W., David A. Paolella, Sarah E. Chambliss, Joseph S. Apte, Jason D. Hill, and Julian D. Marshall. 2021. "PM_{2.5} Polluters Disproportionately and Systematically Affect People of Color in the United States." *Science Advances* 7 (18): eabf4491 DOI: 10.1126/sciadv.abf4491
- Unified Government of Wyandotte County. 2016. "Statistical Neighborhood." Unified Government GeoSpatial Services. Accessed August 25, 2021. <https://arc-gis-hub-home-arccgishub.hub.arcgis.com/datasets/unifiedgov::statistical-neighborhood/about>
- USGCRP (US Global Change Research Program). 2016. *The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment*. Washington, DC. https://health2016.globalchange.gov/high/ClimatHealth2016_FullReport.pdf
- USGCRP (US Global Change Research Program). 2017. "US Climate Resilience Toolkit: Tribal Nations." Silver Spring, MD. <https://toolkit.climate.gov/topics/tribal-nations>
- Volland, Craig. 2016. "Analysis of EC and Health Studies to Assess Threshold Effect Level." https://drive.google.com/file/d/1rR_6BAe3colPKSmmzF9cW05icLqsj8us/view

www.cankc.org

www.ucsus.org/resources/environmental-racism-heartland
es.ucsus.org/recursos/racismo-ambiental-kansas-city



CleanAirNow is a climate and environmental justice organization dedicated to improving air quality in Kansas City and the surrounding region and building community power through environmental health education, equitable community-based research projects, and community-led solutions in public policy to improve public health.

info@cankc.org
<http://cankc.org>
<https://www.facebook.com/cleanairnowkc>



The Union of Concerned Scientists puts rigorous, independent science to work to solve our planet's most pressing problems. Joining with people across the country, we combine technical analysis and effective advocacy to create innovative, practical solutions for a healthy, safe, and sustainable future.

NATIONAL HEADQUARTERS
 Two Brattle Square
 Cambridge, MA 02138-3780
 (617) 547-5552