



Environmental Racism and the Contamination of Black Lives: A Literature Review

Sheree Henderson¹ · Rebecca Wells¹

Accepted: 7 December 2020 / Published online: 6 January 2021

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Abstract

Exclusionary housing policies concentrate housing inequities, disproportionately exposing Black communities to environmental pollutants, and isolating them from essential health resources (Dimick et al. 2013). For this study, a literature review was conducted to explore how environmental racism has contaminated Black lives and to understand the policy failures that have perpetuated these inequities. Using case study methodology, this paper highlights three specific events to illustrate the contamination of Black lives: toxic wells in Dickinson County, Tennessee; coke plants in North Birmingham, Alabama; and the water crisis in Flint, Michigan. The central policy failures in these cases were delayed response, misinformation, weak enforcement of regulations, and inadequate solutions provided by environmental health officials. Future research should focus on the intersection of environmental hazards, community trust, and the effectiveness of prevention strategies in Black communities. Environmental health officials should focus on transparency, accountability, and equal protection for all lives.

Keywords Environmental health · Environmental racism · Health disparities

Introduction

In April of 2015, Freddie Gray died in the custody of the Baltimore Police Department. He fell into a coma in the police van while being transported and died a few days later due to spinal injuries he sustained during his arrest. Before Freddie Gray, Tamir Rice was 12 years old when he was killed by police in a park in Cleveland, Ohio. Michael Brown was 18 years old when he was killed

✉ Sheree Henderson
sjhenderson.is.here@gmail.com

Rebecca Wells
Rebecca.wells1@uga.edu

¹ College of Public Health, Department of Health Promotion and Behavior, University of Georgia, 100 Foster Road, Athens, GA 30602, USA

by police walking down a street in Ferguson, MO. Eric Garner was 27 years old when he died from a chokehold in police custody in Staten Island, New York. In short, Freddie Gray was another Black body lost due to a police encounter, each contributing to the many protests that happened during this time in efforts to advocate for Black lives.

Freddie Gray's name and circumstances may seem most notable for being a Black life lost to police brutality among the many other Black lives that have met the same fate under similar circumstances; however, there is so much more to Freddie Gray's story than how he died. What is often neglected is how he lived. Long before Gray met his untimely fate in 2015, he was a young Black boy in Baltimore, MD, living in extreme poverty and thus exposed to significant amounts of lead (Turner 2016). In 2008, Gray's family filed a lawsuit against their landlord after he and his siblings had taken six tests between 1992 and 1996 that showed they had significant blood levels of lead (Turner 2016). Children are particularly vulnerable to the adverse health outcomes of lead poisoning because children have higher absorption levels. These adverse health effects can include lowered brain activity or asthma; indirect impacts of this have been linked to increased chances of incarceration (LeBrón et al. 2019). Gray's community was one whose schools were underfunded, and which is considered a food desert; both factors exacerbate conditions such as lead poisoning (Turner 2016). These environmental issues may seem small compared to violent acts of police brutality, but they are just as relevant. Gray spent his life bearing the brunt of infrastructural violence, that is violence caused by infrastructures that determine access and quality of resources and services (Rodgers and O'Neill 2012). Gray lived in a community where he was slowly being poisoned by lead during his developmental years, and his parents never got the help they needed despite the documented evidence of lead poisoning. Gray is not an outlier; he is an all too familiar example of the Black experience in the United States (Bullard 2001). Race plays a major role in one's environmental quality, and infrastructural violence is linked to race (Rodgers and O'Neill 2012). History has shown that White people have accumulated advantages, and Black people have accumulated disadvantages that significantly impact the environments in which they live (Bullard 2001). That persistence of accumulated advantages and disadvantages is environmental racism.

This review acknowledges the well-publicized stories in which Gray and other Black people have lost their lives but focuses primarily on the contamination of Black lives. The contamination of Black lives refers to the degradation of mental, physical, and/or emotional health of Black people through environmental racism. This paper will begin by providing a detailed explanation of infrastructural violence and environmental racism to assist readers in understanding the magnitude and implications of these issues for Black people. The discussion will then focus on racialized housing policies in the United States, which constitute an officially sanctioned context for environmental racism. In this context, I will explore the negative health effects of toxic exposures on Black lives using three specific case studies: North Birmingham coke plants, Dickinson County toxic wells, and the Flint water crisis. Lastly, there will be a discussion of the policy failures exhibited in the three case studies and recommendations.

Background

Racism can manifest through stereotypes, prejudicial beliefs, or discrimination, and Jones (2002) lists three types of racism: internalized, interpersonal, or structural. Though by no means confined to this group or location, this study focuses on racism towards Black people in the United States. Structural racism is the level of racism most relevant to this study because environmental racism is a form of structural racism, which precipitates interpersonal and internalized racism.

Since environmental racism is a form of structural racism, the two are defined similarly. Structural racism is the policies and practices that normalize and legalize racism in a way that creates differential access to goods, services, and opportunities based on race (Jones 2002). Environmental racism refers to policies, practices, or directives that result in advantages or disadvantages to individuals or communities based on race. This is reinforced by government, legal, economic, and military institutions (Bullard et al. 2008). Environmental racism encompasses infrastructural violence, which is violence caused by infrastructures that determine access and quality of resources and services (Rodgers and O'Neill 2012). Infrastructures influence how people relate to the space they inhabit and how they relate to other people within that space. These infrastructures can be a material embodiment of violence through racialized policies that cause adverse outcomes to marginalized communities, enforcing and reinforcing social orders at the expense of lives and health (Rodgers and O'Neil 2012).

Environmental racism is addressed through environmental justice initiatives and policies. The Environmental Protection Agency (EPA) defines environmental justice as the following: 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 (Allen et al. 2019). “Fair treatment” means that no group will be impacted disproportionately by environmental factors due to enacted policies and procedures. “Meaningful involvement” means that people can actively participate in the decision-making of policies and procedures that affect their environments and, ultimately their health (Allen et al. 2019). This paper will illustrate how “fair treatment” and “meaningful involvement” have been implemented by the EPA.

Description of Problem

Racism itself is a fundamental cause of racial health disparities (Tackett et al. 2020). Health disparities relevant to environmental racism include asthma, cancer, and chemical poisoning, which is caused by disparities in exposure to air pollutants, lead, and toxicants (Gee and Payne-Sturgers 2004). In 1982, Black communities in Warren County, NC led protests that catapulted the environmental justice movement when a study revealed that three out of the four hazardous waste landfills in their region were located in Black communities even though Black communities only made up 20 percent of the region's population (Bullard 2001). The protests in Warren County led to over \$25 million in cleanup costs for North Carolina and a new study commissioned by the United

Church of Christ entitled *Toxic Wastes and Race* (United Church of Christ 1987). The report found that 60 percent of Black people live in communities with at least one abandoned toxic waste site, and 40 percent of the nation's total estimated landfill capacity are in Black communities (United Church of Christ 1987).

After the protests in Warren County, many environmental justice initiatives, studies, policies, and organizations were created with the objective of exposing and correcting racialized environmental regulations. In 1992, the EPA produced the first governmental report on environmental justice. Two years later President Clinton issued Executive Order 12,898, Environmental Justice for Low Income and Minority Populations, which prohibited discriminatory practices for programs receiving federal funds (Bullard et al. 2008). Despite these initiatives, environmental health disparities persisted for Blacks. To illustrate how little progress has actually been made in the quest for environmental equality, *Toxic Wastes and Race at Twenty, 1987–2007*, explored these disparities and asserted that not only is lead poisoning still the number one environmental threat to children in the USA, but it continues to disproportionately affect Black children (Bullard et al. 2008).

The problems that Black communities faced before the Warren County protests remain, and additional problems have manifested due to budget cuts and weakening health protections. One major issue is the federal government's inconsistency in addressing environmental health between presidents. After President Clinton prioritized environmental justice for "low income and minority populations", President Bush muddied the waters of environmental justice by removing race and class from the government's special considerations. Following the Bush administration, President Obama appointed EPA administrators that prioritized environmental justice again through their strategic plan, *Plan EJ 2014* (Paris et al. 2017). Despite eight years of support for environmental justice under the Obama administration, our country experienced another major shift in environmental policy with the election of President Trump.

Current President Trump, spent his first few months in office signing multiple executive orders to deregulate toxic industries and proposed a budget that included eliminating the EPA's Office of Environmental Justice (Paris et al. 2017). The Trump administration moved to limit publicly available data on environmental contaminants and restrict public feedback on environmental regulations (Paris et al. 2017). Under Trump, the Dakota Access Pipeline (DAPL) was resumed even though it had been documented as leaking gallons of oil before; the EPA's ban on chlorpyrifos was reversed even though research has shown it is harmful to agricultural workers and their families; the Lead Risk Reduction Program was cut even despite its success in reducing blood lead levels across socioeconomic lines; and finally the elimination of the Risk Management Plan for industrial workplaces, as well as toxic cleanup budget cuts, left Texans underprepared as they tried to recover from Hurricane Harvey (Paris et al. 2017). These policy decisions and deregulation have disproportionately impacted communities of color. Trump has placed vulnerable communities at greater risk by prioritizing economic profit over environmental health with executive orders that cripple the government's ability to address environmental problems (Paris et al. 2017). As Whitehead et al. (2012) asserts, "Politics play a key role, in structuring inequalities through political agendas and various laws that do not protect vulnerable populations; sequentially, these decisions can stimulate environmental injustices that are experienced by disadvantaged

communities” (p.246). With the current political climate, there is no more urgent time to revisit environmental racism and the health disparities it causes.

Examination of Exclusionary Housing Policies

To understand environmental racism in the United States, we must discuss the nation’s history of housing policies and the ways they have impacted Black people. After the Emancipation Proclamation freed slaves, White leaders felt a need to maintain racial dominance, which was achieved through exclusionary housing policies (Table 1) such as zoning ordinances and restrictive covenants (McGrew 1997). George Frederickson, as cited by Ritzdorf (1997), argued that White leaders assumed that Blacks were so inferior that they would not survive the decline in their living conditions and would eventually disappear. Black people have most certainly not disappeared, but instead, they have had to endure a history of exclusionary housing policies relegating many to reside in neighborhoods where they are economically, socially, politically, and environmentally disenfranchised (McGrew 1997).

Exclusionary housing policies create residential segregation, allowing for health inequities to be concentrated in certain neighborhoods. Evidence that cholera, typhoid, and tuberculosis were concentrated in disadvantaged low-income neighborhoods following the Industrial Revolution generated modern housing codes and laws (Jacobs 2011). However, policies that were created to resolve housing inequities only increased them (Commission of Civil Rights 1973). New York City’s creation of zoning ordinances in 1916 (Table 1) allowed them to rezone neighborhoods resulting in manufacturing zones being concentrated in areas where Blacks resided. As a result, many residents in these areas incurred elevated levels of asthma (Maantay 2007). Similarly, in Detroit, zoning ordinances were used to build predominantly Black neighborhoods next to highways which exposed them to highly polluted air (Gee and Payne-Sturges 2004).

In addition to zoning laws, local government participation in residential segregation includes authorizing building permits, enforcing building inspections, and locating

Table 1 Exclusionary housing policies and practices

Housing Policy	Definition
Zoning ordinances	Ordinances created on the rationale that industrial, residential, and commercial districts should be separated to avoid conflicting uses of land; this was used to zone Black communities in close proximity to industrial pollution.
Restrictive covenants	Private contracts used to legally forbid home sales and rentals to Blacks.
Blockbusting	A practice used by real estate agents and brokers to scare White homeowners into selling their properties below market value as Black homeowners moved into neighborhoods. These below-market value homes would then be sold to a Black family at a price above market value.
Steering	A practice used by real estate agents to influence a buyer’s choice of communities based upon the buyer’s race.
Redlining	A practice used by the FHA to outline Black neighborhoods with red making them ineligible for federally insured loans, according to HOLC rating system.

Definitions were taken from McGrew (1997)

sanitation systems in a way that discourages private builders from building for Black residents (Commission on Civil Rights 1973). The housing and real estate industry follows guidelines set by federal, state, and local municipalities; however, the industry itself is also complicit in promoting exclusionary policies and engaging in discriminatory practices. In 1922, the National Association of Real Estate Brokers published a guide to train real estate brokers where they specified "the purchase of property by certain racial types is very likely to diminish the value of other property" (Commission on Civil Rights 1973). While such exclusionary policies are no longer overt, residential segregation persists. Two large housing audits were funded by the Department of Housing and Urban Development (HUD) in the 1970s and 80s that found significant levels of discrimination (Hogan and Berry 2011). An analysis of Housing Discrimination Studies from 1989–2000 showed that Blacks were still subject to exclusionary practices, albeit more covert practices such as steering (Table 1) (Hogan and Berry 2011).

Besides local policies and practices, housing segregation has also been perpetuated by federal policy (Table 2). In 1917, the Supreme Court ruled exclusionary housing policies unconstitutional yet upheld it by ruling other exclusionary housing policies constitutional. The Federal Housing Administration (FHA), which is primarily responsible for building the middle-class through homeownership wealth, provided mortgage insurance guidelines specifying that suburban housing development projects needed racially restrictive covenants in place to receive funding because they viewed "the infiltration of inharmonious racial and nationality groups" as "adverse" to neighborhood stability (McGrew 1997). From 1934 to 1962, the FHA financed three out of every five homes purchased in the United States and less than 2% were for nonwhite home buyers (McGrew 1997); this included over one million Black veterans returning home from World War II (Woods 2013). Since that time, the Supreme Court has ruled restrictive covenants to be unconstitutional in *Shelley v. Kraemer* and has barred housing discrimination entirely (e.g. public and private) in *Jones v. Mayer*. While these cases show progress, they do not reverse the damage done by years of discriminatory housing policies.

Black Communities and Toxic Exposures

Exclusionary housing policies concentrate housing inequities, disproportionately exposing Black communities to environmental pollutants, and isolating them from essential health resources such as healthy food options, hospitals, pharmacies, and green spaces (Dimick et al. 2013). Black families are 1.7 times more likely than other families to live in homes with severe physical issues and disproportionately affected by substandard conditions such as lead paint, overcrowding, or poor sanitation that is conducive to health problems such as asthma, heart disease, and neurological disorders (Dimick et al. 2013). As mentioned previously, modern housing policies that were created in response to pollution concerns following the Industrial Revolution, only increased housing inequity and risk for Black people. Blacks are 79% more likely than Whites to live within neighborhoods where industrial pollution is heavily concentrated (Johnson et al. 2008). Blacks are more likely than their White counterparts to reside near landfills, medical waste incinerators, diesel bus depots, and Superfund sites, which all contaminate the natural and structural

Table 2 Timeline of federal housing policy

Year	History of Housing
1917	Supreme Court declared racial zoning ordinances unconstitutional in <i>Buchanan v. Warley</i> .
1922	Standard Zoning and Enabling Act enforced zoning ordinances nationally.
1926	Supreme Court decided restrictive covenants were constitutional in <i>Euclid v. Ambler and Corrigan v. Buckley</i> .
1932	Federal Home Loan Bank was created to give assistance to savings and loan associations.
1933	Home Owners Loan Corporation created to assist the refinancing of small home mortgages in foreclosure during the Great Depression.
1934	The National Housing Act establishes the Federal Housing Administration to offer federal mortgage insurance.
1937	Home Owners Loan Corporation developed a rating system to evaluate loan risks that began the practice of redlining.
1945	Over one million Black veterans returned home without adequate housing, despite Veterans Affairs guaranteed mortgage loans.
1947	Congress establishes the Housing and Home Finance Agency to consolidate and oversee most federal housing programs.
1948	The Supreme Court ruled that enforcement of racially restrictive covenants by State courts was a violation of the Constitution in <i>Shelley v. Kraemer</i> .
1949	Housing Act authorizes 810,000 public housing units.
1962	President Kennedy's Executive order on equal opportunity in housing prohibits discrimination in housing with funds obtained through federally assisted programs.
1964	Title VI of the Civil Rights Act forbids discrimination in a variety of federally assisted programs, including low-rent public housing and urban renewal.
1965	Congress establishes the United States Department of Housing and Urban Development.
1968	Supreme Court decision in <i>Jones v. Mayer</i> bars discrimination in all housing, public and private.
1968	Title VIII of the Civil Rights Act (Fair Housing Act) passed, prohibits denial of housing on the basis of race, color, or national origin.
1974	Supreme Court found zoning to be discriminatory in <i>Southern Burlington County NAACP v. Township of Mount Laurel</i> .
1976	Supreme Court decided in <i>Hills v. Gautreaux</i> that the Department of Housing and Urban Development contributed to racial segregation in Chicago.
1977	Housing activists get Congress to pass Community Reinvestment Act requiring banks to report lending practices in neighborhoods they gather deposit.

Historical events and dates were taken from McGrew (1997), Maantay (2002), Woods (2013), and Commission on Civil Rights (1973)

environments in which many Black people live (Gwynn and Thurston 2001). Now that we have established the case that segregationist housing policy in the USA has contributed to the contamination of Black lives, this paper will highlight three specific case studies to illustrate the contamination of natural and structural environments, causing adverse health outcomes in Black communities: Dickinson County, TN toxic wells; North Birmingham, AL coke plants; and the Flint, Michigan water crisis.

Dickinson County, Tennessee Toxic Wells

The Holt Family case in Dickinson, TN is one of the most notable cases of how proximity to wastes sites can devastate entire families. This case is referred to as the "poster child" of environmental racism, and many point to it as confirmatory evidence of the ways that government entities neglect the lives and livelihood of Black and poor residents (Huang 2011). According to government records, several local industries buried their waste at a landfill in a mostly Black community in Dickinson County as far back as 1968, including waste material that was cleaned up from other landfills that were in mostly White communities (Johnson et al. 2008). Dickson County had less than 5% Black residents, and Harry Holt was a black farmer who owned 150 acres of land that was fifty-four feet from the landfill (Bullard et al. 2008).

The EPA documented that trichloroethylene (TCE), a volatile organic compound and suspected carcinogen, had contaminated the Holt's family wells in 1988 but assured them their wells were safe (Johnson et al. 2008). In 1991, the EPA did a Site Inspection Report confirming the TCE level had increased in the wells yet still deemed it safe. During this same period of time when the EPA was assuring the Holt family and other Black families that their wells were safe, the agency was sending White families letters urging them to switch to municipal water supply (Leiter, 2009). In 2000, the Holt family's well was tested again and registered at 120 parts per billion—twenty-four times more than the EPA's Maximum Contaminant Level, and the family was finally given access to Dickinson City water (Johnson et al. 2008).

Despite the Holt family being transferred to city water in 2000, the damage was already done because of the EPA's inaction and deception. These contaminants left several generations of the Holt family with major health issues. Harry Holt was diagnosed with prostate cancer and bone cancer; his wife Beatrice Holt was diagnosed with cervical polyps; their daughter Sheila was diagnosed with breast cancer; and all their neighbors had at least one family member suffering from some form of cancer (Bullard et al. 2008). These negative health outcomes occurred both before and after the family and their neighbors moved to city water, affirming the lingering effects and significant impact that toxic exposure has on human lives.

North Birmingham, AL, Coke Plants

In 1917, when the Supreme Court ruled zoning ordinances unconstitutional in *Buchanan v. Warley*, Birmingham, Alabama overturned this ruling because city leaders claimed that desegregating Blacks and Whites would result in violence. This allowed the city to concentrate industrial pollution in Black neighborhoods including areas in North Birmingham. One of the primary sources of industrial pollution in North Birmingham throughout the years has been burning coal to produce coke, which is used to create metals for steel production (Allen et al. 2019). Coke emissions can be a mixture of several different carcinogens such as formaldehyde, carbon monoxide, phenol, arsenic, cadmium, mercury, polycyclic aromatic hydrocarbons (PAHs), and aliphatic aldehydes (United States Department of Health and Human Services [DHHS] 1973). In 2011, the EPA sought to remedy this environmental issue in North Birmingham through their

Superfund program (EPA 2018). The EPA Superfund program is a federally funded program that allows immediate cleanup of contaminants in areas that have been identified as environmentally hazardous, but it does not guarantee long-term remediation for communities like North Birmingham that have endured a long history of industrial pollution. To receive long term remediation, a Superfund site must qualify for the National Priorities List (NPL) by either having a hazard ranking score (HRS) of at least 28.5, being designated as a priority by the state, or being specified as a priority by the Agency for Toxic Substance and Disease Registry (ATSDR) through a health advisory. The Superfund site in North Birmingham had an HRS score of 50 in 2014. Birmingham at large released 1.9 million pounds of chemicals according to the Toxic Release Inventory (TRI) in 2017.

North Birmingham residents used a collaborative approach to fight this issue. In 2013, residents collaborated with business, faith, and local government representatives to form the North Birmingham Community Coalition (NBCC). While this group has resulted in better community communication about environmental issues, it still has been minimally successful in advocating for a safer environment. In 2015, NBCC requested a hearing on an air permit that was issued to a local coke plant that sparked health concerns among residents such as heightened symptoms of chronic obstructive pulmonary disease (COPD), asthma, and cancer (Allen et al. 2019). The request for the hearing was denied, and NBCC followed up with a Title IV complaint the same year. In response to the Title IV complaint, the EPA requested that the ATSDR conduct a public health assessment (PHA) based on air pollutants data collected from 1999–2012, and ATSDR stated that the pollutants could be harmful to individuals with increased vulnerability but not the general public. Despite community concerns, adverse health outcomes, and the overqualification of the Superfund site for the NPL, the community of North Birmingham has yet to be put on the list of EPA sites needing long-term remediation.

Flint Water Crisis

Perhaps the most well-known environmental justice case in recent history is the Flint, Michigan Water crisis. A prosperous city in the 1950s and 60 s, Flint, Michigan benefited economically from the automotive industry; however, these industries began an exodus in the 1960s (Adams 2019). General Motors made up about ninety percent of Flint's wage, salary, and shareholder earnings and they left the city in the 1980s (Adams 2019). While the economic vitality of the city diminished, the industrial pollution did not; contaminants remained in the air, soil, and water (e.g. batteries, paints, gasoline, enamels, and by-products). The median income of its' residents at the time of the water crisis in 2014 was less than half the median income for the United States (Gostin 2016). Today, according to the US Census, the median income continues to be less than half the median income for the United States at just under twenty-eight thousand.

Like so many other instances of environmental racism and injustice, the Flint Water Crisis occurred despite existing regulations to protect the American people from contamination in their drinking water. Table 3 offers a timeline of the Flint Water Crisis. In April of 2014, the city of Flint, Michigan changed its water supply from the Detroit Water System to the Flint River in order to save money. Residents immediately complained that their tap water was discolored and appeared to be hazardous after the water supply

change, but city, state, and federal officials did not take action in a timely manner (Butler et al. 2016). Even when the water was tested initially as LCR protocol requires to ensure the water system change is safe, the procedure was not done according to LCR guidelines and there was inaccurate information reported that allowed the problem to persist. Michigan Department of Environmental Quality (MDEQ) informed the EPA after reviewing sampling results in February 2015 that Flint was utilizing corrosion controls- but they were not. It was only after doctors came forward about elevated blood lead levels in children in September of 2015, over a year after residents' initial complaints, that the state of Michigan acknowledged there was an issue.

Table 3 Timeline of flint water crisis

Date	Event
April 2014	In an effort to cut costs, the city of Flint stops using Detroit city water and begins using Flint River water until they can connect with a regional water system.
December 31, 2014	Flint Water Treatment Plant samples 100 homes that did not represent areas of highest risk, making their first violation of the lead and copper rule (LCR); a federal regulation passed in 1991. According to the LCR, you have to test the homes that are in areas of highest risk.
January 2015	Detroit offers their water system to Flint again, but Flint leaders deem the water from the river safe.
February 27, 2015	Michigan Department of Environmental Quality (MDEQ) staffer Stephen Busch emailed EPA about the sampling results done in Flint and assured them that Flint was utilizing corrosion controls even though they were not.
September 24, 2015	Doctors detect high levels of lead in children's blood samples and urge Flint to stop using water from river.
September 29, 2015	The state of Michigan first acknowledges that there is a problem when Governor Rick Snyder pledges to take action.
October 2015	Governor Snyder announces that the state will spend \$1 million to buy water filter and test water in Flint public schools.
October 15, 2015	The Michigan Legislature and Governor Snyder approve \$9.4 million in aid to Flint.
December 29, 2015	Governor Snyder accepts the resignation of Department of Environmental Quality Director Dan Wyant and apologizes for what occurred in Flint.
January 5, 2016	Governor Snyder declares a state of emergency in Flint.
January 14, 2016	Governor Snyder asks Obama administration for major disaster declaration and more federal aid.
January 15, 2016	Michigan Attorney General Bill Schuette begins an "independent review" in Flint crisis.
January 16, 2016	The White House provides federal aid and an emergency declaration, but not a disaster declaration.
February 3, 2016	The House Committee on Oversight and Government Reform convened to examine the federal administration of the Safe Drinking Water Act (SDWA) in Flint and determined there was failure at every level of government.
March 2016	A governor-appointed panel concludes that the state of Michigan is "fundamentally accountable" for the crisis.
April 20, 2016	Two state officials and a local official are charged with evidence tampering.

This timeline was put together using data from Butler et al. (2016), Adams (2019), and Denchak (2018)

Lead is one of the top environmental contaminant threats to children and pregnant women (citation). Exposure to lead can result in anemia, kidney damage, brain damage, fetal death, and premature delivery. (Center for Disease Control and Prevention [CDC] 2018). The Flint Water Crisis represents a more rare lead exposure pathway; the majority of lead exposure for children comes from ingesting lead paint or dust and only about 10–20% of exposure is due to drinking water contamination (EPA 2019). The residents shared concerns of the water quality in April of 2014; the EPA was officially made aware of the high lead levels in the water in April of 2015; and the EPA still did not act until January of 2016 (Butler et al. 2016). This crisis could have been avoided, but instead it was exacerbated further by neglectful government officials and misinformation. In 2016, the House Committee on Oversight and Reform found that every level of government was at fault for this crisis.

The crisis in Flint is not the only example of primarily Black and/or poor communities being subject to contaminated water; from 2003 to 2016, Washington DC, North Carolina, Mississippi, and New York all had notable cases of lead exposure from drinking water (Butler et al. 2016). Washington DC had contaminated drinking water from 2001 to 2004 that the city attempted to cover up until they were exposed in 2003 by community members and a professor from Virginia Tech. Durham, North Carolina and Greenville, North Carolina discovered there were elevated blood lead levels in children in 2006 through regular pediatric visits. Jackson, Mississippi residents were warned about lead in their drinking water six months after the problem was discovered in July of 2015. Ithaca, New York shut off their public drinking water in every school due to high levels of lead being detected in the water in February 2016.

Discussion

The majority of current environmental policies were passed into law from the late 1960s to the early 1980s with the purpose of protecting environmental health and human health (Kepner 2016). The EPA was established in December of 1970, consolidating all environmental programs into one entity. Its mission was addressing the overwhelming concern of environmental pollution and ensuring that inequities in environmental hazards do not persist (Kepner 2016). To be clear, the EPA does not make laws; Congress writes laws, and the EPA is given the authority to write regulations that provide the legal details of how to implement those laws. The EPA is responsible for keeping government entities, businesses, and individuals accountable when they violate environmental laws as well as provide notice and guidance when an environmental hazard has been found.

In 1992, the EPA produced the first government report that examined environmental justice, concluding that inequities in environmental hazards continued to persist. Two years later, President Clinton issued Executive Order 12,898, Environmental Justice for Low Income and Minority Populations, which prohibited discriminatory practices by programs receiving federal funds (Bullard et al. 2008). However, in all of the cases discussed in this paper, there were consistent policy failures that disproportionately burdened Black communities. Themes underlying these policy failures include delayed response, weak enforcement of environmental regulations, misinformation, and inadequate solutions.

Delayed Response

To understand the issue of delayed response, we must turn our attention to the Safe Drinking Water Act (SDWA) of 1974 and the Clean Air Act (CAA) of 1970. Both laws authorize the EPA to set national standards for minimum allowable contaminants in either drinking water or air. These laws further require the EPA to enforce these standards if a state or local jurisdiction is not following the standards or providing adequate enforcement (EPA 2018b). The law, however, does not specify a timetable for EPA intervention or what intervention entails; this ambiguity has given the EPA the capacity to respond in an untimely manner.

All three cases explored in this paper took over a year from the time there was public outcry or evidence of an environmental hazard to the time the environmental hazards were acknowledged as a public health concern. In Flint, Michigan, residents immediately complained to local authorities about health concerns in April of 2014 with the new Flint Water System, but it was not acknowledged locally or federally as a public health concern until two years later in 2016. It would seem there would have been concern initially about changing the water source to water from the Flint River knowing the history of industrial pollution in Flint, but it cannot be confirmed that the EPA was aware of this potential problem. This is a problem in and of itself. However, it is evident that the EPA did officially become aware of the water crisis in April of 2015 when doctors began to report elevated blood lead levels in children, and yet it still took until 2016 for the agency to acknowledge the crisis (Butler et al. 2016).

Similarly, in North Birmingham, Alabama and Dickinson County, Tennessee the EPA acknowledged and addressed similar environmental issues in an untimely manner. The Walter Coke Plant collected soil samples from three communities in North Birmingham in 2005, and these samples provided concerning results, but this only prompted more testing (EPA 2018a). The Jefferson County Department of Health (JCDH 2009) monitored the air in 2 areas in North Birmingham from 2005 to 2006 and found the air to have volatile organic compound, semi-volatile organic compounds, metals, carbonyls, and hexavalent chromium (EPA 2018a). When the New Hudson School was built in North Birmingham in 2009, the soil was tested, and elevated levels of arsenic and polycyclic aromatic hydrocarbons (PAHs) were found in the soil (Allen et al. 2019). Yet it was not until 2011, six years after Walter Coke's initial report, that the EPA acknowledged that North Birmingham housed a significant environmental hazard and began to take action to protect residents through the Superfund program.

The case in Dickinson County, TN has been described as the “poster child” for environmental racism, and with good reason, since the EPA took twelve years to help the Holt family. The EPA documented that TCE, a volatile organic compound and suspected carcinogen, had contaminated the Holt's family wells in 1988 and tested several more times up until 2000 when the contamination had elevated to twenty-four times the amount that the EPA deems to be safe. At that point, the agency finally moved the Holt family to a safer water source (Johnson et al. 2008). This case begs the question of who the Holt family was supposed to go to when they knew their water was unsafe, the EPA insisted it was, when the environmental protection regulations are intentionally ignored or harmfully modified.

Weak Enforcement of Environmental Policies and Misinformation

Aside from vague language allowing the EPA latitude for delayed response, there is also an issue of government representatives weakly enforcing environmental policies and intentionally providing inaccurate information. The Lead and Copper Rule (LCR), a guideline under SDWA, provides instruction on testing water safety specifically for copper and lead. The LCR has the following requirements (EPA 2020):

- The testing does not have to involve all homes being serviced by the system, but it has to take place in homes that represent the highest risk for lead and copper contamination (e.g. old homes, home in areas known to have a history of pollution, dilapidated homes).
- If the water tests above 15 ppb for lead and copper, then action must be taken (e.g. water quality parameter monitoring, corrosion control treatment, source water monitoring/treatment, public education, lead service line replacement)
- The community water supply must take first-draw samples. A first-draw sample means that the water has been sitting for 6 h in the plumbing before turning on the faucet.
- The water system has to test at the entry point of the pipe network and at 25 taps (for a large system on a standard schedule) or 10 taps (for a large system on a reduced schedule).
- The water system has 30 days to provide the results to the people who receive their water from the tap sampled, regardless of whether the system is above or below the acceptable contamination level.

The Flint Water Treatment Plant (FWTP) followed none of the above requirements; they did not test highest risk homes or take first-draw samples, and therefore could not have effectively done any of the other requirements. In fact, the most egregious violation made was when Michigan Department of Environmental Quality (MDEQ) staffer Stephen Busch confirmed to the EPA that the water was safe in Flint and the city had an optimized corrosion control system. Flint was not utilizing a corrosion control system, and as mentioned previously, the guidelines to verify water safety were not followed. The lie told by Mr. Busch was so evident that criminal charges were brought to him later.

The historical pollution in Dickinson, Tennessee and North Birmingham, Alabama both occurred prior to the SDWA and the CAA. This begs the question of new laws' ability to address historical issues. Regardless, similar to the Flint water crisis, government officials blatantly lied about the environmental hazard in Dickinson, Tennessee. The EPA consistently told the Holt family that their water was safe, while informing White residents that the same water was unsafe. The Holt family continued to drink from toxic wells while the EPA helped White residents switch to safe water systems. Unfortunately, in contrast to the Flint water crisis, no one received criminal charges for documented lies made to the Holt family. The Holt family did successfully secure monetary compensation after fighting in court for several years, but this cannot make up for health problems and premature death experiences by the family. North Birmingham residents were not victims of misinformation, but they certainly were not protected either. The CAA was passed to regulate emissions of hazardous air pollutants, but it took over 40 years from the time the

CAA was passed to acknowledge the impact of the historical pollution in North Birmingham; it is almost as if the law “grandfathered” in prior pollution in that area and areas like it.

Inadequate Solutions

After reviewing the problems of delayed response, misinformation, and weak enforcement of environmental regulations, it is important to specify what “addressing” or responding to these cases entails. In all three cases, the solutions provided were untimely and inadequate; none of the solutions reflect long-term remediation of the environment or residents’ health. The solutions were also repetitive at times and similar to the protocols that allowed the hazards in the first place.

The EPA declared 35th Avenue in North Birmingham as a Superfund site, which on the surface seems significant win. However, being a Superfund site is only an *avenue* to long-term remediation, not a *guarantee* of long-term remediation. The Superfund program means that removal actions will immediately begin on contaminants in the site, but there is not an enforced timeframe for the removal. Further the program provides no remedy for residents whose health has already been impacted or who will accumulate adverse health outcomes while waiting for their environment to become safer. The funding needed for long term remediation is only available to Superfund sites on the National Priorities List (NPL), and while the 35th Avenue Superfund site is eligible to be in the NPL, it has yet to be put on the list.

Flint residents were provided free filters and bottled water as soon as there was an emergency declaration, but supplies were limited, and these temporary solutions did not help residents who had already been adversely affected. There continues to be testing, monitoring, and removal of contamination in Flint, but until all contamination is removed, the crisis is still active.; The free bottled water program was ended in 2018; however, it is not anticipated that the city will be lead-free until 2022 (Ruckart et al. 2019). The free filter and water program proved to be an inadequate mitigation strategy, with its premature end once again leaving citizens at risk. While much attention has been paid to the Flint Water Crisis, the crisis will continue until proactive and preventative measures are implemented to fully protect the public’s health.

The Dickinson County Landfill hazard resulted in extreme adverse health outcomes endured by the Holt family throughout generations; cancer, heart problems, sickness, and premature death. After over a decade of consuming contaminated water (a fact known by the EPA) the family was eventually moved to a clean water source. Then, the Holt family had to fight for years before receiving a \$1.75 million dollar settlement in 2011 from Dickinson City and County governments that were split between 11 family members. The community-level solution is another monitoring program, this time for TCE contamination to make sure it does not spread. Given the inadequacy of the EPA’s initial monitoring of Dickinson County soil, it remains to be seen whether this new monitoring system will protect residents. Reliance on the same repetitive, inadequate solutions allows these hazards to persist.

Recommendations

After reviewing the literature and specific case studies that exhibited environmental racism, there are four key recommendations. First, to achieve equity, federal and state policies must adopt strategies that prevent previous contaminated infrastructures from being “grandfathered” in. They must also put in stricter regulations to prevent communities from new toxic exposures. Remediation of environmental hazards has not been completely effective at absolving affected communities of adverse health outcomes. For example, one study (LeBrón et al. 2019) of urban health inequities found that children’s blood lead levels only decreased by 25% after removing a portion of lead exposure in the household. LeBrón et al. (2019) hypothesize that this could be due to accumulated exposure in the bones. The researchers also pointed out that it does not account for the full life course of the lead exposure as the half-life of lead in bones is 20 to 30 years (LeBrón et al. 2019). Similarly, exposure to coke oven emissions and trichloroethylene (TCE) that were found in the North Birmingham and Dickinson County cases, cannot be completely eradicated through remediation of the environments. While these contaminants do not store themselves in the bones, the residents in both cases had long-term exposure which led to long-term adverse health outcomes. This is not a cost-effective strategy, but it will prioritize the health of the public and work toward building and at times restoring trust between communities and the government.

Second, policies are needed that will promote and enforce community-wide remediation. In all the cases reviewed in this paper, cleanup was not community-wide. North Birmingham and Dickinson County remediation only focused on a particular area where the contamination was highly concentrated, and in Flint, the tests and replacement of pipes are primarily implemented in high-risk areas. The remediation of areas that have the most contamination does not ensure the cities are free from contamination; it simply removes the majority of the contamination.

Third, findings from this study support the effectiveness of collaborative approaches to environmental justice. In North Birmingham, residents collaborated with business, faith, and local government representatives to form a coalition that brought awareness of the 35th Avenue site to the EPA. This coalition continued to represent the community’s interests in future dialogues with the EPA about environmental issues in North Birmingham. For similar coalitions to succeed in this way, it is necessary to have multiple sources of expertise at the table focused on preventing exposure, minimizing harm, and devising adequate solutions.

A fourth recommendation, while lofty in the current political environment, is for Congress to codify the Executive Order 12,898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. In its current form, this order provides a presidential directive, but it is not legislation. By codifying the order, it will assign federal responsibility in ways that expand the capacity of the EPA to uphold accountability and advance equivocal protection of Black communities.

Conclusion

Environmental racism refers to policies, practices, or directives that result in advantages or disadvantages to individuals or communities based on race. The EPA defines environmental justice as fair treatment and meaningful involvement regardless of race, color, national origin, or income. “Fair treatment” means that no group will be impacted disproportionately by environmental factors due to enacted policies and procedures. “Meaningful involvement” means that people can actively participate in the decision-making of policies and procedures that affect their environments and, ultimately, their health. This paper has illustrated that there has been little to no regard for “fair treatment” or “meaningful involvement” by the government in consideration of negative environmental impacts on Black lives. Exclusionary housing policies enforced by federal, state, and local governments have concentrated housing inequities, disproportionately exposed Black communities to environmental pollutants, and isolated them from essential health resources. In these environmental inequities, the contamination of Black lives persists.

Over time, cases like the ones reviewed in this paper, along with exclusionary housing policies, have resulted in the lack of trust between Black communities and environmental health officials. This itself can present as a problem that exacerbates environmental hazards because these communities may be less willing to engage, follow advice, or help environmental health officials. Future research should focus on the intersection of environmental hazards, community trust, and effectiveness of prevention strategies. Environmental health officials should focus on transparency, accountability, and equal protection for all lives.

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