Making the Invisible Visible

Shining a Light on Warehouse Truck Air Pollution

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Executive summary

KEY WORDS

Air Pollution
Air Quality
Environmental Justice
Warehouses
Trucks

In recent years, as corporations taught consumers to expect just-in-time products and home delivery, warehouse growth in the U.S. has exploded, and companies are building warehouses closer and closer to communities. While this infrastructure has long existed in some parts of the country—specifically in port communities—warehouses are now crowded beside homes, schools, parks and community centers in more parts of the country than ever before. Each warehouse generates hundreds, if not thousands, of truck trips each day.

While trucks perform an essential role in the goods supply chain, most trucks today also contribute to noise pollution, traffic and safety concerns, and, notably, harmful air pollution. In fact, goods transport is the fastest growing driver of greenhouse gas emissions, and the largest absolute contributor to emissions in many regions.[1] Local air pollution causes health harms at all stages of life, including pre-term and low birth weight births, respiratory illness, heart disease and stroke, and there is increasing evidence of impacts on brain development and function, dementia and diabetes.

This paper demonstrates who is at risk from diesel trucks serving warehouses. It summarizes the new science about health impacts from air pollution generated by these trucks, and it also points to available solutions that can protect community health.

Traffic-related air pollution is more varied — and more dangerous — than we knew

A growing body of peer-reviewed research published within the last five years indicates that exposure to traffic-related air pollution (measured by nitrogen dioxide (NO_2) exposures) increases the risk of the development of childhood asthma. Asthma is the leading cause of missed school days each year and has been linked to diminished school performance.[2] Air pollution from trucks is also associated with increased health risks at other stages of life. Air pollution raises the risk of preterm birth and low birth weight.[3] For adults, air pollution increases the risk of dementia,[4] in addition to heart disease and stroke.[5]

Diesel trucks also emit other health-harming pollution, including fine particulate matter ($PM_{2.5}$), volatile organic compounds, carbon monoxide and sulfur dioxide.

The less visible air pollution is, the more dangerous it may be. Freight trucks and buses make up around 10% of the vehicles on U.S. roads, but they are responsible for nearly half of the transportation sector's nitrogen oxide emissions.[6] Diesel trucks emit serious pollution at start up, while idling, and traveling at low speeds.[7]

5,000

Number of childhood asthma cases each year in the San Francisco Bay area attributed to NO_2

Transport is fast-growing sector that brings pollution right at nose level

Due to legacies of redlining and other discriminatory policies, new and existing distribution facilities and the roads that serve them are more likely to be located in proximity to communities of color and areas of low wealth.[8] Many residents living near warehouses have been sounding the alarm for some time.[9]

As state governors and legislators look for policy solutions to some of our most pressing climate and health challenges, they have little time to waste. Those who live nearest to warehouses face the greatest risks if political leaders move too slowly.

However, two factors make the challenge of transforming warehouses particularly vexing. First, while the Energy Information Agency maintains a database of facilities like refineries, nothing similar exists detailing current and proposed warehouse locations, making it difficult for communities and policymakers alike to learn the identities of owners and operators of these buildings. Second, access to air pollution data is improving, but the quality, quantity and consistency of the data available to communities remain inadequate. Many regulatory air pollution monitors capture data only one out of every six days,[10] and more publicly available information on air quality is needed.[11] The monitoring of near-road $PM_{2.5}$ is limited to areas with large populations,[12] meaning that near-road hotspots like warehouses in less populous areas are likely unmonitored. Furthermore, only a few hundred reference-grade NO_2 monitors are currently operating around the country.[13] Finally, warehouses are not required to monitor air emissions from activities on site.

While warehouses provide economic opportunity and jobs, companies and policymakers must do more to safeguard community health and reduce the impacts of truck-related air pollution. There are affordable solutions available now to help mitigate this pollution. This whitepaper addresses which communities are currently bearing the risk from proximity to warehouses, how air pollution from truck traffic is impacting their health and ways policymakers and businesses can reduce the harm from these operations.

Proximity Mapping for Truck-Attracting Facilities

EDF's Proximity Mapping framework is a new way to understand how the risk from transportation-related air pollution is distributed. Proximity Mapping produces estimates that characterize populations living near specific facilities or other truck-attracting pollution sources. The methodology has been peer reviewed.[14] Its earliest application was to understand communities living near oil and gas wells in the United States.

Proximity map users can work with map layers to gain a better understanding of the disproportionate proximity of communities of color and areas of low wealth to areas that attract trucks, especially warehouses and distribution facilities. These maps also show individuals with health conditions living near high truck-traffic areas, which can be made worse by pollution from trucks. The inequities apparent in the Proximity Maps are consistent with what many communities have long been saying about truck-related air pollution in their neighborhoods.

What is new about Proximity Mapping is the ability to compare a set of facilities to one another based on demographic and health characteristics of neighbors, and to compare neighbors around a set of facilities to state or national baselines.

EDF's Proximity to Environmental Stressors Assessment Tool is GIS application that applies aerial apportionment to estimate the characteristics of populations living near specific facilities or other pollution sources, using the U.S. Census Bureau's American Community Survey, 5-year estimates, at the census tract level. The tool was designed and tested for oil and gas well sites and has not been reviewed for application to very large facilities.

Methodology

Proximity Mapping is a GIS application that applies areal apportionment to estimate the characteristics of populations living near specific facilities or other pollution sources, using the U.S. Census Bureau's American Community Survey 5-year estimates at the census tract level. Commonly used in academic research, the areal apportionment method assumes populations are evenly distributed across a given census tract, which imperfectly approximates the real spatial distribution of communities and introduces increasing uncertainty at higher resolutions and for larger tracts (e.g. rural areas). While using smaller geographies would reduce apportionment-related uncertainty, U.S. Census block groups and blocks carry higher margins of error than tracts due to smaller sampling sizes in ACS surveys. The tool's tract-level analysis aims to minimize each potential source of uncertainty.

Additionally, the tool removes bodies of water using the 2015 Census Areal Hydrography National Geodatabase before making apportionment calculations. Health data comes from the Centers for Disease Control and Prevention's Places dataset.

The methodology used to create the Proximity Maps builds on previous tools, such as EJSCREEN or CalEnviroScreen. With those tools, a user could examine the residents around one facility at a time. What is new about Proximity Mapping is the ability to compare a set of facilities to one another based on demographic and health characteristics of neighbors, and to compare neighbors around a set of facilities to state or national baselines.

When applied to warehouses, Proximity Mapping for Truck-Attracting Facilities tabulates population totals surrounding warehouse facilities that are at least 100,000 square feet and in active commercial operation.

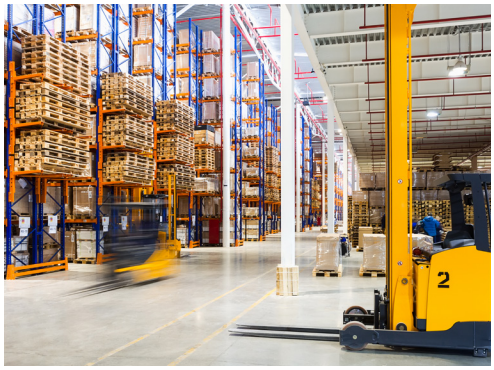
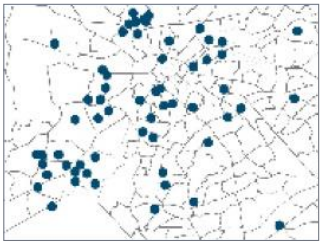
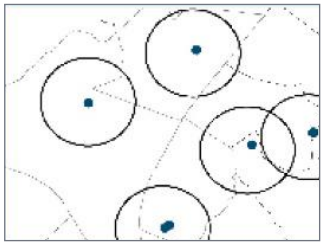
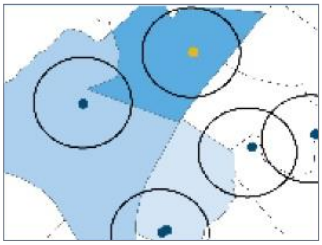
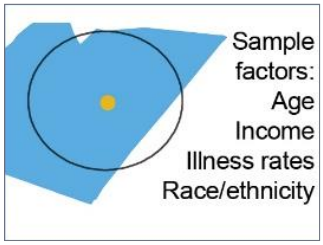


FIGURE 1

Proximity Mapping: Targeting transportation policy for health and equity

1 | DATASETS The starting point	2 | BUFFERS Identify close-in communities	3 | IMPACTS Map pollution burdens	4 | QUALITATIVE ANALYSIS Dive deeper
Map the study area with health and demographic data.	Widen the lenses to look at neighborhoods.	Estimate environmental stressors.	Prioritize facilities for action.
High Truck-Traffic Facilities (point location data) CDC PLACES (health data) American Community Survey (population data)	Map a 1/2-mile buffer around facility sites to reflect the nearby residents most effected by pollution.	EDF's Proximity to Environmental Stressors Assessment Tool estimates the health and demographic characteristics of neighbors near each facility.	Zoom in to prioritize facility improvements in places where neighbors have higher burdens or demographic inequalities.
			

1 MILLION

Children under five live within a half mile of a warehouse in 10 states

Findings: 15 million live within half-mile of warehouses in 10 states

EDF analyzed 10 states across the nation where warehouses have proliferated. In these 10 states, we identified 17,600 warehouses. Here's what we learned about warehouse neighbors:

- Some 15 million people live within a half mile of warehouses in 10 states.
- More than 1 million children under five live within a half mile of a warehouse in the study zone.
- No state distributed the risk from warehouses evenly. Black, Latino, Asian and American Indian people bear the brunt of risk from from living in proximity to warehouses. In some states like Illinois, Massachusetts and Colorado, the concentration of Black and Latino residents around warehouses is double what would be expected, given the state population.

TABLE 1

Neighbors within a half mile of a warehouse

% of Population Compared to State Average

State	# of Warehouses	Total Neighbors	< 5 years old	Black	Latino	Asian	American Indian	Below federal poverty line
California	4,618	3,900,000	263,000	122%	137%	103%	96%	118%
Colorado	449	250,000	16,000	182%	166%	100%	122%	133%
Illinois	2,401	1,981,000	138,000	139%	199%	117%	123%	131%
Massachusetts	585	787,000	49,000	140%	196%	104%	120%	160%
Maryland	696	458,000	32,000	125%	110%	86%	108%	151%
North Carolina	1,468	562,000	40,000	165%	151%	134%	71%	131%
New Jersey	1,777	1,898,000	130,000	139%	175%	109%	116%	146%
New York	1,115	2,543,000	167,000	137%	148%	112%	113%	137%
Texas	3,801	2,182,000	165,000	141%	129%	114%	90%	130%
Washington	691	384,000	24,000	168%	132%	139%	107%	133%

EDF research on neighbors of warehouses.
Population figures are rounded to the nearest thousand, and percentages are rounded to the nearest whole number.

Warehouses draw trucks to neighborhoods

It is a common perception that trucks are found on the highway, far from people. The reality is trucks are starting, stopping and idling right beside where people live, work, play and pray. For example, this intersection of I-10 and I-610 in Houston—in close proximity to warehouses and other truck-attracting facilities—sends trucks rumbling right through a neighborhood.

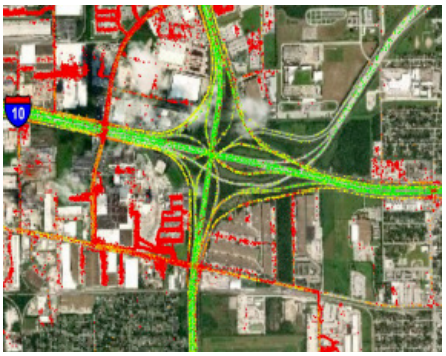


FIGURE 1

Houston I-10 at I-610

Source: American Trucking Research Institute Bottlenecks, 2022

Proximity to trucks matters when it comes to harmful air pollution

While the pollution burden may be variable, the resulting health disparities are clear and consistent—the result of decades of racist land use policies.

Millions of people live in close proximity to truck traffic. One in six people live within 300 feet of a major road, airport or railroad. Some 17,000 schools across the U.S. are located within ~800 feet of a heavily traveled road.[15] Air pollution varies more due to proximity to truck traffic than was previously known, with greater variety in impact by race and age.

First, air pollution itself varies significantly from block to block. In a 2017 study, EDF and its partners drove air pollution sensors mounted on Google street view cars on streets and highways in Oakland an average of 30 times for 11 months, to collect nearly 3 million unique air quality measurements. It found black carbon and NO_2 concentrations varied 500- 800% across city blocks in the area. Concentrations on city-designated truck routes linking highways to industrial areas were 1.9–3.6 times higher than on other surface streets.[16]

While the pollution burden may be variable, the resulting health disparities are clear and consistent—the result of decades of racist land use policies. Black children are five times more likely to be hospitalized for asthma and eight times more likely to die from asthma, as compared to non-Hispanic white children.[17] Due to legacies of redlining and other discriminatory policies, new and existing distribution facilities and the roads that serve them are disproportionately located in proximity to communities of color and areas of low wealth.[8] As a result, the consequences of exposure to truck traffic are not equal:

- Nationally, Black communities are exposed to 26% higher levels of soot from heavy-duty diesel trucks than the U.S. population average.[18]
- Among Medicare enrollees, Black Americans had three times higher risk of death due to fine particulate exposure than the national average.[19]
- Death rates from traffic-related pollution can be more than 30 times higher in some parts of the Bay Area than in other areas.[20]
- More than 5,000 new childhood asthma cases each year in the San Francisco Bay Area are attributed to NO_2, but the impacts are not equally distributed. On average, neighborhoods with higher percentages of residents of color experienced double the rate of asthma from traffic-related air pollution compared with predominantly white neighborhoods.[21]
- Up to one in two new cases of childhood asthma in parts of Oakland are attributed to this air pollution. Areas with elevated NO_2 levels included those with higher truck traffic due to presence of highways, truck routes or industrial activity that attracted trucks.[22]

AIR POLLUTION IS LINKED TO

Asthma
Preterm birth
Low birth weight
Dementia
Heart disease
Stroke

Health-damaging NO_2 emissions are largely due to medium- and heavy-duty trucks and buses

Heavy-duty trucks and other diesel-burning vehicles are a major source of nitrogen dioxide pollution. Freight trucks and buses make up around 10% of the vehicles on U.S. roads, but they are responsible for nearly half of the transportation sector's nitrogen oxide emissions.[23]

Diesel trucks emit significant pollution at start up, while idling, and traveling at low speeds.

Air pollution from diesel trucks causes harm at all stages of life

Developing asthma changes a child's life. It changes the trajectory of physical, emotional and academic growth. Asthma is the leading cause of missed school days each year and has been linked to diminished school performance.[24] Nearly one in two children with asthma miss at least one day of school each year because of their asthma. Collectively across the country, asthma causes more than 10 million missed days of school each year.[25]

Although ambient air pollution exposure has been long been associated with asthma exacerbations in children, whether air pollution contributes to the development of asthma among children has been an area of active debate—until recently.

Recent consistent evidence has shown that exposure to traffic-related air pollution (measured by nitrogen dioxide (NO_2) exposures) increases the risk of the development of childhood asthma (see sidebar). EPA's own 2016 Assessment of Nitrogen Oxides states "There is likely to be a causal relationship between long-term NO_2 exposure and respiratory effects based on the evidence for development of asthma".[26] This evidence includes several large cohort studies, systematic review and synthesis of this literature in meta-analyses and increasing understanding of the biological mechanisms.

Air pollution from trucks is also associated with increased risks at other stages of life. We now know that air pollution raises the risk of preterm birth and low birth weights.[27] Later in life, air pollution increases the risk of dementia,[28] in addition to heart disease and stroke.[29]

When children get sick, caregivers likely reduce their productivity in the workforce, or drop out entirely, to manage medical needs and remain available for the unexpected. Workers who take unexpected sick leaves may see their careers stall or take themselves out of the running.

Advances in understanding children's asthma

Scientists found that a drop in nitrogen dioxide (NO_2), over a period of air pollution decline, was associated with a **reduction in asthma** incidence among southern California elementary school students.

Another study found that an alternative standard of 20 parts per billion NO_2 was estimated to result in **20% lower** childhood asthma incidence compared to actual exposure levels.

(Garcia, Erika, et al. "Effects of policy-driven hypothetical air pollutant interventions on childhood asthma incidence in southern California."*Proceedings of the National Academy of Sciences* 116.32 (2019): 15883-15888.)

In studies of Latino and Black children across five cities, a higher average NO_2 exposure during infancy was associated with higher likelihood of childhood asthma diagnosis.

(Nishimura, Katherine K., et al. "Early-life air pollution and asthma risk in minority children. The GALA II and SAGE II studies." *American journal of respiratory and critical care medicine* 188.3 (2013): 309-318.)

A long-term study of Toronto children found a 17% increased risk of asthma development among those with **higher exposure** to NO_2 and ozone.

(To, Teresa, et al. "Early life exposure to air pollution and incidence of childhood asthma, allergic rhinitis and eczema." *European Respiratory Journal* 55.2 (2020).)

A study found a significant relationship between air pollution exposures and diagnosis of **childhood asthma**. Researchers found that there was a 4% increase in risk of asthma development with **increasing NO_2** levels at the child's residential address.

(Tetreault, Louis-Francois, et al. "Childhood exposure to ambient air pollutants and the onset of asthma: an administrative cohort study in Québec." *Environmental health perspectives* 124.8 (2016): 1276-1282.)

More data is needed on warehouses and air pollution

Right now, there is no public, national database of warehouse locations.

Warehouse locations are hard to identify

It is very hard to identify the locations of current and proposed warehouses. Right now, there is no public, national database of warehouse locations. Private databases such as Data Axle and Costar are expensive and are limited in search capacity and data availability. Individuals can create their own databases by checking local permits or searching for open warehouse jobs, though this likely won't be comprehensive. Since warehouses are distinctive shapes and sizes, satellite imagery may offer another approach to identifying warehouse locations.

Monitoring and modeling aren't keeping up

The extent of air monitoring, and the conclusions drawn from models about how monitoring readings reflect the air people breathe, are not keeping up with the proximity of people to truck traffic.

Many regulatory monitors capture data only one out of every six days.[30] A recent study found that companies pollute more when the government isn't watching.[31] The monitoring of near-road $PM_{2.5}$ is limited to areas with large populations, meaning that near-road hotspots in less populous areas will likely be unmonitored. There are only a couple of hundred operational reference grade NO_2 monitors around the country.[32] Warehouses are currently not required to monitor air emissions from activities on site.

The models experts use to understand the impact of truck emissions near warehouses also aren't keeping up. Since land use models are updated only every five or ten years, they may not include warehouses built in since the model update.[33] Warehouses are also not included in the National Emissions Inventory as potential emissions sources.[34] There is no transparency into where old trucks are operating. One recent study found that emissions around warehouses were three times greater than previously known.[1] As a result, emissions from warehouses may be significantly under-counted.

Solutions are affordable and available

Fortunately, solutions to understand air pollution at a neighborhood level are increasingly available. More communities now have insights into where potential hotspots are. Data confirms their concerns and helps them to request interventions to accelerate investments in zero-emissions goods transport.

Monitoring

Innovation in monitoring technologies can shine a light on warehouse emissions. Satellites are already observing warehouse emissions, and satellite imaging will soon offer more temporal resolution. For many years now, NASA and NOAA have been operating a suite of satellites. Many of these follow polar orbits and collect near-global readings once per day at approximately the same time every day in each location.[35] Satellite-derived data could be used to supplement the existing ground-level ambient monitoring network, helping to provide more continuous monitoring coverage and to identify pollution hotspots.[36] Researchers are using atmospheric composition satellite data to measure levels of NO_2, certain volatile organic compounds, and $PM_{2.5}$.[37] In addition, over the next few years an increasing number of satellites will be geostationary, meaning they will maintain a position over the same region, allowing for a higher frequency of measurements.[38]

Satellite Insights

In 2019, satellite-observed levels of NO_2 in neighborhoods with the greatest percentage of **residents of color** were more than **twice as high** as levels in the neighborhoods with the fewest residents of color. Even at the height of COVID lockdowns, with many cars off the road, the former neighborhoods had one and a half times higher NO_2 levels than the pre-pandemic average for the latter neighborhoods, in part due to **persistent truck traffic**.[39]

Hunter Kerr, Gaige, Goldberg , Daniel L., Anenberg, Susan C., COVID-19 pandemic reveals persistent disparities in nitrogen dioxide pollution, PNAS 118(30), July 19, 2021, https://doi.org/10.1073/pnas.202240911

Communities, researchers and environmental agencies can also use low-cost sensors to help fill in temporal and geographic monitoring gaps. Air sensor accuracy varies widely across different brands and further varies based on measured pollutants, relative humidity, and temperature.[40] As with satellite data, low-cost sensors perform better when they are calibrated to nearby Federal Reference Monitors.

Low-cost Sensor Insights

EDF's 100 x 100 project deployed 100 low-cost black carbon monitors. EDF and partners found a hotspot in Oakland where **pollution from refrigerated truck**s outside a food storage facility overnight was twice as high as daytime concentrations.

Warehouse inventory

Private workarounds are no substitute for a comprehensive, regularly updated, free, national database of current and proposed warehouses. Public leaders can require disclosure in an easily-accessible, searchable format of warehouse data. Relevant disclosure should include warehouse location, arterial roads, number of loading docks, expected truck trips, ownership and secured lenders. Leaders should also require disclosure of proposed warehouses, with projected truck traffic and emissions expected.

Zero-emissions vehicles and charging

Zero-emissions solutions for goods transport are both currently available and affordable. There has been tremendous progress in the availability and readiness of zero-emission vehicles suitable for good movement. Delivery vans, yard trucks, and regional haul trucks all have attractive zero-emission options today.[41] Manufacturers are investing billions to expand zero-emission options for long-haul trucking as well.[42] States and cities can spur the transition to zero-emission trucks within their jurisdiction through policies such as the Advanced Clean Truck program, easing permitting requirements for charging infrastructure installation and purchase incentives.

Indirect Source Review

California's South Coast Air Quality Management District has pioneered an Indirect Source Review rule to incentivize reductions in emissions at warehouses.[43] This points system encourages a move away from polluting activities on site, improves transparency and funds reductions in exposure in vulnerable neighborhoods. The Clean Air Act explicitly supports non-federal regulation of locations that attract mobile sources of air pollution, and the ability to enact an Indirect Source Review does not depend on California's unique authority under the Clean Air Act.[44]

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Appendix

Data uses the U.S. Census Bureau's American Community Survey 5-year estimates at the census tract level. Population figures are rounded to the nearest thousand, and percentages are rounded to the nearest whole number.

California

Total warehouses: 4,618
All warehouse neighbors: 3,900,000

Category	Total population	Compared to state %	% in warehouse neighbors	% in state
Hispanic/Latino	2,090,000	137%	54%	39%
Black	335,000	122%	9%	7%
American Indian	73,000	122%	2%	2%
Asian	668,000	103%	17%	17%
White	2,090,000	84%	54%	64%
Children under 5	263,000	108%	7%	6%
Adults 65+	433,000	79%	11%	14%
Below federal poverty line	605,000	118%	16%	13%
Less than high school education	610,000	144%	24%	17%
Limited English proficiency	610,000	148%	6%	4%

Colorado

Total warehouses: 449
All warehouse neighbors: 250,000

Category	Total population	Compared to state %	% in warehouse neighbors	% in state
Hispanic/Latino	89,000	166%	36%	22%
Black	2,4000	182%	10%	5%
American Indian	7,000	122%	3%	2%
Asian	11,000	100%	4%	4%
White	199,000	91%	80%	87%
Children under 5	16,000	109%	6%	6%
Adults 65+	26,000	76%	10%	14%
Below federal poverty line	33,000	133%	13%	10%
Less than high school education	25,000	187%	15%	8%
Limited English proficiency	9,000	222%	3%	2%

Appendix

Data uses the U.S. Census Bureau's American Community Survey 5-year estimates at the census tract level. Population figures are rounded to the nearest thousand, and percentages are rounded to the nearest whole number.

Illinois

Total warehouses: 2,401
All warehouse neighbors: 1,981,000

Category	Total population	Compared to state %	% in warehouse neighbors	% in state
Hispanic/Latino	655,000	199%	33%	17%
Black	422,000	139%	21%	15%
American Indian	18,000	123%	1%	1%
Asian	135,000	117%	7%	6%
White	1,169,000	80%	59%	74%
Children under 5	138,000	113%	7%	6%
Adults 65+	225,000	82%	11%	14%
Below federal poverty line	355,000	131%	18%	14%
Less than high school education	239,000	158%	19%	12%
Limited English proficiency	32,000	198%	2%	1%

Massachusetts

Total warehouses: 585
All warehouse neighbors: 787,000

Category	Total population	Compared to state %	% in warehouse neighbors	% in state
Hispanic/Latino	182,000	196%	23%	12%
Black	104,000	140%	13%	9%
American Indian	7,000	120%	1%	1%
Asian	62,000	104%	8%	8%
White	581,000	91%	74%	81%
Children under 5	4,9000	118%	6%	5%
Adults 65+	106,000	84%	14%	16%
Below federal poverty line	125,000	160%	16%	10%
Less than high school education	86,000	170%	16%	9%
Limited English proficiency	28,000	196%	4%	2%

Appendix

Data uses the U.S. Census Bureau's American Community Survey 5-year estimates at the census tract level. Population figures are rounded to the nearest thousand, and percentages are rounded to the nearest whole number.

Maryland

Total warehouses: 696
All warehouse neighbors: 458,000

Category	Total population	Compared to state %	% in warehouse neighbors	% in state
Hispanic/Latino	51,000	110%	11%	10%
Black	182,000	125%	40%	32%
American Indian	5,000	108%	1%	1%
Asian	29,000	86%	6%	7%
White	236,000	88%	51%	58%
Children under 5	32,000	117%	7%	6%
Adults 65+	59,000	86%	13%	15%
Below federal poverty line	62,000	151%	14%	9%
Less than high school education	42,000	135%	13%	10%
Limited English proficiency	10,000	126%	2%	2%

North Carolina

Total warehouses: 1,468
All warehouse neighbors: 562,000

Category	Total population	Compared to state %	% in warehouse neighbors	% in state
Hispanic/Latino	75,000	151%	13%	9%
Black	212,000	165%	38%	23%
American Indian	8,000	71%	1%	2%
Asian	23,000	134%	4%	3%
White	305,000	76%	54%	71%
Children under 5	40,000	116%	7%	6%
Adults 65+	66,000	80%	12%	15%
Below federal poverty line	121,000	131%	22%	16%
Less than high school education	63,000	126%	17%	14%
Limited English proficiency	7,000	176%	1%	1%

Appendix

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New jersey

Total warehouses: 1,777
All warehouse neighbors: 1,898,000

Category	Total population	Compared to state %	% in warehouse neighbors	% in state
Hispanic/Latino	641,000	175%	34%	19%
Black	391,000	139%	21%	15%
American Indian	15,000	116%	1%	1%
Asian	207,000	109%	11%	10%
White	1,091,000	82%	58%	70%
Children under 5	130,000	116%	7%	6%
Adults 65+	230,000	82%	12%	15%
Below federal poverty line	296,000	146%	16%	11%
Less than high school education	214,000	151%	17%	11%
Limited English proficiency	34,000	180%	2%	1%

New York

Total warehouses: 1,115
All warehouse neighbors: 2,543,000

Category	Total population	Compared to state %	% in warehouse neighbors	% in state
Hispanic/Latino	715,000	148%	28%	19%
Black	602,000	137%	24%	17%
American Indian	30,000	113%	1%	1%
Asian	268,000	112%	11%	9%
White	1,377,000	82%	54%	66%
Children under 5	167,000	111%	7%	6%
Adults 65+	338,000	83%	13%	16%
Below federal poverty line	478,000	137%	19%	14%
Less than high school education	300,000	130%	17%	13%
Limited English proficiency	92,000	133%	4%	3%

Appendix

Data uses the U.S. Census Bureau's American Community Survey 5-year estimates at the census tract level. Population figures are rounded to the nearest thousand, and percentages are rounded to the nearest whole number.

Texas

Total warehouses: 3,801
All warehouse neighbors: 2,182,000

Category	Total population	Compared to state %	% in warehouse neighbors	% in state
Hispanic/Latino	1,108,000	129%	51%	39%
Black	407,000	141%	19%	13%
American Indian	24,000	90%	1%	1%
Asian	138,000	114%	6%	6%
White	1,445,000	87%	66%	76%
Children under 5	165,000	107%	8%	7%
Adults 65+	213,000	80%	10%	12%
Below federal poverty line	408,000	130%	19%	14%
Less than high school education	314,000	140%	23%	16%
Limited English proficiency	124,000	152%	6%	4%

Washington

Total warehouses: 691
All warehouse neighbors: 384,000

Category	Total population	Compared to state %	% in warehouse neighbors	% in state
Hispanic/Latino	64,000	132%	17%	13%
Black	36,000	168%	9%	6%
American Indian	12,000	107%	3%	3%
Asian	59,000	139%	15%	11%
White	272,000	88%	71%	81%
Children under 5	24,000	102%	6%	6%
Adults 65+	47,000	82%	12%	15%
Below federal poverty line	54,000	133%	14%	11%
Less than high school education	30,000	135%	12%	9%
Limited English proficiency	9,000	147%	2%	2%

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