



HOUSING HABITABILITY AND HEALTH: OAKLAND'S HIDDEN CRISIS

A REPORT ON CHILDHOOD LEAD AND ASTHMA BY ALAMEDA COUNTY PUBLIC HEALTH
AND ALAMEDA COUNTY HEALTHY HOMES DEPARTMENT



April 2018

Acknowledgements

This report was produced by the Alameda County Public Health Department and the Alameda County Healthy Homes Department.

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April 2018

EXECUTIVE SUMMARY

This report examines connections between deepening health problems and disparities in health among children in Oakland and the conditions created by dilapidated housing, especially given the Bay Area's high rents and extreme housing shortage. While gentrification and displacement have changed many neighborhoods and brought an influx of wealthier residents to Oakland, significant disparities remain in health outcomes that are tied to race, income, neighborhood poverty level, and housing status, among other social and environmental conditions. An emerging picture from a new data analysis suggests that as the housing crisis continues to deepen in Oakland, lower-income residents are in effect becoming trapped in the only housing they can afford—with housing conditions that have the potential to cause serious health consequences, especially to young children. Key health outcomes include lead poisoning and asthma, which occur at higher rates in neighborhoods lacking safe, decent, and affordable housing. These neighborhoods have higher poverty, fewer resources, and weaker infrastructure to support good health, as well as greater exposure to health risks. The shortest life expectancies are concentrated in these places. Current data (2011-2015) shows a 20-year difference in life expectancy between a community in West Oakland and a community in the Northwest Hills of Oakland.

Key Findings:

- Oakland has some of the highest blood lead level rates in Alameda County and California, with eight zip codes that report between 6.0 to 7.6 percent elevated blood lead levels among children under six years old who have been tested.
- While asthma prevalence has not changed significantly in Oakland and Alameda County since 2001, there remain large disparities in asthma burden. African Americans have especially disproportionately high rates of asthma emergency department visits and hospitalizations. In Oakland, there are about 440 asthma emergency department visits per year for children under five. Over half are African American even though African Americans make up only 20.6 percent of the population under five in Oakland.
- Poverty has deepened in many neighborhoods, suggesting a widening economic divide and greater health inequities for residents according to race and place. Between 2000 to 2011-2015, census tracts in East Oakland and parts of West Oakland and North Oakland showed a percentage point gain of over 15 percent of persons at 200 percent poverty level.

As the housing crisis deepens in Oakland and throughout the Bay Area, tenants are at greater risk of exposure to deteriorating housing conditions in order to keep their rents from rising or from losing their housing. Substandard housing is putting the health of residents in danger. These **Recommendations** focus on improving gaps in the current system and on better alignment of policy, practice, and resources that are urgently needed to protect the health of children at risk of asthma and lead poisoning from their housing conditions.

1. Proactive or healthy housing inspection program

Because of significant risks and challenges tenants face if they report problems (fear of eviction, rent increase or other retaliation, and the challenge of navigating agency bureaucracies), many substandard housing conditions go unreported in complaint-driven code enforcement inspection systems. Additionally, under complaint-based systems, problems often don't get reported until they are severe, making them riskier to tenant health and more expensive for landlords to repair. A proactive system would remove the risks and challenges of reporting from tenants and ensure that all rental housing is inspected and brought up to code when needed.

2. Tenant protections

Dramatic increases in housing costs, along with widening economic inequality, has led to more renters vulnerable to housing instability. This includes extreme cost burden; being at greater risk of eviction and harassment from landlords; overcrowded housing; and living in poor housing and neighborhood conditions. Implementing and enforcing tenant protection policies—including rent stabilization, just cause eviction and anti-harassment ordinances—are crucial, along with resources for tenant counseling and legal services.

3. Repairing and preserving existing housing

Preserving housing at all affordability levels means prioritizing funding for rehabilitation and repair of existing housing stock, as well as requiring long-term affordability restrictions and replacing affordable units on a one-for-one basis.

4. Improve blood lead testing among children at high risk of exposure

State and local healthcare insurers and providers and health departments must do more to ensure identification of children with high risk of lead exposure, to ensure those at risk receive blood lead level testing, and to ensure those with elevated blood lead levels and identified sources of lead exposure receive supportive services and that lead source remediation takes place.

5. Improve data collection and sharing

Greater alignment and coordination between local government, health providers, and community-based organizations is needed in order to address the gaps in data. No single source of data exists to assess the habitability conditions of all rental housing units with related health issues at the local level.

The costs of substandard housing can be long term and devastating for the children and families affected, while ultimately impacting everyone in the city and county. Childhood asthma and lead poisoning cost the U.S. billions of dollars each year through healthcare, missed school and work time, special education, juvenile justice, and social services. Yet both of these chronic health problems have a feasible housing solution. Instead of utilizing secondary prevention methods—which entail finding children after they've become sick and diagnosed with elevated blood lead levels or repeated asthma attacks, and then addressing the hazards in their home—we must shift to primary prevention efforts that improve both the health of residents and the housing stock for all.

INTRODUCTION

This report examines connections between deepening health problems and disparities in health among children in Oakland and the conditions created by dilapidated housing, especially given the Bay Area’s high rents and extreme housing shortage. While gentrification and displacement has changed many neighborhoods and brought an influx of wealthier residents to Oakland, significant disparities remain in health outcomes that are tied to race, income, neighborhood poverty level, and housing status, among other social and environmental conditions. An emerging picture from a new data analysis suggests that as the housing crisis continues to deepen in Oakland, lower-income residents are in effect becoming trapped in the only housing they can afford—housing conditions that have the potential to cause serious health consequences, especially for young children. Key health outcomes include lead poisoning and asthma, which occur at higher rates in neighborhoods lacking safe, decent and affordable housing. These neighborhoods have higher poverty, fewer resources, and weaker infrastructure to support good health, as well as greater exposure to health risks. The shortest life expectancies are concentrated in these places.¹ Current data (2011-2015) shows a 20-year difference in life expectancy between a community in West Oakland and a community in the Northwest Hills of Oakland.

Oakland is a critical site of the housing and displacement crisis in the Bay Area. Given its expensive rental market, low vacancy rates, shortage of affordable housing and old housing stock, tenants are at greater risk of exposure to deteriorating housing conditions in order to keep their rents from rising or from getting displaced. Renters with higher *housing cost burden*, meaning their housing costs are greater than 30 percent of their income, are at especially high risk because they have a thinner margin of income left over after paying their monthly rent. They have fewer options to move or relocate, and little money left to pay for utilities, food, medicine, transportation, and other necessities. The higher the housing cost burden, the more likely renters are to live in overcrowded and substandard conditions.ⁱ Up to 7,000 children in Oakland/Emeryville/Piedmont live in renter households that are severely cost-burdened at 50 percent or more.ⁱⁱ Substandard housing conditions are linked to serious health consequences.

Young children bear the highest disease burden of these housing costs. Permanent brain damage from lead poisoning robs children of their potential as human beings. Chronic asthma leads to missed school days, repeated hospitalizations, and physical impairment; in extreme cases, even death. Rather than experiencing home as a supportive and protective anchor, children in distressed housing conditions may face anxiety, depression, and challenges with school performance, along with early learning and developmental problems as a result of the condition of their home. Adverse experiences in early childhood are especially critical because they can affect health throughout the life course.ⁱⁱⁱ

¹ Life expectancy is a good global indicator of health. It can be thought of as the average age of death in a certain area or for a certain group.

Race and ethnicity is strongly associated with risk of exposure to conditions leading to both childhood asthma and lead poisoning. African American children especially have higher rates of asthma emergency department visits and elevated blood lead levels both locally and across the country. These health inequities reflect the greater morbidity (disease) and mortality (death) rates of residents in lower-income neighborhoods, which predominantly include people of color. Communities of color face disparate risk from older, poor-quality housing—a condition stemming from policies and practices that bolstered and maintained racial segregation and economic disinvestment. Redlining and racial covenants excluded people of color from homeownership and intergenerational wealth transfer, thereby contributing to housing instability. Current racial bias and discrimination continue to affect people’s housing conditions. For example, African Americans are more likely to be denied home loans, experience discrimination when applying for rental housing, and experience evictions at higher rates.^{iv}

The current system suffers from misalignment and lack of coordination, with different public agencies in different jurisdictions, along with various community nonprofit organizations and healthcare institutions, all addressing pieces of the problem. Without adequate coordination, problematic property owners—although often a small minority of all landlords—slip through the cracks, have rental housing units that do not meet rental housing unit standards, and profit at the expense of people’s health. The disjointedness of data collection and analysis for the system also limits our ability to understand the problem and to more effectively work together to design and implement solutions to address the problem. No single source of data exists to assess the habitability conditions and related health impacts of all rental housing units at the local level. Instead, it is necessary to approximate these using various geographic levels of data from the U.S. Census, American Housing Survey, city code enforcement cases, and data from multiple public agencies. Just as important for understanding the local impacts of housing habitability are the voices of the public health practitioners and clinicians who see daily consequences for children in home visits or examining rooms, and the voices of families who struggle to navigate these systems to keep their housing and protect their health.

Even with this limited kaleidoscope of data pieces, the overall picture is an alarming one that reveals a collective problem that renters, rental property owners, code enforcement agencies, healthcare providers, public health agencies, and policymakers all have a role in solving. As the agencies responsible for protecting the public’s health, Alameda County Public Health Department and Alameda County Healthy Homes Department are raising awareness and proposing recommendations to address and reduce rental housing habitability issues at the nexus of the displacement and affordability crisis, a looming public health threat to the lives and futures of children and families.

LEAD EXPOSURE



A house in Oakland that was later remediated for lead-contaminated paint by Alameda County Healthy Homes Department.

Lead is a naturally occurring metal found deep in the ground. It has been used in a variety of products found in and around our homes and other buildings, including paint, pipes and fixtures, and gasoline. Lead-based paint (in pre-1978 homes and other buildings) and lead-contaminated soil are the most common sources of lead poisoning in Alameda County. Other sources include contaminated air and water, among others.

Lead gets into your body in two ways – through breathing it in or by eating/drinking something containing it. Lead exposure can

come from a combination of the sources listed above, usually over time. Lead can affect almost every organ and system in your body. The most sensitive is the central nervous system (the brain), particularly in children. Lead also damages kidneys and the reproductive system. The effects are the same whether it is breathed or swallowed.

Childhood lead poisoning remains a serious problem in the United States, despite being the most preventable environmental disease among young children. With the ongoing lead contamination crisis in Flint, Michigan, and the rise in news coverage about lead risks in cities across the country, including Oakland, this is a critical moment of national attention to a persistent and hidden threat.

Half a million young children in the United States have blood lead levels above 5 micrograms per deciliter (the point at which the Centers for Disease Control (CDC) recognizes as lead poisoning). According to the CDC, 25.9 percent of children age 1-2 years living in housing built before 1950 have blood lead levels at 5 mcg/dl or greater. More recent research has shown that no amount of lead is safe, with evidence of irreversible damage to a child's developing brain occurring at lead levels much lower than previously believed.^v

Children diagnosed with lead poisoning suffer permanent brain damage that can result in learning disabilities, speech and language deficiencies, Attention Deficit Hyperactive Disorder (ADHD), developmental delay, behavioral problems, and lifelong health impacts as adults. Lead is associated with anemia, hypertension, cardiovascular and renal disease, delayed puberty, and reduced fertility. Perinatal lead poisoning can have lasting effects on the mother, fetus, and breastfeeding child.^{vi} Childhood lead poisoning may present as learning and behavioral issues; in teens and young adults, it may be associated with increased school drop-out rates and aggressive behavior.^{vii}

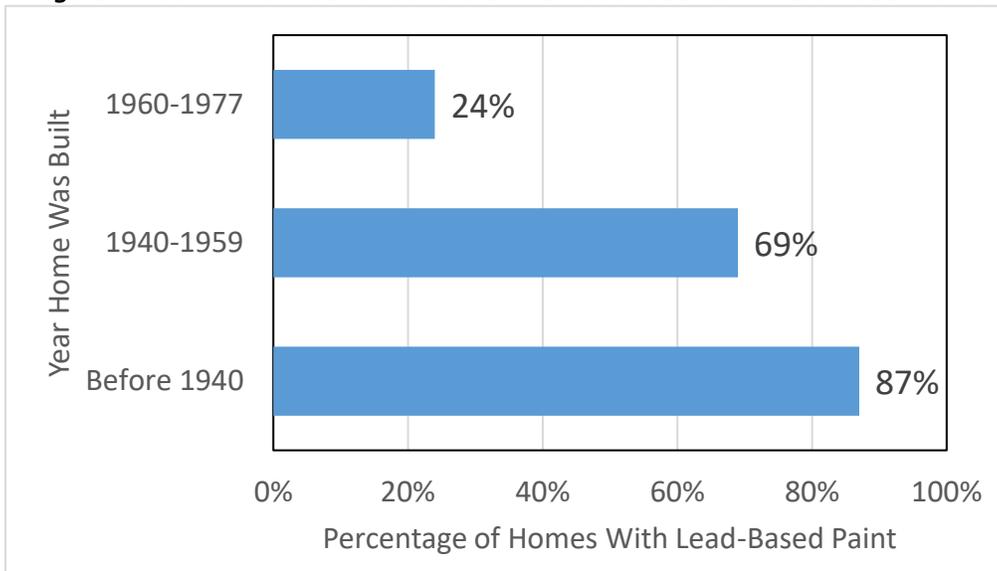
Because individuals with abnormal levels of lead in their bodies may not have obvious symptoms, a blood lead test is warranted with known sources of potential lead exposure and with risks of lead exposure.^{viii}

Lead-based paint and the contaminated dust it creates in homes and lead-contaminated soil remains one of greatest sources of exposure for children. In 1977, the federal government banned the use of lead-based paint in residential properties. Therefore, the year 1978 is used as a benchmark year for identifying housing constructed with lead paint, sometimes under layers of newer paint. If the paint is in good shape, the lead paint is usually not a problem. Deteriorating lead-based paint (peeling, chipping, chalking, cracking, damaged, or damp) is a hazard and needs immediate attention.^{ix}

In cities with older housing stock, such as Oakland, many residents live in buildings with lead paint that may be exposed or deteriorate, as described above, as a result of lack of maintenance over time. Children, due to crawling and their naturally exploratory natures, are at most risk for inhaling and ingesting lead dust and chips from lead paint in the building as they touch walls, windows, and floors where lead dust can accumulate, and play outdoors on soil that is contaminated by deteriorated exterior lead-based paint and other lead sources, such as industrial pollution and past use of leaded gasoline. Over time, paint dust and chips become loose from wear and tear (particularly from windows or doors opening and closing) or from improper home renovations.

In Oakland, 81.1 percent of the city's total 158,937 housing units were built in 1979 or earlier, with 37.3 percent built in 1939 or earlier.^x From national studies, we know that more than half of homes built prior to 1978 contain some lead-based paint. Among homes built before 1960, the amount with lead-based paint is 76 percent; among homes built before 1940, the share is 86 percent.^{xi} Of the older housing stock, rental housing occupied by low-income families in particular carries the greatest lead risk.^{xii}

Figure 1: Year Home Was Built and the Likelihood It Contains Lead-Based Paint



From 2007 to 2011, about 5.3 percent out of 20,485 Oakland children 0-5 years screened had BLL \geq 4.5mcg/dl. (Because of data limitations, of the 66,642 children 0-5 years screened in Alameda County during this time, location was unknown for 22.8 percent. It's likely many of the 15,000 for whom location was unknown were from Oakland.)

As another sample, in 2012, out of 2,532 Oakland children 0-5 years who were screened, there were 255 found to have elevated blood lead levels, or 6.8 percent.² Oakland has some of the highest blood lead level rates in Alameda County and California, with eight zip codes that report between 6.0 and 7.6 percent elevated blood lead levels among children under six years old who have been tested (Table 1). California does not require universal testing of children. Only those considered at risk of exposure, including children enrolled in Medi-Cal or living in older housing, are indicated to be screened, which amounts to about 10 percent of the population in Oakland.^{xiii}

Along with age of housing, socioeconomic status is another key factor contributing to elevated BLL in children. Housing age is often found to be the greatest predictor of elevated childhood BLL. Socioeconomic factors are related to many disease outcomes and health disparities in the U.S., and lead exposure is no exception. Children of lower socioeconomic level have been found in many studies to show higher incidences of elevated BLL.^{xiv} In Oakland, 28 percent of the African American population and 25 percent of the Hispanic population are represented among children found to have elevated blood lead levels. These numbers reflect the national landscape: 28 percent of African American households and 29 percent of poorer households face housing-related lead exposure risks, compared with 20 percent of white and 18 percent of wealthier households.^{xv}

Table 1: Alameda County Children Tested in 2012 (Zip Codes with Minimum of 250 Children Tested)

Source: California Department of Public Health

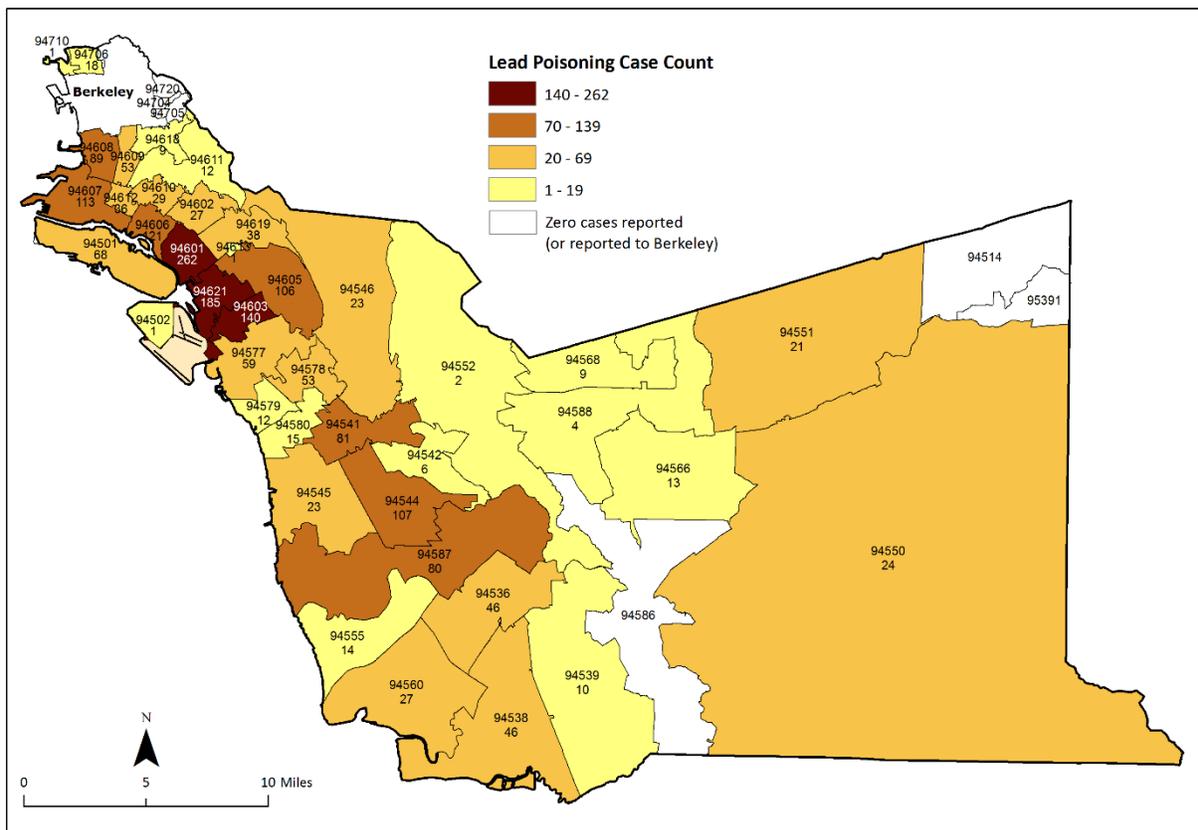
Zip Code	Children Age <6 Tested	Children Age <6 with BLL \geq 4.5 mcg/dl	% Children Age <6 with BLL \geq 4.5 mcg/dl	Approximate Neighborhood
94601	502	38	7.57%	Fruitvale
94606	295	22	7.46%	San Antonio
94605	377	27	7.16%	Upper Eastmont/Castlemont
94607	253	18	7.11%	West Oakland
94621	448	28	6.25%	Seminary/Havenscourt
94608	257	16	6.23%	North Oakland/Emeryville
94538	261	16	6.13%	Fremont/Blacow
94603	400	24	6.00%	Deep East Oakland/Elmhurst
94501	382	17	4.45%	Alameda island
94587	375	10	2.67%	Union City

² The national average is 2.5 percent. However, it can be misleading to compare percentages, because the population of children tested varies so greatly.

94541	463	12	2.59%	North Hayward/Cherryland
94577	275	7	2.55%	San Leandro/Durant
94578	330	8	2.42%	San Leandro/Bay-O-Vista
94536	257	5	1.95%	North Fremont/Brookvale
94544	613	10	1.63%	South Hayward

In 2012, the Community Assessment, Planning, and Education (CAPE) Unit of ACPHD conducted an analysis of lead screening data for children 0-20 years of age in Alameda County who had been tested from 2007-2011. The analysis found that children living in Oakland and Emeryville had the highest percentages of elevated BLL (5.3 percent and 4.6 percent, respectively) (Figure 2). The actual number of lead-exposed children is unknown given the current limitations of testing and data. In order to better understand the scope of the problem, CAPE also developed a predictive model using statistical methods to incorporate multiple known risk factors for elevated BLL in children at the Census tract level throughout the county (Figure 3).^{xvi}

Figure 2: Number of Reported Lead Poisoning Cases $\geq 5\text{mcg/dl}$, Ages 0-20 Years

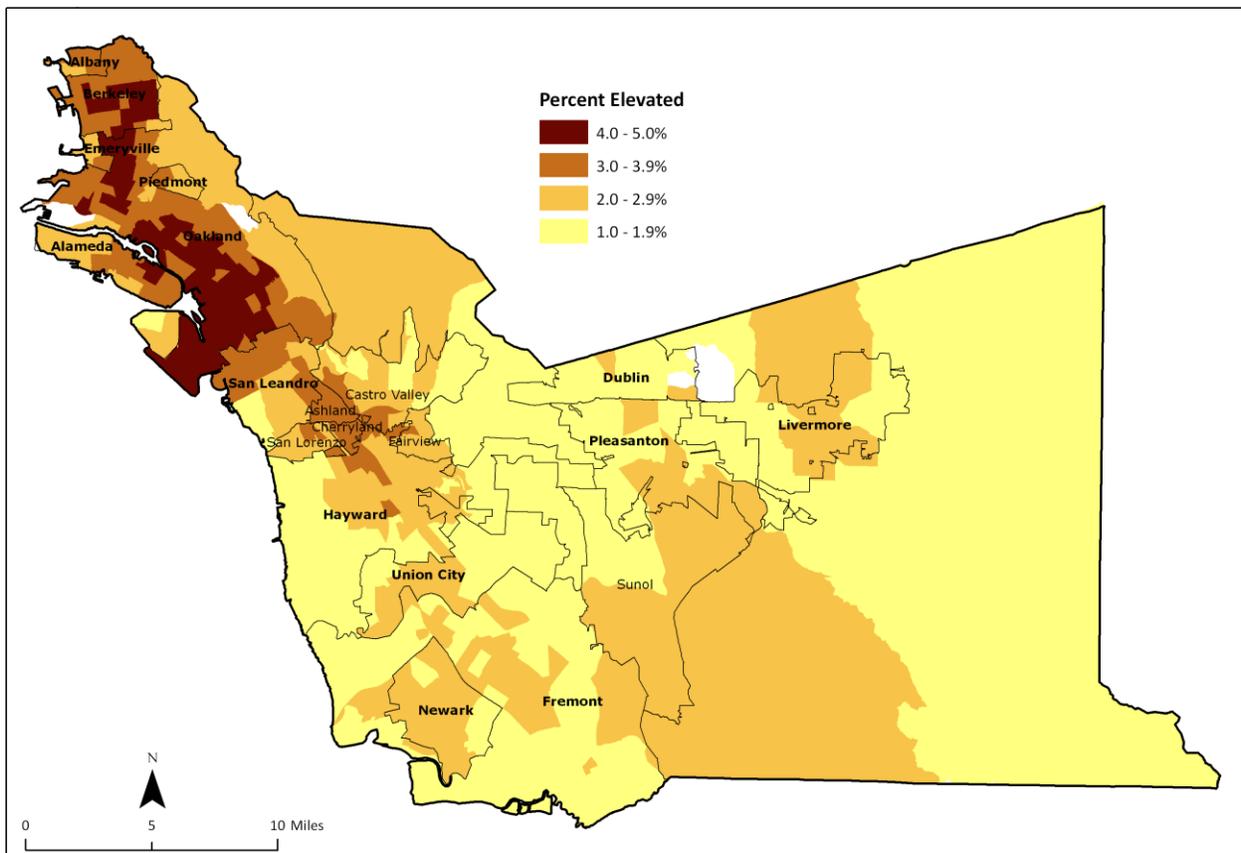


Source: CAPE, with data from CDA CLPPP 2007-2011.
Note: Berkeley maintains a separate registry.

A MOM'S PERSPECTIVE: CATHERINE'S STORY

Catherine is the mother of a three year-old boy living in the East Oakland zip code 94621, where elevated blood lead levels affect 6.5 percent of children tested. Her son, Robbie, was tested on his second birthday and found to have a lead level of 12.3 mcg/dl (5 mcg/dl is the threshold for lead poisoning). As a result of the lead poisoning, Robbie has become extremely hyperactive, staying up until 3 a.m. every night and constantly running around. At three years old, he is mostly non-verbal and was recently diagnosed as autistic. He needs at least two adults to accompany him outside because he runs toward traffic and other hazards. Because of the demands of his care, Catherine had to quit her job as a manager at PetCo, and the family is struggling to stay afloat financially.

Figure 3: Predicted Elevated Blood Lead Level $\geq 5\text{mcg/dl}$



Source: CAPE, with data from CDA CLPPP, Census 2010, and American Community Survey (ACS) 2006-2010.

Catherine and her husband rent an old house in a neighborhood off of 64th Avenue. “The paint was chipping everywhere in the back. He always played there,” she said. “There was paint chipping outside, and we played all the time in the summer. He goes walking around holding the wall, and then we go eat our lunch there, do the kiddie pool, water the plants. It’s just normal stuff, but you don’t know you’re killing your kid.”

They pay \$1,435 for the one-bedroom house, and in return for the affordable rent, the landlord seldom made repairs.

When the roof leaked, they had to complain many times before the landlord got it fixed. By then, water had leaked into the back walls of the house and caused the interior paint to peel as well. Though the landlord repaired the roof, she did not have the house repainted. When Alameda County Healthy Homes Department began case managing Robbie for lead poisoning, and notified the landlord after a home inspection, Catherine says she gave her a 22-page legal document asking her to state that she had been notified of the lead hazard in



Robbie, 3, playing next to the garage where peeling paint exposed him to lead poisoning. AC Healthy Homes Department abated by repainting the garage and installing a sandbox to cover exposed contaminated soil.

the house in return for a \$5,000 relocation payment. After Catherine refused to sign it, she received numerous phone calls from the landlord asking her to sign. The family is now trying to hang on in the house until they can save enough money to move.

“I went through a bad depression about it, feeling real guilty and blaming myself,” she said. “My only job is to protect my child. He was only one or two, and this happened. Only one year of having this child and you ruined his whole life.”

A PUBLIC HEALTH NURSE’S PERSPECTIVE: INTERVIEW WITH DIEP TRAN

What are the most common habitability problems that you see in clients’ homes?

If it’s a low-income neighborhood like East or West Oakland, then I will see mold, leaks, old carpets, rats, roaches, bed bugs, peeling chipping paint, bed bugs, everything.

Can you share a story of a child who has been poisoned by lead and what symptoms they presented with? What is the impact of lead on the body?

Most of the children we get have been exposed but they don’t have symptoms yet. If there are symptoms, they are vague, they can mimic other conditions. For example, a child will be slightly irritable, say no a lot, hit siblings a lot, toss and turn at night, have constipation, have anemia. A lot of them have anemia but it could also be from the diet. There is hyperactivity, learning

disabilities, but it is not evident when the child is one or two years old; we have to wait until the child goes to school at age five.

Can you describe a case where the family found out that the child was poisoned? What were the steps taken? What was the cost? What's entailed in the treatment of lead cases?

We don't treat until the child's blood lead level is above 4.5 mcg/dl of blood because the medicines also remove other good things in the body like potassium, calcium, creating a serious imbalance.

We found that most of the lead paint was on the outside of the apartment building, and the child happens to love playing right next to it. His playground is also an area where there is peeling paint and a high lead content in the soil. He would touch everything and put his fingers in his mouth.

I have a case of a child who came two years ago as a refugee. His blood lead level was 8 which was not too bad but it's not zero either. We want it to be at least under 2. We were able to figure out that the lead source may have been due to the eye makeup that they had been using since birth. The child's first blood lead level was 8. The doctor recommended another blood lead test and six months later when it was tested, his blood lead level went up to 72. It was from the house this time.

After moving to the United States and living in Fruitvale, it went up to 72. He was hospitalized and chelated. He was very hyperactive. I visited him after 9 p.m. and he could not sit still in his hospital bed. He was touching everything and practically climbing up the wall all night. We immediately did an inspection of the house because, once a child has been chelated, his body acts like a magnet and would attract more lead if there is still lead in the house. We found that most of the lead paint was on the outside of the apartment building, and the child happens to love playing right next to it. His playground is also an area where there is peeling paint and a high lead content in the soil. He would touch everything and put his fingers in his mouth. It's now three years later and I still have him. His levels have gone down though since I helped him move out of his apartment building.

Can you talk about the chelation process? What does it mean?

It means that you give the child a medication that will find the lead in the body and bind with it so that it can be excreted (taken out of the body) through the urine or feces. If the child's blood lead level is not too high, they will use oral chelation several times a day for one to two months. If the level is higher, they will do IV or intramuscular (IM) chelation. Usually it's so toxic that if they do IV and IM chelation, they only keep the child in the hospital for five days and after that the child goes home with oral medications. The chelation is so toxic because it removes potassium which is needed for your heart, removes calcium which is needed for growth and

also for the heart. It removes all the other essential electrolytes for your body. It also removes iron.

A child who is already anemic will take a much longer time to get rid of the lead that is already in their body. At the same time, that child, if there is still lead left in the home environment, will absorb more. It's a vicious cycle from which the child cannot get out, holding onto the lead and absorbing more if they the source of lead exposure is not removed or addressed.

When a child is chelated, how long are they vulnerable to lead?

Years and years. If you find the correct lead sources and make them inaccessible to the child, the blood lead level will start to drop but it would not go back to normal for years.

Can you talk about the developmental effects among children who were found to be exposed to lead or poisoned?

I see lead poisoning complemented with autism in many cases. They don't talk; they are anti-social, they don't look at you and most of them are also hyperactive, poor social skills, and not doing well in school.

What happens when you or your clients bring up the issue of lead-based paint in their homes to their landlords?

If they don't speak English, or look like they don't have papers—eviction, immediately. One mother with three young children was evicted three times in one year. She said she doesn't want to report the landlord to the police because she's afraid of being deported.

The landlords do it very fast, they just come in and throw out everything. One landlord tried to evict this family and the family said we have free legal assistance, we are not leaving the house. We don't know where to go and it's illegal what you are doing to us. The family goes to work and when they came home all the locks had been changed. They couldn't go in their house at all.

Depending on the parents' immigration status, if they are in the vulnerable group, undocumented, then eviction is very common. In one instance, I was doing a home visit to see the child and the landlord asked, "Are you here because of the lead? Give me money to fix the lead." A week later, the mother is evicted. It's very predictable.

ASTHMA



Amy Sholinbeck of ACPHD Asthma Start during a home visit.

Asthma is one of the most common chronic diseases, affecting 24.6 million Americans, 6.2 million of them children.^{xvii} It inflames and narrows the airways. These are tubes that carry air into and out of your lungs. It most often starts in childhood, but can affect people of all ages. Asthma symptoms start when irritants or triggers cause the lining of the airways to become inflamed (swollen) and narrow. The muscles around the airways

can then spasm (contract rapidly). This causes the airways to narrow even more. When the lining of the airways is inflamed, it produces more mucus. The mucus clogs the airways and further blocks the flow of air. When these symptoms are severe and not easily controlled, it's called an "asthma attack," which can be life threatening and is a major cause of emergency department (ED) visits and hospital admissions.

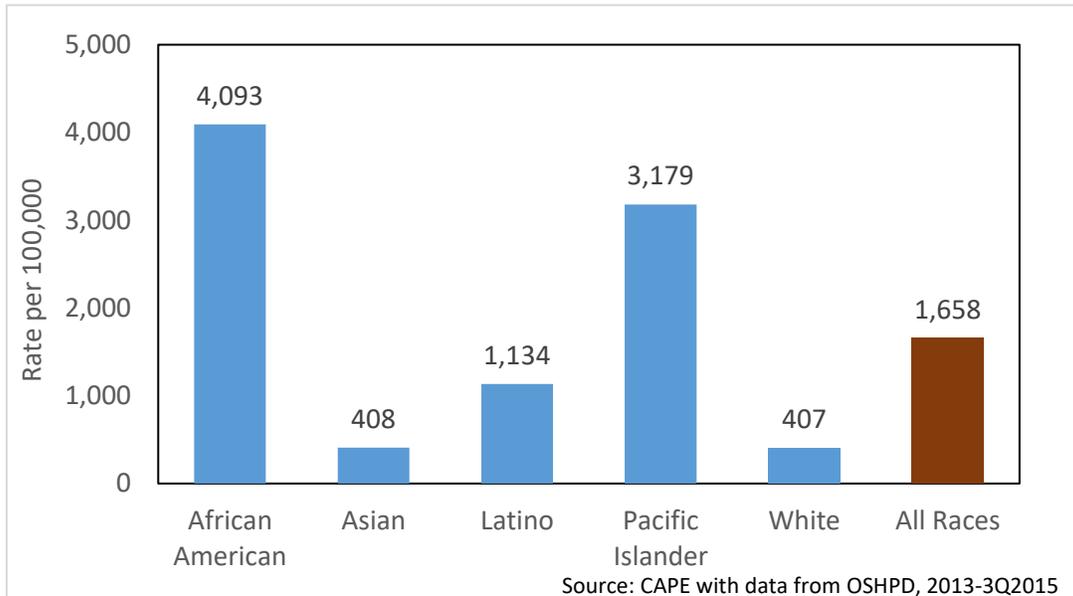
Symptoms of an asthma attack include the following:

- *Coughing.* Coughing from asthma is usually worse early in the morning and at night. This can lead to problems sleeping.
- *Tightness in the chest.* You may feel breathless and like something is squeezing your chest.
- *Wheezing.* A hoarse, squeaky, musical, or whistling sound when you breathe.
- *Coughing with mucus.*

Epidemiological evidence has shown asthma to be consistently associated with housing habitability conditions—notably indoor dampness and mold, as well as pests such as cockroaches and rodents. The evidence strongly suggests habitability as a causation of asthma exacerbation in children.^{xviii} According to another study, approximately 21 percent of asthma cases in the U.S. can be attributed to mold exposure in homes. The aggregate cost from asthma-related missed school and work days, medical costs and early deaths was estimated to be \$56 billion in 2007.^{xix}

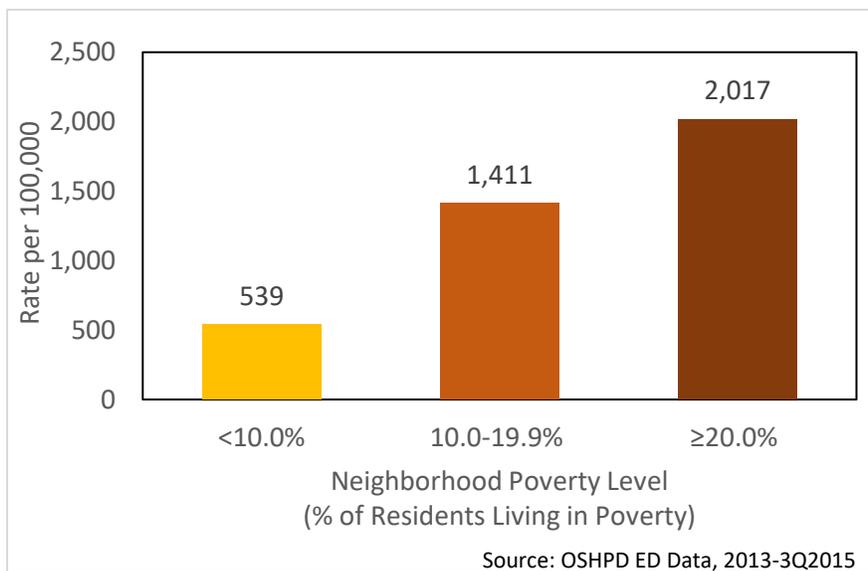
While asthma prevalence has not changed significantly in Oakland and Alameda County since 2001, there remain large disparities in asthma burden. African Americans have especially disproportionately high rates of asthma emergency department visits and hospitalizations. In Oakland, there are about 440 asthma ED visits per year for children under five years of age. Over half are African American even though African Americans make up only 20.6 percent of the population under five in Oakland. In January 2013-September 2015, African American children under the age of five had an age-specific rate of 4,093 per 100,000 residents for asthma ED visits.

Figure 4: Asthma Emergency Department Visit Rate by Race/Ethnicity, <5 Years of Age, Oakland, CA



Data trends also show that people with lower incomes have more poorly controlled asthma, higher rates of asthma ED visits and hospitalizations, and more repeat hospitalizations. Asthma ED visits and inpatient hospitalizations are serious incidents where a person suffers an asthma attack with severe difficulty in breathing.

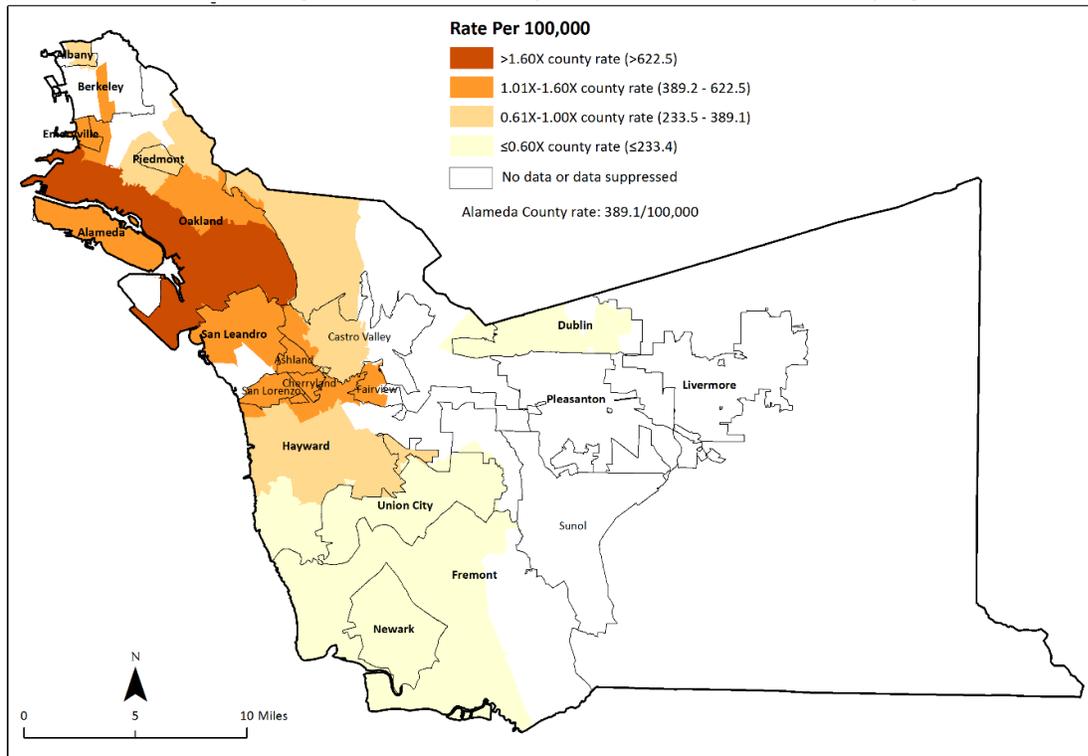
Figure 5: Asthma Emergency Department Visits by Neighborhood Poverty, <5 Years of Age, Oakland, CA



Since 2001, ACPHD has operated a program called Asthma Start serving residents throughout Alameda County. Based in East Oakland out of Eastmont Mall, the program provides free in-

home case management services addressing the medical, environmental, and psychosocial needs of families with children diagnosed with asthma. Asthma Start typically receives more than 800 referrals annually from hospitals and clinics, serving an average of 375 clients a year. Of these clients, about 45 percent had visible mold in their homes in 2017.

Figure 6: Asthma Hospitalization Rate, <5 Years of Age



Source: CAPE, with data from OSHPD 2013-3Q2015.

“I had one family in an old building with at least 30 to 40 units that was recently purchased by a San Francisco real estate entity. This new owner was basically trying to get people out. When my client was complaining about the mold in her closet area, it was easier just to pay people to leave. Several of her neighbors had just taken an offer of cash for keys. One person got \$5000 which isn’t very much because you still have to go and find market-rate housing. She said there was flooding, some of her neighbors were ankle-high in water when their units flooded. The carpet and everything was wet. The new owner was not offering to move them back in, that was not an option.”

—Yonas Gebremichael, Asthma Coordinator, Alameda County Public Health

“I recently visited the home of a mom with two small children living in a tiny space with bed bugs, mold, no utilities, and a water heater taking up the entire room. She pays \$800 a month and is afraid to complain for fear of losing this housing. We see a half dozen stories like this every month, where families must choose between deplorable conditions or a roof over their heads.”



Mold in Margaret's bathroom.

MARGARET AND JUANA³: TWO OAKLAND MOTHERS SHARE THEIR STORIES

Margaret is a mother of five children, all with asthma. Juana has one daughter with asthma. Both families are clients of ACPHD's Asthma Start program and both have gone to the emergency department repeatedly for asthma attacks.

Margaret lives in a large old house with a leaking damaged roof, extensive mold, holes in the walls, and many repairs needed. Last year, the roof partially collapsed, falling on one of her sons and breaking his arm as he sat in his bedroom. The roof is currently covered by a tarp, but the landlord has still not made any repairs. Margaret has a Section 8 housing voucher, and she is afraid that if she loses this house, she will not be able to find another landlord who will accept her voucher in this housing market.

"It's emotional, for everybody. My girls and my sons, they'll come and try to sleep in my bed sometimes, out of fear, thinking nothing has happened in your area," she said. "I have to put a face on, to not allow the fear and worries to overtake me as a mom. Because I'm saying to them, 'We're okay. We're at home.' But every time a repair issue comes up and it's not been addressed, you wonder, well what else is going to happen? After you get a broken arm, you wonder, what else could it have been? My son asked, 'What happened if my head was there, could it have broken my neck?' So it messes with my head."



A hole in the wall of Margaret's home.

Every time a repair issue comes up and it's not been addressed, you wonder, well what else is going to happen? After you get a broken arm, you wonder, what else could it have been?

Like Margaret, Juana and her family feel trapped in their situation because they can't afford to move but have a landlord who will not make repairs. The apartment has old, broken windows that let in excess moisture, triggering Juana's daughter's asthma. Sharon, who is eight years old,

³ Names have been changed to protect their identities.



The exterior of Juana's building in East Oakland.

was diagnosed at age two and has been to emergency department many times for asthma attacks. Her medications for asthma and multiple allergies take up an entire shelf of their closet. Juana is not able to work because she spends most of her time taking her daughter to get asthma check-ups and caring for her. Through a request from their Asthma Start case worker, the landlord finally changed the old carpet, which was full of dirt and grime and another source for asthma triggers.

“If you saw the building you would see it is about to fall. I am not the only one with this problem. The apartment dripped a big leak and

the landlord came to fix it way later. Big holes were made, pieces of roof looked like they were going to fall down. The landlord does not maintain the building, but then he says I changed the carpet so I’m increasing your rent by \$200,” Juana said in Spanish.

*The landlord does not maintain the building, but then he says I changed the carpet so I’m increasing your rent by \$200. It’s difficult because I am very desperate. I feel that there’s not much I can do.
My daughter is not getting any better.*

Juana’s husband paid \$500 himself to paint over the windows, and Juana mops and cleans every day to keep the dust and mold from affecting her daughter. The rent for the one-bedroom unit with several broken windows was \$1,000 before the additional \$200 rent increase. Water from the family’s shower now leaks into the unit downstairs, and they covered the hole from the leak with black plastic. Most recently, the old stove caused Juana’s pot to explode while cooking, starting a small fire. The unit has no smoke detectors.

“It’s difficult because I am very desperate. I feel that there’s not much I can do. My daughter is not getting any better,” Juana said. “I talked to the neighbors. Even their clothes are full of mold, and the landlord doesn’t do anything.”

Meanwhile, she says the owner has evicted some of the other tenants and given some \$6,000 buyouts to leave.

“I said to my husband, I do not want the money,” Juana said. “I want them to fix it, but if we do that, we will be evicted.”



Mold on the bedroom wall next to the bed where the family sleeps.

INTERVIEW WITH A RESPIRATORY THERAPIST: PRISCILLA WARD

What do you do at UCSF Children’s Hospital?

I’m a respiratory therapist and a certified asthma educator and I do asthma coordination, education, case management at UCSF Benioff Children’s Hospital in Oakland. I focus on in-patient asthma and on recidivism—coming back to the hospital in less than a month due to asthma. My priorities are the ones who have been to the emergency room (ER, also referred to as the ED) a lot or who have been hospitalized a lot or the ones who have substandard housing conditions: mold, cockroaches, or the ones who are non-compliant with their medication.



Asthma and allergy medications for Juana’s daughter.

I’ve been a respiratory therapist for 42 years now. I worked in the ER quite a bit and saw quite a few asthmatics and how it impacted their life. For some the result was permanent impairment and some was death.

What are the most common habitability problems that you see in clients’ homes?

Mold, leaks, old carpet, rats, roaches. On occasion I hear of someone who doesn’t have heat. A lot of mold, a lot of cockroaches—I think those are the two most common ones. Occasionally rats.

Could you talk about the health impacts for your clients and their families? What are the most common health conditions caused by substandard housing?

I have caregivers that are giving the medical intervention as they should—their controller meds. They don't miss doses and their child continues to utilize healthcare services in the ER and be admitted in the acute care hospital. They are disempowered and afraid to really deal with the environmental triggers that their child is exposed to for fear of losing their affordable housing. Some patients I have are undocumented immigrants that don't want to take advantage in Alameda County of the wonderful program, Asthma Start, for fear of getting deported or detained so it definitely impacts the health of their children with asthma.

I have one family that I will never forget. Their child was having an asthma flare (also known as an asthma attack) and they told me they lived in a garage, the whole family, and there were quite a few. They had no heat, no adequate ventilation and they also had rats. This particular landlord had more than one particular substandard rental on the same property. The family just could not afford to pay more and they felt stuck.

The symptoms for your child with an asthma flare: they'll have wheezing, coughing, difficulty breathing; they'll be admitted to the hospital; they'll be on medication to treat their asthma; not to mention the parent has to take time off of work and the child misses school, and it just affects the whole family, their finances and their child's education.

You could have life threatening asthma if you have more than two ER visits a year and most of our patients here do. A lot of our patients do have frequent ER visits for a variety of reasons: lack of resources in the community and clinics they go to, or transportation issues, literacy issues, or some issues where they live in substandard housing.

What are the symptoms of severe/persistent cases?

They always have symptoms and their symptoms just get worse when they're sick. Every day they cough and wheeze. Their activities are limited; their life is limited. They are on controller medications that are pretty strong.

Asthma is our number one admitting diagnosis. You don't get rid of asthma ever, it may become dormant but you could still have an attack. There are some teenagers that hadn't had an attack in like five years and then they had one.

The habitability issues are big—because people have cockroaches, mold, and they write letters to the landlord, and the landlord for example will just paint over the wall that has mold but not address the root of the problem.

What is the value of prevention?

Prevention is everything. Prevention would mean that they wouldn't be coming to the hospital for ER room visits or admitted to the hospital. They wouldn't miss much school and the parents would be able to work and they would be able to have life, participate in sports, activities.

Prevention is worth it all. Prevention is everything in improving the health and quality of the families and the patients.

Some people die from asthma attacks. Not just your quality of life but there are between 4,000 and 5,000 deaths a year in the United States from asthma, including children.

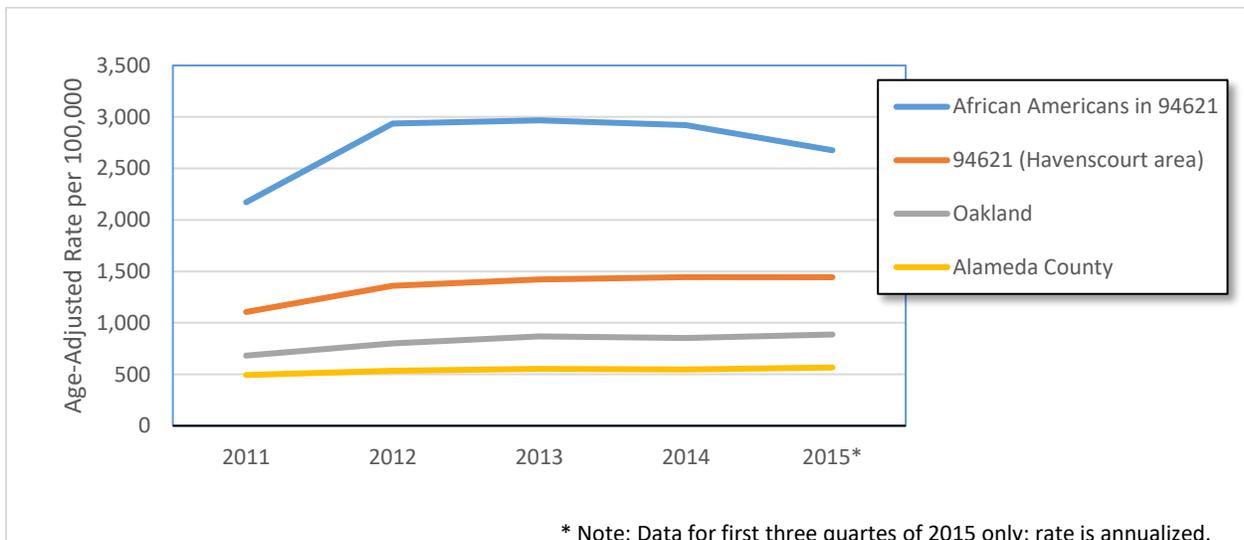
What are some impacts of asthma on one’s physical, emotional, and mental health?

In one patient I can remember, it makes them depressed because they are different than the other kids, they can’t participate in activities sometimes because they have frequent symptoms, they can’t participate. One mom told me her daughter couldn’t even walk a block or two without becoming short of breath so it really impacts her; she can’t be a normal kid. I know another family she’s allergic to everything; she’s allergic to fresh cut grass, she’s highly allergic so it just makes her feel different, isolated. They have a disease that prevents you from being like the other kids. They miss a lot of school and their education suffers. The parents miss a lot of work.

HAVENSCOURT: PROFILE OF A NEIGHBORHOOD WITH THE HIGHEST ASTHMA BURDEN

The Havenscourt neighborhood in East Oakland is an area bound by Seminary Avenue, Hegenberger Road, San Leandro Boulevard, and Bancroft Avenue. While home to rich diversity and remaining affordability for many Oakland families, the neighborhood also encapsulates the inter-related issues of housing vulnerabilities and health problems for residents.

Figure 7: Emergency Department Visits for Asthma, Havenscourt Neighborhood



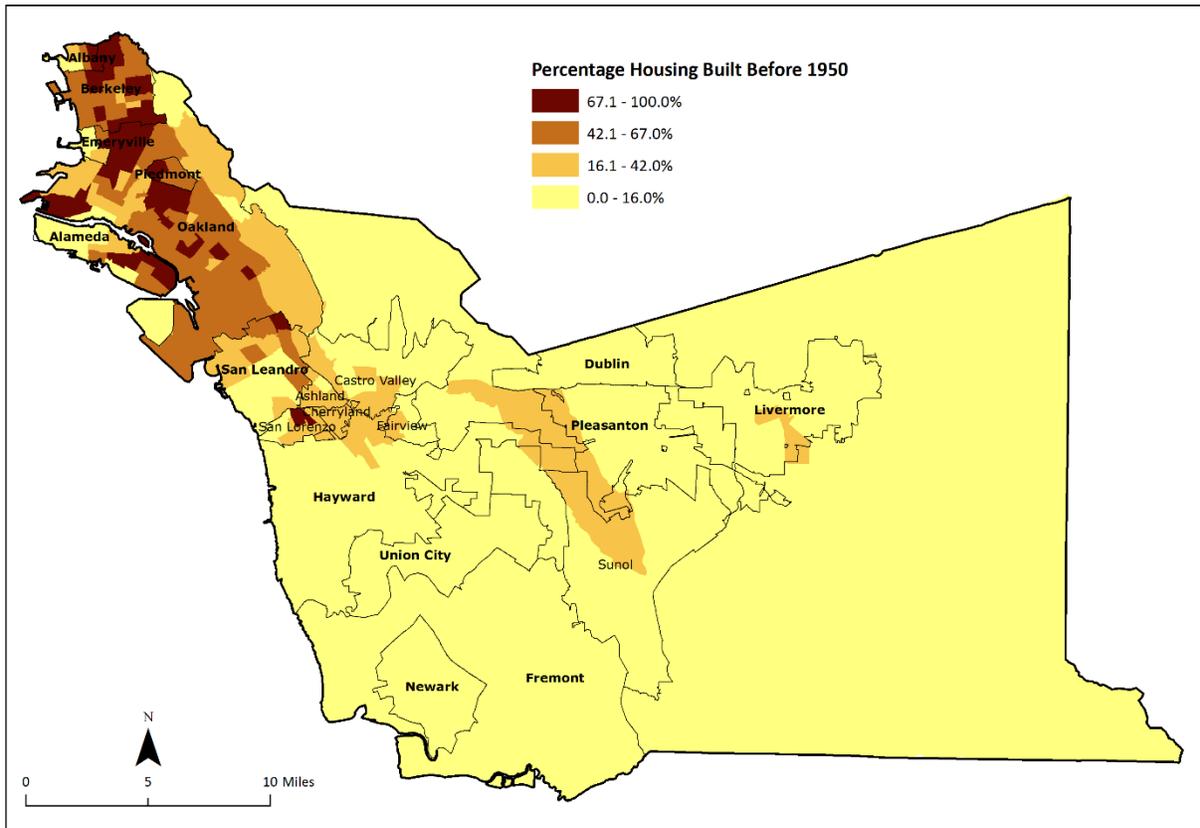
Havenscourt has some of the highest hospital admissions and emergency department visits for asthma in all of Oakland and Alameda County. Residents are twice as likely to visit the emergency department due to asthma than Alameda County residents. African Americans residents in Havenscourt are particularly impacted, with rates approximately five times that of the county overall (Figure 7). Asthma is the second most reported health issue among adult Havenscourt residents. Sixty-three percent of residents spend more than 30 percent of their income on housing costs, and 46 percent of residents reported issues in their home, including asthma triggers like pests (23 percent), mold (16 percent), and poor air quality (14 percent).^{xx} A majority of residents (63 percent) are renters. Unhealthy housing conditions, including pest infestations, mold, and peeling lead-based paint contribute to the neighborhood's high health disparities.

In 2015, the Healthy Havenscourt Collaborative was formed as a neighborhood collective anchored by the East Bay Asian Local Development Corporation (EBALDC). Along with residents, the collaborative includes community organizations and institutional partners such as health providers, ACPHD and ACHHD working together to improve the health and well-being of Havenscourt residents. The collaborative's approach—which includes strengthening asthma services and education alongside advocating for improved housing—is one example of a multi-pronged solution that addresses both the habitability conditions of housing units along with the health and stability of their residents.

HABITABILITY CONDITIONS IN OAKLAND RENTAL HOUSING

There is limited data to provide a complete picture of local housing habitability conditions. Without an up-to-date, city-level housing survey that consistently collects data about habitability conditions, we must piece together data from multiple sources that provide an aggregate and approximate view of Oakland's housing stock. In 2013, the Urban Strategies Council was commissioned by the Alameda County Healthy Homes Alliance to establish the first set of neighborhood-level indicators on the health of Oakland's housing. According to the study's authors, the most important contextual measure for evaluating the health of the housing stock was likely to be its age—given the potential for deferred maintenance, structural deficiencies, lead-based paint, and other hazards.

Figure 7: Housing Built before 1950, Alameda County



Source: CAPE, with data from American Community Survey (ACS) 2006-2010.

The American Housing Survey (AHS) is another source for a high-level, comparative view of inadequate housing conditions (such as water leaks, peeling paint, rodents, and mold) in the metropolitan statistical area that includes Oakland. However, since the survey covers an area which encompasses several counties, it is of limited help in understanding Oakland-specific conditions. Rather, the AHS is most useful as a comparison of the Oakland metro area with the 28 other metropolitan areas surveyed nationally. Key findings from the 2011 AHS included the Oakland metro area's ranking second worst among the 29 metro areas for heating problems, and seventh worst for mold problems. Renter households were 2.8 times more likely than owner households to have a mold problem.^{xxi}

Finally, the City of Oakland collects code enforcement data on complaints they receive and inspect. This data provides another window into the housing habitability issues in the city, but because it is dependent on residents calling code enforcement to file a complaint, it provides only a limited view. Many residents don't know about the city services available, how to access them, or are afraid to contact government agencies for fear of generating landlord backlash or alerting immigration authorities.

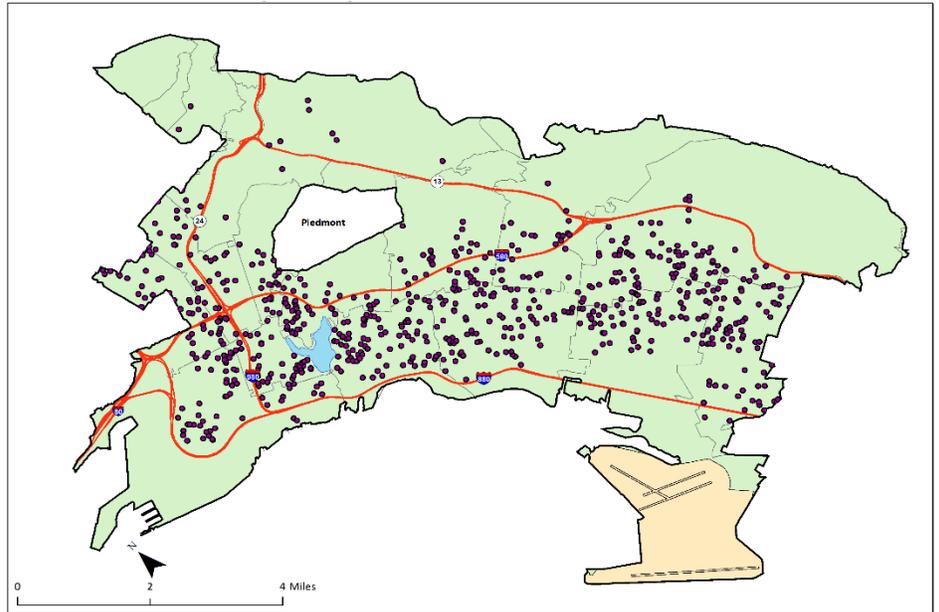
In order to better understand the habitability issues in Oakland, we focused on examining one year of code enforcement complaints from 2017, the latest available data. The analysis sought

to answer the question of what are the most frequent habitability issues affecting Oakland renters, and especially how extensive are mold issues in housing?

Figure 8: Tenant Habitability Complaints, 2017, Oakland, CA.

There were 896 unique tenant code complaints in 2017:

- 313 mold complaints
- 164 precursors to mold (water leaks, mildew, bubbling paint)
- 330 structural issues (roof, deteriorating construction, wiring and electricity problems)
- 80 vector issues (rats, mice, roaches, rodents, bedbugs)
- 42 litter (trash, debris)

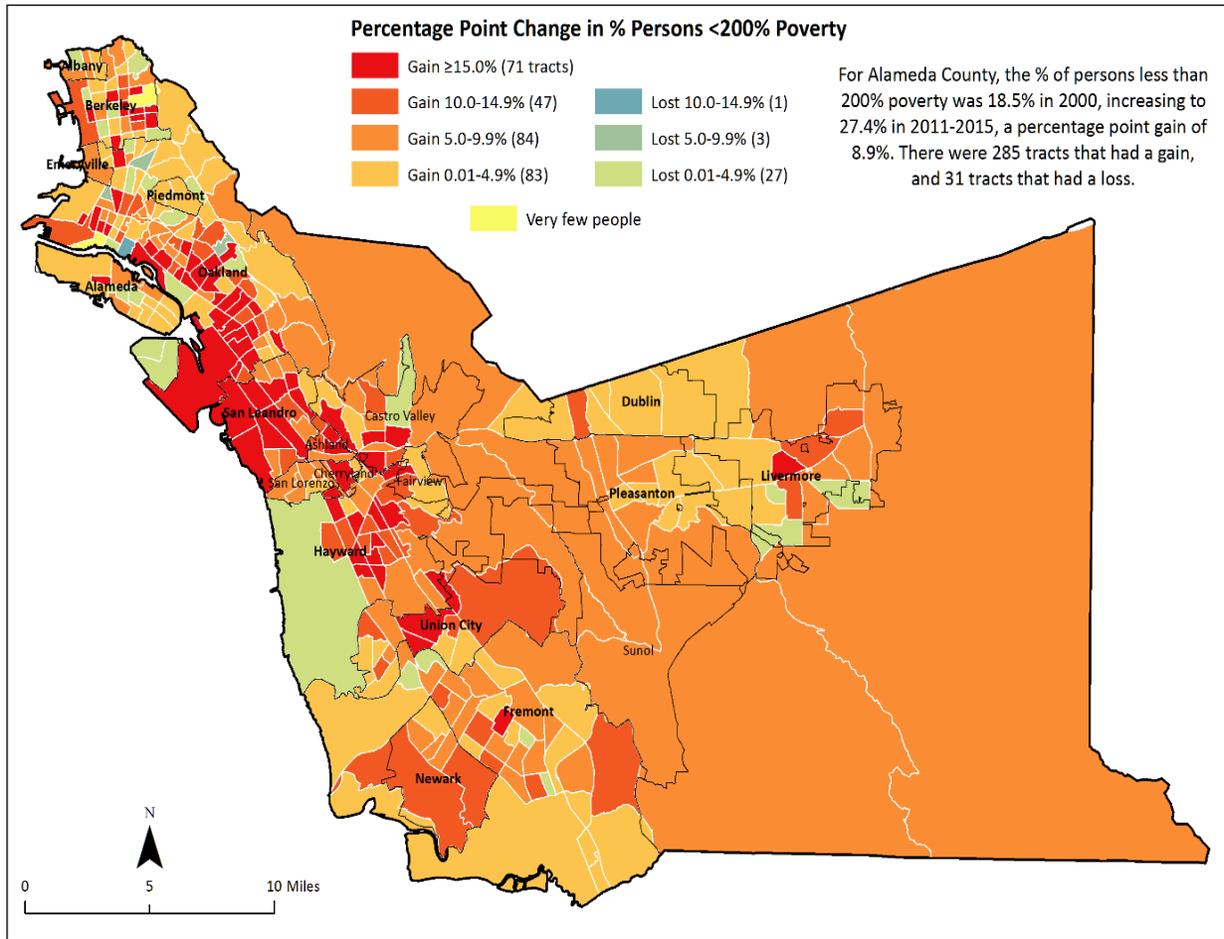


Source: CAPE.

IMPACT OF GENTRIFICATION AND THE HOUSING AFFORDABILITY CRISIS

Much of Oakland is undergoing ongoing gentrification and displacement, or is at risk of gentrification and displacement of low-income households.^{xxii} The growth of high-wage and low-wage jobs (with a shrinking middle-wage sector), the shortage of affordable housing, skyrocketing rents, and the ongoing legacy of housing segregation, redlining, and neighborhood disinvestment have combined to accelerate neighborhood change in Oakland second only to San Francisco in the Bay Area. While Oakland has seen an influx of wealthier residents, an emerging picture from analysis of the most recent available Census data suggests that housing inequity is deepening as the economic divide widens. In other words, gentrification has not just moved poverty elsewhere, it has concentrated poverty further into pockets of greater vulnerability. The map in Figure 10 shows that between 2000 and 2011-2015, Alameda County actually saw an 8.8 percent increase in percentage of persons at below 200 percent poverty level. Many of the census tracts with a gain in poverty of 15 percent or greater are in neighborhoods in Oakland, along with parts of Central and South County.

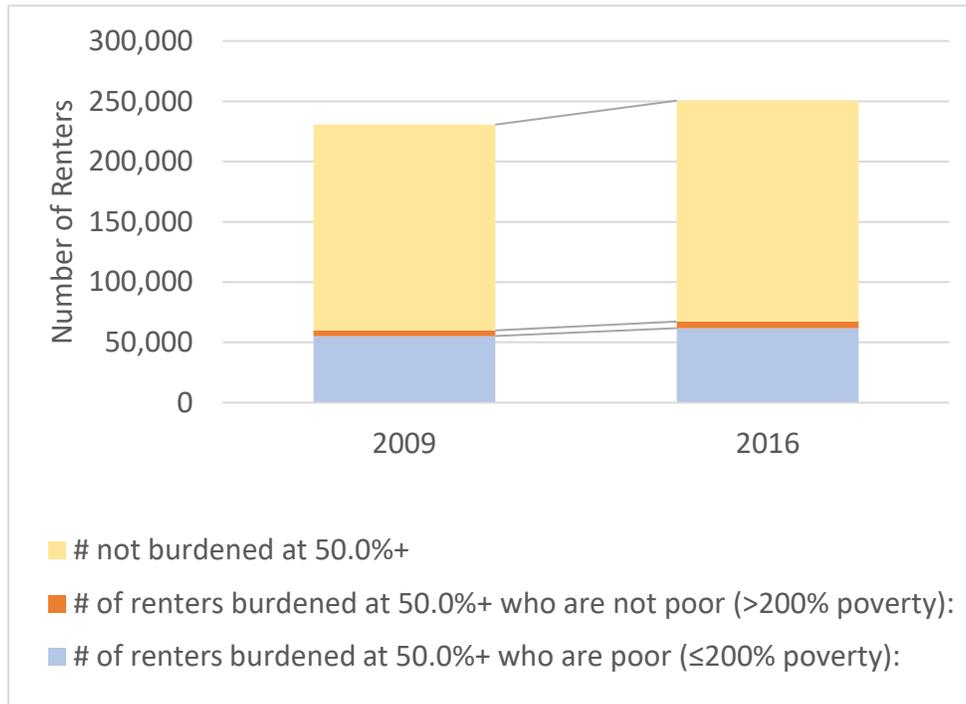
Figure 10: Change in Poverty, 2000 to 2011-2015, Alameda County.



Source: CAPE, with data from Census 2000 and American Community Survey 2015 five-year files.

The chart below (Figure 11) shows that while the number of renters who are not extremely cost-burdened (paying 50 percent or more of their income for housing) has increased between 2009 and 2016, the number of extremely cost-burdened renters has stayed about the same. Furthermore, the overwhelming majority (79 percent) of these cost-burdened renters are living at below 200 percent poverty level. This indicates that while Oakland has seen an increase in the number of better-off renters, its population of poor households vulnerable to rental housing insecurity has not gone away either.

Figure 11: Oakland Renters Experiencing Extreme Housing Cost Burden (50% or more of income).



Housing cost burden is highly associated with living in housing units that have a habitability issue such as overcrowding or incomplete plumbing facilities or kitchens.^{xxiii} In Oakland’s housing market, low-income residents pay a high proportion of their income to live in substandard conditions—the only affordable housing available to them.

RECOMMENDATIONS

As the housing crisis deepens in Oakland and throughout the Bay Area, tenants, particularly low-income tenants, are at greater risk of exposure to deteriorating housing conditions in order to keep their rents from rising or from losing their housing. Substandard housing is putting the health of residents in danger. These recommendations focus on improving gaps in the current system and on better alignment of policy, practice, and resources that are urgently needed to protect the health of children at risk of asthma and lead poisoning from their housing conditions.

1. Proactive or healthy housing inspection program

Because of significant risks and challenges tenants face if they report problems (fear of eviction, rent increase, or other retaliation and the challenge of navigating agency bureaucracies), many substandard housing conditions go unreported in complaint-driven code enforcement

inspection systems. Additionally, under complaint-based systems, problems often don't get reported until they are severe, making them riskier to tenant health and more expensive for landlords to repair. A proactive system would remove the risks and challenges of reporting from tenants and ensure that all rental housing is inspected and brought up to code when needed.

2. Tenant protections

Dramatic and rapid increases in housing costs, along with widening economic inequality, has led to more residents, especially renter households that are a growing share of the population, to become vulnerable to housing instability and displacement from their home. This includes extreme cost burden (spending 50 percent or more of their income for housing costs); being at greater risk of eviction and harassment from landlords; doubling or tripling up in overcrowded housing; and living in poor housing and neighborhood conditions. Implementing and enforcing tenant protection policies—including rent stabilization, just cause eviction and anti-harassment ordinances—are crucial, along with resources for tenant counseling and legal services.

3. Repairing and preserving existing housing

Preserving housing at all affordability levels means prioritizing funding for rehabilitation and repair of existing housing stock, as well as requiring long-term affordability restrictions and replacing affordable units on a one-for-one basis.

4. Improve blood lead testing among children at high risk of exposure

State and local healthcare insurers and providers and health departments must do more to ensure identification of children with high risk of lead exposure, to ensure those at risk receive blood lead level testing, and to ensure those with elevated blood lead levels and identified sources of lead exposure receive supportive services and that lead source remediation takes place.

5. Improve data collection and sharing

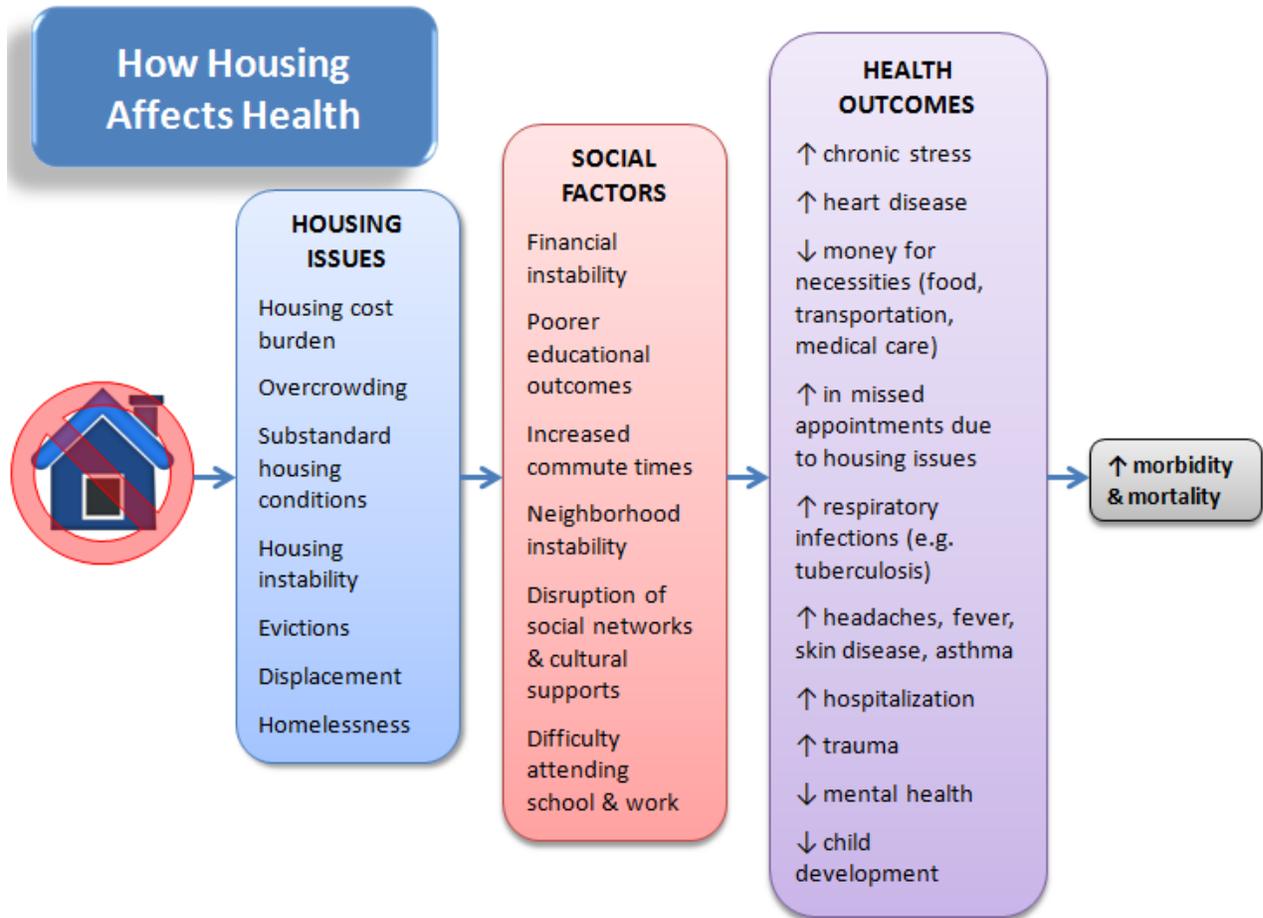
Greater alignment and coordination between local government, health providers, and community-based organizations is needed in order to address the gaps in data. No single source of data exists to assess the habitability conditions of all rental housing units with related health issues at the local level.

In conclusion, the costs and impacts of substandard housing can be long-term and devastating for the children and families affected, while ultimately impacting everyone in the city and county. Childhood asthma and lead poisoning cost the U.S. billions of dollars each year through healthcare, missed school and work time, special education, juvenile justice, and social services. Yet both of these chronic health problems have a feasible housing solution. Instead of utilizing secondary prevention methods—which entail finding children after they've become sick and diagnosed with elevated blood lead levels or repeated asthma attacks, and then addressing the hazards in their home—we must shift to primary prevention efforts that improve both the health of residents and the housing stock for all.

APPENDICES

HOW HOUSING AFFECTS HEALTH: A SUMMARY OF THE RESEARCH

Housing affects health in multiple ways. The diagram below is a summary of current public health literature, and while not comprehensive, provides an overview of the pathway from the housing crisis to physical and mental health outcomes.^{xxiv}



HEALTH IMPACTS OF SUBSTANDARD HOUSING CONDITIONS^{xxv}

HEALTH SYMPTOM	SUBSTANDARD CONDITION	LONG-TERM HEALTH IMPACT
Lead poisoning	Deteriorated lead-based paint (peeling, chipping, chalking, cracking, damaged, or damp) on interior or exterior of the building	<ul style="list-style-type: none"> - Brain damage - ADHD, delayed learning, and lower IQ (which will impact school performance) - Behavioral problems - aggressive, destructive and/or delinquent behavior - Developmental problems - High blood pressure - Kidney disease - Reproductive problems with reduced fetal growth and low birth weight
Asthma attacks and respiratory problems	Mold and moisture, caused by leaking pipes, inadequate ventilation, inadequate drainage Holes and cracks in walls or roof. Cockroach infestations Dust mites and other triggers found in old carpets Broken or inadequate heat Holes in walls or roof and inadequate weatherproofing	<ul style="list-style-type: none"> - Asthma attacks - Respiratory infections - Chronic bronchitis - Chronic pneumonia - Eye problems, conjunctivitis - Allergic rhinitis - Chronic sinusitis - Lowered immune system, frequent colds
Infections, viruses	Rat infestations Lice and bedbugs Flea bites	<ul style="list-style-type: none"> - Skin infections - Hantavirus
Skin rashes and fungal infections	Fleas from rats and birds Infested and dirty carpets Leaking water and humidity Leaking sewage	<ul style="list-style-type: none"> - Chronic dermatitis - Acute fungal infections and rashes
Stress	Excessive indoor temperature Lack of clean and warm water Constant housing problems Harassment Eviction Threats	<ul style="list-style-type: none"> - Depression - Anxiety - Hypertension - Cardiovascular problems

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- ⁱ California Department of Public Health, *The Overlapping Issues of Health and Housing: A Report on California Statewide Data and Healthy Housing Indicators*. October 2013. Available at <https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/EHIB/CPE/CDPH%20Document%20Library/Mold/HealthyHousingIndicators.pdf>
- ⁱⁱ Community Assessment, Planning, and Evaluation (CAPE) Unit analysis of 2015 American Community Survey PUMS 5-year files.
- ⁱⁱⁱ Association of Maternal & Child Health Programs, Life Course webpage. Available at <http://www.amchp.org/programsandtopics/LifecourseFinal/Pages/default.aspx>
- ^{iv} Housing Discrimination Against Racial and Ethnic Minorities 2012. U.S. Department of Housing and Urban Development, Office of Policy Development and Research. June 2013. Available at https://www.huduser.gov/portal/Publications/pdf/HUD-514_HDS2012.pdf
- ^v United States. Advisory Committee for Childhood Lead Poisoning Prevention. *Low Level Lead Exposure Harms Children: A Renewed Call for Primary Prevention*. Center for Disease Control and Prevention, 4 Jan. 2012. https://www.cdc.gov/nceh/lead/acclpp/blood_lead_levels.htm.
- ^{vi} *Case Studies in Environmental Medicine (CSEM): Lead Toxicity*. Agency for Toxic Substances and Disease Registry (ATSDR), 12 Jun. 2017. <https://www.atsdr.cdc.gov/csem/csem.asp?csem=34&po=10>
- ^{vii} Health Impact Project, 10 Policies to Prevent and Respond to Childhood Lead Exposure. August 2017.
- ^{viii} Lead Poisoning Risk Questionnaires, Lead Poisoning Prevention Program of the Healthy Homes Department of the Alameda County Community Development Agency, <http://www.achhd.org/medicalproviders/levels.htm>.
- ^{ix} *Protect Your Family from Exposures to Lead*. U.S. Environmental Protection Agency. <https://www.epa.gov/lead/protect-your-family-exposures-lead>
- ^x Community Assessment, Planning, and Education (CAPE) Unit analysis of American Community Survey 2012-2016.
- ^{xi} Health Impact Project, 10 Policies to Prevent and Respond to Childhood Lead Exposure. August 2017.
- ^{xii} Health Impact Project, 10 Policies to Prevent and Respond to Childhood Lead Exposure, August 2017.
- ^{xiii} Little, Susan, Environmental Working Group. "Update: Almost Three-Fourths of Medi-Cal Toddlers Miss Annual Lead Tests Required by Law." January 31, 2018. <https://www.ewg.org/news-and-analysis/2018/01/update-almost-three-fourths-medi-cal-toddlers-risk-lead-exposure#.WrrBP4jwa71>
- ^{xiv} Community Assessment, Planning, and Education (CAPE) Unit, Childhood Lead Poisoning Analysis. December 6, 2012.
- ^{xv} Health Impact Project, 10 Policies to Prevent and Respond to Childhood Lead Exposure. August 2017.
- ^{xvi} Community Assessment, Planning and Evaluation (CAPE) Unit, Alameda County Public Health Department. Childhood Lead Poisoning Analysis. December 6, 2012.
- ^{xvii} Environmental Protection Agency, 2017 Asthma Fact Sheet. https://www.epa.gov/sites/production/files/2017-08/documents/2017_asthma_fact_sheet.pdf
- ^{xviii} Mendell, Mark, Respiratory and Allergic Health Effects of Dampness, Mold, and Dampness-Related Agents: A Review of the Epidemiologic Evidence. *Environmental Health Perspectives* (2011) 119(6); 748-56. Accessed at: <https://www.ncbi.nlm.nih.gov/pubmed/21269928>
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- ^{xx} 2017 survey of 525 Havenscourt residents conducted by the Healthy Havenscourt Collective.
- ^{xxi} National Center for Healthy Housing, *State of Healthy Housing 2013*. Available at <http://www.nchh.org/Policy/2013StateofHealthyHousing.aspx>
- ^{xxii} Urban Displacement Project, *Mapping Gentrification and Displacement in the San Francisco Bay Area*. Accessed March 30, 2018. Available at: <http://www.urbandisplacement.org/>
- ^{xxiii} Community Assessment, Planning, and Evaluation (CAPE) Unit analysis of HUD CHAS data
- ^{xxiv} Pew Charitable Trusts, *The Relationship Between Housing and Health*. 2016. Available at <http://www.pewtrusts.org/en/multimedia/data-visualizations/2016/the-relationship-between-housing-and-health>
- ^{xxv} Drawn from "Shame of the City: Slum Housing and the Critical Threat to the Health of L.A. Children and Families" (April 2007) and California Healthy Housing Coalition Healthy Homes Indicators Workgroup: http://www.cahealthyhousing.org/images/pdf/CHHC_Literature_Review_Compilation_2011_Final.pdf