

Out of Breath: Childhood Asthma, Poverty and Housing



Children who live in substandard housing may be paying a high price with their health. This paper examines the relationship between childhood asthma, concentrated poverty and substandard housing in the Louisville metropolitan region.

An estimated 20,000 children are affected by asthma in the Louisville area alone and the number of them with severe asthma is growing.¹

Concentrated poverty and substandard housing each have a direct impact on childhood asthma. In Louisville Metro, children who live in neighborhoods with high rates of poverty are more likely to go to the emergency room or be hospitalized for asthma.

Data in this report also show that in neighborhoods which are likely to have a lot of substandard housing, children are more likely to suffer from severe asthma conditions, resulting in hospitalization, than those who live in neighborhoods with a higher quality of housing.

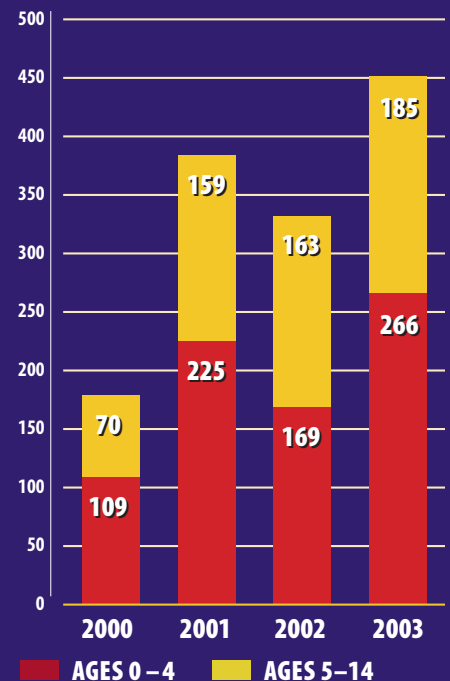
The provision of decent, affordable housing across the region is essential if we are to ensure that children's health does not deteriorate simply because of where they live. Currently, affordable housing in Louisville is highly concentrated in relatively few areas, leaving low-income working families few alternatives should their housing conditions pose health risks for their children.

¹ State of the Air 2004. New York, NY: American Lung Association. Estimates of sensitive population ages 0-14 in Louisville KY-IN MSA based on national estimate of 8.3 percent of population with asthma.



Childhood Asthma Hospitalizations

Louisville MSA*



Since 2000, asthma hospitalizations among children under age 15 more than doubled. Children under 5 years account for more than half of childhood asthma hospitalizations.

Source: Kentucky Hospital Inpatient Discharge Claims, Kentucky Department for Public Health, Health Policy Branch.

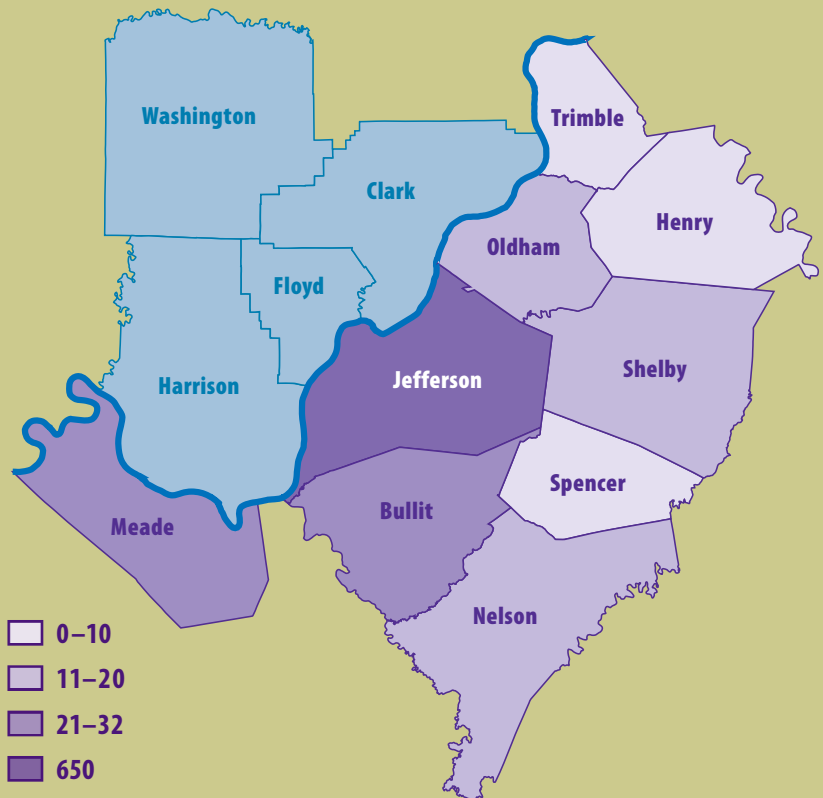
*Data for Bullitt, Henry, Jefferson, Meade, Nelson, Shelby, Spencer, and Trimble counties. Data for Indiana counties in the Louisville KY-IN MSA not available.

Childhood Asthma in the Louisville Metropolitan Area

- ▶ Since 2000, there have been nearly 1,400 children hospitalized with the primary diagnosis of asthma in Louisville and surrounding Kentucky counties.
- ▶ More than half of child asthma hospitalizations in the Louisville area are for children younger than 5.
- ▶ More than half of child asthma hospitalizations in Louisville Metro were for children living in just 8 of the 39 Metro zip codes. All 8 zip codes are low-income communities.
- ▶ Child asthma hospitalization rates ranged from no children in some zip codes in eastern Louisville where poverty rates are under 3 percent, to 495 per 100,000 children in zip code 40208 where the poverty rate is 23 percent.
- ▶ In Louisville Metro zip code 40208, the child asthma hospitalization rate was 1.6 times that of the nation and 18 times higher than rates in some eastern Jefferson County zip codes.
- ▶ In 2003, there were more than 1,700 asthma related emergency room visits to Kosair Children's Hospital from Jefferson County children alone. Almost half of those emergency room visits were by children from just 6 zip codes.
- ▶ Kosair Children's Hospital data indicate that twice as many African American children in Louisville Metro make emergency room visits due to asthma as white children.

2002-03 Total Asthma Hospitalizations in Louisville KY-IN MSA* Ages 0-14

There were 738 child asthma hospitalizations during 2002-03 in the region, including 650 in Jefferson County.



Source: Kentucky Hospital Inpatient Discharge Claims, Kentucky Department for Public Health, Health Policy Branch.

* Asthma hospitalizations by age not available for Indiana counties in the Louisville KY-IN MSA

The Costs of Childhood Asthma

Childhood asthma not only presents challenges to children's overall health and well-being, but children with asthma often miss school. Parents and their employers lose productivity at work when parents must stay home or seek treatment for their children. The direct financial costs of treatment and hospitalization to families and the community are also great.

- ▶ In 2003, the annual cost of emergency room visits at Kosair Children's Hospital was \$3.2 million.
- ▶ The estimated annual cost of hospital stays for children 0-14 in Louisville Metro in 2003 was over \$2.8 million.
- ▶ Twenty-four children stayed an average of 10 days in intensive care at Kosair Children's Hospital in 2003, at a total cost of \$1.3 million.

These estimated health care costs should be considered a low estimate. Emergency room costs included here are limited to one local health care provider, Kosair's Children's Hospital. Estimates do not include treatment sought in physician's offices or medication costs.

Asthma Triggers

Asthma comes from the Greek word *panos*, meaning “to pant” or “to breathe hard.” When someone with asthma comes in contact with an allergen or “trigger,” the muscles around their airway walls constrict, making it difficult to breathe. Common symptoms are coughing, wheezing, chest tightening, and shortness of breath. Young children often have a series of related illnesses, such as pneumonia or bronchitis, before being diagnosed with asthma.²

Both indoor and outdoor environmental triggers have an impact on the severity of a child’s asthma condition. While heredity plays a role, severe asthma symptoms are more likely to occur when a person with asthma is bombarded with several triggers at once. For example, if a child lives in an apartment that has excessive moisture because of leaky plumbing and is in a neighborhood with poor air quality, these indoor and outdoor triggers act together to increase the chances of an attack.³

Second-hand smoke, exhaust fumes from vehicles, and industry toxins such as particulates and butadiene are also associated with an increased severity of asthma symptoms.⁴

Recent studies cite mounting evidence that indoor allergens are often key aggravators of asthma, from its onset to an increase in the severity of symptoms.⁵ Many children are spending increasing amounts of time indoors. This is especially true in urban areas where parents believe the presence of crime or drug activity means their children cannot play safely outdoors.

² American Lung Association. Asthma & Children Fact Sheet (2004). Available at <http://www.lungusa.org> (accessed January 2004).

³ Krieger, J. and Higgins, D.L. (2002). Housing and Health: Time Again for Public Health Action. *American Journal of Public Health*, 92 (5).

⁴ American Lung Association. Asthma & Children Fact Sheet (2004). Available at <http://www.lungusa.org> (accessed January 2004).

⁵ Institute of Medicine. (2004). *Clearing the Air: Asthma and Indoor Air Exposures*. Washington, DC: National Academy of Sciences.

INDOOR TRIGGERS

Mold

Dust

Pest infestation

Cigarette smoke

Old carpeting

Pet dander

Mice

Leaky pipes

Fuel-burning heaters

Inadequate ventilation

OUTDOOR TRIGGERS

Vehicle emissions

Industrial pollutants

- Particulate matter
- Butadiene
- Volatile organic chemicals

Ozone

Weather changes

One Louisville child’s story

Until Katlin was two, she lived in a newly built house with her parents, and though her father had asthma, she showed no signs of the disease.

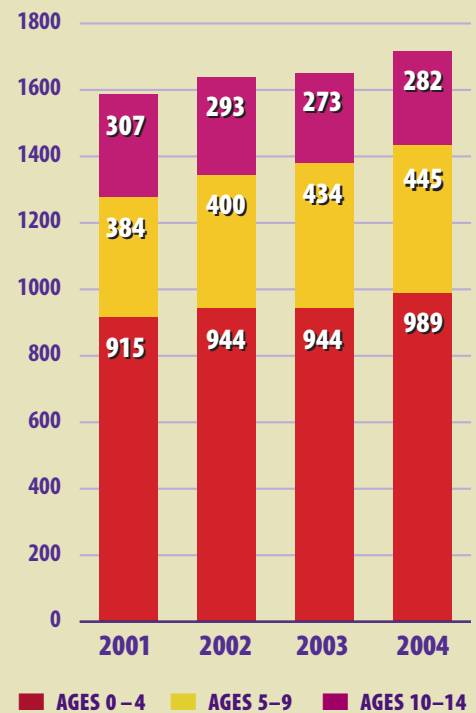
When Katlin turned three, her family began to move from apartment to apartment in downtown and West Louisville.

Now five, Katlin lives in zip code 40203. She takes medication every day, but still misses lots of school because of her asthma.

Katlin’s mom says missing school hasn’t affected Katlin’s grades yet. But, she says, “I know if we lived in a better place, she’d breathe a whole lot easier.”

Childhood Asthma Emergency Room Visits

Kosair Children’s Hospital: 2001-2004



Over the last four years, the incidence of emergency room visits related to asthma has increased steadily. In 2004, nearly six out of ten emergency room visits were by children under age five.

Source: Kosair Children’s Hospital

Concentrated Poverty

Children who live in neighborhoods with high poverty rates may have more severe asthma symptoms because of their community's lack of resources. Neighborhoods with high poverty rates are often plagued by factors that increase the risk of environmental triggers for childhood asthma, such as abandoned properties, old industrial sites, and poor quality housing.

Families in neighborhoods with high poverty rates may have limited access to affordable, primary health care or their children may have symptoms that more often require emergency or in-patient treatment. Their neighborhoods may be located near major traffic corridors or industrial sites that increase their exposure to toxins. Finally, their housing options can be very limited.

Severity of symptoms

Timely medical care is essential in managing childhood asthma. In some cases, emergency room visits and hospitalizations signal that a child has not had adequate outpatient management of the disease.

However, several studies suggest that emergency room visits are not being used to replace primary care. Rather, there is evidence that those who use emergency rooms are a "less healthy population" than those who do not.^{6,7} In other words, more children in Louisville neighborhoods with high poverty rates may have severe asthma symptoms than children who live in neighborhoods with low poverty rates.

Many, though not all, of the Louisville zip codes with the highest hospitalization rates are predominately African American. Nationally, African

Americans are five times more likely to seek emergency room care for asthma than whites and three times more likely to be hospitalized for asthma.⁸

The African American child population in Metro Louisville is 25 percent. However, Kosair Children's Hospital data indicate that African American children make up 63 percent of child asthma related emergency room visits. These data provide only a snapshot of Louisville emergency room visits. We need more extensive data, from all local hospitals, to provide a better picture of racial disparities related to emergency room use.

Neighborhood air quality inequities

Studies have repeatedly linked air pollution to increased incidences of childhood asthma. A report by the U.S. Environmental Protection Agency found that racial minority and low-income populations experience higher levels of exposure to selected air pollutants than other populations.⁹

During 2000-2001, an extensive air quality study was conducted in West Louisville.¹⁰ Results showed chronic risk levels of both volatile organic compounds and other toxins at all 12 West Louisville monitoring sites. Five of the monitoring sites are in zip codes with the highest child asthma hospitalizations rates (40210 and 40211). Many of the toxins cited in the report have been associated with aggravated respiratory problems and increased emergency department visits and hospitalizations for asthma.¹¹

Limited housing choices

A very high poverty rate, of about 38 percent of a neighborhood's population or more, signals a high risk of substandard housing in a neighborhood. However, choosing to move to a well-maintained apartment, a better constructed house, or into a healthier neighborhood are rarely options for low-income families given what they can afford to pay for housing. For a family in Louisville Metro to pay the fair market value of nearly \$600 a month for a three-bedroom rental, they need an annual income of at least \$34,000.¹²

In Louisville Metro neighborhoods with the highest numbers of asthma related child emergency room visits, many families are paying more than a third of their incomes on rent. In Louisville Metro zip codes 40202, 40203, 40211, and 40212, which include the neighborhoods of Smoketown, Shelby Park, Russell, Portland, and Park Duvalle, almost half of families pay more than a third of their incomes on rent. In these same neighborhoods, more than one in five families pay over half of their incomes on rent.

⁶ Zuckerman, S. Shen YC (2004). Characteristics of Occasional and Frequent Emergency Department Users: Do Insurance Coverage and Access to Care Matter? *Med Care*, 42(2): 176-82.

⁷ Ford, Jean G., Meyer, I.H., Sternfels, P., Findley, S., McLean, D, Fagan, J. and Richardson, L. (2001). Patterns and Predictors of Asthma-Related Emergency Department Use in Harlem. *Chest*, 120: 1129-1135.

⁸ National Center for Health Statistics. (2001). "National Hospital Discharge Survey 2001."

⁹ United States Environmental Protection Agency, Policy, Planning and Evaluation. (1992, June). *Environmental Equity: Reducing Risk for All Communities*.

¹⁰ Science International, Inc. (2003). *West Louisville Air Toxics Study Risk Assessment*. Available at http://unixfp.iglou.com/apcd/toxics_risk/index.html. (accessed January 2004).

¹¹ National Institutes of Health. National Heart, Lung, and Blood Association. *National Asthma Education and Prevention Program*. (1997). *Expert Panel Report 2: Guidelines for the Diagnosis and Management of Asthma*.

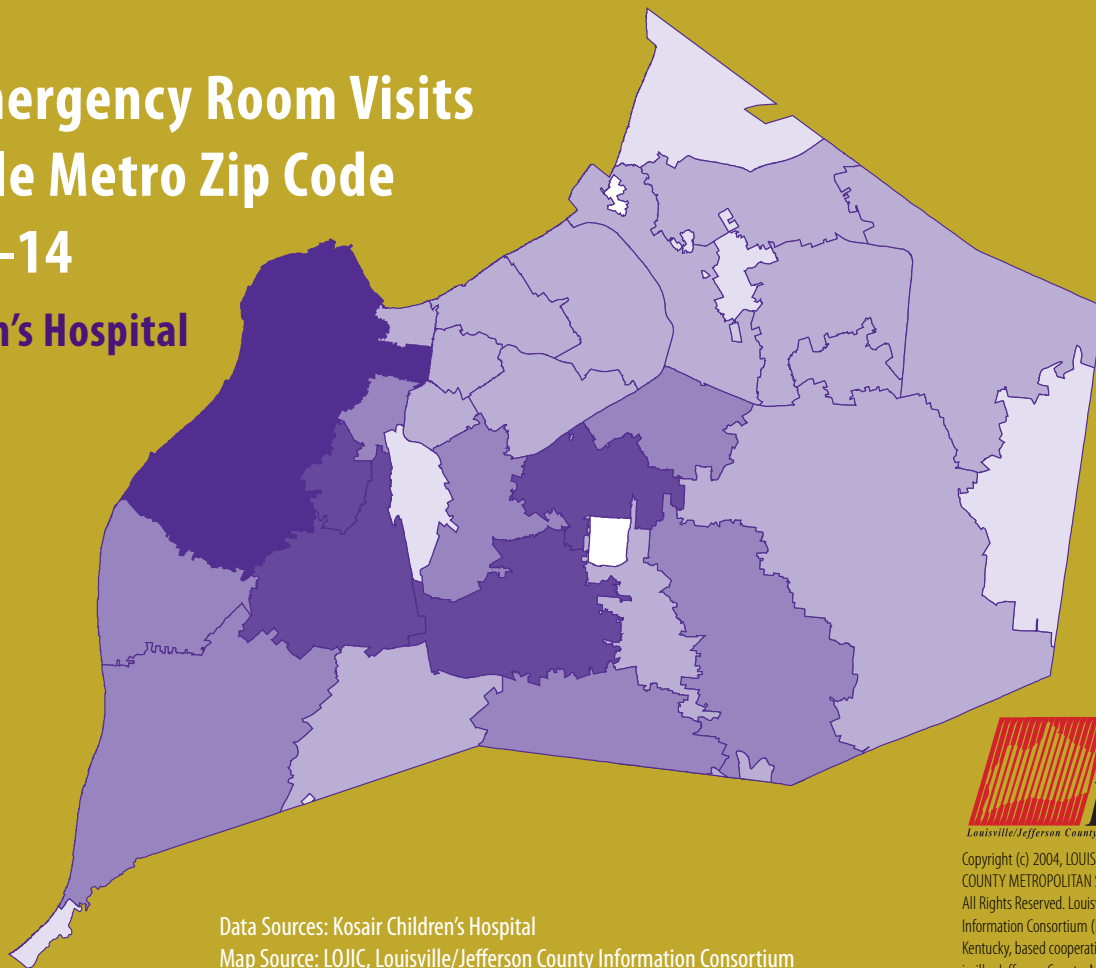
¹² National Low Income Housing Coalition. (2004). *Out of Reach 2004*. Available at www.nlihc.org/oor2004/ (accessed February 2004).

Asthma Emergency Room Visits by Louisville Metro Zip Code Children 0–14

**Kosair Children's Hospital
2001–2004**

Visits

- 4–25
- 26–100
- 101–250
- 251–500
- 501–788
- No Data/No Visits

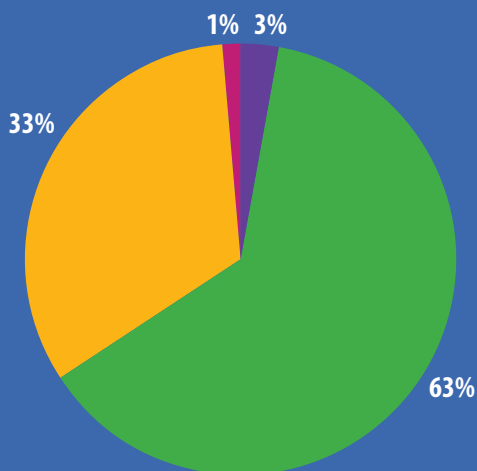


Data Sources: Kosair Children's Hospital
Map Source: LOJIC, Louisville/Jefferson County Information Consortium
Analysis by Department of Geography & Geosciences, University of Louisville



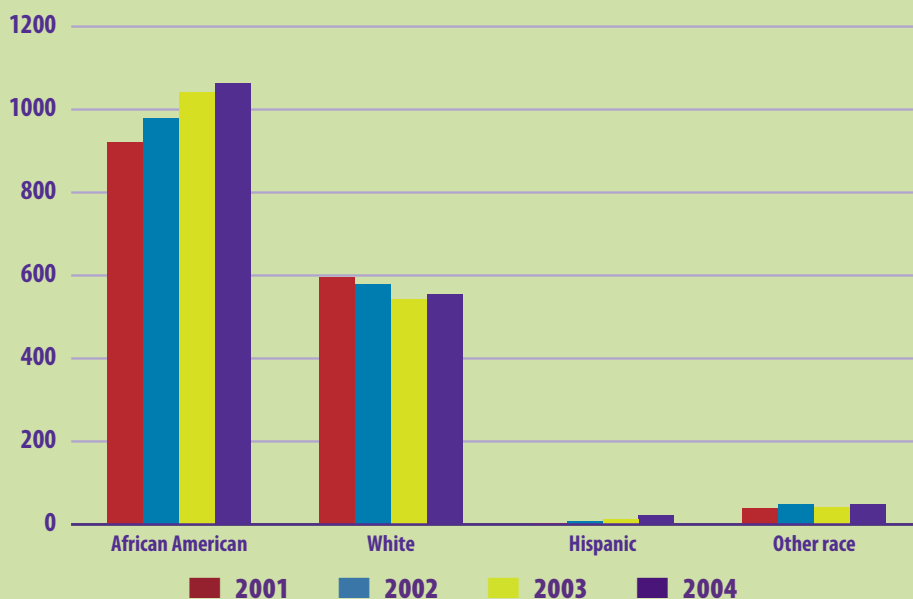
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Asthma Emergency Room Visits at Kosair Children's Hospital Children Ages 0-14: 2004



- African American
- White
- Hispanic
- Other race

Asthma Emergency Room Visits at Kosair Children's Hospital, by Race and Hispanic Origin: 2001-2004



Since 2001, emergency room visits at Kosair Children's Hospital among African American and Hispanic Children have steadily increased, while the numbers for white children declined until 2004, when they rose slightly. For children of other races who sought emergency asthma treatment at Kosair, numbers remained relatively constant over the four-year period.

Source: Kosair Children's Hospital

Substandard Housing

The maps on the opposite page show that most neighborhoods with high child asthma hospitalization rates fall within areas of high risk for substandard housing. Further, there are no high child asthma hospitalization rates in areas of the city with little substandard housing

Increasingly, studies link substandard housing with a host of chronic illnesses such as asthma, even after controlling for factors such as income and smoking indoors.¹³ Substandard housing, or housing in which conditions are deemed less than suitable to maintain good health, encompasses a number of potential variables.

Housing conditions

Housing in dire need of external repairs to the degree that roaches or mice enter the building would be considered substandard housing. One childhood asthma study involving inner-city children found that cockroach exposure was a major factor for asthma severity.¹⁴ Likewise, when a leaky roof or poor plumbing causes mold to form, excessive moisture in the air acts as an asthma trigger.

Due to limited local housing condition data, several census variables were selected that signal substandard housing in Louisville Metro to create the map on the opposite page. These variables were combined and weighted to determine the substandard housing risk level (low, medium, or high) across the city.

Poverty

In neighborhoods where most households are earning low wages, including California, Smoketown/Shelby Park, Portland, and Shawnee, childhood asthma hospitalization rates far exceed the national rate. Louisville Metro's highest child asthma hospitalization rates are in six Louisville

high poverty zip codes, 40202, 40203, 40208, 40210, 40211, and 40212.

Renting versus owning

Families who rent cannot necessarily afford extensive repairs to reduce major asthma triggers. If repair or maintenance requests to landlords go unanswered, or are not timely, children's respiratory conditions may deteriorate. Across the nation, some communities have taken on aggressive structural remedies of deteriorating housing by investing an average of \$8,000 per home to remove mold, repair leaks, install new ventilation systems, or remove old carpet.¹⁵

Overcrowding

For families who may live with several family members but cannot afford to rent a larger apartment or house, cramped conditions can lead to inadequate ventilation or increased clutter. These factors are linked with excess dust and potential pest infestations, both of which exacerbate asthma symptoms.

Median house value

Across Louisville Metro, median house values range from \$32,000 in areas of high substandard housing risk to up to \$301,000 in areas with low risk. While there are several ways to reduce asthma triggers inside the home, when a child with asthma lives in a well-constructed and well-maintained home, it can have a positive impact on that child's health.¹⁶

By repairing substandard housing, or in some cases, replacing it with safe, affordable housing, our community can support families whose children suffer from severe asthma symptoms. When health and housing advocates work together, we can make homes and neighborhoods healthier for all children.



Census Variables that Signal Substandard Housing

1. Population below poverty
2. Vacant
3. Renter-occupied (vs. owner-occupied)
4. Crowding (>1 person per room)
5. Lacking heat
6. Lacking complete plumbing facilities
7. Lacking complete kitchen facilities
8. Median year structure built
9. Median house value

For methodology and data sources, visit www.metropolitanhousing.org

¹³ Krieger, J. and Higgins, D.L. (2002). Housing and Health: Time Again for Public Health Action. *American Journal of Public Health*, 92(5): 758.

¹⁴ The Inner-City Asthma Study. (2004). *New England Journal of Medicine*, 351: 1068-80.

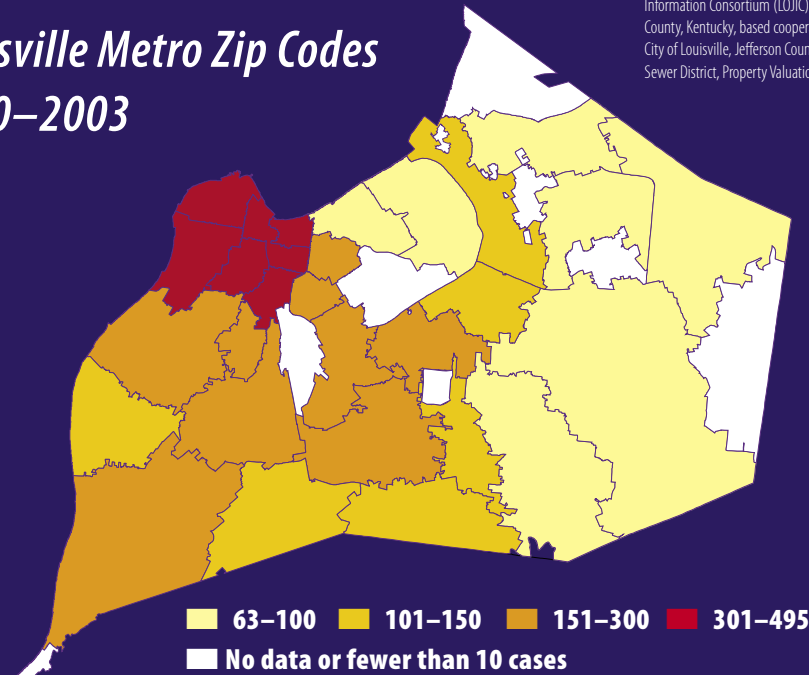
¹⁵ Krieger, J. and Higgins, D.L. (2002). Housing and Health: Time Again for Public Health Action. *American Journal of Public Health*, 92(5): 762.

¹⁶ Thomson, H., Petticrew, M., and Morrison, D. (2001). Health Effects of Housing Improvement: Systematic Review of Intervention Studies. *Boston Medical Journal*, 323: 187-190.

Asthma Hospitalization Rate Per 100,000 Children 0–14

Louisville Metro Zip Codes
2000–2003

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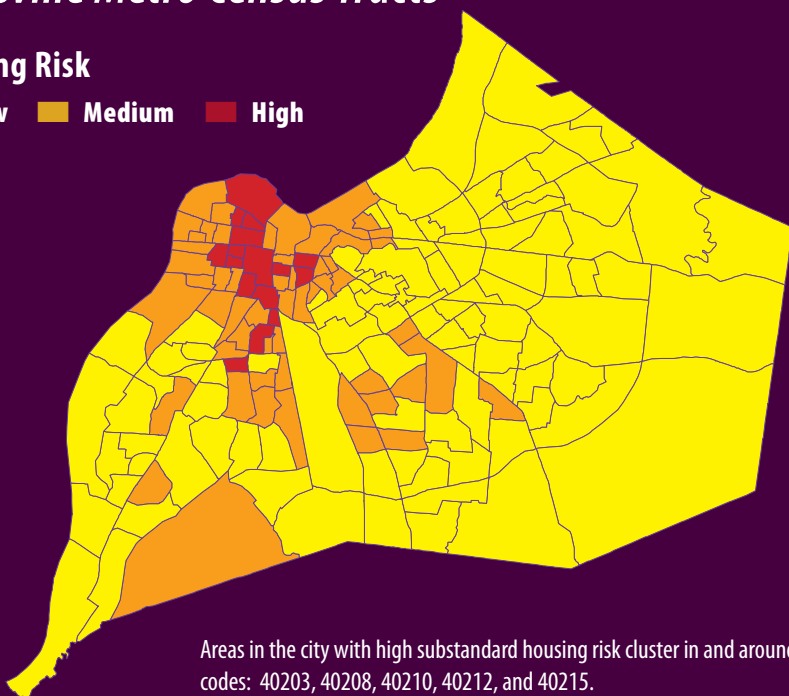


Areas with the highest child asthma hospitalization rates are: 40208, 40211, 40202, 40210, 40212, and 40203. Rates in each of these zip codes exceed the national child asthma hospitalization rate of 308 hospitalizations per 100,000 children ages 0-14.

Cartographic Modeling of Factors Associated with Substandard Housing Louisville Metro Census Tracts

Housing Risk

Low Medium High



Areas in the city with high substandard housing risk cluster in and around these zip codes: 40203, 40208, 40210, 40212, and 40215.

Data Source: U.S. Census, SF3
Analysis by Department of Geography & Geosciences, University of Louisville

Asthma Inpatient Hospitalizations (Children 0-14)

by Louisville Metro Zip Code
in Rank Order by Rate, 2003

Zip	Rate per 100,000 Children
U.S.	308
40208	495
40211	432
40202	415
40210	409
40212	398
40203	389
40215	272
40218	250
40217	240
40216	229
40204	213
40214	193
40213	188
40219	179
40272	158
40228	146
40258	137
40220	136
40118	120
40229	114
40222	110
40243	102
40291	99
40206	92
40245	91
40059	80
40223	73
40207	70
40241	64
40299	63
40205	49
40242	27
40023	0
40209	0

Note: Hospitalization data reflect hospitalization discharges; not individual children. A single child may have been hospitalized more than once during a year and would be counted as more than one hospital discharge. Data are for primary diagnosis of asthma.

Source: Kentucky Hospital Inpatient Discharge Claims, Kentucky Department for Public Health, Health Policy Branch, 2004.

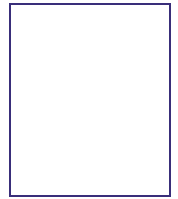


Metropolitan Housing Coalition
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The Metropolitan Housing Coalition is comprised of over 160 member organizations to advocate for fair, decent and affordable housing for all people in the metropolitan region.

Please call 584-6858 for membership information.

www.metropolitanhousing.org



Housing and Health Advocates Working as Partners

While there is no cure for asthma, the disease can be managed by reducing asthma triggers and following recommended medication regimens. Here are some ways housing and public health advocates are working nationally to stem the tide of severe childhood asthma.

- ▶ **Address concentration of poverty in the region**
 - a) Strengthen federal, state, and local policies to improve access to primary health care for children with asthma
 - b) Identify and remediate brownfields, properties contaminated by hazardous materials and industrial pollution sources in high poverty neighborhoods
 - c) Ensure that there is a better geographic distribution of affordable housing in our community
 - d) Work with transportation planners to mitigate congested main thoroughfares near high density, lower cost housing
- ▶ **Eliminate substandard housing**
 - a) Develop a regional healthy homes initiative
 - b) Systematically identify and remediate unhealthy housing stock
 - c) Support families to improve their home environment, reducing exposure to allergens and irritants
- ▶ **Aggressively identify and treat childhood asthma**
 - a) Expand prevention and outreach strategies by providing simple tools for families to better manage asthma
 - b) Monitor asthma prevalence and incidence to improve intervention strategies
 - c) Provide “asthma mobiles” that take the treatment into communities

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Data partners include Kentucky Department for Public Health, Health Policy Branch, Kosair Children’s Hospital, and the Louisville Metro Health Department.

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