

Healthy Homes Needs Assessment for Rochester, NY – Report Appendices
September 22, 2015

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Appendix I – State of Healthy Housing Evidence Table

(Source: National Center for Healthy Housing, <http://www.nchh.org/LinkClick.aspx?fileticket=moPP0%2fzgD8I%3d&tabid=344>)

Housing Problem	Definition	Factor in AHS Severe and Moderate Physical Problem Rating	Pathway/Health Effect	Evidence Source
1) Holes in floors	Holes large enough for someone to trip in; may or may not go all the way through to a lower floor or to the exterior of the unit.	Yes	Trip/fall hazard. Enables pest entry. Sign of structural problems.	Office of the Deputy Prime Minister. 2004. Housing Health and Safety Rating System Guidance.
2) Signs of rats	Seeing rats or signs of rats inside the house or building during the three months prior to interview or while the household was living in the unit if less than three months. Signs of rats include droppings, holes in the wall, or ripped or torn food containers.	Yes	Rat bites: Infectious disease associated with rats.	CDC, HUD. 2006. Healthy Homes Reference Manual. DHHS. Krieger, J., Higgins D. 2002. Housing and Health: Time Again for Public Health. Am J Public Health. 2002 May; 92(5): 758–768.
3) Water leaks from outside	Housing units with water leakage during the last 12 months are classified by whether the water leaked in from outside the building and by the most common areas (roof, basement, walls, closed windows, or doors) or reasons for water infiltration (fixtures backed-up or overflowed or pipes leaked).	Yes	Source of mold/dampness: Asthma/allergies, cough, wheeze, structural damage from rot that will lead to other problems.	IOM Report. 2004. Damp Indoor Spaces and Health. Krieger, J., Higgins D. 2002. Housing and Health: Time Again for Public Health. Am J Public Health. 2002 May; 92(5): 758–768. Office of the Deputy Prime Minister. 2004. Housing Health and Safety Rating System Guidance.

Housing Problem	Definition	Factor in AHS Severe and Moderate Physical Problem Rating	Pathway/Health Effect	Evidence Source
4) Sewage disposal breakdown	Limited to housing units in which the means of sewage disposal was a public sewer, septic tank, or cesspool. Breakdowns refer to situations in which the system was completely unusable. Examples: septic tank being pumped because it no longer perked, tank collapsed, tank exploded, sewer main broken.	Yes	Lack of access to toilet or liquid waste disposal results in unsanitary conditions and spread of disease.	Lowry, S. 1990. Housing and Health. Br Med J, 1990; 300:177-9. Office of the Deputy Prime Minister. 2004. Housing Health and Safety Rating System Guidance.
5) Room heater without flue	Any room heater that burns kerosene, gas, or oil and that does not connect to flue, vent, or chimney.	Yes	Carbon monoxide poisoning.	CDC, HUD. 2006. Healthy Homes Reference Manual. DHHS. Office of the Deputy Prime Minister. 2004. Housing Health and Safety Rating System Guidance
6) Lack kitchen facilities	A housing unit lacking one of the following kitchen facilities: (1) kitchen sink; (2) burners, cook stove, or microwave oven; and (3) refrigerator.	Yes	Poor food storage: food poisoning.	CDC, HUD. 2006. Healthy Homes Reference Manual. DHHS. Office of the Deputy Prime Minister. 2004. Housing Health and Safety Rating System Guidance.

Housing Problem	Definition	Factor in AHS Severe and Moderate Physical Problem Rating	Pathway/Health Effect	Evidence Source
7) Window problems	<p>“Boarded-up windows” that are sealed off to protect against weather or entry and include windows and/or doors covered by board, brick, metal, or some other material. “Broken windows” indicates several broken or missing window panes.</p>		<p>Indication of security problems, barrier to fire escape, source of water intrusion, injuries from broken glass, indication of broader maintenance problems related to health, lead poisoning due to deteriorated paint.</p>	<p>Krieger J., Higgins D. 2002. Housing and Health: Time Again for Public Health. Am J Public Health. 2002 May; 92(5): 758–768.</p> <p>Office of the Deputy Prime Minister. 2004. Housing Health and Safety Rating System Guidance.</p>
8) Open cracks or holes in walls	<p>Statistics are presented on open cracks or holes in the interior wall or ceilings of the housing unit. Included are cracks or holes that do not go all the way through to the next room or to the exterior of the housing unit. Hairline cracks or cracks that appear in the walls or ceilings but are not large enough to insert the edge of a dime, are not counted. Very small holes caused by nails or other similar objects are also not counted.</p>	Yes	<p>Sign of structural problem. Enables rats, mice, and cockroach entry.</p>	<p>CDC, HUD. 2006. Healthy Homes Reference Manual. DHHS.</p> <p>Krieger J., Higgins D. 2002. Housing and Health: Time Again for Public Health. Am J Public Health. 2002 May; 92(5): 758–768.</p>
9) Signs of mice	<p>Seeing mice or signs of mice inside the house or building during the three months prior to interview or while the household was living in the unit if less than three months. Signs of mice include droppings, holes in the wall, or ripped or torn food containers.</p>		<p>Mouse bites: Spread of infectious disease. Asthma and allergies.</p>	<p>IOM Report. 2000. Clearing the Air: Asthma and Indoor Air Exposures.</p> <p>Krieger J., Higgins D. 2002. Housing and Health: Time Again for Public Health. Am J Public Health. 2002 May; 92(5): 758–768.</p>

Housing Problem	Definition	Factor in AHS Severe and Moderate Physical Problem Rating	Pathway/Health Effect	Evidence Source
10) Water supply stoppage	Housing unit was completely without running water from its regular source. "Completely without running water" means that the water system servicing the unit supplied no water at all.	Yes	Lack of proper sanitation can result in spread of infectious diseases. Dehydration, which is associated with headaches, constipation, dry skin.	Office of the Deputy Prime Minister. 2004. Housing Health and Safety Rating System Guidance.
11) Lacking complete plumbing	A housing unit that does not have all three specified plumbing facilities (hot and cold piped water, flush toilet, and bathtub or shower) inside the housing unit, or in which the toilet or bathing facilities are also for the use of the occupants of other housing unit.	Yes	Lack of proper sanitation can result in spread of infectious diseases. Water-related diseases.	CDC, HUD. 2006. Healthy Homes Reference Manual. DHHS. Office of the Deputy Prime Minister. 2004. Housing Health and Safety Rating System Guidance.
12) Exposed wiring in unit	Any wiring that is not enclosed, either in the walls or in metal or plastic coverings with the exceptions of appliance cords, extension cords, chandelier cords, and telephone, antenna, or cable television wires.	Yes	Electric shock and fire, which poses risk of death.	CDC, HUD. 2006. Healthy Homes Reference Manual. DHHS. Office of the Deputy Prime Minister. 2004. Housing Health and Safety Rating System Guidance.

Housing Problem	Definition	Factor in AHS Severe and Moderate Physical Problem Rating	Pathway/Health Effect	Evidence Source
13) Roofing problems	<p>“Roofing problems” is comprised of three components: sagging roof, missing roofing material, and hole in roof. A “sagging roof” is a critical defect indicating continuous neglect or deep or serious damage to the structure. “Missing roofing material” includes rotted, broken, loose, or missing shingles, tiles, slates, shake, and tin, caused by extensive damage from fire, storm, or serious neglect. “Hole in roof” is when the missing roof materials expose the interior of the unit directly to weather.</p>		Enables water and pest entry: mold, allergens. Sign of structural problems.	<p>Putus T., Tuomainen A., Rautiala S. 2004. Chemical and Microbial Exposures in a School Building: Adverse Health Effects in Children. Archives of Environmental Health: An International Journal, 59(4), 194-201.</p> <p>Office of the Deputy Prime Minister. 2004. Housing Health and Safety Rating System Guidance.</p>
14) Foundation problems	Foundation crumbling or has open crack or hole. This includes large cracks, holes, and rotted, loose, or missing foundation material.		Enables water and pest entry. Sign of structural problems.	<p>CDC, HUD. 2006. Healthy Homes Reference Manual. DHHS.</p> <p>Office of the Deputy Prime Minister. 2004. Housing Health and Safety Rating System Guidance.</p>
15) Broken plaster/peeling paint	The area of peeling paint or broken plaster must be on the inside walls or ceilings and at least one area of broken plaster or peeling paint must be larger than 8 inches by 11 inches.	Yes	Sign of moisture-control problems, leading to mold and deteriorated paint. Deteriorated paint may contain lead, resulting in lead hazard.	<p>Sachs, H. 1974. Effect of screening program on changing patterns of lead poisoning. Environmental Health Perspective.</p> <p>Krieger J., Higgins D. 2002. Housing and Health: Time Again for Public Health. Am J Public Health. 2002 May; 92(5): 758–768.</p>

Housing Problem	Definition	Factor in AHS Severe and Moderate Physical Problem Rating	Pathway/Health Effect	Evidence Source
16) Water leaks from inside	Housing units with water leakage during the last 12 months are classified by whether the water leaked in from the outside of the building and by the most common areas (roof, basement, walls, closed windows, or doors) or reasons for water infiltration (fixtures backed-up or overflowed or pipes leaked).	Yes	Source of mold and dampness: Asthma/allergies, cough, wheeze, upper respiratory tract symptoms.	IOM Report. 2004. Damp Indoor Spaces and Health. Krieger J., Higgins D. 2002. Housing and Health: Time Again for Public Health. Am J Public Health. 2002 May; 92(5): 758–768. Office of the Deputy Prime Minister. 2004. Housing Health and Safety Rating System Guidance.
17) Flush toilet breakdown	The flush toilet may be completely unusable due to a faulty flushing mechanism, broken pipes, blocked sewer pipe, lack of water supplied to the flush toilet, or some other reason.	Yes	Lack of proper sanitation can result in spread of infectious diseases.	Lowry S. 1990. Housing and Health. Br Med J, 1990; 300:177-9.
18) Heating equipment breakdown	Heating equipment not providing heat at its normal heating capacity through some fault in the equipment.	Yes	Illness from cold conditions. Use of dangerous means such as unvented space heaters to remedy problem.	Krieger J., Higgins D. 2002. Housing and Health: Time Again for Public Health. Am J Public Health. 2002 May; 92(5): 758–768. Office of the Deputy Prime Minister. 2004. Housing Health and Safety Rating System Guidance.

Housing Problem	Definition	Factor in AHS Severe and Moderate Physical Problem Rating	Pathway/Health Effect	Evidence Source
19) Rooms without electrical outlet	A housing unit with at least one malfunctioning electric wall outlet in each room of the unit. A working electric wall outlet is one in operating condition. An extension cord does not qualify as an electric wall outlet.	Yes	Use of extension cords to supply power poses risk of electrocution, fire, and trip hazards.	Office of the Deputy Prime Minister. 2004. Housing Health and Safety Rating System Guidance.
20) Siding problems	Outside walls slope, lean, slant, or buckle. Outside walls missing siding, bricks, etc. Problems caused by storm, fire, flood, extensive neglect, vandalism, and so forth.		Possible lead-based paint hazard. Moisture intrusion. Sign of structural problem.	Office of the Deputy Prime Minister. 2004. Housing Health and Safety Rating System Guidance.

Appendix II – Using the Poor Quality Index to Inform Indicator Selection

The Poor Quality Index (PQI) was developed for the U.S. Department of Housing and Urban Development Office of Policy and Research by Econometrica (Eggers & Moumen, 2013). The index ranks 35 housing quality indicators by “weight,” which the researchers assigned based on severity. For example, indicators that automatically qualify a dwelling as “inadequate” are ranked a 10. Other indicators are ranked lower than 10 according to severity. We used PQI indicators weighted as a 4 or higher (the “most important” indicators of poor quality housing) to help select which CofO violations to analyze.

We began with the 20 indicators used in the SHHR. We then compared categories of local interest to the PQI and identified seven that were rated relatively high. We selected SHHR indicators that were weighted 4 or higher in the PQI to be assessed in this pilot, plus three more:

- Heating equipment breakdown (includes conditions weighted between 2 and 4)
- Room heater without flue (unvented kerosene heaters are assigned a weight of 4)
- Exposed wiring in unit (weight of 4)
- Roofing problems (various roofing problems assigned a weight of 5)
- Siding problems (various siding problems assigned a weight of 5)
- Window problems (windows broken assigned a weight of 5)
- Foundation problems (foundation problems assigned a weight of 5)
- Signs of rodents were weighted low in the PQHI (2), but were included in this assessment because of their importance for asthma.
- Water leaks from the inside and outside were not included in the PQI ranking system, but both were added to our assessment because of their association with asthma and other home environmental health hazards.

Although they were highly weighted (10), we did not include “no working elevator” and “incomplete plumbing or kitchen facilities” because these are not common issues in Rochester.

Appendix III – Data cleaning

The City returned an Excel database of 4,677 inspection records for 2013. Records were imported into Microsoft Access and cleaned to correct addresses and remove duplicates, resulting in 4,627 unique property records. Data cleaning methods are summarized in detail elsewhere and available on request.

Summary of Duplicate Record Removal

Type of duplicate data	Change(s) to Citation data	Change(s) to All Inspection data
Same address and same case number in Citations data	Citations consolidated to a single row	No changes
Same address and different case number in Citations data	All references to that address are removed (12 records)	All references to that address are removed (13 records)
Same address and different case number in All Inspection data, with matching data for only 1 case number in Citations	No changes	All Inspection data with a case number that matches the Citations data is kept; all other case numbers for that address are removed (20 removed)
Same address and different case number in Property data, with no matching data by case number in Citations	No changes	The first address and case number are retained and the rest are removed. (The case number is not significant in this situation.) (16 removed)

Appendix IV – Preparing the Data for Mapping in ArcGIS 10.1

The detailed methods for these steps are described elsewhere, and are available upon request.

Formatting

Addresses received from the city were in “STREET #####” format (e.g., “MAIN ST 0123”). Some addresses included apartment numbers (e.g., “MAIN ST 0123A”). The input format for geocoding addresses is “##### Street” (e.g., 123 MAIN ST”). We used MS Excel to extract the multiple parts of the address and reassemble. A visual scan of the addresses was conducted to ensure accuracy.

Geocoding

Addresses were geocoded in ArcGIS 10.1 using the New York State Street Address Mapping Program.¹ NYS developed a composite (based on many data sets) geocoder through their Street Address Mapping (SAM) program. SAM is available as a free web-based geocoding service, with no batch limit.

- In ArcMap, go to **Catalog -> GIS Servers -> Add ArcGIS Server -> Use GIS Services**
- Enter <http://gisservices.dhSES.ny.gov/arcgis> as the URL. Leave the username and password blank.
- Once your connection is established, navigate in ArcCatalog to `gisservices.dhSES.ny.gov (user)\Locators\SAM_composite.GeocodeServer`
- Drag and drop the locator into your ArcMap document, and it will become available for batch geocoding.

The City of Rochester is developing a similar geocoder for local addresses, but it isn't available yet.

After geocoding, addresses that fell outside city boundaries were checked and either adjusted or removed. Adjustments were made using the ArcGIS “Review/Rematch Addresses” function.

Joining to Geographic Boundaries

“Spatial Join” was used to link the geocoded addresses to our selected geographic boundaries. We then used the “summarize” function for each of the mapped indicators. This exported a database with the total number of properties inspected and the total number of properties meeting the specified criteria in each geographic area. We used this to calculate the rate for each criteria (e.g., HHI ≥ 3), imported the data back into ArcGIS, and linked it to the geographic layer. This allowed us to display the geographic boundaries shaded by the overall rate for each criteria.

¹ <https://gis.ny.gov/streets/>