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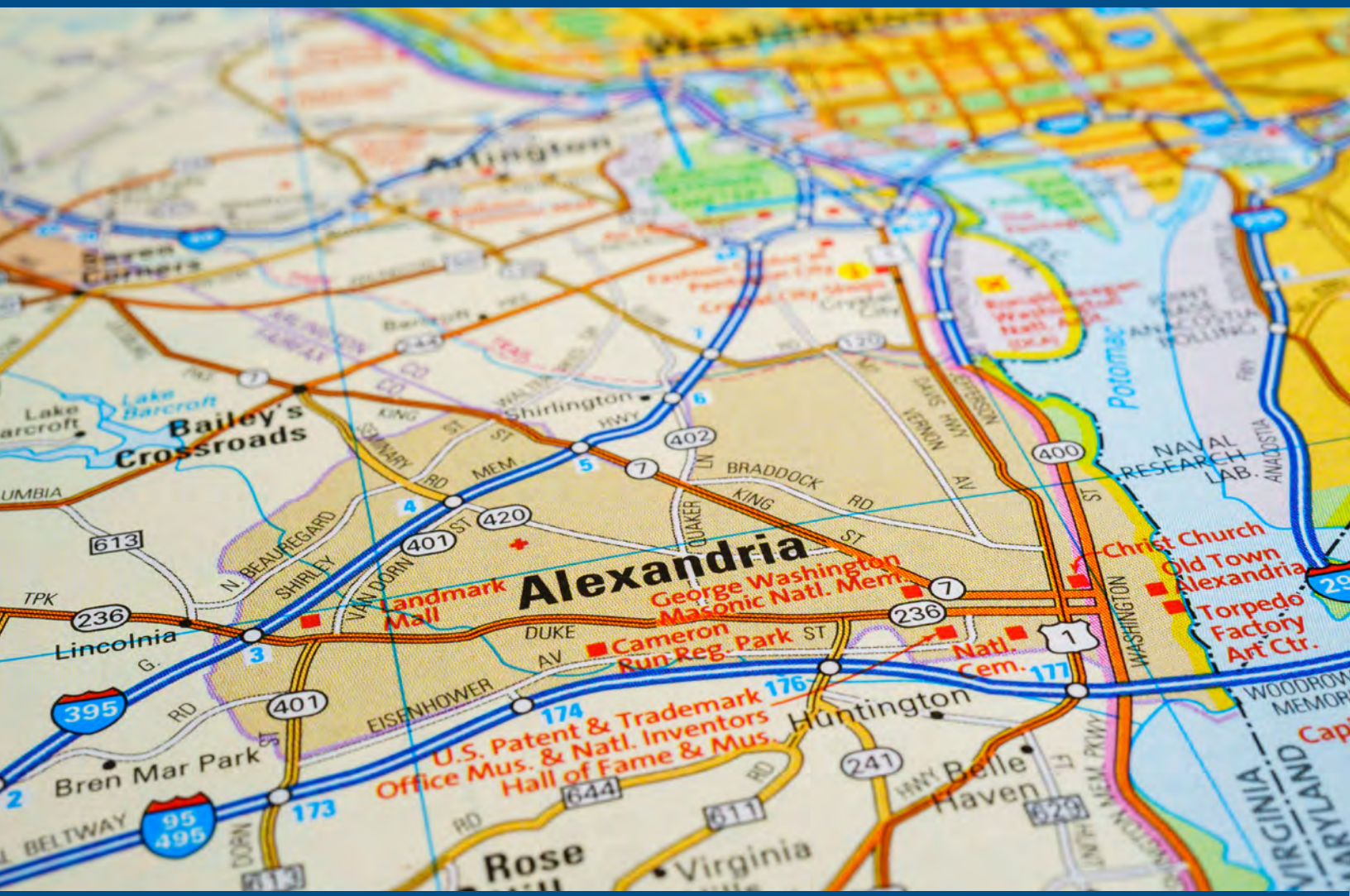
HEALTHY HOUSING



HEALTHY HOUSING IN ALEXANDRIA:
Where We Are and Where We Can Go

2021 | NOVEMBER

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This report was prepared by the National Center for Healthy Housing for the Alexandria Health Department, City of Alexandria, VA.

November 2021

I. HOW TO USE THIS REPORT

This report takes a multifaceted approach to examine how the City of Alexandria government ("City") can support and improve the health and safety of housing within the community. The report evolved from resident recommendations highlighted in the community health improvement plan (CHIP) developed by the Alexandria Health Department (AHD) and the Partnership for a Healthier Alexandria. This report should be considered one of the first steps toward creating healthier housing for all residents in the community. It examines current housing data assets and gaps, analyzes the City's existing policy framework, considers key allies, and provides recommendations to help create healthier housing in Alexandria.

Where and when resources were identified that might benefit the City's efforts to improve housing health, they are integrated into the overall discussion and guidance of the current state of healthy housing in Alexandria. Given the concerns and interests voiced by residents in the recent CHIP, this report is designed to serve as a roadmap to (1) help AHD, city agencies, policymakers, residents, landlords, nonprofits, and other potential partners work together to create healthy housing goals and (2) prioritize issues and policies to help them advance and achieve those goals.

The data matrix, found in Appendix B, and summary provide a snapshot of what data related to the health of the housing is currently available, what data are missing but could be easily gathered, and how the data could be used in assessing the state of housing in Alexandria, as well as to inform policy and funding decisions. The data matrix and summary also identify key data not currently available, which—though potentially difficult to collect—could be worthwhile for the City of Alexandria to gain a better sense of the state of healthy housing, where future investments should be made, and how to assess its progress.

As the data matrix provides a picture of what data are publicly available, the City and AHD can also use it to work with partners interested in furthering Alexandria's healthy housing goals. The matrix may also help AHD and its healthy housing partners identify previously unknown sources for data and/or advocate, as necessary, for support to gather additional data at the appropriate level of granularity for evaluating housing health. Although not every identified indicator and data point is entirely necessary to evaluate housing health, a broader array of datasets increases the ability to cross-reference them with other various demographic and socioeconomic indicators; such information can help the City of Alexandria and its partners determine which populations are at greatest risk and the most effective ways to serve them.

This report's policy and resources matrix, found in Appendix C, provides an overview of current policies, programs, and resources at the disposal of Alexandria agencies and residents to help advance healthier housing. Its accompanying summary report examines what existing policies and programs can be used to improve and increase Alexandria's stock of healthy housing; it also provides examples of policies and programs the City could incorporate to help build health equity among residents. Using its Code Comparison Tool, NCHH also compares the City of Alexandria's codes to those established in the International Property Maintenance Code and those recommended in the National Healthy Housing Standard (NHHS), which was developed jointly by the American Public Health Association and NCHH. Found in Appendix D, NCHH's code comparison report will help policy decision-makers employ evidence-based standards for safe and healthy homes by offering healthy home requirements and stretch provisions in seven key categories to help improve housing conditions. Since good policies and programs are informed by science, the code comparison report and the policy and resources matrix should be reviewed in concert with the data matrix to identify which additional data could be collected and/or cross-referenced with existing datasets to make informed decisions to drive Alexandria's healthy homes initiative.

Although resources identified in the matrices are not exhaustive, the information includes information about data availability and/or the policies and programs NCHH examined. This analysis and its accompanying matrices should be used a starting point to engage community stakeholders, service providers, policymakers, funders and foundations, and other state and local government agencies. NCHH has also provided several resources, from model policies to examples of best practices, as appendices in the report to help the City advance new policies and programs.

II. WHAT IS HEALTHY HOUSING?

Housing is one of the most well-documented and powerful social determinants of health. This association has been acknowledged for thousands of years from some of the world's earliest laws on inadequate housing construction to the ongoing influence of the 19th century sanitation movement on our modern housing codes.[1] Although our homes are generally seen as safe havens, research shows that homes that are not well designed, constructed, or maintained can adversely impact the health and well-being of their residents. Under the best circumstances, Americans spend nearly 70% of their time in their homes[2]; but during the recent COVID-19 pandemic, many individuals, including young children and older adults, spent even more time in residential environments. For many, being homebound sparked greater awareness of the importance of their home environment and how much of a role in their overall health, safety, and well-being is played by the effectiveness of a home's ventilation, its indoor air quality (IAQ), maintenance, thermal comfort, and even its basic structure. As observed during the pandemic, poor housing conditions, which often exacerbate respiratory ailments, also put older adults and those with respiratory conditions and compromised immune systems at greater risk of severe outcomes from exposure to the COVID-19 virus.

HEALTH IMPACTS

According to the U.S. Department of Housing and Urban Development (HUD), at least 40% of the homes in the U.S. have at least one significant home or safety hazard that puts household members at risk.[3] Housing hazards can include faulty heating, plumbing, and electrical systems; roofing issues; water leaks; leaded paint and water pipes; inadequate ventilation; noxious gases, such as radon and carbon monoxide; and trip and fall risks. Exposure to housing-related hazards, ranging from structural and ventilation defects to toxic materials (such as lead and asbestos) to mold and pests, can cause significant harm to residents and lead to unintentional injuries and health problems, such as asthma and respiratory illnesses, lead poisoning, or radon-induced lung cancer.

Annually, carbon monoxide (CO) poisoning results in more than 200 accidental deaths nationally, with lower-level exposures, the symptoms of which resemble the flu, often left undiagnosed. Lead poisoning has a range of long-term health effects. In children, it can cause intellectual and behavioral issues, including reduced IQ and attention span, hyperactivity, impaired growth, reading and learning disabilities, hearing loss, insomnia, and other health problems. Adults suffering from lead poisoning may have headaches, difficulty concentrating, high blood pressure, and other health problems. Costly housing or housing instability contributes to significant stress and mental health issues, including depression. Children who encounter housing instability often suffer both developmentally and academically.[4] Numerous preventable hospitalizations are connected to home hazards that lead to trips and falls among seniors.

According to the U.S. Department of Housing and Urban Development (HUD), diseases related to environmental health hazards in the home, such as asthma, lead poisoning, and cancer, are estimated to cost more than $76 billion annually; asthma incidents related to home environmental exposures average $405 million per year.[5] Issues related to housing hazards reach beyond health: They reduce the ability for seniors to age safely in their homes, result in children missing school or poor performance in class, and cause work absences for adults, all of which can have long-term economic impacts for individuals and the community at large.

Although health impacts from environmental home hazards affect all races, ethnicities, and income levels, the lost wages caused by pandemic shutdowns—along with the effects of substandard housing and issues such as overcrowding—have exposed the overarching injustice of unhealthy housing suffered by people of color and those living in low-income communities. In a study conducted by Enterprise Community Partners prior to the pandemic (2019), 38% of the low-income households interviewed stated that they lived in homes with poor indoor air quality, and nearly half (48%) reported exposure to indoor toxins. Fifty-four percent (54%) reported delaying medical care due to costs and having to choose between rent and medicine.[6] While healthy housing is important for everyone, improving the health of housing for low-income households is essential for building health and social equity.

Healthy housing is safe, affordable, and stable.

DEFINING HEALTHY HOUSING

Healthy housing is safe, affordable, and stable. It focuses on the individual home and living conditions to eliminate or control environmental hazards that trigger allergies and respiratory illnesses ranging from asthma to chronic obstructive pulmonary disease (COPD); that cause slips and falls; and that result in toxic exposures to mold, volatile organic compounds (VOCs), radon, or carbon monoxide. Healthy housing measures address both the interior and exterior condition of the home but are less focused on elements of the surrounding community, such as walkability, and access to green space or amenities. While these indicators are important to health, they are generally captured under the broader umbrella of community health and not housing health. Healthy housing is maintained well and pest-free. A healthy home conserves water and is energy efficient to reduce utility costs, lower housing cost burden, and offer appropriate thermal comfort. Healthy homes are structurally sound and weatherized to provide more than simple shelter: They are well-insulated, without holes in the walls, flooring, or foundation; are leak-free; and are sealed against drafts and water intrusion. A healthy home is properly ventilated in order to manage interior moisture, with adequate air exchanges to filter particulates and other pollutants and vent combustible gases and toxins outside the home.

Among the key factors when considering housing health are the resources available to residents and their capacity to maintain, enhance, and/or improve the condition of their home. Whereas a more financially secure owner or renter may have the ability to move to a healthier and more desirable home, to improve their homes by adding or upgrading its components, and to choose less-toxic materials in their home (such as their cleaning supplies, furniture, or paint), moderate- to low-income residents often have fewer options. Different residents may need differing types of support. For instance, some residents may need only education, better awareness of how their home environment impacts their health, and perhaps a tax abatement or similar benefit

THE PRINCIPLES OF A HEALTHY HOME

DRY: Damp houses provide a nurturing environment for mites, roaches, rodents, and molds, all of which are associated with asthma.

CLEAN: Clean homes help reduce pest infestations and exposure to contaminants.

PEST-FREE: Exposure to mice and cockroaches increase asthma episodes in children. Inappropriate treatment for pest infestations can exacerbate health problems as pesticide residues pose risks for neurological damage and cancer.

VENTILATED: Increasing the fresh air supply improves respiratory health.

SAFE: Falls are the most frequent cause of residential injuries to older adults and children, followed by injuries from objects in the home, burns, and poisonings.

CONTAMINANT-FREE: Chemical exposures include lead, radon, pesticides, volatile organic compounds, PFAS, and environmental tobacco smoke. Many of these exposures are far higher indoors than outside.

MAINTAINED: Poorly maintained homes are at risk for moisture and pest problems. Deteriorated lead-based paint in older housing is the primary cause of lead poisoning.

THERMALLY CONTROLLED: Prolonged exposure to excessive heat or cold when homes do not maintain adequate temperatures put residents are at risk for various health problems.

ACCESSIBLE: Increased accessibility in and outside the home can help reduce trips, falls, and isolation, and improve mental health and physical activity.

AFFORDABLE: High housing cost burdens can lead to housing instability, with frequent moves, overcrowding, and homelessness. High housing costs can force families into substandard housing, and contribute to damaged credit, job loss, lack of nutritious food and adequate healthcare, and poor mental health.

to encourage healthy home improvements. Others may need financial assistance, such as low- or no-interest loans or even a grant to implement healthy home measures. Between lack of resources and housing cost burdens, residents earning lower incomes (homeowners and renters alike) may have only limited ability to implement healthy housing measures; and renters are especially limited in their options for renting, creating, or maintaining a healthier home. Landlords and property managers may lack the resources, impetus, or will to improve housing conditions, so incentives may be needed to ensure their tenants live in healthy housing.

THE CITY OF ALEXANDRIA AND HEALTHY HOUSING

Appreciating the City of Alexandria's political structure and any opportunities or limitations its structure may present is a key step toward comprehending the state of housing in the jurisdiction. Alexandria is classified as an "independent city," which means it is not part of any other territory or county and is considered a primary administrative division of Virginia.[7] However, as Virginia follows Dillon's Rule,[8] Alexandria may not enact legislation without the express authorization of the Virginia's state government, possibly limiting its ability to impose certain codes or policies without first advocating for and gaining approval at the state level.

As the City of Alexandria assesses and considers how to improve its housing and the well-being of its residents, several specific factors may need to inform the discussion of healthy housing. First and foremost: preserving and expanding high-quality affordable housing. The simple fact that Alexandria has a lack of affordable housing and significant income disparities means it has healthy housing issues. With Alexandria's high housing costs, some residents cannot afford healthcare, utilities, food, and other necessities. Lack of affordable housing also leads to housing instability and homelessness, and related financial issues are shown to cause significant stress, sometimes leading to mental health problems. At a national level, a 2019 County Health Rankings report funded by the Robert Wood Johnson Foundation found every 10% increase in housing cost burden resulted in 86,000 more people in fair to poor health.[9] Approximately 40% of renters in Alexandria currently pay more than 30% of their annual income for rent, and 18% are severely cost burdened (paying more than 50%). The median household income currently stands at $105,014, with the median household income for Hispanic households at $65,433 and $64,974 for Black/African American households, compared to a median income of $128,893 for White households.[10]

Preservation of existing housing is a much more expedient and cost-effective way to address housing affordability, yet the age of housing and its condition must be part of the equation. More than 70% of Alexandria's housing stock was built prior to 1990 (many asbestos regulations did not go into effect until 1985), more than 60% was built before 1980 (lead-based paint was banned for residential use in 1978), and nearly 20% was built before 1950,[11] which means the housing may contain asbestos as well as lead (in paint, pipes, and fixtures) and may not have many of the energy, health, and safety measures commonly employed now. While the age of housing alone cannot be used to judge the health or condition of a home because it may not take into account renovations and upgrades implemented over the years, lack of data around permitting and the various types of permits makes it difficult to track what housing has been improved to meet more recent standards of health and safety. A snapshot of the City's health available via the 2021 County Healthy Rankings indicates 17% of its housing suffers from severe housing problems; i.e., at least one of the following four issues: overcrowding, high housing costs, lack of kitchen facilities, or lack of plumbing facilities.[12] Of those four issues, high housing costs and overcrowding are the most prevalent in Alexandria; according to the American Community Survey, only 348 units lack kitchens and 143 units lack flush toilets.

Preserving and upgrading housing is also essential to helping older adults remain in the community and age in place. Approximately 11% of Alexandria's population is currently over the age of 65, when incidents of preventable falls, most often in the home, increase exponentially. Alexandria's rate of hospitalization from falls is significantly worse for individuals between 65 and 85 years old, and hazards in the home environment are often one of the most cited reasons for trips and falls. In many instances, healthy home improvements such as installation of handrails or better lighting could greatly improve health outcomes for seniors, enabling them to remain in the community rather than going to long-term care facilities, which increases their risk of contracting infectious diseases such as COVID-19.[13]

Flooding is already high on the list of healthy housing considerations for Alexandria. This will only increase in importance as flooding events become more frequent and severe due to climate change. Flooding and its associated water damage in homes can cause mold growth; exposure to mold can lead to asthma attacks, eye

ISSUES TO CONSIDER WHEN THINKING ABOUT "HEALTHY HOUSING" IN ALEXANDRIA

There is not one indicator or number that signifies how healthy the housing is for a city or neighborhood; however, the following data indicators demonstrate some of Alexandria's healthy housing-related issues:

Affordability

Approximately 40% of renters in Alexandria currently spend more than 30% of their annual income on rent, and 18% are severely cost burdened (pay more than 50%).

Flooding

According to the Centers for Disease Control and Prevention (CDC), over 2,700 homes and 5,200 people live in a flood hazard area. Over the course of four major flooding events from 2019-2021, Alexandria fielded 810 requests for assistance via its 311 line.

Lead

The number of homes with lead hazards are unknown. Data from the Virginia Department of Health indicates 2,916 children were tested for lead in 2019 in Alexandria. Since the onset of the COVID-19 pandemic, the number of children currently being tested for exposure to lead may be depressed. In addition, **Virginia American Water** (VAW) reported that approximately 2,070 public-side lead service lines remain in the city. Although VAW replaces leaded service lines when main water lines are replaced, the number of private-side lines with lead that should be replaced is not known.

Injury

The hospitalization rates for hip fractures among Alexandrians over 65 is 734.3/100,000 for women and 345.8/100,000 for men. These rates are significantly higher for adults over 85.

Asthma

Alexandria's current asthma rate for adults (8.3%) is a slightly better than Virginia's overall rate (9%). However, there is a significant racial disparity in hospitalization rates for asthma, with the rate for Black/African American residents 163.5% higher than the overall rate. Additionally, asthma rates are worse in certain ZIP codes, such as in 22311 and 22304 (West End) and 22305 (Arlandria), than across the rest of the city.

Proximity to Environmental Hazards

The Environmental Protection Agency's (EPA) Environmental Justice Screening and Mapping Tool (**EJSCREEN**) indicates areas in Alexandria around the Capital Beltway, Interstate 395, and North Patrick Street as high in traffic proximity. In addition, much of Alexandria is in the 90th to 100th percentile for proximity to hazardous waste compared to the rest of the state. The city also has several residential areas that were previously industrial sites.

Outdoor Air Quality

EPA's EJSCREEN indicates Alexandria is in the 90th percentile or higher for PM2.5 and in the 80th percentile or higher for ozone compared to the rest of the state. High ozone levels are health risks as they make breathing more difficult and increase the lungs' susceptibility to infections, especially for children whose lungs are still developing.

and skin irritation, allergic reactions, and severe infections in people with weakened immune systems. Damp indoor environments may also attract pests and cause building materials to deteriorate. The city's proximity to the Potomac River and its many tributaries makes it extremely prone to flooding: 20% of the city is currently mapped as floodplain. At a minimum, flooding contributes to mold and mildew, but frequent floods in Alexandria are creating even more significant damage and health risks. Since 2019, Alexandria has endured at least three "50-year" flood events, the most recent caused by remnants of Hurricane Ida.[14] As the City works to improve its storm water infrastructure, it may also need to consider additional policies and program to shore up homes for both owners and renters. According to a *Washington Post* article, 11 communities are set to receive capital improvement funds to address 90 problem areas, but many communities are left out.[15] Moreover, while wealthier homeowners may be in a better position to implement and afford flood mitigation measures, the frequency and intensity of storms may overwhelm lower-income households.

In assessing and deliberating healthy home measures, the City may also want to consider the significant health disparities seen among its residents. On average, Black/African American residents die about five years earlier than White residents and have twice the overall average rate of preventable hospitalization. Black/African American residents have a rate 2.6 times higher than White residents, and Hispanic residents have a rate 1.4 times higher than White residents.[16] Alexandria's *Eco-City Charter* indicates that one in eight residents have a respiratory illness, and the Health Matters in Alexandria portal reported that nearly 22% of adults in Alexandria have been informed by a healthcare provider at some time in life that they have asthma, with 8.3% of adults currently reporting having asthma. Nationally, approximately 20% to 30% of asthma cases can be linked to home environments, and although the data for Alexandria are not broken down according to race or income, a report from the Virginia Department of Health indicates populations of color and in poverty consistently have higher asthma rates and poorer outcomes when compared to the general population. The lower the income, the higher the prevalence.[17] Alexandria's 2019 *Community Health Assessment* (CHA) highlighted some of the community's disparities through quantitative and qualitative data collection.

KEY HEALTHY HOUSING INDICATORS

- Age of Housing
- Physical Condition
  - mold/mildew
  - holes: walls/floors or foundation
  - functioning plumbing/electricity
  - operable windows
- Ventilation/IAQ
- Overcrowding
- Leaded Paint/Pipes
- Asbestos/Radon Remediation
- Smoke/Carbon Monoxide Alarms
- Thermal Comfort
- Housing Affordability/Stability
- Asthma/COPD
- Slips and Falls
- Elevated Blood Lead Levels

Of the 10 health issues cited by AHD in the CHA, at least five are strongly related to housing conditions. Beyond the obvious neighborhood and built environment, housing conditions may impact chronic health conditions such as asthma and high blood pressure, economic stability, cause injuries from poisonings to falls, and contribute to mental health issues. The CHA reported unintentional deaths from falls doubled between 2018 and 2019, and CHA survey responses from community residents, across all demographics, cited affordable housing as their top quality-of-life concern. Although it is likely some of the respiratory illness rates in the assessment are tied to the high level of particulates and other toxic substances found in the city's air, a clearer sense of residents' housing conditions and their environmental health hazards may help determine contributing factors and root causes of the health disparities and how to address them. Alexandria's residents identified housing, including its affordability and quality, as one of their key community health priorities in *Alexandria's Community Health Improvement Plan 2025* (CHIP).

Investments in healthy housing also make fiscal sense. According to HUD, healthy housing programs provide a significant return on investment (ROI). For example, every $1 spent on an asthma reduction program yields an ROI of $5.30 to $14; every $1 to reduce lead paint hazards, an ROI of at least $1.39; and every $1 on radon mitigation results in a return of $4.95. The benefits of healthy housing investments come from reduced healthcare costs, increased school attendance, less work absenteeism, increased income due to attendance, and fewer deaths.[18]

III. PROJECT GOALS, OBJECTIVES, AND METHODOLOGY

As previously stated, this analysis is an initial step to help the City consider where investment might be needed to improve housing conditions across the city and help AHD create a healthy housing coalition.

NCHH worked with AHD staff to determine currently available resources to review including community health needs assessments, reports, and neighborhood surveys; and to identify key stakeholders who could provide insight to existing data, programs, and policies. NCHH developed a data matrix of indicators needed to understand housing conditions and poor health trends related to housing as well as to highlight existing disparities. NCHH employed its experience in other communities to inform the list of indicators and develop relevant criteria, such as update frequency, available geographic level, and whether the data were publicly available to evaluate. Available data were identified and gathered using reports, portals, and surveys shared by AHD, as well as from resources such as the U.S. Census Bureau, the U.S. Environmental Protection Agency's (EPA) Environmental Justice Screening and Mapping Tool (EJSCREEN), the Centers for Disease Control and Prevention's (CDC) Environmental Public Health Tracking Network (EPHT), and stakeholder interviews. Information for this report was compiled over the months of July and August 2021 and may be limited based on the resources and staff available during this period. This matrix was created to inventory data currently collected by the City, what data are available from other known sources (e.g., utilities, state health department), and identify what data gaps remained. Details on the resulting matrix, which provides a glimpse of the Alexandria's current healthy housing landscape, can be found in Section IV.

NCHH also worked with AHD staff to examine existing policies and programs to understand how the current framework is working to address problems related to unhealthy housing. NCHH's policy and resources matrix outlines services, programs, policies, codes, and standards known to support improvements in housing quality. This matrix evaluates each policy's status using criteria such as whether or not the policy is currently in place, whether a policy or program would be feasible to implement in Alexandria, and its potential impact on the community and its residents. Information about policies and programs was gathered through a review of City of Alexandria and Virginia state websites, a scan of codes and standards commonly employed by the City, and via interviews with key stakeholders from City of Alexandria and state agencies as well as partner organizations.

In addition, NCHH conducted a code comparison of Alexandria's building codes with the National Healthy Housing Standard (NHHS) to gain a better understanding of what codes the City might adopt to improve the health of its housing stock. A summary of the results from the code comparison as well as findings from the policy and resources matrix are available in Section V. The summary identifies what policies and programs the City (or a partner organization) currently has in place, where potential gaps exist, and provides a comparison of current policies against known best practices.

IV. DATA ANALYSIS

The City of Alexandria is comprised of 38 census tracts across eight ZIP codes, and its neighborhoods are divided into 18 "Small Area Plans" for Master Plan purposes. The City is doing a commendable job collecting data for these various geographies. It collects and tracks several indicators at various levels of granularity including state, city/county, ZIP code, census tract, and block. Data currently collected include demographic, health and safety, and socioeconomic information such as disability issues, hospitalization rates, employment, and income; and housing information ranging from age and type of housing (i.e., single- or multifamily) to household type (i.e., renter versus homeowner). Several datasets are broken down according to race and/or income, which is critical to determining potential disparities.

The City provides a substantial amount of this data to the public via its "Performance Dashboard," which provides analytics according to topic area (e.g., inclusive, economic, housing, environment) as well as for major City agencies (e.g., Office of Housing, Code Administration). It also conducts an annual resident survey to collect and track key data based on input from community residents, which is posted online. In addition, the Alexandria Health

THE STATE OF HEALTHY HOUSING DATA IN ALEXANDRIA

STRENGTHS: There are several areas of data collection in which Alexandria is doing very well:

- **Health**. The city provides excellent data resources with its "**Performance Dashboard**" and its "**Health Matters in Alexandria**" portal, which covers many topic areas and provides details about disparities across race, gender, and age when available.
- **Flooding**. The city collects and publishes impact data in the form of heat maps of the city after significant flooding events. It also publishes statistics on the number of flood prevention activities performed in the city in a monthly newsletter.
- **Codes**. Code Administration publishes monthly reports that include the number of inspections completed. These are notably transparent and readable reports that not every city publishes.

IDENTIFIED GAPS: There are also some areas where we identified data gaps:

- **Housing conditions**. Overall, Alexandria does not have any central or comprehensive data on housing quality in the city; however, there are several opportunities for Alexandria to begin collecting this data, such as analyzing codes reports or working with the annual resident survey.
- **Disparities**. While some of the existing data are disaggregated by race/ethnicity, income, and/or age, this is not universal. As flooding is a significant problem in Alexandria, this is particularly notable as an issue for flooding data.
- **Other individual indicators**. There are other specific indicators that Alexandria currently lacks, which can be observed in the full data matrix. Some relevant data gaps specifically noticed were current asthma rates among children, asthma ED utilization rates (hospital admittance rates for asthma are available), and heat-related mortality and hospitalizations.

Department maintains a large amount of key community health, demographic, and socio-economic data from a broad spectrum of resources on its "Health Matters in Alexandria" portal. Although not all data are available at every geographic level, data are available from the city/county level down to ZIP code and census tract, providing the ability to create reports with various indicators according to location and compare the results against other localities.

Given many communities in the Alexandria area prone to flooding—which can cause severe and costly water damage as well as lead to mold, mildew, and structural damage—the City is collecting data on housing located within flood hazard areas or that is vulnerable to flooding. The City is also tracking information on census tracts that have experienced flooding events. Unfortunately, the data do not specify race/ethnicity or income, information that could help determine which populations are most in need of assistance and how best to serve them after a major event.

Additionally, although the City collects and tracks a substantial amount of data, little is specific to housing quality and conditions, especially major interior and systems issues, such as homes with lead-based paint, heating/cooling issues, or visible mold/moisture, which would help provide a better assessment of the city's housing stock. While existing data may be used to create a broad sense of the health of housing in the city, additional data are essential to accurately determine what home hazards currently exist in the community. That additional data can inform needed programs and policies to mitigate or prevent issues. Although the lack of ZIP-code- or property-level data may require additional inspections and assessments, it appears that (at least in some cases) the information may

exist but is not currently accessible. For example, there currently appears to be no mechanism to track residential properties that have undergone lead or asbestos remediations. Similarly, there appears to be no mechanism to identify properties that have undertaken weatherization upgrades or when upgrades may have occurred. It is also important to recognize that any sort of new system for data collection would likely require additional resources to support understaffed City agencies.

DATA MATRIX

NCHH reviewed 100 environmental home hazard indicators related to health from nearly 20 data sources including the U.S. Census, the Northern Virginia Association of Realtors®, resident surveys conducted by the City, the EPA Map of Radon Zones, and the National Environmental Public Health Tracking tool to identify what healthy housing data were available and currently collected for Alexandria. Data were grouped into three main categories: the state of the city's housing stock, which considered factors such as the age of housing, the breakdown of renters versus homeowners, and vulnerability to flooding; population health, which examined the extent of housing cost burden, the number of children tested for and with elevated blood lead levels (EBLLs), the prevalence of asthma, and behavioral issues (e.g., smoking); and local capacity, which addressed issues such as complaints to the City about housing conditions or reports of code violations, number of annual housing inspections conducted by City agencies, cost of lead pipe replacement, and the number of homes and populations served by the City's home repair programs.

If data for the various indicators currently exists, the matrix provides the most recent year it is available, how frequently the data are updated, the smallest geographic level at which it is provided, and whether the data are publicly available. The matrix also includes a rating scale of 0 to 3 (*0* is none and *3* is strong), which assesses each data points' *feasibility*, *relevancy*, *potential impact*, and *readability*.

Out of the 100 healthy housing indicators included in the data matrix, NCHH was able to obtain data from various resources for 33 indicators and partial data for another 20; we were unable to find data at the city level for nearly half (47) of the indicators. The City is capturing data (full or partial) on numerous indicators related to housing health, including 20 (14 full, six partial) indicators directly connected to housing stock, 18 linked to health (13 full, five partial), and 15 associated with local capacity (eight full, seven partial).

Some health data tied to home environmental hazards—such as children tested for blood lead levels (BLLs) or children with elevated BLLs—are available either from the City of Alexandria or Virginia state government with both racial and income breakdowns. Other data, such as incidents of chronic obstructive pulmonary disease (COPD), asthma, lung cancer, or falls and injuries among older adults, are only categorized by race/ethnicity. In instances where only partial data were found, it was often only available for one age group (e.g., adult

Feasibility reflects how easy or difficult it would be for the City of Alexandria to collect the data. Indicators with higher feasibility may have an existing source or structure set up for collection, strong precedent/case studies for collection in other locations, or otherwise low barriers to collection. Indicators with lower feasibility may have fewer or no existing sources or stronger barriers to collection (e.g., time-consuming collection process or collection would require entering the home).

Relevancy refers to how important the dataset would be to helping the City identify and address healthy housing issues. While a case could be made that all the indicators included in the matrix are relevant to assessing healthy housing, indicators with higher relevancy would be those specifically important to Alexandria or where the data are critical to assessing a specific healthy housing issue accurately.

Potential Impact refers to how much of an impact the data point or dataset could have on Alexandria's programs and policies. High potential impact indicators may cover multiple healthy housing issues, help assess a widespread problem, be highly actionable, or directly lead to a policy/program change.

Readability refers to how easy it would be to access, read, and understand the dataset. This is particularly important both for general transparency and ease of access, especially given the City's goal to build a community coalition and work on these issues with diverse organizations. Indicators with lower readability ratings may be difficult to access, require specialized software or knowledge to understand/analyze, or rely heavily on estimates or inferences from other data.

versus children) or one or another indicator of the measure. For example, data on incidents of asthma provided level of hospitalization but did not cover incidents related to emergency department (ED) utilization in which an individual was treated at the ED and later released. Knowing the frequency of asthma-related ED visits is helpful in appreciating the severity of the illness and the positive impact home remediations can make. Additionally, for optimal analysis, health outcome data should be collected at the smallest geographic level possible without violating Health Insurance Portability and Accountability Act (HIPAA) regulations and categorized by both race/ethnicity and income. This level of detail can better inform what programs may be needed and where programs could better serve residents to improve their housing to enhance health outcomes.

Unfortunately, to get the best reading on the state of the city's housing health, many of the indicators with available data must be examined in conjunction with the lens of indicators that are currently not being captured. For example, the age of the housing stock can provide a sense of the number of homes that might be at risk for lead or asbestos exposure. But without more details and evidence about the condition of the housing—both interior and exterior—it is difficult to have a full picture of the impact the age of the housing has on health. As a prime example, many older, stately properties in Alexandria have undergone renovations that improved the health and efficiency of the home, but little to no data were collected on which structures incorporated lead or asbestos remediations. Fortunately, the City may be able to capture several data points, identified as *moderate* to *relatively easy* to capture and understand, employing some of the mechanisms the City currently uses.

NCHH's team reviewed all the indicators according to their relevance for measuring and understanding the state of healthy housing in Alexandria, along with their potential to impact policy decisions. It is important to know what data is not currently collected to understand how AHD might address potential policy and program gaps related to housing health. Forty-seven of the indicators identified by NCHH as key to determining the health of housing had no data available. Of these 47 indicators, 23 were rated *moderate* to *strong* for their relevancy and potential impact to health and housing and were also rated *relatively easy* to capture and understand. Only 20 of the 47 indicators not currently collected were identified as *difficult* to capture or understand. These ratings, which could be better informed by the addition of local input and expertise, can help with prioritization of resources and future efforts.

For example, housing data rated *relatively easy* to capture and understand, such as having a functional smoke/carbon monoxide (CO) detector or other questions about the condition of the home, could be added to the City's annual resident survey for self-reporting. AHD could work with the City's Office of Housing as well as the state housing and health agencies to determine the availability of accessible housing as well as the number of homes and population served by lead programs.

One specific source of housing-related data that the City already has access to is the information collected by the Department of Code Administration. Code Administration publishes monthly reports online, which include monthly and annual data documenting the number of inspections completed, violations issued, rodent complaints, and nuisance abatement hotline calls. These numbers are helpful for understanding the City's capacity and how many homes are being served by code enforcement but do not provide much detail about the housing conditions present in the homes that code officers are inspecting. However, code officials collect far more information than is presented in the monthly reports; this information is entered in the software program that Code Administration uses to collect and track code enforcement cases. With some dedicated resources and staff time committed to the project, the software program could be used to collate this information and reveal additional details about both the city's housing conditions and how well enforcement mechanisms work in Alexandria. Some of the data that could be collected this way include:

- A breakdown of the types of code complaints and violations by type of issue. Currently, only rodent complaints are noted in the monthly reports. Code Administration told NCHH—anecdotally—that their most frequently observed internal issues are rodents (mice and rats) and broken or missing air

conditioning units. Frequent external issues include trash, unmowed grass, inoperable vehicles, unfit properties, and deferred maintenance.

- The average number of violations per property or management company.
- The average length of time and number of actions needed to bring an issue into compliance, as well as a record of issues that appear to have achieved compliance.
- Type of issue, collated into complaint-based versus proactive inspections. Alexandria performs both.
- Issue occurrence by location in the city. City code inspectors are assigned census tracts. While the department currently does not create reports by census tract, the data could be used to identify areas with more frequent code complaints and inspections, examine differences in the time to resolution for census tracts with similar housing types and violations, if there are specific housing issues clustered in the city, or to identify training needs for individual inspectors.
- Code Administration officers do not collect any demographic information for the households they serve; however, reports of issues by census tract could be compared to city demographic information to determine how or if code issues occur in predominantly minority or low-income neighborhoods compared to the city as a whole and to help identify and address patterns of disparities. For example, fewer violations than expected in a census tract with known poor housing quality could indicate barriers for residents in accessing services due to immigration status, language barriers, or fear of repercussions from landlords.
- Code Administration also issues permits for renovation. This data could be analyzed to capture and track the number of homes undergoing renovation requiring lead or asbestos remediation and implementation of lead-safe work practices.

Opportunities exist to leverage existing Department of Code Administration software and information to reveal additional details about city housing conditions and enforcement.

Housing condition data collected via complaint-based code enforcement will never be representative of Alexandria as a whole, as it may reflect only the worst conditions and can be restricted to those who are willing or able to register complaints with the city government. Many people who feel disenfranchised, such as those who do not trust the city government to act or renters concerned with retribution from their landlords, may not be comfortable submitting complaints; however, code complaint data can still provide insight into common housing quality issues in Alexandria. Since the City already logs all this information, it would only need to allocate the necessary resources and/or staff time to identify how to retrieve the information from the database and collect it into a report. This may require involving the IT department to assist Code Administration in working with the software. Such a project would be a relatively easy way for the city to access new housing data.

Health issues identified as *relatively easy* to *moderate* to capture, such as the number of people poisoned by carbon monoxide or who experienced heat-related mortality, hospitalizations, and asthma-related emergency department visits, could be tracked by AHD with reporting help from local hospitals or healthcare and urgent care centers. Alexandria's location in a large metropolitan area poses both potential obstacles and opportunities in this regard. On one hand, residents may utilize healthcare facilities outside city boundaries, which could make it difficult for AHD to access reports from these facilities (unless they are able to establishing reporting agreements with them) and challenging for AHD to parse out data specific to Alexandra's residents versus the larger metro area. On the other hand, there may be other organizations in the region who are already working with healthcare facilities on this kind of data access with whom Alexandria could partner. For example, Alexandria may be able to work with or partner with existing asthma programs in the District of Columbia to or gather additional data.

Data indicators almost always the most difficult to capture are those related to interior housing conditions requiring a visual inspection and entry into residents' homes. This challenge is not unique to Alexandria; many cities across the country lack detailed information on their interior housing quality issues. Nonetheless, working toward collecting this data could be well worth the City of Alexandria's time and effort to better understand the

state of housing and health or to build local capacity in the community. To tackle this issue, it may be most helpful for the City to identify ways to approximate this data rather than aiming for a comprehensive survey of all the data indicators listed in the data matrix:

- Issues identified as having high readability scores (i.e., easily understood), such as visible mold/ moisture, signs of pests, or open cracks or holes, could ostensibly be captured by adding them to the annual resident survey or through the City's annual inspections of rental properties (owner-occupied properties would likely have to continue to rely on self-reporting).
- Data collected by Code Administration, as outlined above, could be used to better understand the types of housing conditions frequently encountered by code officials.
- External conditions, while not a complete substitute for internal conditions, are easier to collect, and the two can be related. A "drive-by" survey could help identify external issues that often have internal implications. For example, roof issues may mean water is leaking into the home and causing mold or moisture hazards.
- There may also be opportunities to partner with existing programs that already conduct visits in residents' homes, such as AHD's BabyCare program. These programs could potentially be used to collect data if organizations were willing to add housing condition questions to an existing questionnaire or protocol. Or, as an easier first step, these programs could be invited to participate in conversations about healthy housing in Alexandria and share their anecdotal observations about any housing issues they encounter.
- Finally, partnerships with community-based organizations in the city and conversations with groups such as neighborhood organizations, or city forums with community members, could lend additional insight into housing conditions and pave the way to future data collection.

Data for other indicators, such as indoor air quality (IAQ), while relevant and impactful, are difficult to capture without special equipment. Rather than tracking the data, code implementation and building permits around ventilation, such as improved air infiltration and increased air exchange, may be more essential to address the issue rather than trying to capture the data.

V. HEALTHY HOUSING POLICY, PROGRAMS, AND RESOURCES

NCHH worked with AHD staff to scan policies and programs administered by various relevant state and City of Alexandria agencies to determine how the current policy framework is addressing issues related to unhealthy housing. The types of inspections and certificates required for new construction and renovations were examined for both homeowner and rental properties as were the building codes that govern how the City approaches development. It is important to note, as Alexandria is in a Dillon state, its ability to develop codes specific to City goals and objectives is somewhat limited, and its construction and renovation codes are governed by the Virginia Uniform Statewide Building Code (USBC). The USBC covers three distinct areas: new construction (Virginia Construction Code), renovations and upgrades (Virginia Existing Building Code), and maintenance (Virginia Maintenance Code). Virginia's building and fire codes were most recently updated in July 2021 through adoption of the 2018 model I-Codes developed by the International Code Council. These codes help guide the City's programs and influence the resources available to promote healthier housing across Alexandria. In addition to the codes, the policies Alexandria uses to identify, monitor, and mitigate health impacts related to housing conditions such as lead, asbestos, and mold were also reviewed, along with how or if they were addressed in the City's permitting processes and/or disclosures.

Following the review of policies for inspection, NCHH conducted examinations of the types of protections and assistance that might be available for tenant relief and of the programs designed to remedy housing issues known to contribute to unhealthy housing situations. In addition to AHD and the Virginia Department of Health (VDH) on the public health side of the equation and the Office of Housing and the Virginia Department of Housing and Community Development (DHCD) on the housing side, NCHH sought to determine what programs and activities

THE STATE OF HEALTHY HOUSING POLICIES, PROGRAMS, AND RESOURCES IN ALEXANDRIA

STRENGTHS:

- **Inspections**. The city has a strong structure to identify lead and other housing hazards through the Maintenance Code Division's annual rental inspections, its rental districts for inspection, and its issuance of a certificate of occupancy once the permitting stage has confirmed work is properly completed.
- **Home repair programs**. Several City and state programs provide low- or zero-interest loans for low-income homeowners interested in making healthy housing repair or upgrades.
- **Green building and energy efficiency**. There are numerous federal, state, and local mechanisms to provide energy assistance and provide energy efficiency upgrades in residents' homes. Alexandria's adoption of green building policies provides a lead-by-example effort to improve the health and efficiency of its buildings.
- **Affordable housing**. The city is committed to expanding and preserving the quality and quantity of its affordable housing and has built strong relationships with affordable housing partners. The city has the opportunity to build on these strengths to reinforce healthy housing measures in its affordable housing efforts.

IDENTIFIED GAPS:

- **Asthma**. Alexandria has no home-based visiting program to identify and help remedy home-based asthma triggers and relies heavily on services of and reports from medical providers.
- **Lead**. The USBC only requires that lead-painted surfaces be maintained and free of chipping. Per the AHD's Division of Environmental Health, when a child with an EBLL is identified and an environmental investigation is triggered, the code enforcement is informed via reports, but there are no real mechanisms to enforce anything beyond compliance with the code's basic lead requirements.
- **Permitting process**. Alexandria requires a variety of permits for construction, renovation, and demolitions. Its demolition ordinance and permits do not include any lead requirements. Additionally, Alexandria's renovation permits do not require a verification the work will be conducted using lead-safe work practices or in compliance with EPA's **Renovation, Repair, and Painting Rule** (RRP).
- **Healthy housing community-based programs**. Alexandria has a substantial network of community champions and affordable housing partners, but there appear to be fewer partners either identified or focused on healthy housing.
- **Home Repair Programs.** Although the City of Alexandria offers low- and no-cost loan programs for home repair, utilization of these programs appears limited (for example, since 2018, the Home Repair Loan Program has only recorded five loans being issued per year). Program activity has been negatively affected by various factors in the past three years, including staff vacancy, lack of contract architects, and some residents' unwillingness to have workers in their homes during the COVID-19 pandemic.

Relevancy refers to how relevant the policy is to helping the City address healthy housing issues. Those with higher relevancy are specifically important to Alexandria or critical to address a specific healthy housing issue.

Feasibility identified how realistic it would be for the City to enact or strengthen the policy. Policies with higher feasibility may already exist or have a structure in place to improve the policy to add more healthy housing considerations, mechanisms to pass legislation, strong precedent in other communities, or otherwise low barriers to implementation. Policies with lower feasibility may have fewer or no existing viable strategies or stronger barriers to enact the policy.

Potential Impact reflects how much impact the policy or program could have on healthy housing in Alexandria. Policies with a high potential impact may cover multiple healthy housing issues, have multiple beneficiaries (e.g., renters, homeowners, children, seniors), or address a widespread problem.

Sustainability Over Time refers to how stable the policy is or will be in the future. Policies might have high sustainability if they have a wide range of stakeholders, established systems and processes, and dedicated funding. Policies might be less sustainable if funding is temporary, requires a dedicated champion in the legislature, or historically have not endured over time.

were offered through private companies, such as Virginia American Water and nonprofits. The scan also considered policies and funding opportunities broadly available to the City of Alexandria at the state and federal levels to help promote healthier, affordable housing. As feasible, NCHH interviewed staff from various city and state government agencies to gain a clearer understanding of how policies and programs were being deployed.

Overall, NCHH's scan of policies and programs found that Alexandria (or the state of Virginia) has instituted numerous policies and programs to support and promote healthier housing. Findings from the scan, which represent a snapshot of Alexandria's healthy housing policy landscape, are presented in the policy and resources matrix. In addition to the matrix, NCHH conducted a comparison of codes employed by the City of Alexandria with the National Healthy Housing Standard (NHHS) using its code comparison tool. A copy of the report and its results are included in Appendix D.

The goal of the policy and resources matrix and the comparison of codes used by the City to the NHHS and IPMC is to help decision-makers employ evidence-based practices and standards to improve housing and health conditions in the community. The policy and resources matrix should be examined in conjunction with the data matrix to help AHD and its partners determine what the City's next steps should be as it considers launching a healthy homes initiative and/or creating a coalition focused on healthy housing.

POLICY AND RESOURCES MATRIX

The policy and resources matrix highlights policies, programs, and resources currently available to help advance healthier housing in Alexandria. This matrix identifies policies and programs that can be used to create or increase the Alexandria's healthy housing outlook or help residents deal with health issues that may be related to home environmental hazards, such as asthma or lead poisoning. NCHH also attempted to provide examples of model policies and programs the City might consider incorporating to help build residents' health equity. In some instances, the resulting matrix includes recommended healthy housing policies or programs not currently in place to provide a sense of potential best practices the City may want to adopt, such as the NHHS or home asthma visits. The status of policies, programs, and resources are identified as being *completely in place, partially in place, not in place*, or *temporary*. The matrix also employs a 0-to-2 rating scale (i.e., an associated symbol) where *0* is none and *2* is high for criteria such as *relevancy*, *impact*, and *sustainability* to provide users a sense of the importance each measure has toward improving housing health and identifies the potential timeline for implementation.

If a program or policy already includes provisions that address healthy housing, its status is labeled *in place* on the matrix. Alternatively, if there is no program or policy to address the issue, the status cell is empty. As feasible, NCHH also attempted to identify expected beneficiaries and where policymakers and advocates might encounter resistance.

THE POLICY AND RESOURCES MATRIX IS PRESENTED IN **APPENDIX C: TABLE 2**

Alexandria's current codes are aligned with several of those in the NHHS regarding landlord and tenant responsibilities. They also provide for proactive inspections of rental properties, which can identify and potentially lead to early remediation of home health hazards, especially for low-income renters. The City assigns a maintenance code team (MCT) to rental districts based on census tracts who conducts annual inspections of exterior and interior conditions for possible violations of the VMC and fire prevention codes. In multifamily properties with 10 or more units, the MCT inspects no fewer than two units and no more than 10% of the total units, unless an inspector identifies code violations that impact the health and safety of residents, in which case the inspector may examine as many units as they deem reasonable. During the COVID-19 pandemic, property inspections declined with most inspections limited to building exteriors. NCHH was also informed that the department was understaffed, which made it difficult to conduct routine inspections. As the pandemic eases, the department may recruit additional inspectors to ensure properties are inspected and codes are adequately enforced. However, if additional code requirements are added, the department may need additional resources to support this work.

While Alexandria is required to employ USBC codes for construction purposes, NCHH's scan found it has incorporated additional initiatives and policies to meet development goals and the needs of its residents. Although it has neither specific "healthy housing" codes nor ordinances in place or a dedicated healthy homes office, it demonstrates its commitment to the health and well-being of residents through transparency of data, efforts to gain feedback from community residents via efforts such as the CHIP, and the adoption of its *Eco-City Charter* in 2008.

Several of the guiding principles of Alexandria's *Eco-City Charter* also appear aligned with healthy housing objectives, including "Builds Wisely," "Improves Water Quality," "Clears Air," "Conserves Energy and Resources," and "Supports Healthy Living."

Initiatives launched under the umbrella of Eco-City include the City's Environmental Action Plan, which suggests advocating to the state legislature for local building code authority to create, implement, and enforce a local green building code, and its Green Building policies. Three green building standards are accepted under the 2019 Green Building policies, but only one, EarthCraft Multifamily (ECM), may be used for residential projects.

Additionally, although the City's Green Building policies do not cover the full range of health measures captured in the NHHS, they do address many, including improved ventilation and filtration and restrictions on the use of toxic materials, all of which can help reduce respiratory illnesses such as COVID-19 and minimize allergy and asthma triggers. In multifamily properties, the measures may also help reduce the potential of cross-unit exposure or contamination from residents' smoking and/or viruses such as COVID-19 by air sealing to compartmentalize units. The City's Green Building Policy imposes these development standards on new private development, new public development or city-owned buildings, and major renovations that require a Development Site Plan (DSP) or a Development Special Use Permit (DSUP). Further, by calling for standards such as EarthCraft, which was specifically designed for the mid-Atlantic climate, the City ensures green building measures are appropriate to the area's humidity and temperature variations to provide increased moisture controls.

Given the Alexandria's proximity to the Potomac River and its propensity for flooding, NCHH specifically examined measures the City is taking to address the impact of flooding. In response to the frequency and severity of flooding, Alexandria has created "floodplain districts" with special construction and development restrictions and permitting requirements. Codes are designed to address hazards specific to flooding and water intrusion to increase the districts' health and safety standards. The codes establish special permit requirements for construction of residential properties, including elevation specifications for basements and electrical equipment, the use of flood-resistant materials, and construction techniques to minimize infiltration of floodwaters into the home and its systems.

Additional policies and codes that stood out include the Virginia's Landlord and Tenant Act, which provides several safeguards regarding housing conditions, including protections against mold (§ 55.1-1215; § 55.1-1220, A5; § 55.1-1227, A10; § 55.1-1231). For example, if mold within a rental property is found to "materially" effect the health or safety of a tenant, the landlord is not only required to remediate the mold but also to relocate the tenant during the remediation to a comparable place to live or a hotel room at no additional cost. In 2020, the City also published a guide on how mold should be addressed in rental properties[19]; however, it is unclear how often this is implemented due to the burden of proof resting on tenants. Some tenants, such as those who are undocumented or who are illegally subleasing in a space, may fear making complaints or requests.

MODEL HEALTHY HOUSING POLICIES AND PROGRAMS

- ✓ National Healthy Housing Standard
- ✓ Weatherization plus Health
- ✓ Non-Toxic Building Materials
- ✓ Green Building
- ✓ Healthy Homes Repair/Renovation
- ✓ Energy Efficiency
- ✓ Asthma Home Visits
- ✓ Health at Home Education and Outreach

Although the state has set standards to screen children for exposure to lead, Virginia is a targeted screening state, not a universal screening state. Virginia Administrative Code and testing guidelines require children to be tested at 12 and 24 months if they meet certain criteria, such as being eligible for or receiving benefits from Medicaid, the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), or other criteria.[20] When older children—those between the ages of two and six years of age—visit their doctor, they are required to be tested if they have not been previously or if they meet the specific criteria identified by the Administrative Code. Healthcare providers must report any children with elevated blood lead levels (EBLL) to the local health department, such as AHD.

When AHD is notified that a child has an EBLL of 10-14 µg/dL, a case manager coordinates with the child's healthcare provider to provide a public health nursing assessment and follow-up. If the child has an EBLL of 15 µg/dL or higher, AHD conducts an environmental investigation of the residence and generates a report. The report includes a description of the location, type, and severity of identified lead-based paint hazards, as well as any other potential lead hazards. It also includes a description of interim controls and/or abatement options for each identified lead-based paint hazard. Virginia guidelines state that enforcement should be handed over to local code enforcement authorities. In Alexandria, a copy of the risk assessment report is reported to Alexandria Code Administration, and if a lead-based paint hazard is identified, the Code Administration is tasked with enforcing lead-based paint hazard controls[21]; however, there does not seem to be a consistent method for Code Administration to follow up on these reports and ensure hazards are being dealt with appropriately. The authority for Code Administration to follow up on the health department reports is unclear and may benefit from increased communications between the two departments.

Additionally, although Alexandria is currently limited in its ability to require lead screening of children, it could implement a public education and awareness campaign to help parents ask for lead testing during routine doctor visits. The District of Columbia launched its "Twice by Two" campaign to help parents better understand the impact of lead poisoning and mobilize them to request that pediatricians conduct lead tests. In the District, young children are required to be tested for lead at least twice by the time they are two years old, but officials found screenings were not always being performed, and the public awareness campaign was initiated to help get parents more involved in the process.

NCHH's review of the Alexandria's permitting processes also indicated areas for improvement regarding ensuring housing and community health, especially during renovations and construction. Although demolition permits require an asbestos affidavit of compliance, the City's demolition ordinance and permits do not include any lead requirements. Additionally, during the renovation permit application and approval process, neither the contractor nor those applying for construction permits are required to verify that work will be conducted using lead-safe work practices or in compliance with the Renovation, Repair, and Painting (RRP) Rule required by

the U.S. Environmental Protection Agency (EPA). Adding lead considerations and requirements during the demolition and renovation permitting processes are different from and would complement the requirements for lead hazard control, abatement, and permitting when children have EBLLs or when lead hazards are identified in a home. Alexandria could advance lead safety throughout the community by better enforcing RRP rules in the permitting process.

One of the major indicators of housing health is its affordability. Preservation and renovation of existing housing, in addition to new construction, will be key to the City's ability to provide adequate affordable housing for all its residents. Real estate costs and market pressures for more than 20 years have created an imbalance in housing access and created a severe housing shortage in Alexandria, which is amplified by Alexandria's significant income disparities. Increasing access to healthy, affordable housing and creating stable housing environments is essential. Both the state of Virginia and the City of Alexandria have launched several programs and initiatives aimed at increasing the stock of affordable housing and ensuring it is healthy and energy efficient. Programs aimed at affordable housing developers, such as the federal Low-Income Housing Tax Credit (LIHTC), the national Housing Trust Fund, and Virginia's new Housing Opportunity Tax Credit[22], which are administered by the state, all provide optional points for projects built to green building standards. Alexandria's Green Building Policy, instituted in 2019, also establishes minimum green building practices for new development and renovations. While not equivalent to the healthy home level of the NHHS, these standards, which include LEED, EarthCraft, and Enterprise Green Communities Criteria, have healthy housing practices embedded in their energy and environmental objectives.

Another important element of preserving affordability and maintaining community diversity is providing moderate- to low-income residents (including seniors) the assistance they may need to repair or upgrade their homes so they can remain in the community and/or age safely at home. Federal programs such as the Weatherization Assistance Program (WAP), which is administered by Virginia using local agencies like Community Housing Partners in Alexandria, provide energy efficiency (EE) and health and safety (H&S) measures that lower utility costs and improve the well-being and health of residents. Virginia's WAP guidelines for expenditures on health and safety measures are in keeping with the minimum allowable threshold indicated by the U.S. Department of Energy (DOE), the federal agency that oversees WAP. DOE also supported inclusion of additional health measures through its Weatherization Plus Health initiative. Additionally, while state WAP guidelines include multifamily properties, it is unclear as to whether Alexandria's current WAP agency serves multifamily properties as well as single-family properties. Whereas single-family households receive WAP free of charge, multifamily property owners must contribute to the cost of the upgrade. Because of the difficulties associated with outreach to multifamily properties and the related cost-share, few WAP agencies provide services to multifamily properties. However, given the high number of multifamily properties in Alexandria, WAP could be an essential tool to preserve and expand housing affordability while adding additional health and safety to residents' homes.

One of the major indicators of housing health is its affordability. Preservation and renovation of existing housing, in addition to new construction, will be key to the City's ability to provide adequate affordable housing for all its residents.

Two of Alexandria's major utility companies, Dominion Energy and Washington Gas, also provide energy efficiency and weatherization services to Alexandria residents through their assessments and related incentive and rebate programs. While some residents may be aware of these programs, it would behoove the City to ensure contractors as well as eligible renters and owners in both single- and multifamily homes know about these resources to help improve home health and affordability. Use of the utility programs can also help reduce demand for City services and funding.

State and City rehabilitation and upgrade programs, such as Alexandria's Home Rehabilitation Loan Program (HRLP) and Rental Accessibility Modification Program (RAMP) or the state's Rental Unit Accessibility Modification (RUAM) Program also provides crucial low-cost funding to enable residents, especially seniors and disabled

individuals, to make healthy home modifications and repairs that enable low-income residents to remain in the community. In addition to these city and state programs, EcoAction Arlington offers an Energy Masters program that teaches volunteers how to make energy-efficient improvements to affordable housing units. The HRLP is a no-interest loan program that defers loan repayments for 99 years or until either the owner moves or the property is sold, whichever happens first. RAMP provides funding to low- and moderate-income tenants with physical disabilities for modifications to rental housing to make them more accessible. Similarly, RAUM provides funding to tenants with physical disabilities for modifications to rental housing that directly relate to the applicant's disability. These programs provide more accessible rental housing to disabled tenants. Partners such as Rebuilding Together DC-Alexandria and Goodwin House also provide energy assessments and health and energy-efficiency upgrades, contributing to the diversity of the community and benefiting its residents. Rebuilding Together DC-Alexandria provides free home repair and upgrades to low-income seniors, while Goodwin House provides assessments and fee-for-service construction consulting to help residents implement necessary upgrades. Unfortunately, an examination of the HRLP found, on average, only five loans have been distributed annually since 2018. The City may want to investigate how to help more seniors take advantage of these programs and encourage residents to age in place within the community.

Alexandria's 2013 *Housing Master Plan* guides the preservation and expansion of housing opportunity and affordability across the city with the goal of creating housing that is welcoming, safe, healthy, and affordable to households of all incomes, at different life stages, and with different abilities. In the ALL Alexandria resolution, adopted in January 2021, the City resolved to implement and sustain plans, structures, systems, policy efforts, and accountability mechanisms to advance race and social equity. The City's Office of Housing is responsible for coordinating and administering housing-related services and programs and based on NCHH's review and discussions with other City staff, it is very intentional in how it designs housing programs and works with its clients, whether they are residents, nonprofits, developers, or other agencies. The Office of Housing helped initiate and now administers several programs designed to support housing production, maintenance, and rehabilitation, including the City's Housing Trust Fund and the Affordable Housing Set-Aside Program (which primarily comprises affordable units generated through the use of optional zoning incentives for affordable housing). As indicated on the Office of Housing's dashboard, the programs appear to be making a slow but steady dent in the city's need for affordable housing units, which is in line with resident recommendations outlined in the CHIP.

As the majority of affordable rental housing is not subsidized (i.e., it is affordable due to its location, condition, or owner commitment to maintaining affordability, such as offering a certain number of units with lower rents within a market-rate building), Office of Housing staff have also built relationships with landlords of rental properties (single- and multifamily, market-rate and affordable), making sure the City's programs address their issues and concerns, to ensure their housing meets the residents' needs. This effort has helped create a collegial atmosphere and enabled AHD to reach out to landlords throughout the pandemic to provide health information and resources to their tenants. It may also provide needed access to help build their awareness of healthy housing measures and resources available to help them incorporate measures to their properties. The Office of

NATIONAL HEALTHY HOUSING STANDARD

The National Healthy Housing Standard (NHHS) constitutes minimum performance standards for a safe and healthy home and provides health-based measures to fill gaps where no property maintenance policy exists.

The NHHS consists of seven chapters with requirements and stretch provisions, definitions, and annotations for each provision that explain the public health rationale and provide references for more information. Stretch provisions go above the minimum maintenance code and should be integrated during property renovation, if not sooner. Adoption of stretch provisions are encouraged wherever feasible.

It serves as a complement to the International Property Maintenance Code and other housing policies already in use by local and state governments and federal agencies. The NHHS puts modern public health information into housing code parlance to bridge the health and building code communities. It is written in code language to ease its adoption as well as enable localities to tailor it to local conditions.

Housing's tracking and listings of affordable housing projects and partnerships is also a resource for community residents, providing users not only details on the City of Alexandria's progress toward meeting its affordable housing goals, but its "Renter Resources" page also lists housing availability for low- to moderate-income households seeking affordable housing.

The Alexandria Redevelopment Housing Authority (ARHA) owns and oversees 1,136 units of public and affordable housing, with a focus on providing safe and affordable housing for the city's most vulnerable residents. ARHA also manages the Housing Choice Voucher Program (HCVP). In 2021, just over 1,700 housing choice vouchers were leased out of the 1,936 allocated to the agency by the U.S. Department of Housing and Urban Development.

Given the city's lack of affordable housing, ARHA maintains a waiting list of applicants for its housing and had more than 350 applicants when it last closed the list for lack of housing availability. When the waiting list reopened in 2021, ARHA received more than 45,000 applications, and there are currently over 37,000 waiting. In comparison, ARHA received approximately 13,000 applications upon opening the waitlist in 2011. Ninety percent (90%) of the applicants earned less than $40,000 per year, and 63% earned less than $20,000; more than 90% of the applicants were people of color. Extraordinary efforts are needed: not only to meet the demand for housing[23] but also to ensure that it is safe and healthy and to bridge the social inequities caused by dearth of affordable housing.

In a move to expand and improve its stock, ARHA has set a goal of converting all of its public housing units to Housing Choice Vouchers within the next 10 years. It recently started the process by applying for Rental Assistance Demonstration (RAD) funds from HUD. The conversion will help ARHA improve the energy efficiency, health, and safety of its housing while also increasing its cash flow, which will help minimize future deferred maintenance decisions, a constant issue every public housing authority encounters. Through the RAD process, ARHA is proposing to convert 220 units across six properties. At least one of these properties may qualify for a RAD/Section 18 blend, which would further increase revenue for ARHA. In addition, the Virginia General Assembly passed a law in 2020 making it illegal for landlords—including those with market-rate properties—to refuse Housing Choice Vouchers. Units that accept Housing Choice Vouchers must meet minimum standards of health and safety. ARHA's efforts combined with this new law should open more options for low- to moderate-income households unable to find quality affordable housing.

The City is implementing many of the types of programs and policies needed to support healthier housing. Additional structures and policies will be required to ensure existing affordable housing is preserved and that moderate- to low-income residents are not displaced. Additionally, as the City explores ways to preserve housing affordability and ensure conditions are safe and healthy, it may want to consider trying to access additional funding through programs specifically designed to support healthy housing, such as those offered through HUD's Office of Lead Hazard Control and Healthy Homes and the CDC's National Center for Environmental Health. The City is also examining a host of options including tax abatements, tax incremental financing (TIFs), and payments in lieu of taxes (PILOTS) from developers.

In examining available programs, NCHH found many of Alexandria's nonprofits are stepping up both to help expand the stock of affordable housing and also improve the health of the city's housing and residents. Nonprofits such as Rebuilding Together, Alexandria Housing Development Corporation, and Community Housing Partners are working either to build new homes or renovate and upgrade existing housing. These partners will be key to any effort AHD undertakes to create a healthy housing coalition in the city or region.

CODE COMPARISON

In addition to reviewing its policies and programs, NCHH used its Code Comparison Tool (CCT) to compare Alexandria's current housing and property maintenance codes—the Virginia Uniform Statewide Building Code (USBC) and the city-specific codes—against the International Property Maintenance Code (IPMC) and core measures of the National Heathy Housing Standard (NHHS) to assess primary codes and provisions that promote resident health and safety. NCHH considered all applicable codes in generating a single codes analysis for the community.

The comparison tool's customized reports identified where the Alexandria's codes are strong as well as where opportunities exist to strengthen them, with scores and recommendations in 12 sections: "Moisture Control,"

“Pest and Waste Management,” “Plumbing and Water Systems,” “Injury Prevention,” “Chemical Hazards—Building Products,” “Chemical Hazards—Other and Noise Hazards,” “Ventilation,” “Heating/Mechanical, “Lighting and Electrical,” “Fire Safety,” “Structural,” and “Occupancy.” Reports for each section include a status rating and identify provisions in the existing local code where provisions were not included (in part or in full), percentage comparisons to the IPMC and the NHHS, and why the provisions are relevant to healthy housing. The reports also include “stretch provisions” for each section. Although the stretch provisions are not included in the final comparison and rating, they can help the City identify specific priority areas and additional opportunities for improvement.

The Code Comparison Tool both identified areas where the USBC and Alexandria’s code align with the NHHS and areas where opportunities exist for improvement. For example, in the “Structural” and “Occupancy” sections, City codes ranked *average* and *strong*, respectively. The structural component codes align with the NHHS on design loads and weathertight requirements, but the CCT also offers opportunities for improvement regarding locks, security, and air sealing. Under “Occupancy,” the codes align with the NHHS on adequate space, ceiling, height, floor area, and others, but there are areas for improvement with respect to minimum space, kitchen provisions, and chemical storage.

Codes ranked *below average* were found in the “Moisture Control,” “Pest Management,” and “Chemical Hazards—Building Products” sections. City codes are aligned with the NHHS in their requirements for weathertight foundations, wood surface treatment, trash accumulation, and holes in foundations or structural components but could be improved by adding provisions that support the use of integrated pest management, investigate and correct the underlying causes of dampness/moisture, and repair mold-related damage. Additionally, while the USBC requires lead-based paint surfaces to be maintained and free of chipping, it does not restrict its application on the interior or exterior of dwellings, nor does it have any provisions for lead in dust or bare soil.

The attached comparison reports from the Code Comparison Tool include model code language and can help Alexandria identify opportunities to protect resident health and safety by refining its codes.

VI. MOVING THE NEEDLE ON HEALTHY HOUSING: RECOMMENDATIONS

Alexandria does a great job collecting and publishing data about the state of health in the city and in promoting activities. The City also makes a great effort to educate and engage residents through surveys and outreach mechanisms used to gain resident feedback to inform policy and program decisions. AHD’s annual CHA includes a comprehensive amount of data, and its related resident survey could be used to help gather and incorporate additional housing data—specifically, conditions linked to health—to help assess how housing conditions are impacting residents’ health. It also appears that existing data collection methods, such as the information collected by codes officials, the 311 system, and the resident survey, could be readily expanded or analyzed to inform and monitor the status of Alexandria’s housing health.

However, many of the City’s resources do not organize data according to race/ethnicity, income, or age. Methods to assign these characteristics to data and collect it should be prioritized, and the City should consider conducting comparative analyses when appropriate to gain insight into where and why disparities exist. For example, geographic-based data, such as flooding reports and code violations, could be compared to the city’s demographic data, which exists down to the block level, to better understand what is happening and (potentially) why in Alexandria’s various communities. Alexandria also collects and tracks minimal data on housing quality. This report outlines several opportunities for Alexandria to begin collecting this data and evaluating these issues.

A smaller gap in the City’s data is the ability to frame housing as a health issue. As the CHIP already identifies housing as a priority to improve health in the community, its data (as well as additional data resources) and its resident survey could be used to help frame how health indicators already being collected (such as asthma) relate to housing. Including this information could build awareness among policymakers and stakeholders and strengthen the case for an initiative focused on healthier housing.

From a programs and policy perspective, both Virginia and the City of Alexandria recognize that housing health is a major issue, as is the need to preserve and improve existing housing. Unfortunately, Alexandria's policies and programs may not be doing enough to bridge the city's income and race divides as moderate- to low-income households continue to struggle, both economically and with their health. The City also needs to improve its monitoring and follow-up of housing-related health issues such as lead, which can have long-lasting impacts on children, especially those from low-income communities. Alexandria also has the opportunity to update its various permitting processes. During the renovation permit application and approval process, the City can add informational language or a verification that contractors are observing lead-safe work practices and complying with EPA's RRP Rule. This could be as simple as adding a check box for verification for contractors or educational language informing residents of RRP and their contractors' obligation to comply. Including such a verification on local permits could help reinforce federal requirements and prioritize lead-safe work practices. In addition to its renovation permits, the Alexandria's demolition ordinance and permit language does not currently include any lead requirements; this is another opportunity for Alexandria to strengthen lead requirements during the permitting process. Finally, given the impact that housing conditions have on health, the City could do a better job integrating its health and housing programs to ensure healthier outcomes are embedded into all housing projects.

LEVERAGING THE ASSETS AND FILLING THE GAPS

Use What's Available: Data Collection and Sourcing

Given the amount of data Alexandria already collects, it may be feasible to expand existing data collection methods or analyze the data differently (such as overlaying data from various sources) to capture a more comprehensive picture of housing health. Resources needed to gather and analyze the data would vary, from simply assigning the task to a specific individual in one of the various departments collecting data to potentially adding additional staff hours or dedicated staff (and funding) to conduct the collection. Although it is unlikely additional tools would be needed to collect data, additional funding may be needed to enable staff to pursue and build relationships with potential partners—such as other agencies, local hospitals, and/or urgent care facilities—who already collect key data. Staff time would also need to be allocated to analyze the data and understand what it reveals; however, as previously noted, programs that support healthier housing earn a high return on their investment.

- **Utilize existing data**. Alexandria already collects some data, which could be further analyzed or compiled to illustrate housing quality issues in the city. The biggest example is the Codes Administration data, which are already being entered in a software program and would simply need to be extracted and analyzed.
- **Include demographic information**. As feasible, all data collected by the City, especially if it begins collecting more housing quality data, should include demographic information to prioritize the identification of disparities. NCHH noted that Alexandria's code enforcement data does not include demographics, nor do several other datasets including 311 calls and flood response. Additionally, even when the data does not lend itself to demographic indicators, the City might want to explore using proxy indicators, such as geographic location, to gather additional information about how certain events impact residents.
- **Explore new partnerships**. Local hospitals and urgent care centers could potentially share data on additional health indicators that the City does not currently document or report, such as pediatric asthma, asthma emergency department utilization, and heat-related mortality, hospitalizations, and emergency department visits. There are numerous ways the data could be used without violating any Health Insurance Portability and Accountability Act (HIPAA) regulations. AHD could overlay or cross-reference the health data with housing and demographic data to determine potential "hot spots" in the community on which to focus efforts and/or investment.
- **Expand existing data collection methods**. One way to gather more data, such as interior housing conditions, might be to use existing customer satisfaction and awareness surveys. For example, Alexandria could add questions about basic housing quality issues to its annual resident survey. The City of Austin, Texas, did this to measure the public's awareness around wildfires cost-effectively when they added additional questions to an annual survey that local utility Austin Energy was already conducting. Closer to home, Maryland's Howard County government conducts an annual renter survey to learn about the quality of their housing, though it is unclear whether the information collected is publicly available.

- **Explore new data collection methods and programs**. While widespread data surveys or inspections can be more difficult to organize, the City could explore ways to collect portions of this data through small pilot programs, partnerships with community organizations, or via its large network of neighborhood associations.

Engage New Partners/Expand Existing Partnerships

The City has numerous partnerships and coalitions in place that could be used to promote healthy housing policies and programs. Existing partnerships could be strengthened and even used to help expand and build new opportunities. These might include the following:

- **Awareness of affordable housing challenges**. Alexandria appears to have a good network of affordable housing nonprofits, many of which have already embraced green building and healthy housing. AHD could work with the Office of Housing to engage their affordable housing partnerships in healthy housing discussions to determine what barriers and challenges they could encounter in trying to incorporate health and safety measures into their projects.
- **Build allies**. AHD can also work with the Office of Housing to explore ways to build or deepen relationships with organizations like the Northern Virginia Affordable Housing Alliance or statewide groups, such as the Virginia Housing Alliance and HousingForward Virginia. Since these groups are already engaged with local affordable housing providers—and are often interested and working to improve housing quality—they would be natural allies before the Virginia General Assembly, helping to push for needed legislation or serving as a partner or supporter on funding proposals.
- **Bridge gaps between housing and health**. AHD can help organize conversations between affordable housing providers and local healthcare organizations, such as Neighborhood Health Primary Care and Inova, to help them understand how their issue areas affect each other and start identifying ways to work together (for example, identifying health hotspots associated with housing), using their combined resources to address the issues. Entities such as Northern Virginia Health Services Coalition, Community Foundation for Northern Virginia, and Northern Virginia Health Foundation and academic institutions (Virginia Tech, Northern Virginia Community College, et cetera) could be recruited to help convene partners, collect additional information and data, and nurture local healthy housing efforts.
- **Landlord education and communication**. Alexandria rental properties are assigned to a rental district, and the Office of Housing maintains a list of the properties for its annual rental property inspections. AHD used this list periodically during the COVID-19 pandemic to share important health and safety information with landlords and property owners/managers. AHD could continue this work with the Office of Housing beyond “crisis mode” and establish a regular opportunity for landlords to meet with AHD and Housing. While the Office of Housing already offers mediation services between landlords and tenants, outreach with AHD could be a proactive step toward resolving issues before mediation becomes necessary. Regular meetings would allow landlords and the local apartment association to discuss issues and concerns relating to their tenants or implementation of city policies. Such meetings could also enable the City to brief the groups regarding new programs, policies, incentives, and grant opportunities to help them improve their properties.

As AHD looks to engage new and existing partners, as well as understand how to work with them, the department may also want to consider what each of the partners/partnering organizations brings to the table and work to leverage their contribution.

Build upon Existing Policies and Initiatives

Alexandria may want to strengthen healthier housing objectives in the broad, long-term goals articulated via the City’s *Environmental Action Plan 2040*, *Housing Master Plan*, and the *Children and Youth Master Plan*. These plans and initiatives may be used as a guide to establish specific objectives for healthier housing and could include activities such as:

- **Educate residents**. Use the City’s sustainability outreach events to educate community residents about incorporating healthy housing measures in their own homes.

- **Coordinate healthy housing**. Build upon recommendations included in the City's five-year CHIP—specifically, Strategy E, Tactic 2, which calls for creating a coordinated healthy housing program. This gap analysis is one of the first steps identified under Strategy E to support high-quality, healthy, and energy-efficient housing.
- **Create a working group**. Create a formal "healthy housing working group" comprised of City staff from various health/housing agencies and departments to work with various stakeholders: public health professionals, homebuilders and developers, and health and housing nonprofits.
- **Develop policies that consider housing and health**. Develop healthy housing policies using a process similar to what Alexandria used to incorporate green building into its developments. The policies could be guided by results from the comparison of Alexandria's codes to the NHHS; where codes already align with the NHHS, the City could consider adopting NHHS stretch provisions to improve upon the current code.
- **Create audience-specific policies and programs**. The City may also want to ensure policies and programs benefit both single- and multifamily housing, as 59% of the Alexandria's occupied housing units are in properties with five or more units. Moreover, given that 57% of the city's residents are renters, Alexandria may want to consider specific policies and programs to benefit renters, especially low-income renters, who have little recourse when they find themselves in unhealthy housing conditions and who also suffer higher rates of health disparities.
- **Incentivize healthier housing**. Incentivize adoption of healthy housing policies/measures or require them on projects receiving City funding. Alexandria may be limited by Dillon rules as to what it can require developers and contractors to do beyond complying with the Virginia USBC, but the rules do not limit its ability to provide incentives. The City is currently considering several funding mechanisms and tactics to incentive affordable housing development using tools such as tax abatements, tax increment financing (TIF), and payment in lieu of taxes (PILOT). If any of these measures are adopted, associated requirements should include health and safety measures to ensure the health of the housing being renovated or developed.
- **Make public housing healthier**. Ensure healthy housing measures are included in public housing units being redeveloped by ARHA.

Additionally, as the City of Alexandria considers housing and health, it may also want to ensure that policies and programs benefit both single- and multifamily housing, as 59% of the city's occupied housing units are contained within properties of five units or more. Moreover, given 57% of the city's residents are renters, Alexandria may want to consider policies and programs specifically geared to benefit renters, especially low-income renters who have little recourse when they find themselves in unhealthy housing conditions.

HEALTHY HOUSING AUDIENCES, STAKEHOLDERS, AND BENEFICIARIES

The audience for this report and its resources range from elected officials, code inspectors, and landlords to residents and healthcare providers. It also includes funders and foundations interested in how housing impacts health. **Every audience and stakeholder will have one main question: How does healthy housing impact them?** The answer may be different for each of group; in some cases, it will be personal. Healthier housing improves the structural soundness of your property; it protects and improves your constituents' health; it reduces your child's asthma; it mitigates housing complaints; it lowers your operating and maintenance costs; it helps residents age-in-place; it reduces the number of patients you treat with preventable housing-related issues, such as asthma attacks or lead poisoning; it creates living-wage jobs; it raises your property value; it reduces utility and housing costs; it lowers healthcare costs; it is a good return on investment.

Every audience and stakeholder will have one main question: How does healthy housing impact them?

BENEFICIARIES

NCHH identified potential beneficiaries of Alexandria's current policies and programs in the matrix. Although there might be a different impact on renters versus owners based on the program itself (some programs are only for renters, others only for owners), NCHH recognizes nearly everyone in a household benefitted from healthy housing upgrades, even if the upgrade was intended to target a single group, such as seniors or children. Beneficiaries could also extend beyond the immediate household as many of the energy-saving measures recommended under healthier housing are the same (or similar) green building measures employed to help reduce carbon emissions.

NCHH attempted to identify potential beneficiaries of local policies, programs, and resources in the policy matrix along with who might be concerned if specific programs or policies were implemented. Since increasing costs and/or imposing additional regulations often creates opposition, developing avenues to reduce concerns or any additional effort or time needed to implement a measure can minimize the opposition. Initial incentives and additional funding to support new or increased healthy housing requirements goes a long way, as does community engagement and buy-in. AHD's community engagement and efforts to ensure the CHIP and CHA included resident input will also help build support for healthier programs and policies. Furthermore, once policies and procedures are embedded into ongoing development activities, opposition often fades, and they become standard practices. A great example is when codes started to require indoor plumbing. At the time, many landlords and developers worried the requirement result in the end of affordable housing; but few people in the U.S. today can imagine or tolerate living in a home with no flushing toilet or running water. And a major health benefit of this code modernization was the eradication of cholera.

OVERCOMING BARRIERS: "NOTHING WORTH HAVING COMES EASY"

Creating jurisdictional codes and policies in a Dillon state nearly always involves overcoming some barriers, but it may also provide some opportunities. If there are beneficial codes or policies that Alexandria would like to enact in support of creating healthier housing for its residents, the City may need to work with the General Assembly to address codes or develop incentives to promote practices without regulatory measures. While this presents a potential roadblock, it could also help Alexandria build awareness of promising practices used elsewhere without specific codes and/or policies in place, as well as the opportunity to build stronger relationships with its allies, such as other local jurisdictions and housing/health providers interested in pursuing similar legislation. As far as can be surmised, although there are at least two statewide housing organizations—the Virginia Housing Alliance and HousingForward Virginia—there appear to be no coalitions geared specifically toward healthy housing. However, the statewide housing organizations could potentially be leveraged (at minimum) to help create an internal affinity group focused on health and housing.

Collecting and tracking accurate data is almost always difficult. Alexandria already captures an enormous wealth of data; the key hurdles may be identifying who controls the data and whether it is or could be available at the level of granularity needed to assess housing quality accurately. Where data does not exist but mechanisms are in place to capture it, the questions are how or if it is possible to utilize what is already in place and how to ensure the collected data depicts conditions accurately. The City should also make sure that any efforts to engage residents in providing feedback on policies or priorities are equitable; this may include providing multiple ways to share feedback (online, via phone, mailers, and in-person forums) and ensuring that residents have access to a method that works for them. For example, 12% of Alexandrians speak English less than "very well"; however, all responses in the 2020 resident survey were returned in English. This might indicate that those who are not comfortable answering the survey in English are less able to complete and return it. Additionally, according to CDC's Environmental Justice Dashboard, 5,383 households in Alexandria don't have access to the internet. The resident survey is mailed to households with instructions for those who prefer to answer it online, but those who want to complete the survey in Spanish, Amharic, or Arabic can *only* do so online.

Lack of resources and funding is one of the most common barriers new initiatives encounter. Alexandria may be able to overcome these hurdles by accessing state and local money becoming available through the American Rescue Plan Act (ARPA) and/or a concerted effort to submit proposals for HUD health-related grants. Numerous foundations, increasingly aware of the strong connection between housing and health, are stepping up to fund local efforts to support healthier housing. Cities are not the only entities that suffer from lack of resources and funding: Homeowners, landlords, and multifamily property owners/managers also struggle. Many homeowners, landlords, and rental property managers now recognize the benefits that accrue from green building and energy efficiency improvements and will make the necessary investment to upgrade their properties. Unfortunately, some landlords and property managers perceive healthy housing as benefiting only the tenant; dispelling this myth is one of the first steps needed to promote healthier rental housing. Addressing housing issues early helps prevent escalating costs associated with deferred maintenance. Properly maintaining the condition of housing also helps preserve home values and neighborhood stability. However, some owners will need to be encouraged to embrace the idea of improving housing to make it healthier, and incentives from low- or no-cost loans, rebates, and grants to tax abatements may be necessary to stimulate early adoption of healthy housing measures and upgrades.

VII. NEXT STEPS

Launch a Healthy Housing Initiative in Alexandria.

Healthier, affordable housing was identified as one of three community priorities in the recently released Alexandria CHIP, and this gap analysis was one of the first steps recommended to help the community assess what is needed to improve housing conditions. Armed with the information contained in this report, along with the new funding available through the ARPA and a greater focus on health impacts related to housing due to the COVID-19 pandemic, this could be the perfect the time for Alexandria to launch a healthy housing initiative. AHD could consider the following list of steps to move the process forward:

Step 1. Create an internal working group of City agencies who touch housing and health similar to the City's Green Building working group.

Step 2. Identify and convene a meeting of housing and healthcare partners and funders along with impacted residents; work with the group to identify who else should be included.

Step 3. Develop common goals and establish priorities and implementation actions with short- and long-term objectives and milestones, including identifying both internal and external actors who will take the lead on each objective.

A healthy housing initiative could help set the framework to determine what specific measures should be prioritized for Alexandria. The initiative could include various efforts and programs, depending on what each partner and/or stakeholder brings to the discussion as well as what the group decides to prioritize. The initiative could include the following aspects:

- Programs and collaborations to provide housing assessments and collect data to evaluate the condition of the Alexandria's housing. As described above, this might involve increased analysis and use of existing data, efforts to collect new data, and partnerships across programs to share data.
- An education campaign targeted to homeowners, landlords, and tenants to raise awareness of the impact housing has on health, which could guide residents toward resources available from the City and/or its partners for making healthy housing improvements. This could also include information to help all stakeholders understand their rights and responsibilities related to healthy housing.
- Coordination among stakeholders across the housing and health sectors to facilitate and create new programs that help residents identify health hazards in their homes, make home improvements and repairs to correct those defects, and provide services to those affected by healthy housing issues.
- New City policy and program structures to address healthy housing issues long-term. Examples might include creating a dedicated healthy homes office to ensure all residents live in affordable, quality, healthy housing or undertaking changes to code enforcement processes.
- New funding sources. This might include pursuing both private funding (e.g., local foundations willing to invest in healthy housing work) and public funding sources (e.g., federal funding opportunities for which Alexandria could apply or take advantage).
- Statewide policy changes. As previously recognized, Alexandria is limited by Virginia's status as a Dillon state, but local stakeholders could work to identify and coordinate with others across the state to pursue policy revisions that would allow Alexandria to implement changes locally or improve healthy housing statewide.
- Continual evaluation of Alexandria's healthy housing efforts by (1) identifying residents' healthy housing priorities, (2) encouraging community feedback on the City's efforts, and (3) building on the City's progress.

Appendix A provides resources and tools that can serve as a starting place for many of these efforts.

VIII. ENDNOTES

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National Center for
HEALTHY HOUSING

This report was prepared by the National Center for Healthy Housing for the Alexandria Health Department, City of Alexandria, VA.

November 2021

APPENDIX A: TOOLS AND RESOURCES

While not a complete list, AHD may find the following tools and resources available from the National Center for Healthy Housing (NCHH) helpful as it considers how to promote and implement healthy housing in Alexandria.

GENERAL INFORMATION

State of Healthy Housing: This comprehensive analysis provides information about key housing conditions related to health, with rankings for 53 metropolitan areas in the U.S., including the District of Columbia (many of the findings reported for the District also apply to Alexandria as it is part of the Washington, DC MSA).

Healthy housing fact sheets: United States, Virginia

Community Health Workers: Delivering Home-Based Asthma Services

INCENTIVE AND FUNDING OPPORTUNITIES

The American Rescue Plan Act: A New Opportunity for Healthy Homes Funding

Financing and Funding Healthier Housing

Incentivizing Healthy Housing

CODES AND STANDARDS

National Healthy Housing Standard (NHHS)

Technical Assistance for Code Transformation Innovation Collaborative (TACTIC)

IMPROVING PROACTIVE RENTAL INSPECTIONS

Proactive Rental Inspections

How to Make Proactive Rental Inspection Effective

LEAD SAFETY PERMITS, CERTIFICATES, AND ENFORCEMENT

How Municipalities Can Leverage RRP Requirements to Advance Lead Poisoning Prevention

Opportunities to Strengthen Local Lead-Related Policies: RRP Certification

Opportunities to Strengthen Local Lead-Related Policies: Model Ordinance Language to Address Lead Risks in Existing Demolition Requirements

EMERGENCY PREPAREDNESS AND RESPONSE

A Field Guide for Flooded Home Cleanup

Floods and Healthy Housing

TOOLS AND DATA

National Healthy Housing Standard: General

Code Comparison Tool

Housing Code Tools

Accessing Data

APPENDIX B: ALEXANDRIA DATA MATRIX

Table 1a. Alexandria Data Matrix I State of Housing Stock

Yes = data found | Partial = partial data found | No = no data found

STATE OF HOUSING STOCK

Indicator	Current Availability Status	Feasibility (0-3 numerical scale: none(0), weak(1), moderate(2), strong(3))	Relevancy	Potential Impact	Readability	Most Recent Year Available	Data Point	Frequency of update	Smallest geographic unit available	Other geographic units	Publicly available	Online?	Estimate?	Format	Data source/ home	Breakdown available across race/ ethnicity?	Breakdown available across income levels?	Breakdown available across age groups?	Issues Addressed: Affordability	Lead	Respiratory Conditions	Injury Prevention	Emergency Preparedness	Structural/ systems	Mold/ moisture
Age of housing in Alexandria	Yes	3	2.6	3	3	2020		Annual	House level	Census tract, block	Partial	Partial	No	Owned by city/ limited available online	City building data	Yes (block level)	Yes (block level)	No		X					
Rental vs homeowner breakdown	Yes	3	3	2.6	3	2020		Annual	Census Tract	City	Partial	Partial	Yes (ACS)	Owned by city/ limited available online	ACS	Yes (block level)	Yes (block level)	No							
Rental vs homeowner by age of housing	Yes	3	2.6	2.3	2.6	2020		Annual	City		Partial	Partial	Yes (ACS)	Owned by city/ limited available online	ACS	Yes (block level)	Yes (block level)	No		X					
Single vs multifamily by age of housing	Yes	3	2.6	2.3	3	2020		Annual	House level	Census tract, block	Partial	Partial	No	Owned by city/ limited available online	City building data	Yes (block level)	Yes (block level)	No		X					
Housing density	Yes	2.6	1.6	1.6	2.6	2020		Annual	House level	Census tract, block	Partial	Partial	No	Owned by city/ limited available online	City building data	Yes (block level)	Yes (block level)	No							
Housing units with more people than rooms	Yes	2.6	2	1.6	3	2020		Annual	Census Tract	City	Partial	Partial	Yes (ACS)	Owned by city/ limited available online	ACS	Yes (block level)	Yes (block level)	No							
Homes with lead paint hazards	No	1.3	3	3	2.3															X					
Average starting level of lead dust in city	Partial	1	2	1.6	1.3	2015-2021	LHD paper records for EBLLs > 25	By case	Address		No	No	No	Paper copies	Local lead program	Yes	Yes	Yes		X					
Lead pipes (public side)	Yes	2.3	2.6	2.6	2.3	Current	About 2,070	N/A	House level	City	Yes	No	No	Owned by water authority	American Water	No	No	No		X					
Lead pipes (private side)	Partial	1.3	2.3	2.3	1	Expected in next 3 years								Owned by water authority	American Water					X					
Average starting water lead levels	No	1.6	2	1.6	1.6															X					
Homes with major exterior issues (roof, windows, gutters, foundation)	No	1.6	2.3	2.3	2.3																	X		X	X
Water leakage during the last 12 months	No	1.3	3	2.6	2.6																				X
Roofing problems	No	1.6	2.3	2.3	2.3																			X	
Siding problems	No	2	1.6	1.6	2																			X	
Window problems/broken windows	No	2	2.6	2.3	2.6																			X	
Foundation problems	No	1.3	1.6	1.6	2																			X	
Fire escape	No	1.6	2	2	3																		X		
Homes with major interior issues (flooring, stairs, walls)	No	1.3	2.6	2.3	2.3																	X		X	X
Holes in floors	No	1.3	1.6	3	2.3																	X		X	
Open cracks or holes	No	1.3	3	3	2.3																			X	
Broken plaster or peeling paint	No	1.3	2.6	2.6	2.3															X				X	
Signs of pests (mice, cockroaches, rats, bedbugs)	No	1.3	2.6	3	2.6																X				
Visible mold/moisture	No	1.3	3	3	2.6																				X
Homes with major systems issues (HVAC, plumbing, electrical)	No	1	2.6	2.6	2.6																			X	X
Water supply stoppage	No	2	1.6	3	2																			X	
Flush toilet breakdowns	No	1.3	1.6	2	1.6																			X	
Lack of flush toilets	Partial	1.6	2.3	2.6	2.3	2020	143 units w/o complete plumbing facilities	Annual	House level	Census tract, block	Partial	Partial	No	Owned by city/ limited available online	Census	Yes (block level)	Yes (block level)	No						X	
Sewage disposal breakdown	No	1.6	2	2.3	2.3																			X	
Plumbing breakdown/unmet maintenance needs	No	1.3	1.3	1.6	1.6																			X	
Heating equipment breakdown	No	1.3	2.3	2.3	2.3																			X	
Room heater without flue	No	1	2.3	3	1.5																			X	
Exposed wiring in unit	No	1.3	2.6	3	2.6																	X			
Rooms without working electric wall outlets	No	1.3	1	1	1																			X	

Table 1a. Alexandria Data Matrix | State of Housing Stock (continued)

Yes = data found | Partial = partial data found | No = no data found

STATE OF HOUSING STOCK

Indicator	Current Availability Status	Feasibility (0-3 numerical scale: none(0), weak(1), moderate(2), strong(3))	Relevancy	Potential Impact	Readability	Most Recent Year Available	Data Point	Frequency of update	Smallest geographic unit available	Other geographic units	Publicly available	Online?	Estimate?	Format	Data source/ home	Breakdown available across race/ ethnicity?	Breakdown available across income levels?	Breakdown available across age groups?	Issues Addressed: Affordability	Lead	Respiratory Conditions	Injury Prevention	Emergency Preparedness	Structural/ systems	Mold/ moisture
Clothes drier/furnace exhaust not venting properly	No	1.3	2	2.3	2.6																			X	
Unable to maintain thermal comfort (68 degrees)	No	1.3	2	2.3	2.3																			X	X
Lacking kitchen facilities	Yes	1.3	1.3	1.3	2.3	2020	348 units w/o complete kitchen facilities	Annual	House level	Census tract, block	Partial	Partial	No	Owned by city/ limited available online	Census	Yes (block level)	Yes (block level)	No						X	
Fire sprinklers inoperable (if applicable)	No	1.6	2.6	2.6	2.3																		X		
Homes with minor interior issues	No	2.6	2.6	2.6	2.6															X	X	X			
Lacking smoke detector	No	2.3	3	3	3																X	X			
Lacking CO detector	No	2.3	2.6	2.6	3																X	X			
Smoke/CO detector is nonfunctional or expired	No	2.3	3	3	2.3																X	X			
Insufficient lighting	No	1.3	2	2	1.6																X				
Trip hazards	No	1.3	2.6	2.3	2.3																X				
Childproofing/child play area hazards	No	1.3	2.3	1.6	2.3																	X			
Homes with unfenced pools	No	2.6	2	2	2.3																X				
Accessible housing	No	2	2.3	2.3	2														X						
Homes at risk for radon/radon tests	Yes	1.6	2.6	3	2.6	2017, 2008-2017	410 pre-mitigation tests from labs 2008-2017, 30 over 4; 33 tests 2017; 45.2 homes per 10,000 tested	Annual?	County	None	Yes	Yes	No	Portal/ downloadable	EPHT	No	No	No		X					
Radon mitigation systems installed	Partial	1.6	2.6	1	2.3	2008-2017	13 post-mitigation tests	Nine year range, seems updated annually?	County	None	Yes	Yes	Yes	Portal/ downloadable	EPHT	No	No	No		X					
Air pollution (outdoor)	Yes	2.6	2.6	2.3	2.3	Various	In 2016, 3 days modeled above ozone level; 9.5 cancer risk per million	Various	County (census tract for smoke)		Yes	Yes		Portal/ downloadable	EPHT	No	No	No		X					
Indoor air quality	No	0.6	2.6	2.3	1.6															X					
Vulnerability to flooding	Yes	3	3	2.6	2.3	2022 (prelim.)	N/A (maps)	Periodically	Watershed	Block/house (view map)	Yes	Yes	N/A	PDFs	Flood Action Team	No	No	No				X			
Housing within flood hazard area	Yes	3	3	3	2.6	2011	2,723 homes, 5,217 people, 10.03% of square miles	Unknown	County	No	Yes	Yes	No	Portal/ downloadable	EPHT	No	No	No				X			
Experienced previous flooding events	Yes	3	3	3	2.3	2019	14 extreme preciptation days	Annual	Census Tract	County	Yes	Yes	No	Portal/ downloadable	EPHT	No	No	No				X			
Noise complaints/excessive noise	Partial	2.3	2	1.3	2.6	2021	2,365 complaints to Reagan Natl since 1/1/20	Current	Zipcode		Yes	Yes	Yes												
Proximity to highways	Yes	3	2.3	2	2	Unkown	heatmap, not data	Unknown	Block		Yes	Yes	Yes (%)	Portal	EJScreen	Yes	Yes	Yes							
Proximity to industrial areas	Partial	2.3	2	1.6	2.3	Unkown	heatmap, not data	Unknown	Block		Yes	Yes	Yes (%)	Portal	EJScreen	Yes	Yes	Yes							

Table 1b. Alexandria Data Matrix | Health of Population

Yes = data found | Partial = partial data found | No = no data found

HEALTH OF POPULATION

Indicator	Current Availability Status	Feasibility (0-3 numerical scale: none(0), weak(1), moderate(2), strong(3))	Relevancy	Potential Impact	Readability	Most Recent Year Available	Data Point	Frequency of update	Smallest geographic unit available	Other geographic units	Publicly available	Online?	Estimate?	Format	Data source/ home	Breakdown available across race/ ethnicity?	Breakdown available across income levels?	Breakdown available across age groups?	Issues Addressed: Affordability	Lead	Respiratory Conditions	Injury Prevention	Emergency Preparedness	Structural/ systems	Mold/ moisture
Population paying over 30% of income on rent	Y	2.6	2.6	2.6	2.6	2019	City 42%	Annual	Census Tract	ZIP, region, city, county	Yes	Yes	No	Portal	HMA	No	No	Yes; 14-24 significantly worse	X						
Poor or fair health	Y	2.3	2.3	1.6	2.3	2018	City 13%	Annual	County		Yes	Yes	Yes (%)	Portal	CHR	No	No	No							
Poor physical health days	Y	2.3	2.6	2.6	2.6	2018	City 8.9%	Annual	Census Tract	ZIP, region, city, county	Yes	Yes	Yes (%)	Portal	HMA	No	No	No							
Poor mental health days	Y	2.3	2.3	2.3	2.3	2018	City 11.4%	Annual	Census Tract	ZIP, region, city, county	Yes	Yes	Yes (%)	Portal	HMA	No	No	No							
Preventable hospital stays	P	1.6	2.6	2.3	2.6	2015	City 40.9/1,000 medicare	Annual	County	Region	Yes	Yes	Yes (per 10,000)	Portal	HMA	Yes	No	No							
Children tested for BLL	Y	3	3	3	3	2019	2,916 tested in 2019	Annual	City	Possibly ZIP	Not yet	Not yet	No	dashboard under construction	VDOH	Yes (may be incomplete)	Yes (may be incomplete)	Yes (may be incomplete)		X					
Children with EBLLs	Y	3	3	3	2.6	2019	105 people with at least one confirmed EBLL in 2019	Annual	City	Possibly ZIP	Not yet	Not yet	No	dashboard under construction	VDOH	Yes (may be incomplete)	Yes (may be incomplete)	Yes (may be incomplete)		X					
People (children and adults) with current asthma/asthma symptoms	P	2	2.6	2.3	2.6	2018	City 8.3% (adult)	Annual	Census Tract	ZIP, region, city, county	Yes	Yes	Yes (%)	Portal	HMA	No	No	No			X				
Hospitalizaton/ED utilization for asthma attacks	P	2.3	3	2.6	2.6	2017-2019 adult, 2012-2014 pediatric	City 6.3/10,000 adult, 2/10,000 pediatric	Annual (adult only)	Zipcode	ZIP, region	Yes	Yes	Yes (per 10,000)	Portal	HMA	Yes; Black/ African American significantly worse	No	Yes; 65-84 and 85+ significantly worse			X				
COPD/other respiratory conditions	P	2	3	2.6	2.6	2018	City 4.3% COPD	Annual	Census Tract	ZIP, region, city, county	Yes	Yes	Yes (%)	Portal	HMA	Hospitalizat. only; Black/ African American significantly worse	No	Hospitalizat. only; 65-84 and 85+ significantly worse			X				
Lung cancer	Y	2	1.6	1.3	2.3	2013-2017	City 35.5/100,000	Annual	County		Yes	Yes	Yes (per 10,000)	Portal	HMA	Yes	No	No			X				
Mortality, injuries, and incidents for falls among older adults	P	1.6	2.6	2.3	2.3	2017-2019	City 51.8/10,000 hospitalizations	Annual	Zipcode	Region, county	Yes	Yes	Yes (per 10,000)	Portal	HMA	Yes	No	Yes; 65-84 and 85+ significantly worse				X			
Injury deaths	Y	1.6	2.3	2.3	2.3	2017-2019	City 25.5/100,000	Annual	County		Yes	Yes	Yes (per 10,000)	Portal	HMA	Yes	No	No				X			
CO poisoning	N	2	2.6	2.3	2.3	State level																X			
Low birthweight	Y	2	1.6	1.3	1.6	2018	City 6.5% low, 1.2% very low	Annual	County	Region	Yes	Yes	Yes (%)	Portal	HMA	Yes	No	N/A							
Birth defects	N	2	1.3	1.3	1.3	State level																			
SIDS	N	1.6	1	1	1.3	State level																			
Adult smoking	Y	2	3	3	2.6	2018	City 13.4%	Annual	Census Tract	ZIP, region, city, county	Yes	Yes	Yes (%)	Portal	HMA	No	No	No			X				
Insufficient sleep	Y	1.6	1	1	1.3	2018	City 35.5%	Biannual	Census Tract	ZIP, region, city, county	Yes	Yes	Yes (%)	Portal	HMA	No	No	No							
Access to exercise opportunities	Y	2.6	1.6	1.6	2.3	2020	City 100%	Annual	County		Yes	Yes	Yes (%)	Portal	HMA	No	No	No							
Heat-related mortality, hospitalizations, ED visits	N	2.3	2.6	3	2.6	State level																			
Feel safe in your neighborhood	Y	2.3	1.6	1.6	2.3	2020	95% general, 81% feel safe or somewhat safe at night	Annual	City		Yes	Yes	Yes	Portal and PDF	Resident survey	Yes	Yes	Yes							

Yes = data found | Partial = partial data found | No = no data found

Table 1c. Alexandria Data Matrix | Local Capacity

LOCAL CAPACITY

Indicator	Current Availability Status	Feasibility (0-3 numerical scale: none(0), weak(1), moderate(2), strong(3))	Relevancy	Potential Impact	Readability	Most Recent Year Available	Data Point	Frequency of update	Smallest geographic unit available	Other geographic units	Publicly available	Online?	Estimate?	Format	Data source/ home	Breakdown available across race/ ethnicity?	Breakdown available across income levels?	Breakdown available across age groups?	Issues Addressed: Affordability	Lead	Respiratory Conditions	Injury Prevention	Emergency Preparedness	Structural/ systems	Mold/moisture
Number of complaints to city of housing conditions/code violations	Y	3	2.6	2.6	3	2021	539 complaint inspections FYTD	Monthly	City	Possibly census tract	Yes	Yes	No	PDF	Code Administr.	No	No	No				X		X	X
Response times to code complaints	Y	3	2.6	2.6	2.3	2020	94% of inspections completed on date requested	Annual	City	Possibly census tract	Yes	Yes	Yes (%)	Portal	Key indicators dashboard	No	No	No				X		X	X
Breakdown of code complaints/violations by type of issue	Y	3	3	3	3	2021	26 rodent complaint inspections FYTD	Monthly	City	Possibly census tract	No	No	No	Internal data	Code Administr.	No	No	No		X	X	X		X	X
Average number of violations per property	P	2.3	2.3	2.3	2.3	2021				Possibly census tract	No	No		Internal data	Code Administr.	No	No	No				X		X	X
Number of city inspections annually	Y	3	2	2	2.3	2021	1,275 property maintenance inspections FYTD; 5,099 in 2020	Monthly	City	Possibly census tract	Yes	Yes	No	PDF	Code Administr.	No	No	No				X		X	X
Percentage of housing in compliance or served by codes department	P	2.6	2.3	2.3	1.6	2021	2706 property maintenance cases opened in 2020	Monthly	City	Possibly census tract	Yes	Yes	Yes (infer.)	PDF/Portal	Key indicators dashboard	No	No	No				X		X	X
Number of homes brought into compliance via codes process	P	2.6	2.6	2.6	2.3	2021		Monthly	City	Possibly census tract	No	No	No	Internal data	Code Administr.	No	No	No				X		X	X
Length of time/actions needed to bring issues into compliance	P	2.6	2.3	2.3	1.6	2021		Monthly	City	Possibly census tract	No	No	No	Internal data	Code Administr.	No	No	No				X		X	X
Ability to conduct outreach to landlords	N	2.3	2.3	2.3	1.6																				
Service requests via city 311 system	Y	2.3	1.3	1	2.3	2021	85% of service requests closed within their service level agreement	Hourly	City	N/A	Partial	Partial	No	Internal data	Salesforce/ Tableau	No	No	No			X	X	X	X	X
Flooding complaints/issues	Y	2.3	2.6	2.6	2.3	2021	810 requests over 4 events 2019-21	Event based	heatmap	City	Yes heatmap	Yes	No	Internal/posted online for city council meetings	Flood Action Team	No (but can overlay on neighborhood data)	No (but can overlay on neighborhood data)	No (but can overlay on neighborhood data)					X		
Flood prevention activities	Y	2.6	2.3	2	2	2021	June 2021: 349 storm inlets inspected, 76 cleaned; 647 lf of storm pipe inspected, 14 storm structures repaired throughout	Monthly	City		Yes	Yes	No	E-newsletter	Flood Action Team	No	No	No					X		
Average cost of lead remediation in city	N	1.6	2.3	2.3	1		Statewide average, no projects in Alexandria													X					
Average cost of lead service line replacement in city	Y	1.6	2	2	1.6		$4-5,000 for utility side, $5,000 customer side							Internal data	American Water					X					
Number of renovations needing lead safe work practices	N	2	2.3	2.3	2.3															X					
RRP/LSWP certified contractors available in city	P	2.3	2.3	2.3	2		4 contractors available statewide per state program	One time	Statewide		No	No	No		DHCD	N/A	N/A	N/A		X					
Homes tested for lead paint hazards	P	1.6	2.6	2.6	2.6	2015-2021	Not available, paper copies	By case	Address		No	No	No	Paper copies	Local lead program	Yes	Yes	Yes		X					
Number of people served by in-home asthma services (if applicable)	N	1.6	2.6	2.3	2.3																X				
Homes and populations served by repair programs	Y	2.6	2.3	2	2	2021	32 HRLP and 12 RAMP since 2015	Annual	City	Presumably address	Yes	Partial	No	Portal, annual HUD reports	Office of Housing	Yes	Yes	No				X		X	X
Homes with lead hazards remediated (if applicable)	N	1.6	2.6	2.3	2.3															X					
Homes and populations served by lead programs (if applicable)	N	2.3	2.6	2.3	2.3															X					

APPENDIX C: ALEXANDRIA POLICY AND RESOURCES MATRIX

Table 2. Alexandria Policy and Resources Matrix

							Potential Primary Beneficiaries				Potential Pushback						Sustainability Over Time	Jurisdiction/Provider Source					
Policies/Resources/Programs *(Individual policies/resources/programs below are hyperlinked to online sources for additional detail.)*			Current Status	Relevance	Feasibility	Potential Impact	Time to Implement	Renters	Homeowners	Children	Seniors	Homeowners	Landlords	Builders	Civic Associations/ HOAs	Contractors	Other		Federal	State	Municipal	Private Sector	Non Profit/ Community Organization	Other
INSPECTION AND/OR CERTIFICATE	Proactive Rental Inspection		●	●	●	●	in place	X					X					●			X			
	Rental Registry		◉	◉	●	◉	1-2 years	X					X					●			X	X		X
	Certificate of Occupancy		●	●	●	●	in place	X	X				X	X		X		●			X			
CODES / STANDARDS	National Healthy Housing Standard			●	◉	●	5+ years	X	X				X	X		X	X	●		X	X			
	Energy Codes and Policies		●	●	●	◉	in place	X	X					X		X		●		X	X			
	Green Building Policy		●	●	●	◉	in place	X	X					X		X		●			X			
	RESIDENTIAL	Thermal comfort	◉	●	◉	●	5+ years	X	X				X	X		X		●		X				
		Radon-Resistant building techniques		●	◉	◉	5+ years	X	X				X	X		X		●		X				
		Flooding	●	●	●	●	5+ years	X	X				X	X		X		●		X	X			
		Installation & Maintenance of smoke alarms	●	●	●	●	in place	X	X				X			X	X				X			
		Installation & Maintenance of carbon monoxide alarms		●	●	●	1-2 years	X	X				X			X	X			X				
HEALTH AND HOUSING CONDITIONS	LEAD	Blood Lead Level (BLL) Testing	●	●	●	●	in place			X								●		X	X			X
		Elevated Blood Lead Level Investigations	●	●	●	●	in place			X							X	●			X			
		Water Sampling (lead risk assessment)	◉	◉	◉	◉	1-2 years			X		X	X					◉			X			
		Lead Abatement and Remediation	●	●	●	●	in place			X		X	X			X		●		X				
	WATER	Quality Monitoring	●	●	●	●	in place	X	X	X	X													X
		Lead Service Line Replacement	●	◉	●	◉	in place			X		X	X	X		X		●		X	X	X		
	MOLD	Mold Remediation	●	●	●	●	in place	X					X							X				
		Rent Withholding/Ecrow	●	◉	●	◉	in place	X					X					◉		X				
	ASBESTOS	Asbestos Remediation	●	●	●	●	in place	X	X			X	X	X		X		●			X			
	PERMITTING PROCESSES	Renovation, Repair, and Painting (RRP) Rule		●	●	◉	1-2 years			X		X	X	X		X		●			X			
		Lead Safe Work Practices		●	◉	◉	1-2 years			X			X	X		X		●			X			
		Demolition - Asbestos Requirements		●	●	◉	1-2 years	X	X					X		X		●			X			
LAWS / DISCLOSURES	Tenant and eviction protection policy		● ○	●	◉	●	1-2 years	X					X					◉	X	X	X		X	
	Mold		●	●	●	●	in place	X					X					●		X				
	Lead		◉	●	◉	◉	3-5 years			X		X	X	X			X	●	X	X				
	Radon			●	◉	◉	3-5 years		X			X	X	X			X	●		X				
	Asbetos		◉	●	●	●	3-5 years	X	X			X	X					●		X				
RENT ASSIST	Communities of Opportunity Program (COP)		●	●	●	◉	in place	X							X			●		X		X		
	Rental Assistance Program		● ○	●	◉	●	1-2 years	X					X				X	●		X	X			
DEVELOP / REHAB	Virginia Housing Opportunity Tax Credit			◉	●	◉	3-5 years	X							X			●		X		X		
	Low-Income Housing Tax Credit (LIHTC)		●	◉	●	◉	in place	X									X	●	X			X	X	
	National Housing Trust Fund		●	◉	●	◉	in place	X	X						X			●	X			X	X	
	Inclusionary Zoning		◉	◉	◉	●	1-2 years	X	X					X				◉			X			

● Already in Place, Highly Relevant, Highly Feasible, High Impact, Stable Over Time

◉ Partially in Place, Somewhat Relevant, Somewhat Feasible, Moderate Impact, Moderately Stable Over Time

○ Temporarily in Place

X Potential Beneficiary, Source of Pushback, Jurisdiction/Provider Source

Not in Place, Not Relevant, Not Feasible, No Potential Impact, Not Stable Over Time, Not a Potential Beneficiary, Source of Pushback, Jurisdiction/Provider Source

Table 2. Alexandria Policy and Resources Matrix (continued)

							Potential Primary Beneficiaries				Potential Pushback						Sustainability Over Time	Jurisdiction/Provider Source					
Policies/Resources/Programs *(Individual policies/resources/programs below are hyperlinked to online sources for additional detail.)*			Current Status	Relevance	Feasibility	Potential Impact	Time to Implement	Renters	Homeowners	Children	Seniors	Homeowners	Landlords	Builders	Civic Associations/ HOAs	Contractors	Other		Federal	State	Municipal	Private Sector	Non Profit/ Community Organization	Other
ENERGY	Low Income Home Energy Assistance Program (LIHEAP)		●	●	●	●	in place	X	X					X		X		●	X		X			
ENERGY	Weatherization Assistance Program (WAP)		●	●	●	●	in place	X	X					X		X		●					X	
ENERGY	RESIDENTIAL ASSESS / RETROFIT PROGRAMS (UTILITIES)	Dominion Energy (Single-Family)	●	●	●	●	in place	X	X								X	◉				X		
ENERGY	RESIDENTIAL ASSESS / RETROFIT PROGRAMS (UTILITIES)	Washington Gas (Income-Eligible Only) (Single-Family)	●	●	●	●	in place	X	X								X	◉				X	X	
ENERGY	RESIDENTIAL ASSESS / RETROFIT PROGRAMS (UTILITIES)	Washington Gas (Income-Eligible Only) (Multi-Family)	●	●	●	◉	in place	X									X	◉				X		
ENERGY	RESIDENTIAL ASSESS / RETROFIT PROGRAMS (UTILITIES)	Dominion Energy (Multi-Family)	●	●	●	◉	in place	X									X	◉				X		
ENERGY	Commerical Property Assessed Clean Energy (C-PACE)		●	●	●	◉	in place	X										●			X	X		
HEALTHY HOUSING REPAIR	Home Rehabilitation Loan Program (Owner-Occupied)		●	●	●	●	in place		X									◉			X			
HEALTHY HOUSING REPAIR	Rental Assessibility Modification Program (RAMP)		●	●	●	●	in place	X					X					◉			X			
HEALTHY HOUSING REPAIR	Rental Unit Accessibility Modification (RUAM) Program		●	●	●	●	in place	X					X					◉		X				
ASTHMA	Home-Based Visiting Program			●	◉	●	1-2 years			X							X	◉		X	X		X	
CBOS, OUTREACH, EDUCATION	Healthier Housing		●	◉	●	◉	in place	X	X	X	X							◉			X		X	
CBOS, OUTREACH, EDUCATION	Alexandria Fire Department Health/Community Paramedic Program		●	◉	●	◉	in place				X							◉			X		X	
CBOS, OUTREACH, EDUCATION	Energy Efficiency		●	◉	●	◉	in place	X	X									◉			X		X	
CBOS, OUTREACH, EDUCATION	Community Partner Training		◉	◉	●	◉	1-2 years	X	X									◉			X	X	X	X
FUNDING OPPORTUNITIES	American Rescue Plan Act (ARPA)		○	●	◉	●	1-2 years	X	X	X	X						X	◉	X					
FUNDING OPPORTUNITIES	Community Development Block Grant (CDBG)		●	●	◉	●	1-2 years	X	X								X	◉			X			
FUNDING OPPORTUNITIES	HOME Investment Partnerships Program		●	●	●	●	1-2 years	X	X								X	◉			X			
FUNDING OPPORTUNITIES	HEALTHY HOUSING / LEAD	Children's Health Insurance Program (CHIP) Health Services Initiatives (HSIs)		◉	◉	●	1-2 years			X							X	◉		X				
FUNDING OPPORTUNITIES	HEALTHY HOUSING / LEAD	Lead Elimination Assistance Program (LEAP)	●	◉	◉	◉	1-2 years		X	X								◉		X				
FUNDING OPPORTUNITIES	HEALTHY HOUSING / LEAD	Lead Hazard Reduction (LHR) Program		●	●	●	1-2 years			X										X				
FUNDING OPPORTUNITIES	HEALTHY HOUSING / LEAD	HUD Lead Hazard Control/Healthy Housing Grants		●	●	◉	1-2 years			X							X	◉		X				
FUNDING OPPORTUNITIES	HEALTHY HOUSING / LEAD	HUD Healthy Housing Production Grants		●	●	◉	1-2 years			X	X							◉	X					
FUNDING OPPORTUNITIES	HEALTHY HOUSING / LEAD	CDC Childhood Lead Poisoning Prevention Program		●	◉	◉	3-5 years			X								◉	X					
FUNDING OPPORTUNITIES	HEALTHY HOUSING / LEAD	CDC National Asthma Control Program		●	◉	◉	3-5 years			X								◉	X					
FUNDING OPPORTUNITIES	HEALTHY HOUSING / LEAD	CDC Environmental Health Tracking Network		●	◉	◉	3-5 years			X	X							◉	X					
FUNDING OPPORTUNITIES	AFFORDABLE HOUSING	City Housing Master Plan	●	●	◉	●	in place	X	X									◉			X	X		
FUNDING OPPORTUNITIES	AFFORDABLE HOUSING	Local Housing Trust Funds	●	●	◉	●	in place	X	X									◉		X	X	X		
FUNDING OPPORTUNITIES	AFFORDABLE HOUSING	Rental Assistance Demonstration Program (RAD)		●	◉	●	5+ years	X							X			◉	X		X			
FUNDING OPPORTUNITIES	AFFORDABLE HOUSING	Housing Choice Voucher program	●	●	●	◉	in place	X					X					◉	X					
FUNDING OPPORTUNITIES	AFFORDABLE HOUSING	Homelessness Assistance Grants	◉	●	●	◉	1-2 years	X	X									◉			X			
FUNDING OPPORTUNITIES	AFFORDABLE HOUSING	HUD Choice Neighborhood Program			◉		N/A	X					X					◉			X		X	X

● Already in Place, Highly Relevant, Highly Feasible, High Impact, Stable Over Time

◉ Partially in Place, Somewhat Relevant, Somewhat Feasible, Moderate Impact, Moderately Stable Over Time

○ Temporarily in Place

X Potential Beneficiary, Source of Pushback, Jurisdiction/Provider Source

Not in Place, Not Relevant, Not Feasible, No Potential Impact, Not Stable Over Time, Not a Potential Beneficiary, Source of Pushback, Jurisdiction/Provider Source