



Shaping Healthy Affordable Housing through Policy, Design, Place

RESEARCH BRIEF | DECEMBER 2020

SHERRY AHRENTZEN, PHD, UNIVERSITY OF FLORIDA

LYNNE DEARBORN, PHD, UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN

Our homes have a powerful impact on our physical and mental health, as evidenced in a growing body of research.¹ Data from the National Center for Healthy Housing concluded that the home is one of the most dangerous places for American families. Nearly 40 percent of residences have at least one health or safety hazard, costing the US billions annually in treatments for asthma, injuries, lung cancer, and other health problems.² Research also shows that many neighborhood environmental characteristics and physical access to services affect resident health in terms of morbidity; obesity and related chronic health outcomes; diet and physical activity; mental health conditions such as stress, anxiety, and depression; and social well-being emanating from social interaction, social cohesion, and social capital.³ The COVID-19 pandemic adds new dimensions to the built environment's intersections with mental and physical health that renew attention to indoor air quality, fixtures and materials, and safe opportunities to recreate and socialize indoors and outdoors.⁴ Research has revealed four pathways linking health and housing: home stability, financial burdens, safety and housing quality, and certain neighborhood characteristics.⁵ Our research focused on the latter two.

The COVID-19 pandemic adds new dimensions to the built environment's intersections with mental and physical health that renew attention to indoor air quality, fixtures and materials, and safe opportunities to recreate and socialize indoors and outdoors.

We investigated the extent to which the Low-Income Housing Tax Credit (LIHTC) — the nation's largest source of funding for development and preservation of affordable rental housing — helps shape a healthier affordable housing stock.

Every year, each state's housing finance agency (HFA) publishes documents — known as the Qualified Allocation Plan (QAP) — that outline the state's criteria and eligibility requirements for receiving a LIHTC allocation. Past research shows that some states have used the QAP to encourage green building practices, facilitate access to public transit, or reshape poverty concentrations in neighborhoods (see appendix 1 for more details of LIHTC and QAP).⁶

We asked the following: could the QAP also be used to promote a healthier affordable housing stock? We conducted a comprehensive content analysis of healthy housing (HH) provisions in states' QAPs and affiliated documents. The 59 HH provisions we identified include housing quality (i.e.,

building design and construction) and locational factors that can contribute to occupant health—particularly asthma and respiratory ailments, injury and accessibility, toxicity-related problems, cardiovascular disease, diabetes, obesity, mental health conditions such as depression and anxiety, and sleep and circadian rhythms, as well as supportive services. We identified whether the provision was required (i.e., needed to be included in an applicant's proposal to receive a tax credit award) or incentivized (i.e., not required, but if included, an application scored points taken into account when deciding which proposals would receive tax credit awards). We also conducted a survey of state housing agencies and performed in-depth case studies of two states (for further details on methodology, see appendix 2).

This brief summarizes what is working well and what is more challenging in states' efforts to advance healthy housing provisions in the QAP and overall LIHTC process. It concludes with several related policy implications.



1. States incentivize locating affordable housing in neighborhoods with amenities and services that enhance healthier living, but they rarely require proximity to these community amenities.

Of the most frequent healthy housing provisions either required or incentivized by states, four were location related:

- 86 percent of states identified proximity to essential goods and services such as supermarkets, retail, and medical care;
- 80 percent included proximity to public transportation;
- 74 percent identified indoor and outdoor activity spaces for children and adults; and
- 66 percent included preservation of and access to open space.

Yet this ranking dramatically drops when we consider only required provisions (see figure 1).

When the LIHTC award process is highly competitive — that is, many more applications than tax credit awards are available — incentivized location-based amenities are likely to be included in awarded applications as developers strive to achieve the highest score possible. However, there may be a tendency to omit these amenities in less competitive situations. And in certain communities — rural areas, particularly — such amenities may simply not be available.

2. Healthy housing provisions aligned with energy efficiency practices and mechanical systems are among the most frequently required HH provisions in states' QAPs.

Energy efficiency provisions (e.g., size of heating or cooling systems, insulation standards, building performance requirements) are required by more than one-third of states in their QAPs (and may possibly be higher in instances where states require a green building certification, GBC). These energy-saving measures are often enacted for long-term operational cost savings but also can have human health benefits.

Other frequently required HH provisions include accessibility features, environmental or lead remediation practices, low-cost materials such as low or no-Volatile Organic Compound (VOC) paint, or features that are now standard practice in much new construction, such as hard-wired smoke detectors (figure 1).

3. Extensive coverage of housing quality provisions for improving indoor air quality and eliminating toxic substances are rarely embedded in states' QAPs.

From the 59 items on our Healthy Housing checklist, we prioritized 19 criteria critical to vulnerable adults' health and 10 particularly impactful to children's respiratory health

FIGURE 1
Percentage of States Requiring and Incentivizing Healthy Housing Provisions, Top Most Frequent

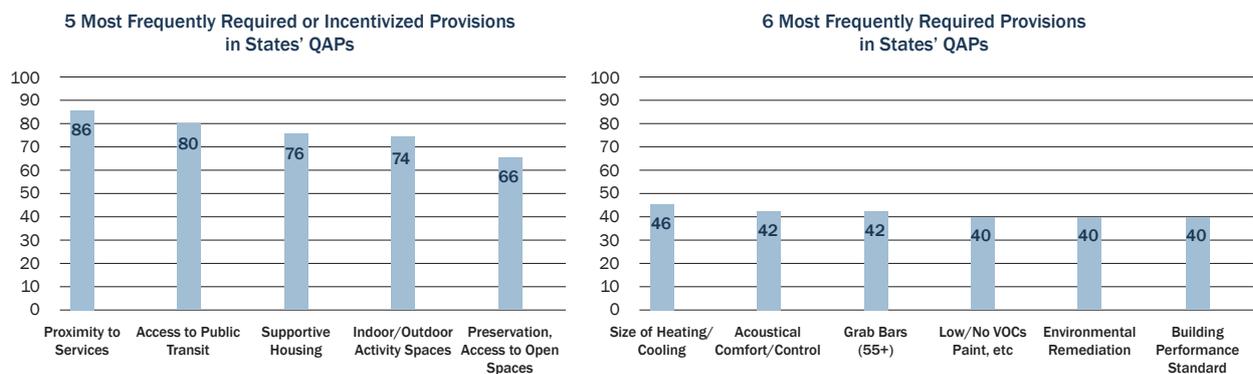
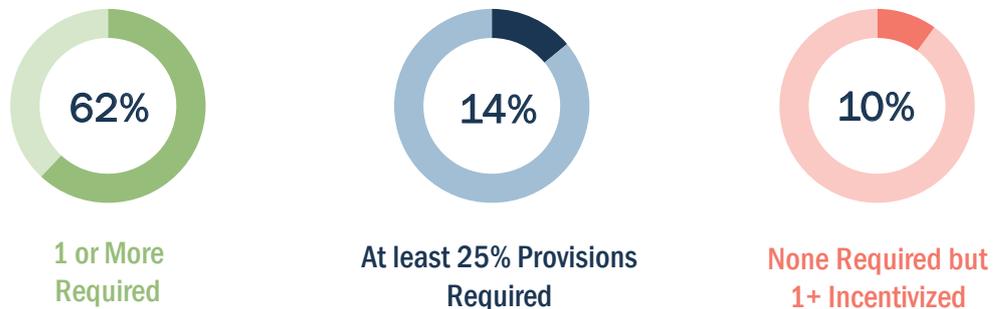




FIGURE 2

Percent of States' QAPs with Required High Priority Healthy Housing Provisions for Children's Health



and exposure to toxicity (see appendix 3). Asthma is the number one chronic disease among children.⁷ According to the CDC, from 2008 to 2013 the annual economic cost of asthma was more than \$80 billion, including medical costs and loss of work and school days.⁸ Research shows the most common indoor asthma triggers derive from building materials and conditions that allow moisture, mold, dust mites, and pests to fester.

Of the 10 high-priority provisions for children, the majority of state QAPs required at least one. Most often they were for lead mitigation or ventilation standards.

But requiring more than one of these priority provisions was uncommon (see figure 2). Only 14 percent of states required at least one-quarter of these 10 criteria. Rarely required were asthma-free materials (4 percent of states); moisture-preventive backing materials for tubs and showers (2 percent); and permanent walk-off mats or similar accommodations (2 percent) — features for which building costs are relatively minimal. Integrated pest management⁹ was also rarely (2 percent) required.

Of the 10 high-priority [healthy housing] provisions for vulnerable children, the majority of state QAPs required at least one. Most often they were for lead mitigation or ventilation standards. But requiring more than one of these priority provisions was uncommon.

4. Universal design appears in many state QAPs.

Accessibility features that go beyond federal mandates such as the Fair Housing Amendment Act frequently appeared in QAPs. Indeed, some QAPs stipulate adherence to specific state policy documents of housing accessibility standards. These documents generally reference universal design practices, whereby all products, buildings, and outdoor or exterior spaces must be designed to be usable to the greatest extent possible by everyone, regardless of age, ability, or status in life.¹⁰ Although no state adhered to comprehensive inclusion of universal design practices, we considered states with building or outdoor accessibility criteria that went beyond federal mandates as reflecting a universal design approach. In our universal design, we also included criteria for “visitability”: a zero-step entrance, doorways of 32-inch width, and a wheelchair-accessible bathroom on the main floor.¹¹

Forty percent of states required some universal design approach in new construction or rehabilitation; 60 percent of states either required or incentivized such. Often these requirements or incentives pertained to particular types of housing, especially new construction. Sometimes the universal design provision was applicable only to housing intended for adults ages 55 and older. Ironically, the potency of universal design is diminished when stipulated in housing units only for older adults. When universal design is applied to homes regardless of resident age or ability, those residences become suitable to a larger range of potential residents and enable occupants



to entertain regardless of visitors' physical abilities. They also allow opportunities for people to age in place and remain in their homes longer. Given that so many states have already innovated beyond federal guidelines for accessibility, the future looks promising for a more comprehensive approach to universal design designated in all affordable housing stock.

Forty percent of states required some universal design approach in new construction or rehabilitation; 60 percent of states either required or incentivized such.

5. A large number of states attempt to reduce noise impacts on health but fewer address lighting qualities related to health.

Acoustical comfort and control measures — such as controls over mechanical or HVAC noise, sound barriers, or housing quality measures for external noise intrusion — was the second most frequently required HH provision, with 42 percent of state QAPs requiring some form of acoustical control or comfort provision. A World Health Organization analysis of 34 studies indicated noise exposure is linked to children's poorer reading comprehension, long-term memory, and standardized test scores.¹²

On the other hand, lighting for health (compared with reduction in energy usage) was less frequently included, even though important research demonstrates that natural light contributes to circadian rhythms and enhances sleep and other behavioral or health issues for populations who spend a significant amount of daytime in their homes, such as the frail, older adults, infants, and preschool age children.^{13,14} Our analyses showed that 28 percent of states either required or incentivized provisions for light at night (i.e., no external sources create light at night in a sleeping area); 14 percent for electric light glare control; 4 percent

for right to light (i.e., easement to receive a reasonable level of natural light from the sky to the windows in their buildings); and none for circadian lighting design. Specified window-to-floor area ratios for day lighting in living spaces was addressed only by 4 percent of states. Artificial lighting specifications to ensure visual acuity was addressed in 10 percent of state QAPs.

6. States that require or incentivize green building certifications (GBCs) also include healthy housing provisions in the QAP.

In our analyses, we grouped states into one of three categories: (1) those that required or incentivized in their QAPs either of two GBCs known for incorporating a prominent number of HH provisions (i.e., Enterprise, LEED); (2) those that required or incentivized other national or state-focused GBCs; and (3) those that did not require or incentivize any GBC. Contrary to our initial expectations, states falling into the latter group — no GBC whatsoever — had a much lower number of our 19 high-priority HH provisions for vulnerable adults in their QAPs compared with those that did incorporate GBCs (see figure 3). Instead, it appears that states valuing GBC also seek to incorporate healthy housing provisions in their QAPs.

On a related note, only one-third of states reported in our survey that they considered sufficient level of healthy housing provisions when choosing a GBC to include in their QAPs, and that consideration ranked last of all possible factors for choosing a GBC posed in our survey (see figure 4). Similarly, although the majority (68 percent) of state agencies believed that incentivizing or mandating use of these GBCs with many healthy housing provisions was an effective means of strengthening healthy housing provisions in their LIHTC program, 65 percent also believed that including HH provisions in their QAP, or affiliated state-level policy documents, can also be effective. Slightly less than half (41 percent) believed collaborating with state health agencies to include specific mandates or scored options was an effective approach.

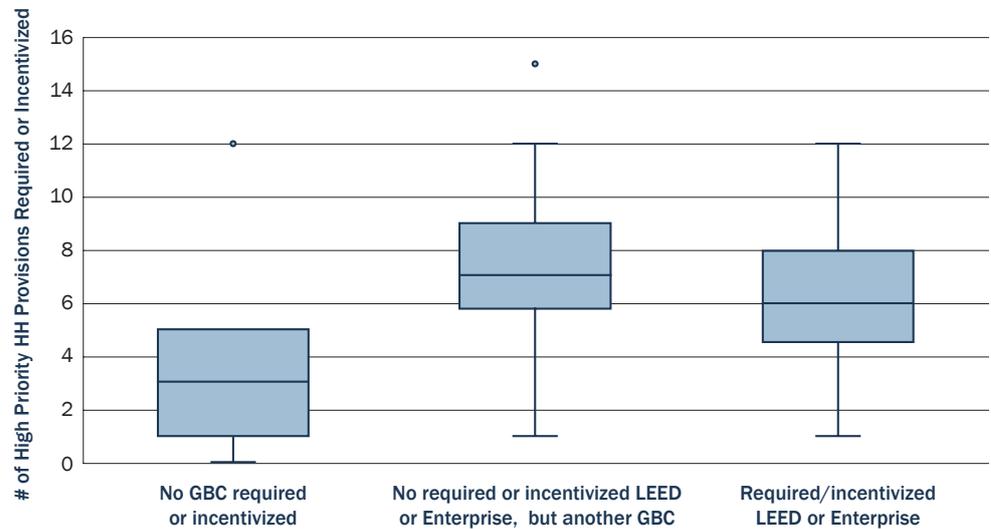
i Living Building Challenge is a national GBC with significant HH provisions. But because of states' low frequency of incentivizing it in 2016 (and none mandating), we did not include it in the first grouping. Also, four states mandated a state-specific GBC. Because these were state-specific and not applicable to all states, we placed them within the second GBC grouping, even though it is possible that some have meaningful levels of HH provisions. Also, it is possible that states that did not include a GBC requirement in their QAP had other statewide mechanisms stipulating GBC for construction or rehabilitation. This is something we did not pursue in our analyses here. Our findings and conclusions should be assessed in light of these methodological constraints.

ii We identified similar findings when examining the 10 high-priority HH provisions related to children's health.



FIGURE 3

Boxplot of Number of High Priority Healthy Housing Provisions (for Vulnerable Adults) in QAP by Type of Green Building Certification in QAP



7. Nearly half of the housing agencies completing our survey think the most effective way to initiate healthy housing provisions in LIHTC is from agency staff, staff knowledge, and staff members’ advocacy of healthy housing provisions.

Agency staff may be the linchpin in advancing healthy housing provisions. Their knowledge may derive from a major episodic event, such as the aftermath of Katrina. Or it may emanate from a growing awareness of the connections between health and the built environment until it reaches, as one of our interview respondents claimed, a “tipping point” when agencies finally take action.

Our case study interviewees mentioned how important it was for agency staff to have research evidence that demonstrated the effectiveness of implementing specific housing quality criteria, particularly in terms of cost-health benefit. The issue of cost was repeatedly raised. In our surveys, more than half of housing agencies claimed additional construction costs as the primary obstacle to strengthening HH provisions in the LIHTC process (figure 5). To agency staff, having the evidence to demonstrate return on investment is essential in moving forward.

FIGURE 4

Reasons for Choosing Specific Green Building Certification for QAP, according to Percent of HFAs (n=34)

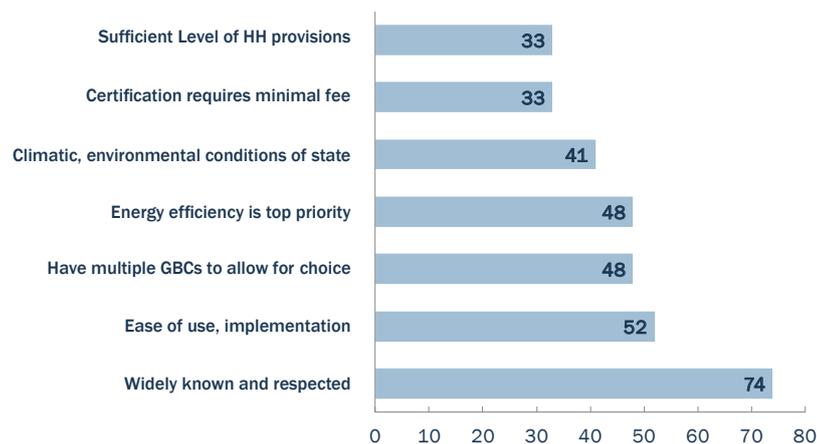
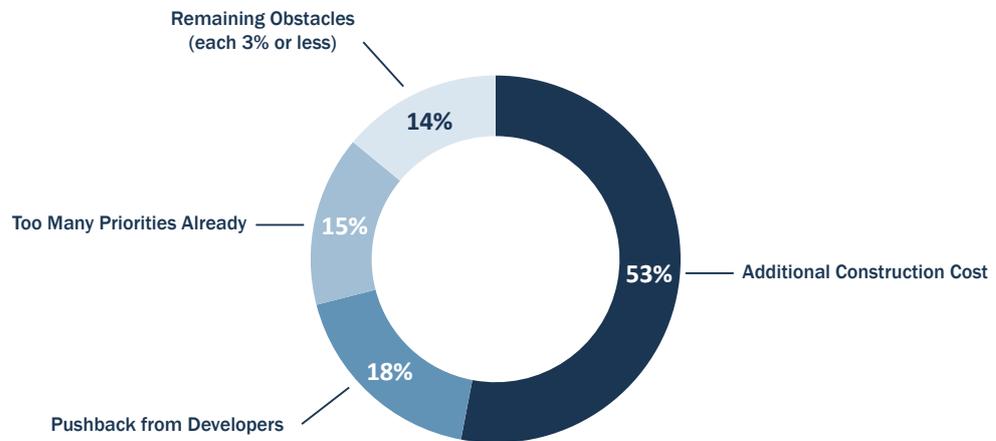




FIGURE 5

What HFAs consider as their #1 Obstacle to Including or Strengthening HH Provisions in LIHTC (n=34)



Economic analyses on the health impact of building practices in housing do exist.¹⁵ To spur further cost-effectiveness research, housing agencies may need to express — and perhaps even prioritize — specific health outcomes for individuals and communities, beyond a generalized sense of wellness or quality of life. Working together with public health agencies may be a critical component to finding solutions that target and support human health in housing and the ways in which state agencies can advance that for affordable housing residents.

Our case study interviewees mentioned how important it was for agency staff to have research evidence that demonstrated the effectiveness of implementing specific housing quality criteria, particularly in terms of cost-health benefit.

Policy Implications of the Research

Heighten focus on indoor air quality (IAQ): Indoor air quality, air flow, and ventilation constitute a top health consideration for HFA staff responding to our survey, yet we found a limited range of low-cost design and construction provisions to improve IAQ included in states' QAPs, such as those affecting humidification of indoor air. Emerging research on COVID-19 further emphasizes the importance of incorporating broader aspects of *not only IAQ but also indoor environmental quality as well, such as sanitized entryways.*

Partner with state public health officials to develop QAPs: HFA staff believe working with public health agencies is an effective means to include specific mandates or scored options in QAPs. Our case studies suggest some states may already collaborate with public health specialists to address supportive housing for specific vulnerable populations such as older adults or chronically homeless individuals. Yet we believe that expanding collaborations to state public health officials with environmental health expertise can underpin a more holistic approach to incorporate healthy housing criteria in QAPs.

Prioritize health concerns that QAP criteria address: We hear from everyone: we can't do everything, so what should we focus on? One approach is to identify one or two key health concerns most pertinent to a specific target population and embed a comprehensive set of provisions in the QAP to address that issue. Many states, for example, suffer from adverse consequences of high rates of childhood asthma. But a complex challenge such as this demands not only a single mechanical system solution but rather myriad design and construction provisions for indoor air quality (e.g., permanent walk-off mats to reduce dust), toxic substance elimination, and moisture control (e.g., moisture-preventive backing materials for tubs and showers). States that have crafted sets of universal design guidelines addressing broad accessibility and visitability are exemplars of how this might be accomplished.



Mandate GBCs with robust healthy building criteria or healthy building certifications (HBCs): HFA staff felt that incentivizing or mandating use of GBCs with many healthy housing provisions was an effective way to strengthen healthy housing provisions in their QAP. Yet survey responses revealed the level of healthy housing provisions was not prominent among the reasons for

incorporating a specific GBC. Recent updates to several GBCs have incorporated additional healthy building criteria. States should seek opportunities to include GBCs in the QAP mandates that are aligned with WELL, Fitwel, the National Healthy Housing Standard, or other HBCs, or that have been augmented with healthy building criteria.

Support for this research was provided by the Robert Wood Johnson Foundation's Policies for Action program. The views expressed here do not necessarily reflect the views of the Foundation.

For further information, contact either Dr. Ahrentzen, Shimberg Center for Housing Studies, University of Florida (ahrentzen@ufl.edu), or Dr. Dearborn (dearborn@illinois.edu), The Illinois School of Architecture, University of Illinois Urbana-Champaign. We are grateful to the research assistants on this project, Dr. Arezou Sadoughi and Mr. Ali Momen-Heravi, members of our advisory team—Casius Pealer, Nancy Muller, Ingrid Gould Ellen, Gina Ciganik, and Holly Holtzen—and several anonymous reviewers.



REFERENCES

1. Dannenberg, A., Frumkin, H. & Jackson, R. (Eds.). (2011). *Making Healthy Places: Designing and Building for Health, Well-being and Sustainability*. Washington, DC: Island Press; Frumkin, H., Frank, L. & Jackson, R. (2004). *Urban Sprawl and Public Health: Designing, Planning and Building for Healthy Communities*. Washington, DC: Island Press; Parrott, K.R., & Atilas, J.H. (2018). "Home Environments and Health." In K.B. Anacker, A.T. Carswell, S.D. Kirby, & K.R. Tremblay, eds. *Introduction to Housing*. Second edition. Athens, GA: University of Georgia Press; World Health Organization. (2017). *WHO Housing and Health Guidelines*. Geneva: World Health Organization; National League of Cities. (2018). *Intersections Between Housing and Health*. Retrieved from <http://www.nationalcivicleague.org/wp-content/uploads/2018/06/HHH-Backgrounder-FINAL.pdf>.
2. National Center for Healthy Housing. (2019). *United States 2019 Healthy Housing Fact Sheet*. Retrieved from https://nchh.org/resource-library/fact-sheet_state-healthy-housing_usa.pdf.
3. Dannenberg, A., Frumkin, H. & Jackson, R. (Eds.). (2011). *Making Healthy Places: Designing and Building for Health, Well-being and Sustainability*; Rollings, K.A., Wells, N.M., & Evans, G.W. (2015). "Measuring Physical Neighborhood Quality Related to Health." *Behavioral Sciences* 5: 190–202.
4. Center for Active Design. (2020). *Research to Action: Building Health for All in the Face of COVID-19*. New York, NY: Center for Active Design.
5. Taylor, L. (2018). "Housing and Health: An Overview of the Literature." *Health Affairs*. Available at <https://www.healthaffairs.org/doi/10.1377/hpb20180313.396577/full/>.
6. Ellen, I. G., Horn, K., Kuai, Y., Pazuniak, R., & Williams, D. (2015). *Effect of QAP Incentives on the Location of LIHTC Properties*. Washington, DC: US Department of Housing and Urban Development. Retrieved from https://www.huduser.gov/portal/publications/mdrt/QAP_Incentives.html; ECP (Enterprise Community Partners). (2015b). *Green Policies Build Green Homes*. Retrieved from <https://www.enterprisecommunity.org/download?fid=6120&nid=3620>; Nedwick, T., & Burnett, K. (2014). *How Can the Low Income Housing Tax Credit Program Most Effectively Be Used to Provide Affordable Rental Housing Near Transit?* Washington, DC, and Bethesda, MD: National Housing Trust and Abt Associates. Retrieved from <http://www.prezcat.org/sites/default/files/How%20Can%20the%20LIHTC%20Program%20Most%20Effectively%20be%20Used%20to%20Provide%20Affordable%20Rental%20Housing%20near%20Transit.pdf>.
7. CDC.gov. (2018). "Asthma | Healthy Schools | CDC." [online] Available at <https://www.cdc.gov/healthyschools/asthma>.
8. Nurmagambetov, T., Kuwahara, R., & Garbe, P. (2018). The economic burden of asthma in the United States, 2008 - 2013. *Annals of the American Thoracic Society*. Retrieved from <https://doi.org/10.1513/AnnalsATS.201703-259OC>.
9. US Department of Housing and Urban Development. (n.d.). *About Integrated Pest Management*. Retrieved from https://www.hud.gov/program_offices/healthy_homes/healthyhomes/ipm.
10. Connell, B., Jones, M., Mace, R., Mueller, J., Mullick, A., Ostroff, E., Sanford, J., Steinfeld, E., Story, M., & Vanderheiden, G. (1997). *The Principles of Universal Design: Version 2.0*. Raleigh, NC: The Center for Universal Design.
11. National Council on Independent Living. (2020). www.visitability.org.
12. Clar, C., & Paunovic, K. (2018). "WHO Environmental Noise Guidelines for the European Region: A Systematic Review on Environmental Noise and Cognition." *International Journal of Environmental Research and Public Health* 15 (2). <https://doi.org/10.3390/ijerph15020379>.



13. Hood, B., Bruck, D., & Kennedy, G. (2004). "Determinants of Sleep Quality in the Healthy Aged: The Role of Physical, Psychological, Circadian and Naturalistic Light Variables." *Age and Ageing* 33:159–165; White, M.D., Ancoli-Israel, S. & Wilson, R.R. (2013). "Senior Living Environments: Evidence-Based Lighting Design Strategies." *HERD: Health Environments Research & Design Journal* 7 (1), 60–78.
14. Boubekri, M. (2008). *Daylighting, Architecture and Health*. New York: Elsevier.
15. Fenwick, E., Macdonald, C., Thomson, H. (2013) Economic analysis of the health impacts of housing improvement studies: A systematic review. *Journal of Epidemiology and Community Health*, 67(10), 835-845.
16. Schwartz, A.F. (2015). *Housing Policy in the United States*. 3rd edition. New York: Routledge.



APPENDIX 1

Low Income Housing Tax Credit Program and Qualified Allocation Plans

*LIHTC is a complex, multifaceted government policy. A full description of the policy and its implementation is beyond the parameters of this research brief. For more information, see the book *Housing Policy in the United States*.¹⁶*

The Low Income Housing Tax Credit (LIHTC) was established by Congress as part of the Tax Reform Act of 1986. LIHTC funds affordable rental housing by providing tax credits to developers for qualified projects. The US Department of Treasury allocates tax credits to each state and a limited number of US territories and cities. Housing finance agencies (HFA) in these states, territories, and cities have broad discretion to shape the program and distribute tax credits to projects according to local needs and priorities they set. Differing for each HFA and changing over time, those selection criteria are published in what are known as Qualified Allocation Plans (QAP): documents that detail the selection criteria and eligibility requirements for competitive awarding of housing tax credits. The criteria can include aspects of property location, tenant population served, building design, construction costs, and more. QAPs include mandatory criteria all funded projects must meet, as well as a scoring system through which proposed housing projects score points based on the number of itemized criteria they fulfill. Tax credits are subsequently awarded to projects that score the most points. A QAP may be regarded as a blueprint or checklist for developers when they design their projects. In many states, there are far more developer applications than there are tax credits to award. As a result, developers often strive to achieve the maximum number of points possible.

Common questions regarding LIHTC include the following:

What is a tax credit? A dollar-for-dollar offset that a taxpayer can subtract from the taxes owed to the federal government. In the case of LIHTC, most developers monetize the credits they receive by selling them to investors or corporations that use them to offset their tax liability. In return, developers receive equity from those corporations to help cover the costs of their affordable rental housing projects. Unlike deductions and exemptions that reduce the amount of taxable income, tax credits reduce the actual amount of tax owed. Corporations with relatively high tax liabilities often seek out tax credits.

Who determines the criteria in a QAP? On an annual or biannual basis, each HFA revises its QAP, which includes various mechanisms (see below) for establishing selection criteria. A QAP might be thought of as a score sheet. HFAs annually review and revise their QAPs and scoring allocation based on constantly evolving housing needs in their states. QAP revisions are open to public review and comment, which purportedly allows representatives from various industries—real estate development, finance, architecture, housing management, and even public health and social services—to push for inclusion of desired criteria.

What mechanisms in the QAP guide allocation decisions? For most HFAs, there are three. Also referred to as mandates, threshold requirements are minimum standards a housing proposal must meet. Proposals that do not meet these threshold requirements are not considered for funding. Set-asides allow HFAs to reserve a portion of their tax credits for particular types of proposals, for example, housing for people with special needs or in rural areas. Federal law requires that every HFA set aside 10 percent of their tax credit authority for nonprofit-sponsored developments. Stated preferences (also referred to as incentivized or optional criteria) are criteria that are not mandates but incentivized through a weighted scoring system, allocating numerical points to each criterion and scoring each developer's proposal based on the number of points covered. In this manner, developments achieving all threshold requirements can be ranked against each other by the number of points their proposals score. HFAs thus have the ability to prioritize criteria of highest importance by assigning greater numbers of points relative to others.



APPENDIX 2

Methodology

The research study employed three methodologies: (1) content analysis of all states' 2016 QAPs; (2) survey of key HFA staff; and (3) focused interviews of HFA staff and representatives from other relevant agencies or organizations in two states.

1. CONTENT ANALYSIS OF STATES' QAPS

- » Sampled all 50 states.
- » For each state, gathered 2016 QAPs and all state policy affiliated documents (ADs) referenced in the QAP that included health-related housing quality (i.e., building design and construction) or locational criteria.
- » Developed the Healthy Housing Checklist, consisting of 59 housing quality (i.e., building design and construction) and locational provisions shown as contributing to occupant health in housing. These derived from Enterprise Green Communities Criteria, National Healthy Housing Standard, and WELL for Multifamily. The checklist also contained 10 items for specific GBCs (e.g., Living Building Challenge, LEED for Neighborhood Development), as well as an "other" category that was later reviewed and included as a criterion, when applicable.
- » Research assistants reviewed each state's QAP and ADs for items on the checklist. If located, the item was marked on the checklist as whether it was (1) required (i.e., mandated) or incentivized (i.e., preference); (2) found in the QAP or AD; and (3) specified for a particular group of residents (e.g., seniors), a particular construction type (e.g., renovation), or another parameter.
- » Three research assistants acted as principal coders. Each coder had a designated set of items to cover for all states. The principal investigators reviewed each coder's work; if discrepancies occurred, discussion ensued until resolutions were found.
- » Statistical analyses were undertaken following specific research questions, using Microsoft Excel and IBM SPSS Statistics.

2. SURVEY OF KEY STAFF IN STATE HOUSING FINANCE AGENCIES

- » Identified a key staff member in each state's HFA who was responsible for or significantly involved in developing the QAP and knowledgeable about healthy housing initiatives of the HFA.
- » Questionnaire had 18 fixed-response and open-ended questions that covered five general topics:
 - key health issues for affordable housing residents;
 - green building and healthy housing;
 - healthy housing provisions;
 - incorporating healthy housing provisions in the LIHTC program; and
 - incentives and barriers.
- » Web-based survey (using Qualtrics) was sent to 50 persons (one per state HFA). Response rate was 34 (68 percent). Follow-up emails and calls were made to those not answering first, second, and third solicitations.
- » Statistical analyses were undertaken following specific research questions, using Microsoft Excel and IBM SPSS Statistics.



3. CASE STUDY FOCUSED INTERVIEWS

- » Set criteria for choice of two states to use as case studies:
 - one that mandated a GBC with a significant number of healthy housing provisions (e.g., Enterprise Green Communities Criteria);
 - one that integrated a large number of healthy housing provisions within the QAP (or AD) regardless of whether they require or incentivize GBCs.
- » Informational interviews were conducted with a key informant in the HFA of five candidate states to better understand context. As a result, two were chosen: Louisiana and Ohio.
- » Two interview tiers established for each case study state:
 - first-tier sample consists of state HFA staff and administrators;
 - second-tier sample consists of individuals in other organizations, agencies, or firms that were relevant actors or influencers (e.g., consultants to HFA, developers).
- » Semistructured interview instruments were developed that included questions on following topics:
 - state's leading health issues driving QAP criteria;
 - history of including health- and GBC-focused criteria in state's QAP;
 - key sectors and individuals influencing health- and GBC-focused criteria included; and
 - understandings of costs associated with including or not including health- and GBC-focused criteria.
- » Phone interviews conducted between January and April 2019: six for Louisiana and four for Ohio.
- » Qualitative data analysis conducted on four key deductive themes.



APPENDIX 3

High-Priority Housing Quality and Locational Features Impacting Vulnerable Populations' Health (young children, older adults, frail and disabled adults)

Of the 59 provisions in the healthy housing checklist, 19 were designated as particularly critical (i.e., “high priority”) to the health of vulnerable adult populations (such as frail, disabled, and older adults) and 10 were similarly designated as high priority to the health of children—based on a review of the research literature cited in our references. There was overlap of provisions within these two groups. The provisions include:

1. **Reduce Lead Hazards in pre-1978 buildings (for substantial rehabilitation)**
2. Asthmagen-free materials
3. Building exterior moisture control
4. Environmentally preferable flooring: limited-use carpet
5. Integrated pest management
6. Mechanical systems and components for humidity or moisture control
7. Mold prevention: surfaces
8. Mold prevention: tub and shower enclosures
9. Permanent walk-off mats, track-off system, or design to accommodate
10. Ventilation: meets ASHRAE 62.2-2010, especially bathroom, kitchen exhaust
11. Building performance standard: new construction or rehabilitation
12. Visual acuity in living environments
13. Daylighting fenestration
14. Cameras or lights in parking lot
15. Impact-reducing flooring
16. Accessibility beyond ADA and Fair Housing (can include universal design)
17. Install grab bars inside or outside showers in homes occupied by persons older than 55
18. Proximity to services
19. Access to public transportation
20. Supportive housing or on-site health care, medical or other care services

Key:

Orange: HH provisions affecting children’s health in terms of toxic exposure

Blue: HH provisions affecting health of children and vulnerable adults in terms of asthma and respiratory conditions

Black: HH provisions items affecting health of vulnerable adults for nonrespiratory conditions
